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INCORPORATING NATURAL PLAY SPACES INTO ELEMENTARY
PLAYGROUNDS FOR CHILD DEVELOPMENTAL BENEFITS

by

Ariel L. Wright

A thesis submitted in partial fulfillment
of the requirements for the degree

of

MASTER OF LANDSCAPE ARCHITECTURE AND
ENVIRONMENTAL PLANNING

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ABSTRACT

Incorporating Natural Play Spaces into Elementary Playgrounds for Child Developmental Benefits

by

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Utah State University, 2019

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Department: Landscape Architecture and Environmental Planning

Play environments are crucial to providing developmental opportunities for children and natural playgrounds provide a developmentally rich play environment. This study compared elementary school playgrounds and nature explore classrooms to determine what natural play spaces can be implemented into an elementary school playground for developmental benefits. The playgrounds were evaluated on safety, ADA requirements and what developmental affordances are encouraged through different play components. A Nature Playground Play Spaces List and handouts were developed, and a playground design exploration was conducted as an example for how the play spaces list can be used and to show what benefits can be seen from incorporating the play spaces. The study suggests that there are developmental benefits in incorporating natural play spaces into an elementary school playground and through intentional design and consideration these spaces can provide greater developmental opportunities for children.

(190 pages)

PUBLIC ABSTRACT

Incorporating Natural Play Spaces into Elementary Playground for Child Developmental Benefits

Ariel L. Wright

Play environments are crucial to providing developmental opportunities for children and natural playgrounds are designed to provide a developmentally rich play environment. This study compared elementary school playgrounds and natural playgrounds to determine what natural play spaces can be implemented into an elementary school playground to provide developmental opportunities. The playgrounds were evaluated for meeting safety and ADA requirements and what their play opportunities. A Nature Playground Play Spaces List was developed from the play spaces found in the natural playgrounds and professionally recognized natural playgrounds. A playground redesign was conducted to provide an example for how the play spaces list can be used and to show what benefits can be seen from incorporating the play spaces.

The study suggests that there are developmental benefits in incorporating natural play spaces into an elementary school playground. Intentional design and consideration of the developmental skills can provide greater developmental opportunities for children within their school play environment.

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CHAPTER 1

INTRODUCTION

Background

Play and play environments are crucial to children's development. Over time, children's play environments have changed from unmanaged natural spaces to more constructed and managed spaces, reflecting broader trends of urbanization and the predominance of supervised and organized childhood activities. This shift has affected the developmental opportunities available in children's play environments. Naturalized playgrounds are a more recent development in playground design that reintroduces natural spaces into constructed and managed spaces for children's play, in part to reintroduce the developmental opportunities absent in constructed playgrounds. However, there is little information available regarding what developmental affordances are found in the various natural play spaces introduced within playgrounds. Therefore, the purpose of this study is to identify what developmental affordances are present in natural playgrounds and how these affordances are incorporated in playground design to contribute to child development. Specifically, I intend to identify and propose natural playground play spaces that can incorporate developmental affordances into elementary school playgrounds to support needed developmental opportunities for 5 to 10 year-old children.

The Value of Play and Play Environments

Play is crucial to children's development. In the past, many philosophers and

scholars defined and accepted theories about play that didn't yet recognize the full potential and importance of it. For example, Schiller described play as a way to expend excess energy while Groos defined it as an instinctive action that practices activities that will be essential later in life (Frost & Klein, 1979). As time has passed, researchers have realized that play has a larger impact on learning and development (Johnson & Duffek, 2008). Frost and Klein stated that "Play is the chief vehicle for the development of imagination and intelligence, language, sex role behavior, and perceptual-motor development in infants and young children" (p. 50). Play is an essential part of a child's life, providing opportunities for growth physically, mentally, emotionally, and in other ways (Bruya et al., 1988; Czalczyńska-Podolska, 2014; Fernelius & Christensen, 2017; Frost & Klein, 1979; Sobel, 2008; Theemes, 1999). Through play children are able to learn and grow in ways that influence their development which in turn impacts them over the course of their lives.

Further, it has been recognized that the play environment has a consequence on the growth and developmental activities that occur during a child's play experience (Czalczyńska-Podolska, 2014; Frost & Klein, 1979). Child development studies have found that the environment encourages and provides developmental affordances, which are opportunities for growth provided by an interaction with an environment. A study by Kandler and Zapko-Willmes (2017) visits the nature and nurture debate and found that genetics and the environment are intertwined in impacting developmental growth. Because of the impact that environments have on growth, it is important to ensure that play spaces provide a full range of affordances and opportunities (Czalczyńska-Podolska, 2014; Frost & Klein, 1979). The design of a play environment can influence the presence

of these developmental affordances and the ability to capture and sustain the interest of a child (Theemes, 1999). Elements and features within a playground can encourage different actions that support one or many of the developmental domains (Frost & Klein, 1979). A playground should ensure the presence of each domain to make available all needed benefits for children (Bruya et al., 1988).

Play is important, and the play space becomes influential to the development of a child. Play environments have a crucial role in providing for opportunities that children can engage in activities that promote growth in developmental domains. The play environments need to be diverse in settings, activities, and attractions to provide children with a diverse and optimal play experience.

Historical Change of Play Environments

Over time, children's play environments, particularly school playgrounds, have changed from unmanaged natural spaces to more constructed and managed spaces. Before playgrounds, children played outdoors in the woods, on the street, or in any open space, "As they sought, coopted, and sometimes were granted play spaces, children become connoisseurs of rural fields and woods; city byways and buildings; and indoor bedrooms, attics, and basements..." (Chudacoff, 2008, p. 4).

In America, designated play spaces for children were introduced during the nineteenth century by designers, like Fredrick Law Olmsted, due to social reforms and beliefs of the benefits of nature (Frost, 2009; Johnson & Duffek, 2008) in response to the urban conditions of the industrial revolution. The play spaces were designed to mimic the natural elements of the 'countryside'; open fields, ponds, and sandboxes. These

environments changed as America developed and enhanced the play spaces, reflecting broader trends of the predominance of supervised and organized childhood activities and safety concerns.

Organized and supervised activities like summer programs and athletic programs were introduced around the 1890s (Moore, 2014). The athletic programs took a more prominent stand as they started to promote physical ideals that prepared the youth for things like war (Johnson & Duffek, 2008). In the 1960's John F. Kennedy's administration took an interest in children's fitness and established the National Council on Youth Fitness (John F. Kennedy Presidential Library and Museum, n.d.). This council created a program for schools to use to promote physical fitness which later led to more programs being created. Additionally, school yards were designed to encourage the physical ideals, large motor skills, and included many of the apparatuses that are present in today's playgrounds; swings, monkey bars, and slides to name a few (Johnson & Duffek, 2008). For the purposes of this study, this type of playground is referred to as a traditional or manufactured playground.

As playground equipment became more popular, safety regulations were applied to ensure a safe play environment. Guidelines like the Consumer Product Safety Commission and ASTM were created to provide standards for play equipment and playgrounds (Moore, 2014). The purpose of these guidelines was to reduce injury and manage risk for children on playgrounds, which "national injury statistics show compliant playgrounds to be much safer than other everyday childhood environments" (Natural Learning Initiative & PlayCore Inc, 2009, p. 3). These guidelines have led to adults managing the child's play space even more.

These changes in children's playgrounds have historically produced "uninspired, 'cookie-cutter' playgrounds with diminished play value" (Moore, 2014, p. 98) changing the way that children played. The playground equipment helped promote physical fitness used in sports but lacked ways to develop socially, emotionally, and cognitively (Bruya et al., 1988). By "adhering to safety guidelines" children's play spaces, particularly playgrounds and schoolyards, have "developed into spaces that lack the complexity needed to challenge them and sustain their interest" (Johnson & Duffek, 2008, p. 6). As playgrounds continued to be developed, equipment became more prominent and nature became less prominent. The relationship that children have with their play environment today is different from how children played years ago (Louv, 2008) because of the change from unmanaged natural spaces to more constructed and managed spaces.

Affected Developmental Opportunities

This shift has affected the developmental opportunities available in children's play environments (Kuh, Ponte, & Chau, 2013). There is a lack of play autonomy, opportunities to engage in all the developmental affordances, and a connection with and to the benefits of nature (Crain, 2003; Czalczyńska-Podolska, 2014).

It is the children and not the setting that should decide how to play (Crain, 2003; Kuh et al., 2013). Playgrounds that encourage autonomy show that there are increased levels of fantasy play and social activities (Czalczyńska-Podolska, 2014). Frost and Klein (1979) describe play in such a way that shows the importance of the child's freedom in the play environment, "play is active, play is spontaneous, play is fun, play is purposeless (play has no goals outside of itself), play is self-initiated" (p. 21).

The traditional playground supports specific actions and encourages certain developmental domains (Frost & Klein, 1979; Sandseter, 2009; Zamani, 2016). In a study done by Frost and Strickland they concluded that equipment designed for the large motor skills doesn't provide for all the developmental domains (Bruya et al., 1988). Zamani (2016) compared a manufactured play environment and a natural playground and found that the manufactured playground supported functional play and non-play behaviors and was "perceived as an unexciting, predictable and tedious environment" (p. 172) while the natural playground supported more diverse cognitive play, learning experiences, and understanding of the world. In another study, the children's play patterns were observed before and after a playground was renovated to a natural playground. The results showed that children's play was more dramatic and supportive of developmental opportunities after it became a natural playground (Kuh et al., 2013). Manufactured playgrounds are only supporting a portion of developmental growth and natural spaces can add more diversity to the play experience (Bruya et al., 1988; Czalczyńska-Podolska, 2014; Frost & Klein, 1979).

Nature has been removed from the play space and the vital connection with nature has been lost. Because of the diminished interaction with nature, a child can experience a decreased use of senses, attention difficulties, and higher rates of physical and emotional illness. This is described by Louv (2008) as the nature deficit disorder. Children face this disorder more frequently today and are at risk of the consequences (Moore, 2014; Natural Learning Initiative & PlayCore Inc, 2009). As research has correlated these consequences with the lack of nature, more studies have been done to explore the advantages of nature and these show that there are many benefits: health, academic, and identity are a few

(Bruya et al., 1988; Czalczynska-Podolska, 2014; Frost & Klein, 1979; Natural Learning Initiative & PlayCore Inc, 2009; Theemes, 1999). These benefits are unavailable in the traditional playground because nature has been removed from the environment.

The developmental opportunities available in a play environment have changed with the shifts in playground design; playgrounds lack support for play autonomy, encouragement of developmental domains, and a connection to nature. “We recognize that children do not discard their emotional, social, and cognitive selves during outdoor time. Children playing outside are thinking, feeling, social, physical beings, and their well-being must be respected on the playground” (Theemes, 1999, p. 9). The playground can provide unique experiences for children, but they must be deliberately designed to do so otherwise children will continue to face unfortunate consequences (Natural Learning Initiative & PlayCore Inc, 2009).

Naturalized Playgrounds

In response to the recognized importance that nature has, around the 1980’s designers and academics like Rusty Keeler and Joe L. Frost started researching, designing, and implementing playgrounds that incorporated nature to provide kids with unique opportunities and a connection to nature; adventure playgrounds, forest kindergartens, and children’s farms (Ethier, 1999; Moore, 2014).

These naturalized playgrounds reintroduced natural spaces into constructed and managed spaces for children’s play, in part to reintroduce the developmental opportunities absent in constructed playgrounds. Naturalized playgrounds are

...a designated, managed location in an existing or modified outdoor environment where children of all ages and abilities play and learn by engaging with and manipulating diverse natural elements, materials, organisms, and habitats, through sensory, fine motor, and gross motor experiences. (Moore, 2014, p. 5)

A naturalized playground uses natural materials as the play equipment (White, 2004). It is an expansion of the traditional playground and adds more affordances and diversity into the play space (Bruya et al., 1988).

The benefits of a naturalized playground are many; “Rather than designed like a well manicure adult environment, naturalized playgrounds are designed from a child’s perspective as informal, even as wild, and as a place that responds to children’s development tasks and their sense of place, time and need to interact with the nature. They are designed to stimulate children’s natural curiosity, imagination, wonder and discovery learning as well as nurture children’s connectiveness with nature” (White, 2004, para. 19). These playgrounds that tie nature back into the play experience provide a rich environment and encourage activities that are open ended, diverse, and beneficial for development (Natural Learning Initiative & PlayCore Inc, 2009). Studies have shown that children playing with natural features create more sustained, constructive, and cooperative play (Kuh et al., 2013). A natural playground is designed to promote all the developmental domains so that children have the opportunities to develop typically.

The need for access and proximity to nature impacted human survival and today it is part of human nature (Winterbottom & Wagenfeld, 2015). Today natural elements often must be purposefully designed into children’s lives (Natural Learning Initiative & PlayCore Inc, 2009). Naturalized playgrounds are a movement to bring nature back into the everyday play experience. This reconnection with nature creates a transcendent

experience for children (Sobel, 2008). As play environments receive more attention for their role in child development, natural playgrounds have surfaced to expand opportunities and reintroduce nature into the traditional playground for the benefit of children.

Purpose of the Study

Although natural playgrounds are becoming more common and desired, the United States has been slow to respond (Johnson & Duffek, 2008). Child care centers and public playgrounds have started seeing changes through incorporating environments like natural playgrounds or children's gardens. Unfortunately, research and studies showing the benefits of natural playgrounds have had a limited influence on the U.S. elementary school playgrounds (Johnson & Duffek, 2008). "Natural outdoor areas within schoolyards have historically been overlooked and even ignored as places for play and learning. 'A typical pattern wherever schools and child care centers are built is to destroy the natural features – trees, grass, topsoil... and leave a barren, lifeless area where children are expected to play'" (Johnson & Duffek, 2008, p. 2). There is a need for natural play space to be introduced into elementary school playgrounds so that children can have a more diverse play experience at school (Johnson & Duffek, 2008).

However, there is little information available regarding what developmental affordances are found in the various natural play spaces introduced within playgrounds. The purpose of this study is to identify natural play spaces according to their affordances, and how these may be incorporated into an elementary playground to provide a more diverse and rich play environment. The elementary playground has the potential to

provide a play environment that is, over time, becoming less common and prominent in children's lives (Johnson & Duffek, 2008). These playgrounds need to be deliberately designed so that children are provided the developmental affordances that are pertinent to their growth. This study will explore the benefits of natural playgrounds, developmental needs of children aged 5 to 10, the developmental domains, and the requirements for elementary playgrounds. Elementary school playgrounds and nature explore classrooms were evaluated to understand what nature playgrounds spaces can and should be incorporated into playground design to provide diverse developmental affordances. Then the play spaces were compiled into a list for accessibility and then used in a playground design exploration to show how these play spaces can be incorporated into an existing playground.

CHAPTER 2

LITERATURE REVIEW

Benefits of Natural Playgrounds

Natural playgrounds are designed to connect children back to nature and provide open-ended play. A natural playground has play activities around, amongst, and incorporated with natural elements (Hamarstrom, 2012; Moore, 2014). It builds upon the foundation of traditional playgrounds while adding nature to support learning opportunities and affordances children lack in other environments (Natural Learning Initiative & PlayCore Inc, 2009).

Playgrounds are a unique opportunity for children to apply what they learn in school (White, 2004). They get to physically experiment and use their knowledge to manipulate and experience the environment around them. A natural playground is an active learning environment and can be used as an outdoor classroom. There, children can learn and engage in math, fine arts, music, natural sciences, ethic values, civic and social, spatial concept, language arts, ecology, geography, and history (Johnson & Duffek, 2008). Children that have access to an outdoor classroom have shown improvement in academic achievement (Natural Learning Initiative & PlayCore Inc, 2009). There are advancements in student competence, science, language arts, and math. Providing learning opportunities in the playground provides another tool for children to understand what they are learning in the classroom. Additionally, in developing the other domains, academic achievement improves because the domains are interconnected and dependent (Diamond, 2014).

Natural playgrounds afford diverse opportunities to practice, explore, and learn developmental skills. Children are drawn to the natural environment and prefer natural spaces when they have the ability to choose (Crain, 2003; Zamani, 2016). Their sense of curiosity and exploration are aroused as they engage and manipulate the natural environment. Additionally, natural playgrounds are able to support a wide range of users because of the diversity of activities (Natural Learning Initiative & PlayCore Inc, 2009).

Affordances for the many developmental domains are found throughout natural playgrounds. These playgrounds support more sustained play and allow for play behaviors to develop into deeper play experiences (Dowdell, Gray, & Malone, 2011). Higher imaginative play is afforded because the playground is designed to encourage open-ended play (Zamani, 2016). Children develop an understanding of the world and how they fit into the whole (Crain, 2003). They also develop their self-identify and understanding of social interactions as they engage with other children in activities. Crain found that “when children encounter tasks that enable them to develop their emerging capacities, they display very positive emotions” (p. 9). The natural environment provides emotional and mental rejuvenation through stress relieving activities and the connection to nature. Positive interactions with nature on a daily basis, healthy physical well-being, and activities like music and dancing support the development of cognitive skills (Diamond, 2014). Cognitive play is supported by creativity, reasoning, observational, and organizing skills which have been found abundantly within natural playgrounds (Dowdell et al., 2011; Natural Learning Initiative & PlayCore Inc, 2009; Zamani, 2016). In the natural environment there are countless opportunities to engage the senses to encourage exploratory, learning, and creative play (Zamani, 2016). Risky play is supported through

natural elements like trees and rocks (Sandseter, 2009; Zamani, 2016).

The natural playground provides many opportunities for children to immerse themselves in learning and developmental activities. Children's success in life isn't merited by just their academic achievement but by other traits like determination, self-control, and social skills; skills that are promoted in natural spaces (Diamond, 2007). Overall, the natural playground provides activities for a range of development skills while the traditional playground only supports the physical and social domains.

In a study exploring three type of playground zones, Zamani (2016) found that an area that had elements of a traditional playground mixed in with natural features supported more diverse and cognitive play than the purely natural or traditional zones. Playgrounds integrating the two types of playgrounds allow for the benefits of each to be available to children. The playground is an opportunity for children to learn hands on (Crain, 2003). It becomes not only a place for children to physically develop but to test what they have learned in school and enhance all the developmental domains (Diamond, 2007). This study looks at incorporating natural play spaces into elementary playgrounds looking more at this mixed play environment.

Developmental Needs for Specific Age Groups

The developmental needs of children vary at different stages of a child's life. For this study, the needs of 5 to 10 year olds are emphasized because these are the intended users of elementary playgrounds. Child care centers and public playgrounds are seeing changes in the playground design from a traditional playground to a more natural playground while elementary school playgrounds are not (Johnson & Duffek, 2008).

Robin Moore (2014) describes two groups and their needs in the elementary school years; early childhood consisting of ages 3 to 7 and middle childhood ages 8 to 12.

Within the early childhood years, children take initiative, create their play, and engage in make-believe play (Crain, 2003). The opportunities provided to this age range need to offer risk, creativity, experimentation, and problem solving. During this time, the children form friendships, especially with the same gender, at the same time as participating in activities that support confidence in individual actions (Moore, 2014). Social and physical skills are expanded with the introduction of games with rules. Children learn to engage and interpret their surroundings and their playmates at the same time as determining their self-worth (Theemes, 1999). The play environment for early childhood needs to support risk, exploration, and experimentation within play spaces that provide intellectual, social, and physical challenges.

For the middle childhood years, children are in the ‘hunter-gather’ phase (Sobel, 2008). Children engage with nature using skills like observation, naming, classifying, counting, and describing. Play during this age becomes more explorative, intellectual, and physical (Crain, 2003). To engage and support growth for children in middle childhood, play environments need to provide diverse activities, physical challenges, natural elements, cognitive challenges, and social challenges (Natural Learning Initiative & PlayCore Inc, 2009).

The playground environment of an elementary school must be designed to promote growth for both early and middle childhood. The child-centered approach emphasizes that “children are naturally motivated to develop different capacities at different stages, and they have a kind of inner wisdom with respect to the experiences

they need. When they find activities that enable them to develop their powers, they take a keen interest in the activities and throw themselves into them...we take our cues from the child; we watch for children's keen interest and enthusiasm. Then we give them opportunities to work on the activities that generate these feelings" (Crain, 2003, p. 5). Affordances need to be available for the different age groups so that children can develop as they discover new skills and engage with the environment around them. Children are constantly refining and learning new skills and the playground is a safe space to test and develop these developmental domains.

Developmental Domains

As research has delved deeper into understanding the developmental needs of children, five developmental domains have been identified based upon typical growth and behavioral patterns: physical, social-emotional, communication, cognitive, and sensory (Natural Learning Initiative & PlayCore Inc, 2009; PlayCore, 2016; Theemes, 1999). The development of each domain is interconnected; each domain influences and depends on the development of the other domains (Diamond, 2007; Theemes, 1999). These can be broken down further into subcategories for each domain; physical domain has gross motor skill and fine motor skills; social-emotional has self-awareness, self-management, social-awareness, relationship skills, and responsible decision making; communication has receptive, expressive, and pragmatic communication; cognitive has recent memory, language, visuospatial, and executive functioning, and sensory has visual, vestibular, proprioceptive, tactile, auditory, taste, and olfaction (PlayCore, 2016). For the purpose of this study, the subcategories of each domain shall be used to define the developmental

benefits of the play spaces.

Additionally, the environment plays an influential role in providing affordances for the reinforcement, growth, and practice of the developmental domains (Kandler & Zapko-Willmes, 2017). Equipment and different play settings encourage actions and activities that afford growth opportunities for the users. Therefore, each play setting affords specific growth benefits that can be identified through the activity or action that the settings encourages. These settings are often referred to as behavior settings, which is a setting that has one or more patterns of behavior (Popov & Chompalov, 2012).

The following section identifies what activities and equipment encourage each developmental domain with the purpose of identifying behavior settings and their affordances within playgrounds. Each developmental domain will be defined then described by what type of behavior settings support each domain.

Physical Domain

The physical domain encompasses the development of fine and gross motor skills (Theemes, 1999). Fine motor skills involve using small muscle groups for precise movements while gross motor skills engage large muscle groups for movements like running, jumping, and climbing (PlayCore, 2016). Physical activities in the playground include playing with loose parts, playing on a fixed structure, participating in a team game and child-initiated games like hide and seek (Dowdell et al., 2011). Developing physical skills encourages development in other domains; physical activities encourage social interactions, exploration, use of sense, spatial awareness, and growth of self-concept (Bee, 1989; PlayCore, 2016). The environment supports different physical

affordances that promote physical and mental health (Milteer, Ginsburg, Council On Communications, & Media Committee On Psychological Aspects Of Child And Family Health, 2012).

The definition of gross motor used for this study is learning to and developing the use of large muscle groups for activities like running, jumping, and climbing. The definition of fine motor used for this study is learning to and developing the use of small muscle groups, fingers and tongue, for precise movements like grasping and manipulating objects, speech, and hand-eye coordination (PlayCore, 2016).

Behavior settings that promote the use of fine motor skills include the following.

- Play spaces that involve the use of manipulating loose materials like sand, water, building blocks, and dirt.
- Play tables that can be used for activities like painting and manipulation of smaller toys and materials.
- Manipulative play panels or equipment that encourage activities like games, a steering wheel, cooking, building, creating, and pushing buttons.
- Play that involves small toys and using materials like puzzles, beads, and toy vehicles. Measuring cups and spoons are another unique opportunity for using fine motor skills and gaining an understanding of size and volume.
- Play spaces like sidewalks that can be used for painting and drawing.
- Settings that encourage the use of balls for hand-eye coordination.

Behavior settings that promote the use of gross motor skills include the following:

- Play equipment, fixed and non-rigid attachments, that encourage actions like running, jumping, walking, swinging, climbing, rolling, balancing, sliding, and games with rules.
- Bridges and ladders encourage balance and coordination skills.
- Tunnels provide an opportunity to move through a space.

- Settings that encourage the use of balls involving running, jumping, and similar movements.
- Open spaces for physical activities and games with rules.
- Play settings with landforms and changes in topography with both smooth slopes and cliff traversing.
- Play settings with access to vegetation that encourage hide and seek, chasing games, and building dens or shelters. A flexible juniper shrub and spruces are great for hiding and other activities. Trees are a great opportunity for climbing.
- Rocks within the play spaces that can be used for balancing, climbing, in games with rules, and hop scotch.
- Loose materials that encourage digging and building. These can include dirt, sand, shovels, and rakes. These could be in play space like a water table or sand area.
- School gardens where children can help dig, weed, and explore.
- Settings that encourage games like house, castle, and hideouts.
- Non-rigid playground boundaries encourage physical activity.
- A circulation pathway for riding bikes, skateboards, and similar activities.
- An aperture that can be used for looking, listening, and moving from one setting to another (Czalczyńska-Podolska, 2014; Drown, 2014; Fjørtoft, 2001; Hamarstrom, 2012; Heft, 2016; Kuh et al., 2013; Miller & Almon, 2009; PlayCore, 2016; Theemes, 1999; Woolley & Lowe, 2013; Zamani, 2016)

Socio-Emotional Domain

Social-emotional development encompasses internal and external functions like social interactions, cooperation, and self-concept. Social-emotional skills include self-awareness, self-management, social awareness, relationship skills, and responsible decision making (PlayCore, 2016). As children age, the complexity of social and emotional skills develop from solitary play to complex interactions with others (Bruya et

al., 1988). Children learn to express themselves and their feelings while cooperating with others (Milteer et al., 2012; Theemes, 1999; Woolley & Lowe, 2013). The development of the socio-emotional domain has been linked to academic success (Theemes, 1999). Within the play environment, socio-emotional activities include self-focused games, games involving others, and activities that allow a child to interact through sharing and cooperating. (Burdette, & Whitaker, 2005; Dowdell et al., 2011; Woolley & Lowe, 2013).

The definition used in this study for self-awareness is learning to recognize one's emotions, thoughts, and control over oneself. This involves the recognition of strengths, limitations, and confidence. The definition used in this study for self-management is learning to regulate emotions, thoughts, and behaviors. "This includes managing stress, controlling impulses, motivating oneself and setting and working toward achieving personal and academic goals" (PlayCore, 2016). The definition used in this study for social-awareness is learning to empathize with others and understand social norms and the resources available from one's community. The definition used in this study for relationship skills is learning to establish and maintain relationships with others. This involves communicating, listening, negotiating, and helping and receiving help. The definition used in this study for responsible decision making is learning "to make constructive and respectful choices about personal behavior and social interactions" (PlayCore, 2016). This includes considering choices based upon norms, personal standards, and consequences.

Behavior settings that promote the use of social-emotional skills include the following.

- Seating areas throughout the playground for social interactions.
- A stage or amphitheater encourages performances and similar activities. A tree house platform is a play space for imaginative play.
- Moldable and loose materials encourage children to interact together and gain an understanding of their environment and self-expression. This helps the child explore and gain confidence in their abilities. This can occur with materials like painting, sand, water, drawing, or sidewalk chalk.
- Toy figures and vehicles support role and dramatic play.
- Building blocks, spades, trowels, buckets, and shovels encourage solitary and group activities while building self-confidence. These support self-expression and cooperation.
- Activities that require working in groups, sharing, negotiating, cooperating, and resolving issues. This occurs with settings that encourage games with rule, pretend play, and role play. Games that involve balls are great for social interactions.
- Play settings that support exploration encourage self-concept and confidence skills.
- Settings that are safe areas to retreat to so that a child can recuperate and gain self-confidence before playing again. These tend to be smaller spaces while larger spaces encourage games with rules and social interactions.
- A continuous pathway encourages continuous play and increases social interactions. These connect play areas and expand social play throughout the playground.
- Playground equipment that requires more than one child supports social interaction and cooperation. A spring-based seesaw, tire swing, and wide slide are great examples of a two or more-person playground equipment.
- Musical instruments invite social play and self-expression.
- Binoculars or a magnifying glass allow a child to see their surroundings from a new perspective.
- High points of observation allow children to gain an understanding of their surroundings.
- Multi-niche settings that encourage cooperation to do the activity. A water

pump near a sand area or talk tubes are a good example of a multi-niche setting.

- The presence of vegetation can be used for dens and play activities. Low-herb woodlands afford games with rules.
- Insect and small animal habitats promote sensitivity and sympathy skills.
- Landforms and changes in topography promote social interaction and activities.
- Settings like a playhouse that encourage role and dramatic play.
- Play, work, and sand tables encourage social interactions (Drown, 2014; Fjørtoft, 2001; Hamarstrom, 2012; Kuh et al., 2013; Miller & Almon, 2009; PlayCore, 2016; Theemes, 1999; Wang, Woolley, Tang, Liu, & Luo, 2018; Woolley & Lowe, 2013)

Communication Domain

The communication domain involves development of verbal and nonverbal communication skills. Children develop receptive language, the understanding and comprehension of language; expressive language, learning how to communicate wants and needs through language; and pragmatic language, learning how to use language in a social setting (PlayCore, 2016). These skills in turn influence the development of other domains (PlayCore, 2016; Woolley & Lowe, 2013). This domain affects interactions that children have with those around them. As they develop more, children increasingly engage with other children using more complex communication skills (Theemes, 1999). The environment provides opportunities for children to engage with other children and practice their language skills.

The definition used in this study for receptive communication is learning to understand and comprehend language. This includes focusing attention, understanding

vocabulary and questions, and following directions. The definition used in the study for expressive communication is learning how to communicate wants and needs through the use of language. This involves using facial expressions and gestures, vocabulary, and complex utterances. The definition used in this study for pragmatic communication is learning how to use language in a social setting. This includes listening and talking, recognizing and using language to talk to a teacher differently than a peer, and other communication skills like negotiating and resolving issues (PlayCore, 2016).

Behavior settings that promote the use of communication skills include the following.

- Moving and loose parts promote social interactions and self-expression supporting communication.
- Construction materials like blocks, buckets, and shovels encourage communication and expression of wants and needs.
- Open-ended play settings encourage fantasy play and the experimentation of language. These can be a playhouse, den, play counter or table.
- Amphitheaters, tree house platforms, and stages support self-expressive and pragmatic skills.
- Settings that promote games with rules support communication skills because children must communicate both verbally and non-verbally when playing. These can be open spaces or areas with vegetation for games like hide-and-go-seek.
- Playground equipment that encourages turn-taking and repetitive movements encourage social interactions and communication. Examples of this are slides, see-saws, and sway funs.
- Talking tubes encourage receptive and pragmatic language skills.
- Tire swings are great for social communication and expression.
- Water play encourages social interactions and communication. This can occur with a water pump or water table.

- Sand tables or areas encourage social interactions and the use of moldable materials.
- Musical instruments encourage expression.
- Shelters and observation points in close proximity to other play settings can provide refuge while allowing for continued communication. (Hamarstrom, 2012; Heft, 2016; Kuh et al., 2013; Miller & Almon, 2009; PlayCore, 2016; Theemes, 1999; Woolley & Lowe, 2013)

Cognitive Domain

Cognitive development refers to problem solving, creativity, organizational skills, processing, and sense of reality (Theemes, 1999). Children learn to how to engage, learn, and problem-solve as they develop cognitive skills (Milteer et al., 2012). There are four stages of cognitive development: sensorimotor, preoperational, concrete, and formal (Bee, 1989; PlayCore, 2016). Children develop recent memory, learning to recall recent events and information; language, learning to comprehend and express; visuospatial ability, learning to comprehend and manipulate non-verbal information like pictures and graphics; and executive functioning, learning to problem solve, plan, organize, and focus (Burdette, & Whitaker, 2005; PlayCore, 2016). Cognitive processes occur simultaneously to other developmental domains. Some examples include language skills encourage problem solving and cognitive skills improve social interactions (Woolley & Lowe, 2013). The cognitive domain makes sense of the environment and encourages children to explore and learn (Theemes, 1999). Cognitive activities in the playground include construction, interactions with the natural environment, exploration, and imaginative play (Dowdell et al., 2011).

The definition used in this study for recent memory is “the ability to learn and

recall information” (Gromisch, 2011). This includes learning, reasoning, and comprehension skills. The definition used in this study for language is learning to comprehend and express through the use of language. The definition used in this study for visuospatial is learning to identify, comprehend, and manipulate visual information and spatial relationships (PlayCore, 2016). This influences movement and the perception of depth, distance, and spatial orientation (“NeuronUp: Visuospatial Skills,” n.d.). The definition used in this study for executive functioning is learning to problem solve, plan, organize, and focus (PlayCore, 2016)

Behavior settings that promote the use of cognitive skills include the following.

- Vegetation and animals can be used for creative and educational opportunities. Variety in textures, shapes, and colors have added value and opportunities. Seasonal changes provide teaching opportunities about the environment and seasons.
- Moving and loose parts support creative expression, visuospatial skills, and executive functioning. The manipulation of construction materials like buildings blocks, water, paint, sidewalk chalk, and sand support problem solving and creative thinking. Symbolic play occurs with the use of toy figure, natural materials, and props.
- Settings that allow for the manipulation of sizes, volume, shape, and moving parts encourage executive functioning.
- Landform and topographical variation encourage comprehension of different heights and spaces.
- Rocks for climbing, balancing, and jumping can encourage executive functioning.
- Settings that encourage dramatic and fantasy play support recent memory, language, and executive functioning. These can be playhouses and dens within shrubs.
- Settings that encourage exploration of the environment around them. This can occur through exploring the characteristics of an object to understand it.

- Settings that encourage games with rules promote executive functioning.
- Playground equipment that encourages problem solving, risk taking, and planning through physical challenges. Nets, ladders, and rock-climbing walls are a great example of this.
- Manipulative play panels encourage cognitive skills.
- Connected water and sand areas are a great opportunity for problem solving and creativity.
- Benches throughout the playground for observation and reading.
- Games with balls encourage visuospatial and executive functioning.
- Balance beams and pods encourage games with rules and coordination (Drown, 2014; Fjørtoft, 2001; Hamarstrom, 2012; Miller & Almon, 2009; Theemes, 1999; Wang et al., 2018; Woolley & Lowe, 2013; Zamani, 2016)

Sensory Domain

The sensory domain is the development of perception and involves the use of the senses (PlayCore, 2016; Woolley & Lowe, 2013). Children use all of their senses to organize their world. These sensory skills are visual, learning to understand the environment around them visually; vestibular, an area in the inner ear that affects physical and eye movement; proprioceptive, sensory receptors throughout the body that provide body positioning information; tactile, recognizing changes in textures/surfaces and occurs internally and externally; auditory, learning to understand and detect sound vibrations; and taste, learning to recognize and understand chemical reactions within the mouth (PlayCore, 2016). Engaging the senses provides children with more learning tools and opportunities to gain knowledge about the space around them (Theemes, 1999). The senses are stimulated by different factors in the environment and influence the development of the other domains (Crain, 2003; PlayCore, 2016).

The definition used in this study for visual is learning to understand the surrounding environment visually. The definition used in this study for vestibular is learning to interpret information about movement and balance that originates from an area in the inner ear. This influences the comprehension of the head and body in relation to the ground, changes in direction, gravity, speed and direction, and eye movement. The definition used in this study for proprioceptive is learning to understand body position and movement. This originates from sensory receptors throughout the body the influence movement and body parts relations to each other. This involves stretching, bending, pulling, and other similar. The definition used in this study for tactile is learning to recognize changes in textures/surfaces and being touched (PlayCore, 2016). The definition used in this study for auditory is learning to understand and detect sound vibrations (Kid Sense, 2018). These vibrations provide information about volume, pitch and rhythm (PlayCore, 2016). The definition used in this study for taste is learning to recognize and understand chemical reaction within the mouth. The definition used in this study for olfaction is learning to recognize and understand chemical responses through the nose (PlayCore, 2016).

Behavior settings that promote the use of sensory skills include the following.

- Vegetation provides visual, olfaction, tactile, auditory, and taste growth opportunities. Vegetation with seasonal changes provide more developmental opportunities.
- Moving and loose parts stimulate multiple senses and encourage repetitive use. These materials can be sand, water, and building blocks. Sand and water are visually and tactilely stimulating.
- Sidewalk chalk and painting are tactile and visual experiences.
- Observation points offer spaces to use the senses to gain an understanding of

the environment and the playground.

- Musical instruments and other play equipment allow for the manipulation of sound and touch.
- Play panels allow for the manipulation of location and light intensity. This can occur through a color wheel or a maze.
- Materials that provide warm and cold experiences promote tactile experiences.
- Swinging, spring toys, tire swings, and balancing pods or beams develop the vestibular sense.
- Apertures that allow looking and listening into adjacent spaces.
- Binoculars or magnifying glasses that allow for visual manipulation (Burdette, & Whitaker, 2005; Heft, 2016; PlayCore, 2016; Theemes, 1999; Woolley & Lowe, 2013)

Encouraging development for the ‘whole child’ involves physical, socio-emotional, language, cognitive, and sensory skills (Playcore Inc, 2018). These domains are interdependent and intradependent on each other and factors within the environment. The playground can encourage the exploration, practice, and enhancement of each of the developmental domains (Bruya et al., 1988). Each of these affordances need to be purposefully designed into the playground space to ensure that children have the opportunity to engage in a rich developmental environment during play, however there is less evidence describing how these affordances may be purposefully designed in play environments.

CHAPTER 3

METHODOLOGY

Introduction

Children have physical, socio-emotional, communication, cognitive, and sensory developmental needs that should be met within a playground's different behavior settings and can be identified by the activities and actions encouraged in the setting.

This paper is based on the assumption that natural play spaces are beneficial additions to the elementary playground environment because of the diversity and types of behavior settings associated with natural play environments. The research in this study aims to answer the following questions.

1. What developmental affordances are currently available on an elementary playground?
2. What natural play spaces can potentially be incorporated into an elementary playground?
3. What are the developmental affordances of these natural play spaces?
4. How can these natural play spaces be incorporated into an existing elementary playground?

To answer the research questions, six playgrounds and two nature explore classrooms were evaluated for developmental affordances to understand the current developmental opportunities on the playgrounds. Additionally, the playgrounds were evaluated for safety standards and ADA (American Disabilities Act) requirements to ensure that the suggested play spaces could be incorporated into an elementary school playground. The play spaces were then associated with the developmental affordances

they support. A nature playground play spaces list was created to provide an accessible list of play spaces by the affordances they provide play opportunities for. Then a playground design exploration was conducted to determine how the nature playground play spaces could be incorporated into an existing elementary playground.

Site Selection

Evaluated Playgrounds

The sites chosen for this study were selected from the Salt Lake County School District. Based upon the 2017 SchoolDigger ratings (SchoolDigger, 2018), the top three and bottom three performing elementary schools of Salt Lake County School District were chosen for the evaluation process. The rankings are based upon SAGE language arts, SAGE math, and the SAGE science test scores received from the Utah State Office of Education. Additionally, SchoolDigger aggregates data from the National Center for Education Statistics, U.S. Department of Education, and the U.S. Census Bureau. The school's rankings were then verified by the 2018 Utah State Board of Education school accountability report cards (Utah State Board of Education, 2019) which report each schools achievement and growth in language, math, and science test scores. The chosen schools, their rankings, and the study boundary for each, highlighted in pink, are shown in Figures 3.1-3.6.

Because there are no public or elementary natural playgrounds in and around the Salt Lake County School District, the playgrounds chosen for the natural playground evaluations are part of early childhood care centers. These were chosen from a list of

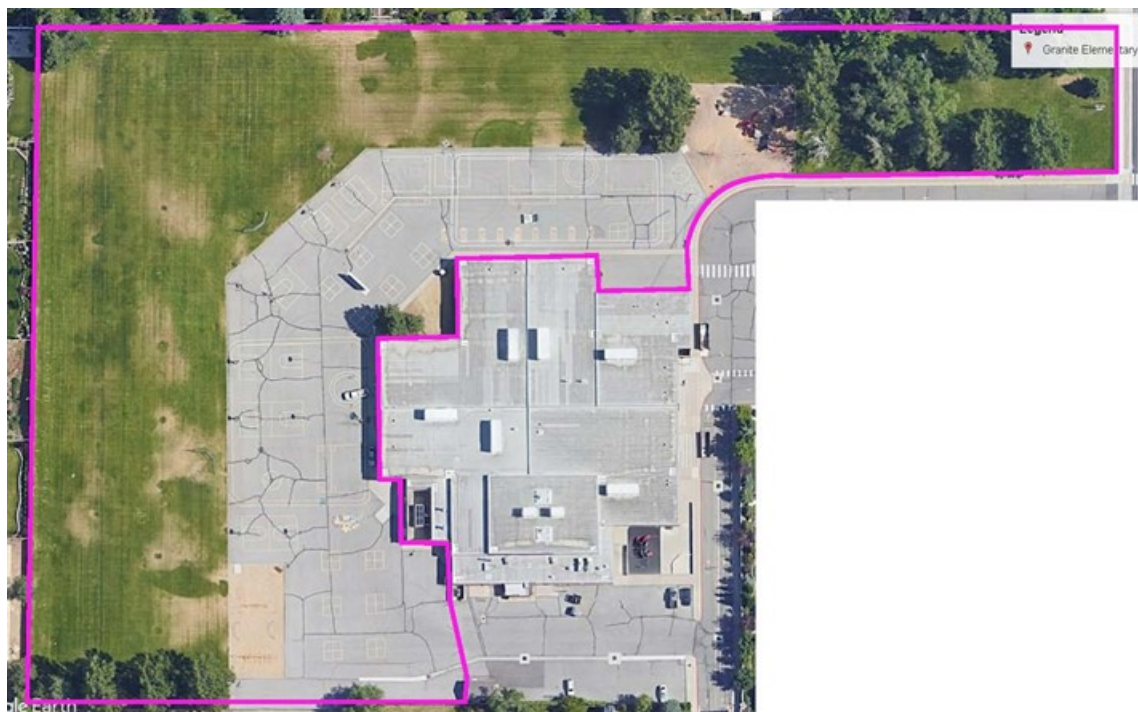


Figure 3.1. Rank #1: Granite Elementary School.



Figure 3.2. Rank #2: Sunrise Elementary School.



Figure 3.3. Rank #3: Endeavour Elementary School.

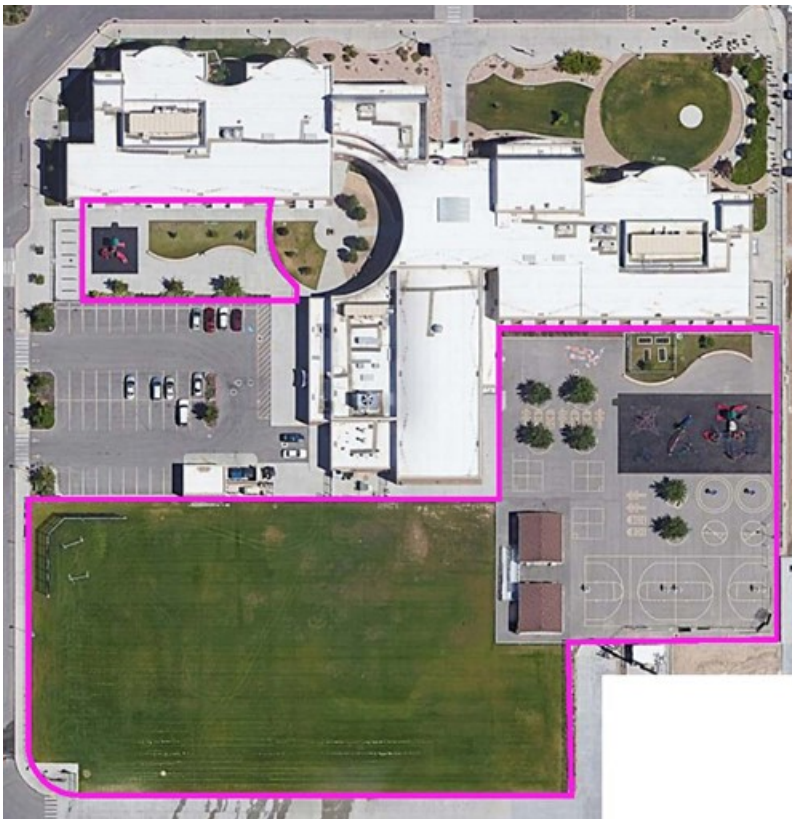


Figure 3.4. Rank #526: Midvale Elementary School.

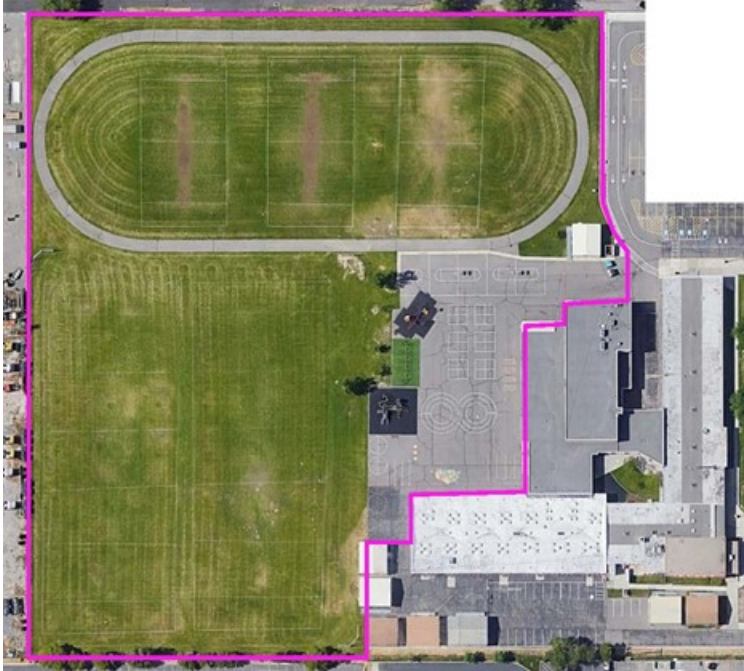


Figure 3.5. Rank #527: Redwood Elementary School.



Figure 3.6. Rank #528: Guadalupe Elementary School.

certified nature explore classrooms (Nature Explore Program & Dimensions Educational Research Foundation, 2019). The Nature Explore Program calls them outdoor classrooms though the two included in this study are used as each care center's playground. These are nature-based playgrounds that incorporate nature into the play and learning experience emphasizing the connection to nature. The certification process requires the outdoor space to be well-designed, to have a committed and involved staff and family, and requires recertification every year. The chosen centers for the evaluation process are shown in Figures 3.7-3.8. Other nature explore classrooms were chosen for evaluation but because of visiting regulations and time conflicts they were unable to be evaluated.



Figure 3.7. Eccles Early Childhood Development Lab School Natural Playground, Salt Lake Figure Community College (SLCC Nature Playground).



Figure 3.8. Little Brigham Aggies Play Garden, Utah State University Brigham Early Care and Education Center.

Nature Playground Play Spaces List

The nature playground play spaces list is derived from the nature explore classrooms and the case studies contained in Robin Moore's (2014) and Rusty Keeler's (2008) books. The case studies were included to capture a wider scope of play spaces of natural playgrounds.

The case studies contained in Moore's (2014) book are nationally recognized natural playgrounds. The purpose behind the case studies was to examine the process, design, development, impacts, and challenges of each playground so that future designers can learn from them as they consider designing/building a natural playground. The

studies contained in Keeler's book are natural playground designs he did himself. These were included in his novel to provide ingredients for readers to pull from to design their own natural playgrounds.

The books provided a list of the play spaces found in the playgrounds. These were added to the nature playground play spaces list in addition to the natural play spaces identified from the two nature explore classrooms. The case studies included in the study are shown in Figures 3.9-3.26

Robin Moore case studies.



<http://chambers-architecture.com/PublicProjects/Hills&DalesMetroPark.html>

Figure 3.9. Hill and Dales Nature Play Area, Kettering, Ohio.



<http://egpnews.com/tag/el-sereno-arroyo-playground/> ; <https://www.cityparksalliance.org/why-urban-parks-matter/frontline-parks/parks/311-el-sereno-arroyo-playground>

Figure 3.10. El Sereno Arroyo Playground, Los Angeles, California.



<https://www.landscapeperformance.org/case-study-briefs/teardrop-park>

Figure 3.11. Teardrop Park (North), New York, New York.



Figure 3.12. North Canyon Nature Play and Learning Areas, SE Sublimity, Oregon.



<https://www.nps.gov/articles/natureplayzone.htm>

Figure 3.13. Nature Play Zone Indiana Dunes National Lakeshore, Lakeshore, Gary, Indiana.



<http://www.poddesign.net/blog/2016/10/4/2016-honor-award-by-the-asla-ohio-chapter>

Figure 3.14. Marge and Charles Schott Nature PlayScape, Milford, Ohio.



<https://outdoordiscovery.org/plan-your-visit/points-of-interest/fillmore-discovery-park-04/>

Figure 3.15. Fillmore Discovery Park, Holland, Missouri.



<https://www.wral.com/destination-kidzone-at-the-n-c-zoo/13720087/>

Figure 3.16. kidZone, North Carolina Zoological Park.



<https://www.sbnature.org/visit/exhibitions/52/museum-backyard-nature-club-house>

Figure 3.17. The Museum Backyard and Nature Club House, Santa Barbra, California.



https://www.cincinnatiaward.com/cda_entries/the-arlitt-nature-playscape/

Figure 3.19. The Arlitt Nature PlayScape, Cincinnati, Ohio.

Rusty Keeler Case Studies



Figure 3.20. Preschool Play Meadow, Asheville, North Carolina (Keeler, 2008).



Figure 3.21. SoundGarden, East Setauket, New York (Keeler, 2008).

[illegible]

Figure 3.23. Tribal Toddler Playscape, Cherokee, North Carolina (Keeler, 2008).



Figure 3.24. Elementary School Pocket Playscape, Ithaca, New York (Keeler, 2008).



Figure 3.25. Natural Preschool Playscape, Sequim, Washington (Keeler, 2008).

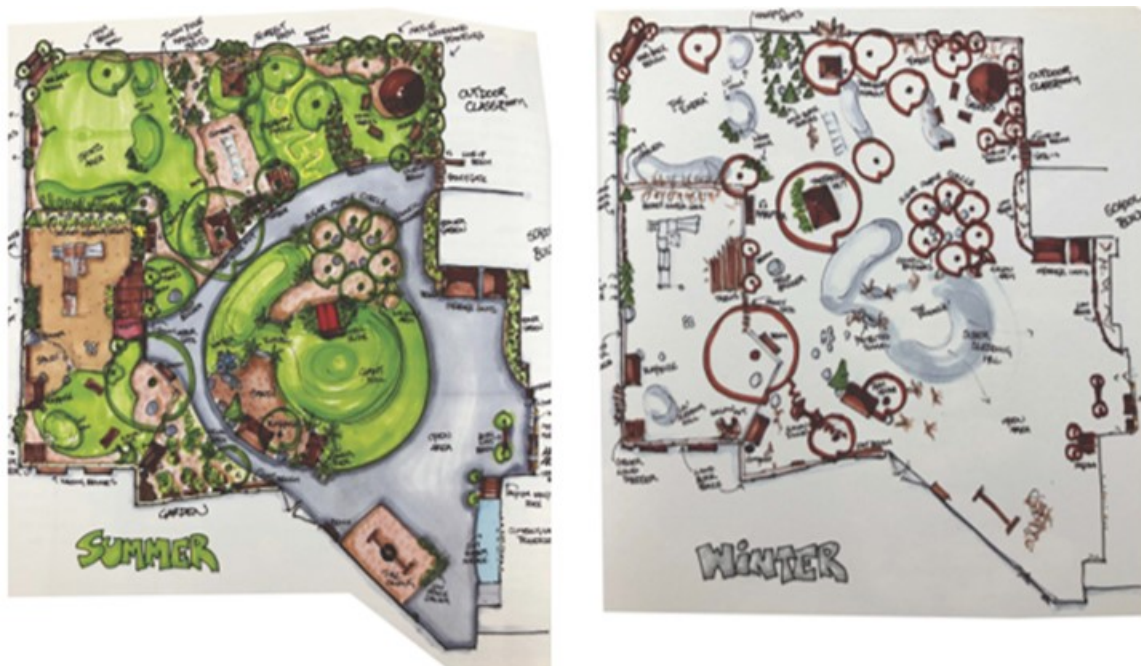


Figure 3.26. Summer and Winter Playscapes, Ontario, Canada (Keeler, 2008)

Evaluations

Safety Evaluation

The U.S. Consumer Product Safety Commission (CPSC) developed the Public Playground Safety Handbook (U.S. Consumer Product Safety Commission, 2010). The document presents safety guidelines for playgrounds and play equipment. These safety requirements were created to minimize playground injuries and provide a safe play environment for children.

Built upon the CPSC guidelines, organizations have created inspection and maintenance checklists to ensure the continued safety of their playgrounds. The evaluation tool developed for this study was derived from the CPSC handbook and

checklist, inspection list created by Grounds for Play, and the checklist by the National Program for Playground Safety (Grounds for Play, n.d.; Mokricky, 2006.; U.S. Consumer Product Safety Commission, 2010). The tool assessed how well the selected playgrounds meet the safety standards required by the CPSC (see appendix A).

Americans with Disabilities Act Evaluation

Accessible guidelines for play areas are established by the U.S. Access Board (2005) and described in their document “Accessible Play Areas: A Summary of Accessibility Guidelines for Play Areas.” This document describes the regulatory implementation of the Americans with Disabilities Act (ADA) for play areas to help designers and park managers access the ADA requirements for playgrounds. It addresses where the ADA guidelines apply, accessible routes, structure requirements, and the amount of accessible play equipment needed.

GameTime; the Disability Services Quality Improvement Center; and Varenas, Heinz, and Dunn have developed checklists of the ADA requirements given in the “Accessible Play Areas” document (Christensen & Morgan, 2002; GameTime, 2017; Varenas, Heinz, & Dunn, 2014). For this study, the evaluation tool for ADA guidelines was derived from these sources. The tool assessed how well the selected playgrounds meet the ADA requirements (see appendix A).

Developmental Affordances Evaluation

Using the developmental domain definitions and their corresponding behavior settings contained in the literature review, an evaluation sheet was developed to identify the developmental affordances of the studied playgrounds through the behavior settings.

The play components for each playground were listed on the evaluation sheet and associated with the primary and secondary supported developmental affordances. The primary affordance(s) are the developmental skill(s) that a play component was designed to support. The secondary affordances are developmental skills that are encouraged by the play component. The tool (see appendix A) assessed the behavior settings within each playground and then the supported developmental affordances.

Protocol

In preparation for each site visit, base maps of each school playground and the evaluation sheets were developed. The base maps were used for orientation and written comments. A small hand camera and phone were used for pictures. A measuring tape was used to address specific rules within the ADA and Safety evaluation sheets.

Each elementary school playground was visited and evaluated in person. The elementary playgrounds were evaluated on a weekend to avoid having children playing on the playground. In a following week, the nature explore classrooms were evaluated during the week but at a time that children were not present. The first playground evaluated (Granite Elementary School) took about 2 hours, in part as a pilot test of the protocol, and the rest of the playgrounds took about 1 to 1.5 hours to evaluate. The safety evaluation was conducted first, then the ADA evaluation, and finally the developmental affordances evaluation. Pictures were obtained of each playground (see Appendix B for highlight pictures). Any problems found on the playground were recorded on the corresponding evaluation sheet and captured with the camera.

The elementary school playgrounds did not require any contact with anyone from

the school throughout the whole process. The nature explore classroom directors were contacted to get permission to visit the playgrounds and to find a time for the site visits. This was required because these playgrounds are not public. The directors of the nature explore classrooms gave an introductory tour and provided additional information about their specific playground. These comments were mostly about what it meant to be a nature explore classroom and what play activities and components were stored in the shed. This did not change the results of the evaluation process.

After the site visits, the evaluations were transcribed into an Excel file. The safety and ADA evaluations were given a point value of either 0 or 1: the playground received a 1 for a rule if it met the requirements or if the rule was not applicable to the playground and a 0 if the playground did not meet the rule. For the developmental affordances evaluation, the play components of each playground were listed. Each play component was then associated with its intended and secondary developmental affordance(s).

Simple calculations were then run to be able to evaluate how well each playground met safety and ADA requirements, what developmental affordances were present and their frequency, and to allow for comparisons between the playgrounds. The safety and ADA evaluation sheet calculations were sums of the 0- to 1-point system. This provided a safety and ADA score for each playground that was then used to compare with. Two tables were created from the developmental affordances evaluation. The first represents the sum of play components that support each affordance. The second represent the developmental affordance composition of each playground.

The nature playground play spaces list was then derived from the play spaces identified in the nature explore classrooms through the developmental affordances

evaluation and the case studies contained in Robin Moore's (2014) and Rusty Keeler's (2008) books. The list was organized by the supported developmental affordances to allow for the identification of spaces that can provide needed developmental opportunities in a playground design. This will help ensure that playgrounds are being designed or redesigned with opportunities for growth in all the developmental domains.

Finally, using the nature playground play spaces list a playground design exploration was completed to understand how these spaces can be incorporated into an existing elementary playground. Additionally, a table of the before and after developmental affordances was created to show the changes and affects that adding natural play spaces can have on the play opportunities within the playground.

CHAPTER 4

RESULTS

Safety Evaluation

The detailed evaluations for each playground can be found in Appendix C and Table 4.1 displays the safety scores for the evaluated playgrounds. All the playgrounds scored within 13 points of a perfect score of 34/34, with the lowest being Guadalupe Elementary School and the highest being Midvale Elementary School. The following sections will review the elementary school playgrounds, nature explore classrooms, similarities and differences between the playgrounds, and then conclude with a summary.

Elementary Playgrounds

Granite Elementary School got a score of 24/34. Sunrise Elementary School got a score of 27/34. Endeavor Elementary School got a score of 28/34. Midvale Elementary School got a score of 29/34. Redwood Elementary School got a score of 23/34. Guadalupe Elementary School got a score of 21/34.

Most of the safety hazards found on the elementary playgrounds were minor issues that could be resolved through more consistent maintenance. The common issues were tears in materials, rust on parts of the play components, displaced surface material, vegetation that needed care, lack of signage, vandalism, collecting water, and tripping/slipping hazards like holes or loose materials on the sidewalk. The most concerning hazard was on Granite Elementary School, where the playground and parking lot share a water drain that is located on the playground. This collected toxins from the

Table 4.1

Safety Scores for Evaluated Playgrounds

Safety Requirement	Granite	Sunrise	Endeavour	Midvale	Redwood	Guadalupe	SLCC	Little Aggies	Rule Total
Equipment									
Rule 1: Platforms allow a change in directions	1	1	1; n/a	1	1	1	1; n/a	1	8
Rule 2: Elevated structures have guardrails	1	1	1; n/a	1	1	1	1; n/a	1	8
Rule 3: Supporting structures and equipment prevents climbing outside the structure	1	1	1; n/a	1	1	1	1; n/a	1; n/a	8
Rule 4: Play structures meet height and space standards	1	1	1	1	1	1	1; n/a	1; n/a	8
Rule 5: Fence surrounding playground is at least 4' high	0	0	1	1	1	1	1	1	6
Rule 6: Swings aren't heavy and don't have protrusions	1	1	1; n/a	1; n/a	1	1	1; n/a	1; n/a	8
Rule 7: No cracks, bending, warps, rust, or breakage	0	0	0	1	0	0	0	0	1
Rule 8: No crushing, pinching, or shearing	1	1	1	1	0	1	1	1	7
Rule 9: No sharp edges, broken/missing parts, loose bolts	1	1	1	1	0	0	0	1	5
Rule 10: No frayed cables, ropes, open hooks or chains	1	1	0	1	1	1	1	1	7
Rule 11: No chipping, peeling paint	1	0	1	1	0	1	1	1	6
Rule 12: No splintering wood	1	1	1; n/a	1	1; n/a	0	1	0	6
Rule 13: No protrusions that could catch clothing	1	1	1	1	1	1	1	1	8
Rule 14: Metal slides don't get too hot	1; n/a	1	1; n/a	1; n/a	1; n/a	1; n/a	1; n/a	1; n/a	8
Rule 15: Portable toys are in good repair	1; n/a	1; n/a	1; n/a	1; n/a	1; n/a	0	1	1	7
Rule 16: 6' fall zone around all play equipment	1	1	1	1	1; n/a	1	1	0	7
Rule 17: No foreign objects in fall zones	1	1	1	1	1	0	1	1	7
Rule 18: No spaces that could trap	1	1	1	1	1	1	1	0	7
Surface									
Rule 19: at least 12" resilient surfacing	1	1	1	1	1	0	1	0	6
Rule 20: No displaced surface material	0	0	1	0	0	0	1	1	3
Rule 21: resilient surfacing is 6' in all directions	1	1	1	1	1	0	1	1	7
Rule 22: Surfacing around swings in front and back	1	1	1; n/a	1; n/a	1	0	1; n/a	1; n/a	7
General									
Rule 23: Signage indicating age group for equipment	0	1	1	1	0	1	0	0	3
Rule 24: Rules are posted on the playground	0	0	0	0	1	0	0	0	1
Rule 25: No vandalism	0	0	0	0	0	1	1	1	3
Rule 26: Vegetation is in good condition	1	1	0	0	0	1	1	1	5
Rule 27: No thorny vegetation	1	1	1	1	1	1	0	1	7
Rule 28: No toxic materials on playground	0	1	1	1	1	1	1	1	7
Rule 29: No animal feces, poisonous plants, or mushrooms	1	1	1	1	0	1	1	1	7
Rule 30: No collections of water	0	1	0	0	1	0	1	1	4
Rule 31: Electrical hazards are secured	1	1	1	1	1	1	1	1	8
Rule 32: No obstructions to interfere with normal play	1	1	1	1	1	1	1	1	8
Rule 33: No slipping hazards	0	1	1	1	0	0	1	1	5
Rule 34: No tripping hazards	0	0	1	1	0	1	0	1	4
Playground Total Score	24	27	28	29	23	21	28	27	

Note: n/a= not applicable

parking lot into the asphalt play area. This safety hazard would take larger means than maintenance to fix, but because the coding didn't take the severity of each hazard into account, this holds the same weight as the other safety issues. Future research could analyze the severity of the safety hazards and fine tune the study instruments.

The highest score was Midvale Elementary School, which is probably related to the age of the playground; it is one of the newer playgrounds. Guadalupe Elementary School received the lowest score. There were two parts to this playground; the main play structure area and the small playground area. Most of the safety problems observed were present in the small playground. Guadalupe Elementary School's score was lower than the other playgrounds because the surfacing around the small playground was grass and dirt. The main playground had surfacing that met the requirements, which is probably because it was installed by a playground equipment company while the small playground was a play set that is typically found in a backyard and self-constructed.

Even though Redwood Elementary School scored higher than Guadalupe Elementary School, this playground posed the greatest concern for safety. This playground is older and showing the wear to where it is getting to be a safety hazard. The worst breakage and rusting was found on this playground. The issues on this playground would take greater effort than the other playgrounds to fix, except for the Guadalupe's smaller playground and Granite's drainage problem.

Nature Explore Classrooms

Both of the nature explore classrooms received one of the higher scores. SLCC Nature Playground got a score of 28/34. Little Brigham Aggies Play Garden got a score

of 27/34.

SLCC Nature Playground had broken pieces, rust, ripping materials, lack of signage, a thorny vine on a trellis, and a hole by the water boxes that could pose a tripping hazard. Little Brigham Aggies Play Garden had rusting components, a wooden table that needs care, an insufficient fall zone around the boulder and balance beams, the depth of woodchips was not 12” deep, and lack of signage. Overall, both playgrounds were well maintained and in good condition. The issues were minor and could be fixed through maintenance. The greatest safety hazard is the insufficient fall zone in the Little Brigham Aggies Play Garden and would require greater measures to fix than the other safety problems.

Similarities and Differences

All playgrounds but Midvale Elementary School have cracks, bends, warps, or rust on some component of the playground. Most of these were tears in material or rust on parts like bolts. Overall, these were minor parts and a small percentage of each playground.

All the playgrounds had electrical hazards secured and out of reach. This could be due to the level of importance that the schools place on this rule.

Most of the playground’s vegetation was in good condition, not thorny or toxic. The elementary school’s had typical vegetation that didn’t offer much in the play space. Of the elementary schools, Midvale Elementary School offered the best vegetation. Additionally, this was the only elementary playground that provided shade around and within the asphalt play area. This is unfortunate because blacktop can get hot in the sun

and is where the active games like basketball and four-square are. The nature explore classrooms had the greatest amount and variety of vegetation. This protected many areas of the playgrounds from the sun and would allow the children to retreat to cool down on a hot day. Sun protection wasn't a rule on the safety evaluation, but it is a concern to consider when designing outdoors.

Most of the elementary school playgrounds were made of steel products coated with a colored primer. Sunrise Elementary School was the only playground with a metal slide. Granite Elementary School had a portion of their playground that featured bare steel monkey bars, balance beams, and swings. The nature explore classrooms used more natural materials for their equipment and had few metal materials. Endeavor and Guadalupe Elementary Schools playgrounds main structures were rope based equipment. Each equipment type faced safety issues, but the net-based structures showed the least amount of problems. This could be due to the age of these structures, the materials used for them, or the amount of time that the children use them. Most of the issues found of the play structures were minor and could be fixed through constant maintenance.

All the elementary school playgrounds, except for Guadalupe, had vandalism. The vandalism on Granite and Sunrise Elementary Schools were on the green rock wall only where the material is soft and easily markable. The nature explore classrooms didn't have any vandalism. One explanation for the nature explore classrooms not having vandalism is because the children are encouraged to create and make art in specific play spaces. Additionally, the children are younger than elementary school ages and might not consider vandalizing the playground and the kids are always watched when using the playground. Because the elementary playgrounds are public, they can be visited outside

of school hours and supervision which is when the vandalism likely occurs. The nature explore classrooms are not public and do not face this issue.

Most of the elementary playgrounds have surfacing less than 12” deep but they have tall fall ratings. All but one of the elementary playgrounds, Endeavor, have tears/gaps or displaced material in their surfacing. Every elementary playground, except for Guadalupe, has appropriate surface material 6’ from all play equipment and the required amount around the swings. The nature explore classrooms don’t have many fall zones. Little Brigham Aggies Play Garden has an insufficient fall zone around the boulder slide and balance logs. As stated earlier, this is the greatest safety issue found on the nature explore classrooms.

The elementary schools had displaced surface material and the nature explore classrooms did not. The elementary schools surfaces receive different wear than the nature explore classrooms. Most of the displaced material was around highly active play components like swings or the twirl bars. The lack of displacement in the nature explore classrooms could be due to constant maintenance or the play activities not being as stressful on the surface materials.

Three of the playgrounds had worn spots in the grass that had turned into mud piles or low spots. The collections of water present on the elementary playgrounds were mostly on the asphalt play areas. Neither of the nature explore classrooms had collections of water.

Guadalupe Elementary School, SLCC Nature Playground, and Little Brigham Aggies Play Garden were the only playgrounds with portable toys. Guadalupe’s were not in good condition. This could be partly due to Guadalupe’s toys being left on the

playground to weather the elements while SLCC Nature Playground's and Little Brigham Aggies Play Garden's toys were stored in a shed on site.

Summary

In conclusion, each playground faced safety issues, and most could be fixed through consistent maintenance, though there were some hazards that would require greater measures to fix. The elementary playgrounds experienced different problems than the nature explore classrooms mostly because of the difference in materials and play activities. There were three types of playground structures and materials; traditional steel-enameled equipment, rope-based equipment, and natural-material based equipment. Each had issues, though the rope-based equipment had the least amount. The age of the playground seemed to be correlated to the wear and number of safety problems. Additionally, within the elementary playgrounds the professionally installed play structures were safer than play equipment like the small playground area and portable toys of Guadalupe Elementary School. The nature explore classrooms had portable toys and some equipment that they had installed themselves. These were well maintained and stored on site. Overall, both types of playgrounds need constant maintenance though the nature explore classrooms were better maintained.

When incorporating nature playground play spaces into an elementary school the likely safety concerns would be what occurs from the wear the play components would receive. Play features that would receive wear through high active use would have to be checked regularly, especially if the materials are natural and more likely to wear quicker than materials like steel. Both of the nature explore classrooms had additional play

materials that would be beneficial to include on an elementary playground, but these would need to be cared for more than regular playground equipment to maintain usability. Guadalupe Elementary School playground was a good example of what would happen to the toys if they were not properly stored and cared for. The nature explore classrooms storage and maintenance are great examples of how to care for the play materials. Additionally, making sure that the vegetation chosen for the gardens are not toxic or harmful in other ways would be important for safety. Through planning and maintenance, the natural playground play spaces can be incorporated into an elementary school playground without creating safety hazards that would endanger children as they play.

Americans with Disabilities Act Evaluation

The detailed evaluations for each playground can be found in Appendix C and Table 4.2 displays the accessibility scores for the evaluated playgrounds with abbreviated rule descriptions. All the playgrounds scored within 6 points of a perfect score of 50/50, with the lowest being Guadalupe Elementary School and the highest being Endeavor Elementary School. There are two possible reasons for the scores of the playgrounds being so high. First, the evaluation tool is not be sensitive enough to measure the accessibility of the playgrounds. Second, the playgrounds have been purposefully designed to meet the minimum standards for accessibility. This study proceeds believing the second statement because the playgrounds should be meeting these requirements and most of the requirements must be met at the building of the playground with little seen changes over time. The following sections will review the elementary school

Table 4.2

Accessibility Scores for Evaluated Playgrounds

ADA Requirement	Granite	Sunrise	Endeavour	Midvale	Redwood	Guadalupe	SLCC	Aggies	Rule Total
Ground Level Accessible Routes									
Rule 1: Routes comply with surface standards	0	1	1	1	1	1	1	1	7
Rule 2: Route is at least 60" wide	1	1	1	1	1	1	0	1	7
Rule 3: Openings on routes comply to standards	1	1	1	1	1	1	1	1	8
Rule 4: Vehicle changes comply to standards	1	1	1	1	1	1	1	1	8
Rule 5: Cross slopes comply to standards	1	1	1	1	1	1	1	1	8
Rule 6: Route is free of protrusions	1	1	1	1	1	1	1	1	8
Rule 7: Route connects to arrival and other site features	1	1	1	1	1	1	1	1	8
Rule 8: Route connects to each play area	0	0	1	1	1	0	0	0	3
Rule 9: Route connects to entry and exit of at least one of each type of ground level play component	0	1	1	1	1	0	0	1	5
Rule 10: There is a transfer access to at least 50% of the elevated components	0	0	1, n/a	0	0	0	1, n/a	1, n/a	3
Rule 11: No objects protrude into the route	1	1	1	1	1	1	1	1	8
Elevated Level Accessible Routes									
Rule 12: Surface is firm, stable, and slip resistant	1	1	1, n/a	1	1	1, n/a	1, n/a	1, n/a	8
Rule 13: The route is at least 36" wide	0	1	1, n/a	1	1	1, n/a	1, n/a	1, n/a	7
Rule 14: There is a passageway space if required	1, n/a	1, n/a	1, n/a	1, n/a	1, n/a	1, n/a	1, n/a	1, n/a	8
Rule 15: Grates/openings comply with standards	1	1	1, n/a	1	1, n/a	1, n/a	1, n/a	1, n/a	8
Rule 16: Level changes comply with standards	1	1	1, n/a	1	1	1, n/a	1, n/a	1, n/a	8
Rule 17: Cross slopes comply with standards	1	1	1, n/a	1	1	1, n/a	1, n/a	1, n/a	8
Ramp Landings									
Rule 18: At least 60" long and as wide as the ramp	1, n/a	1, n/a	1, n/a	1, n/a	1, n/a	1, n/a	1, n/a	1, n/a	8
Rule 19: The slope is no steeper than 1:48	1, n/a	1, n/a	1, n/a	1, n/a	1, n/a	1, n/a	1, n/a	1, n/a	8
Rule 20: There is a landing if the ramp changes directions	1, n/a	1, n/a	1, n/a	1, n/a	1, n/a	1, n/a	1, n/a	1, n/a	8
Handrails									
Rule 21: Gripping surface is the right height	1	1	1, n/a	1	1	1, n/a	1, n/a	1	8
Rule 22: Circular: Gripping surface is the right dimensions	1	1	1, n/a	1	1	1, n/a	1, n/a	1	8
Rule 23: Non-Circular: gripping surface is the right dimensions	1, n/a	1, n/a	1, n/a	1, n/a	1, n/a	1, n/a	1, n/a	1, n/a	8
Rule 24: Cross sections is no greater than 2.25"	1	1	1, n/a	1	1	1, n/a	1, n/a	1	8
Rule 25: Surface is continuous and not obstructed	1	1	1, n/a	1	0	1, n/a	1, n/a	1	7
Rule 26: Min of 1.5" between the gripping surface and adjacent surfaces	1	1	1, n/a	1	0	1, n/a	1, n/a	1	7
Rule 27: Handrail extends beyond ramp	1, n/a	1, n/a	1, n/a	1, n/a	1, n/a	1, n/a	1, n/a	1	8
Rule 28: Ramp surface extends beyond the inside face of the handrail surface	1, n/a	1, n/a	1, n/a	1, n/a	1, n/a	1, n/a	1, n/a	0	7

Note: n/a= not applicable

Table 4.2 cont.

Accessibility Scores for Evaluated Playgrounds

ADA Requirement	Granite	Sunrise	Endeavour	Midvale	Redwood	Guadalupe	SLCC	Aggies	Rule Total
Ramps									
Rule 29: If there are 20 or more elevated play components, there is a ramp to at least 25% of the components	1; n/a	1; n/a	1; n/a	1; n/a	1; n/a	1; n/a	1; n/a	1; n/a	8
Rule 30: Openings comply to standards	1; n/a	1; n/a	1; n/a	1; n/a	1; n/a	1; n/a	1; n/a	1	8
Rule 31: At least 36" wide	1; n/a	1; n/a	1; n/a	1; n/a	1; n/a	1; n/a	1; n/a	1	8
Rule 32: Level changes comply with standards	1; n/a	1; n/a	1; n/a	1; n/a	1; n/a	1; n/a	1; n/a	1	8
Rule 33: Cross slopes comply with standards	1; n/a	1; n/a	1; n/a	1; n/a	1; n/a	1; n/a	1; n/a	1	8
Rule 34: Running slope is no greater than 1:12	1; n/a	1; n/a	1; n/a	1; n/a	1; n/a	1; n/a	1; n/a	1	8
Rule 35: If running slope is greater than 1:20, there are handrails	1; n/a	1; n/a	1; n/a	1; n/a	1; n/a	1; n/a	1; n/a	1	8
Rule 36: Rise of the ramp connecting play components is no greater than 12"	1; n/a	1; n/a	1; n/a	1; n/a	1; n/a	1; n/a	1; n/a	1; n/a	8
Rule 37: If rise is her than 6" there are handrails	1; n/a	1; n/a	1; n/a	1; n/a	1; n/a	1; n/a	1; n/a	0	7
Transfer Systems									
Rule 38: Top of platform meets standard heights	1	1	1; n/a	1	1	1; n/a	1; n/a	1; n/a	8
Rule 39: Platform is at least 14" deep and 24" wide	1	1	1; n/a	1	1	1; n/a	1; n/a	1; n/a	8
Rule 40: Steps comply with standards	1	1	1; n/a	1	1	1; n/a	1; n/a	1; n/a	8
Rule 41: The transfer space complies to standards	1	1	1; n/a	1	1	1; n/a	1; n/a	1; n/a	8
Rule 42: There is a means of support for transferring	1	1	1; n/a	1	1	1; n/a	1; n/a	1; n/a	8
Play Components									
Rule 43: There is at least one of each play type on the route	1	1	1	1	1	1	0	1	7
Rule 44: There is the right ratio of ground level to elevated play components	1	0	1; n/a	1	1	1	1; n/a	1; n/a	7
Rule 45: There is clear space for turning in a wheelchair	1	1	1	1	1	1	0	1	7
Rule 46: Swings have clear space	1	0	1; n/a	1; n/a	1	0	1; n/a	1; n/a	6
Rule 47: The space at each play component on the route complies to standards	1	1	1	1	1	1	1	1	8
Rule 48: Play table tops comply to standards	1; n/a	1; n/a	1; n/a	1; n/a	1; n/a	1	1; n/a	1	8
Rule 49: Play tables have the required knee space	1; n/a	1; n/a	1; n/a	1; n/a	1; n/a	0	1; n/a	0	6
Rule 50: Components that require transfer comply to standards	1	1	1; n/a	1; n/a	1; n/a	0	1; n/a	1; n/a	7
Playground Total Score	44	28	13	29	27	13	8	25	

Note: n/a= not applicable

playgrounds, nature explore classrooms, similarities and differences between the playgrounds, and then conclude with a summary.

Elementary Playgrounds

Granite Elementary School scored a 45/50. Sunrise Elementary School got a 46/50. Endeavour Elementary School got a 50/50. Midvale Elementary School got a 49/50. Redwood Elementary School got a 47/50. Guadalupe Elementary School got a 44/50.

The ADA issues found on the elementary playgrounds were few but impactful. The common issues were displaced surface materials, play areas not being connected to the accessible route, and there was no/little access to the required 50% of the elevated play components. Overall, the elementary playgrounds scored high on the safety evaluations, but this did not mean that the play components were conducive to those with disabilities. The playgrounds met the minimum ADA requirements and did not consider play components that are ADA friendly. This does not show in the ADA evaluation, because it isn't a requirement.

Endeavour Elementary School received the highest score. It met all the requirements for the ADA evaluation sheet but might be the hardest playground for those with disabilities to use. The main play structure is net-based and not conducive to disabled users. Guadalupe Elementary School's main playground faces the same issue. Though, Guadalupe Elementary School didn't receive a perfect score because the small playground was not ADA friendly.

Sunrise Elementary School received a high score, but the play opportunities that

one with disabilities can participate in are few because of the rules the playground failed to meet. There was less than 50% of the elevated play components on the elevated accessible route, each play area was not connected to the accessible route, and there were not enough ground play components to the number of elevated play components. This doesn't leave many play options for disabled users.

There are no accessible ramps to the elevated play components on any of the playgrounds. Instead, there are transfer steps, and these only provide access to the play components that are smaller and appeal to younger ages. The elevated accessible routes don't include the taller and more adventurous play components.

Additionally, for the playgrounds with elevated components there is not accessibility to the required 50% of the elevated components. Though all, but Sunrise, have the right ratio of ground components to elevated components. The first rule shows that those with disabilities are limited in the parts of the playground they can access and participate in. Those with disabilities would not have the same amount of opportunities to engage in developmental affordances as those who are not physical constrained.

Nature Explore Classrooms

SLCC Nature Playground got a 45/50. Little Brigham Aggies Play Garden got a 46/50. These scores are lower than half of the elementary school playgrounds. The SLCC Nature Playground did not provide wide enough paths to all the play areas. There was adequate access to more of the passive play areas but little to the active play areas. This limits the ability for one with disabilities to engage in many of the play activities throughout the playground. Little Brigham Aggies Play Garden did not provide access to

the sand area, did not meet required dimensions on the ramp and play tables, and did not have railings on both sides of the ramp. Even though this playground received almost the same score as the SLCC Natural Playground, this playground is friendlier to those with disabilities. For the most part, someone in a wheelchair could move around the whole playground and have opportunities to engage in almost all the play activities. For the most part, the play areas that are accessible in both playgrounds can be engaged with from the wheelchair. The spaces don't require the child to transfer out of their wheelchair to participate.

Similarities and Difference

Most of the playgrounds, except SLCC Nature Playground, provide ADA entrances and exits to the different parts of the playground but don't really consider accessibility within the playground. With most of the elementary playgrounds having little elevation change, it is easy for someone in a wheelchair to move around the playground, but the play components are not conducive to those with disabilities. These were components like the rock walls, climbing net structures, and the twirl bars. The main structures of Endeavor and Guadalupe Elementary Schools are rope based and would be hard for someone with disabilities to use. The play components that can be accessed on the nature explore classrooms are more passive than active play activities; these are the art areas, gathering spaces, and gardens.

The elementary school playgrounds have little change in slope. The nature explore classrooms have elevation change along the accessible routes, but not to where it would be too difficult for someone in a wheelchair to get around.

A large portion of the ADA requirements are for the elevated access route and play components. Endeavour Elementary School, Guadalupe Elementary School's main play structure, SLCC Natural Playground, and Little Brigham Aggies Play Garden don't have elevated play components and therefore those rules do not apply to these playgrounds.

Summary

In conclusion, the playgrounds met most of the ADA requirements but meeting the requirements does not mean that it is an inclusive playground. There are play components along the accessible route, but someone with disabilities would have a hard time using them. ADA users would use the elementary playgrounds differently than the nature explore classrooms. To engage in the main play structures of the elementary school playgrounds it would require transferring from the wheelchair onto the play component. The play areas that are accessible in the nature explore classrooms can be engaged with from the wheelchair. Additionally, these opportunities support many of the developmental affordances. Overall, both types of playgrounds meet most of the minimum ADA requirements, but the nature explore classrooms provide more play opportunities that are friendly to ADA users.

When incorporating natural playground play spaces into an elementary school playground the likely ADA issues would be the accessibility to the natural play features. The pathways would need to be ADA materials and wide enough. Play features would need to be designed to allow ADA access. For example, the garden boxes would need to allow a wheelchair to pass between them and have a reach height that the child could

engage at. The play features should meet ADA requirements and should also consider how a child in a wheelchair would use the play component. This would allow more than the minimum ADA requirements to be met and would open play opportunities up to a child in a wheelchair. Through careful planning and consideration, the natural playground play spaces can accommodate ADA accessibility and allow these children to engage and develop the affordances.

Developmental Affordances Evaluation

The detailed evaluations for each playground can be found in Appendix C, Table 4.3 displays the number of play components for each developmental affordance, and Table 4.4 displays the evaluated playgrounds developmental affordances compositions. The Developmental Affordance Opportunities table shows the number of play components that support the developmental affordances. The Developmental Affordance Composition shows the percent that the affordance is supported in the playground as either a primary or secondary affordance. Both tables include an average for each affordance. The averages for the elementary school playgrounds were calculated separately from the nature explore classrooms to allow for comparison. The averages of the primary and secondary affordances were then added together to analysis the developmental opportunities overall. The conclusions stated throughout this section are drawn from Table 4.3 and are about the primary affordance(s) unless stated otherwise. The following sections will review the elementary school playgrounds, nature explore classrooms, similarities and differences between the playgrounds, and then conclude with a summary.

Table 4.3
Number of Play Components and Averages for the Developmental Affordances of the Evaluated Playgrounds

Developmental Affordance	Granite		Sunrise		Endeavor		Midvale		Redwood		Guadalupe		SLCC		Little Aggies		Pri Avg		Sec Avg		Com Avg	
	Pri	Sec	Pri	Sec	Pri	Sec	Pri	Sec	Pri	Sec	Pri	Sec	Pri	Sec	Pri	Sec	Elem	NEP	Elem	NEP	Elem	NEP
Physical Domain																						
Gross Motor	42	1	39	1	16	3	43	1	30	1	32	0	62	12	46	8	33.7	54.0	1.2	10.0	34.8	64.0
Fine Motor	5	11	1	11	4	6	4	12	0	5	14	8	56	18	43	16	4.7	49.5	8.8	17.0	13.5	66.5
Social-Emotional Domain																						
Self-Awareness	1	11	1	9	3	3	2	8	1	2	4	9	16	19	17	22	2.0	16.5	7.0	20.5	9.0	37.0
Self-Management	1	10	1	10	0	7	1	11	0	5	1	10	9	11	8	16	0.7	8.5	8.8	13.5	9.5	22.0
Social-Awareness	1	9	0	8	1	8	0	13	1	4	3	17	9	57	12	44	1.0	10.5	9.8	50.5	10.8	61.0
Relationship Skills	19	11	16	11	19	3	22	11	12	9	25	7	70	13	54	12	18.8	62.0	8.7	12.5	27.5	74.5
Responsible Decision Making	5	2	5	2	3	4	6	4	3	2	7	10	15	30	16	20	4.8	15.5	4.0	25.0	8.8	40.5
Communication Domain																						
Receptive Communication	2	10	2	10	2	10	3	14	2	8	4	11	7	25	16	20	2.5	11.5	10.5	22.5	13.0	34.0
Expressive Communication	3	22	2	18	0	14	3	27	0	16	5	24	26	51	21	37	2.2	23.5	20.2	44.0	22.3	67.5
Pragmatic Communication	18	15	15	12	16	1	18	16	10	10	25	8	60	32	50	19	17.0	55.0	10.3	25.5	27.3	80.5
Cognitive Domain																						
Recent Memory	2	5	2	6	1	6	2	7	1	5	3	9	4	13	4	13	1.8	4.0	6.3	13.0	8.2	17.0
Language	2	6	2	6	3	5	2	11	1	5	3	12	8	25	15	18	2.2	11.5	7.5	21.5	9.7	33.0
Visuospatial	23	9	22	7	10	5	27	8	18	5	13	6	27	30	25	16	18.8	26.0	6.7	23.0	25.5	49.0
Executive Fu.	14	17	14	13	10	9	16	13	7	9	19	6	55	46	49	35	13.3	52.0	11.2	40.5	24.5	92.5
Sensory Domain																						
Visual	0	6	0	3	2	6	1	7	0	2	3	15	21	52	11	38	1.0	16.0	6.5	45.0	7.5	61.0
Vestibular	21	10	20	8	9	2	18	12	12	6	17	2	18	3	17	3	16.2	17.5	6.7	3.0	22.8	20.5
Proprioceptive	23	9	20	9	7	3	25	7	16	5	13	10	21	8	22	9	17.3	21.5	7.2	8.5	24.5	30.0
Tactile	4	1	0	2	3	4	4	0	0	1	10	3	55	10	35	6	3.5	45.0	1.8	8.0	5.3	53.0
Auditory	0	2	0	1	0	3	0	2	0	1	0	2	6	23	4	8	0.0	5.0	1.8	15.5	1.8	20.5
Taste	0	0	0	0	0	0	1	0	0	0	0	0	5	0	8	0	0.2	6.5	0.0	0.0	0.2	6.5
Olfaction	0	0	0	0	0	1	1	0	0	0	1	0	8	12	10	5	0.3	9.0	0.2	8.5	0.5	17.5

Note: Pri = Primary Developmental Affordance(s); Sec = Secondary Developmental Affordance(s); Pri Avg = Primary Affordances Average; Sec Avg = Secondary Affordances Average; Com Avg = Combined Primary and Secondary Average; Elem = Elementary School Playgrounds; NEP = Nature Explore Classrooms; Executive Fu. = Executive Functioning

Table 4.4
Evaluated Playground's Developmental Affordances Composition

Developmental Affordance	Granite		Sunrise		Endeavor		Midvale		Redwood		Guadalupe		SLCC		Little Aggies		Pri Avg		Sec Avg		Com Avg	
	Pri	Sec	Pri	Sec	Pri	Sec	Pri	Sec	Pri	Sec	Pri	Sec	Pri	Sec	Pri	Sec	Elem	NEP	Elem	NEP	Elem	NEP
Physical Domain																						
Gross Motor	88%	2%	87%	2%	73%	14%	88%	2%	86%	3%	55%	0%	58%	11%	51%	9%	79%	55%	4%	10%	83%	65%
Fine Motor	10%	23%	2%	24%	18%	27%	8%	24%	0%	14%	24%	14%	52%	17%	48%	18%	11%	50%	21%	17%	32%	67%
Social-Emotional Domain																						
Self-Awareness	2%	23%	2%	20%	14%	14%	4%	16%	3%	6%	7%	16%	15%	18%	19%	24%	5%	17%	16%	21%	21%	38%
Self-Management	2%	21%	2%	22%	0%	32%	2%	22%	0%	14%	2%	17%	8%	10%	9%	18%	1%	9%	21%	14%	23%	23%
Social-Awareness	2%	19%	0%	18%	5%	36%	0%	27%	3%	11%	5%	29%	8%	53%	13%	49%	2%	11%	23%	51%	26%	62%
Relationship Skills	40%	23%	36%	24%	86%	14%	45%	22%	34%	26%	43%	12%	65%	12%	60%	13%	47%	63%	20%	13%	68%	75%
Responsible Decision Making	10%	4%	11%	4%	14%	18%	12%	8%	9%	6%	12%	17%	14%	28%	18%	22%	11%	16%	10%	25%	21%	41%
Communication Domain																						
Receptive Communication	4%	21%	4%	22%	9%	45%	6%	29%	6%	23%	7%	19%	7%	23%	18%	22%	6%	12%	26%	23%	33%	35%
Expressive Communication	6%	46%	4%	40%	0%	64%	6%	55%	0%	46%	9%	41%	24%	48%	23%	41%	4%	24%	49%	44%	53%	68%
Pragmatic Communication	38%	31%	33%	27%	73%	5%	37%	33%	29%	29%	43%	14%	56%	30%	56%	21%	42%	56%	23%	26%	65%	81%
Cognitive Domain																						
Recent Memory	4%	10%	4%	13%	5%	27%	4%	14%	3%	14%	5%	16%	4%	12%	4%	14%	4%	4%	16%	13%	20%	17%
Language	4%	13%	4%	13%	14%	23%	4%	22%	3%	14%	5%	21%	7%	23%	17%	20%	6%	12%	18%	22%	23%	34%
Visuospatial	48%	19%	49%	16%	45%	23%	55%	16%	51%	14%	22%	10%	25%	28%	28%	18%	45%	27%	16%	23%	62%	49%
Executive Functioning	29%	35%	31%	29%	45%	41%	33%	27%	20%	26%	33%	10%	51%	43%	54%	39%	32%	53%	28%	41%	60%	94%
Sensory Domain																						
Visual	0%	13%	0%	7%	9%	27%	2%	14%	0%	6%	5%	26%	20%	49%	12%	42%	3%	16%	15%	45%	18%	61%
Vestibular	44%	21%	44%	18%	41%	9%	37%	24%	34%	17%	29%	3%	17%	3%	19%	3%	38%	18%	15%	3%	54%	21%
Proprioceptive	48%	19%	44%	20%	32%	14%	51%	14%	46%	14%	22%	17%	20%	7%	24%	10%	41%	22%	16%	9%	57%	31%
Tactile	8%	2%	0%	4%	14%	18%	8%	0%	0%	3%	17%	5%	51%	9%	39%	7%	8%	45%	5%	8%	13%	53%
Auditory	0%	4%	0%	2%	0%	14%	0%	4%	0%	3%	0%	3%	6%	21%	4%	9%	0%	5%	5%	15%	5%	20%
Taste	0%	0%	0%	0%	0%	0%	2%	0%	0%	0%	0%	0%	5%	0%	9%	0%	0%	7%	0%	0%	0%	7%
Olfaction	0%	0%	0%	0%	0%	5%	2%	0%	0%	0%	2%	0%	7%	11%	11%	6%	1%	9%	1%	8%	1%	18%

Note: Pri = Primary Developmental Affordance(s); Sec = Secondary Developmental Affordance(s); Pri Avg = Primary Affordances Average; Sec Avg = Nature Explore Classroom Primary Affordances Average; Com Avg = Combined Primary and Secondary Affordances Average; Elem = Elementary School Playgrounds; NEP = Nature Explore Classrooms

Elementary Playgrounds

Granite Elementary School had play opportunities for most of the developmental affordances except for visual, auditory, taste, and olfaction. There were 5-1 play opportunities for fine motor, self-awareness, self-management, social-awareness, responsible decision making, receptive communication, expressive communication, recent memory, and language. The playground scored above the elementary school average in gross motor, fine motor, self-management, relationship skills, responsible decision making, pragmatic communication, expressive communication, recent memory, executive functioning, visuospatial, vestibular, tactile, and proprioceptive skills. The playground scored below average for self-awareness, receptive communication, language, visual, taste, and olfaction. The playground scored the average for social-awareness and auditory.

Sunrise Elementary School had play opportunities for most of the developmental affordances except for social-awareness, visual, tactile, auditory, taste, and olfaction. There were 5-1 play opportunities for fine motor, self-awareness, self-management, responsible decision making, receptive communication, expressive communication, recent memory, and language. The playground scored above the elementary school average in gross motor, self-management, responsible decision making, recent memory, visuospatial, executive functioning, vestibular, and proprioceptive. The playground scored below average for fine motor, self-awareness, social awareness, relationship skills, receptive communication, expressive communication, pragmatic communication, language, visual, tactile, taste, and olfaction. The playground scored the average for auditory skills.

Endeavor Elementary School had play opportunities for most of the developmental affordances except self-management, expressive communication, auditory, taste, and olfaction. There were 5-1 play opportunities for fine motor, self-awareness, social awareness, responsible decision making, receptive communication, recent memory, language, visual, and tactile. The playground scored above the elementary school average in self-awareness, relationship skills, recent memory, language, visual, and olfaction. Endeavor scored below the average for gross motor, fine motor, self-management, responsible decision making, receptive communication, expressive communication, pragmatic communication, visuospatial, executive functioning, proprioceptive, vestibular, taste, and tactile. The playground scored the average for social-awareness and auditory.

Midvale Elementary School had play opportunities for most of the developmental affordances except for social-awareness and auditory. There were 5-1 opportunities for fine motor, self-awareness, self-management, receptive communication, expressive communication, recent memory, language, visual, tactile, taste, and olfaction. The playground scored above the elementary school average in gross motor, self-management, relationship skills, receptive communication, expressive communication, pragmatic communication, recent memory, visuospatial, executive functioning, proprioceptive, taste, vestibular, tactile, and olfaction. The playground scored below the average in fine motor, social-awareness, responsible decision making, and language. The playground scored the average in self-awareness, auditory, and visual.

Redwood Elementary School did not have play opportunities for fine motor, self-management, expressive communication, visual, tactile, auditory, taste, and olfaction.

There were 5-1 opportunities for self-awareness, social-awareness, responsible decision making, receptive communication, recent memory, and language. The playground did not score above the elementary school average for any of the developmental affordances. The playground scored below the average in gross motor, fine motor, self-awareness, self-management, relationship skills, responsible decision making, receptive communication, expressive communication, pragmatic communication, recent memory, language, visuospatial, executive functioning, visual, vestibular, tactile, taste, and olfaction. The playground scored the average in social-awareness and auditory.

Guadalupe Elementary School had play opportunities for most of the developmental affordances except for auditory and taste. There were 5-1 play components that provide opportunities to develop self-awareness, self-management, social-awareness, receptive communication, expressive communication, recent memory, language, visual, and olfaction. The playground scored above the elementary school average in fine motor, self-awareness, self-management, social-awareness, relationship skills, responsible decision making, receptive communication, expressive communication, pragmatic communication, recent memory, language, executive functioning, visual, vestibular, tactile, taste, and olfaction. The playground scored below the average in gross motor, visuospatial, and proprioceptive. The playground scored the average in auditory, though there are not play spaces that encourage the use of either of these skills because the average score is 0%.

Overall, the elementary school playgrounds supported more play opportunities for the gross motor, relationship skills, pragmatic communication, visuospatial, executive functioning, vestibular, and proprioceptive affordances. There were three major parts to

each playground: the main play structure(s), asphalt game area, and open fields. Most of the play equipment was single person use that encourages the use of large muscles, spatial understanding, and the vestibular skills. The asphalt games and open fields encourage gross motor, social, and executive functioning activities. Throughout the playgrounds, there are only a few opportunities to use the other developmental skills.

The results for Sunrise Elementary School and Granite Elementary School are similar, which could be related to the fact that the main play structures of both playgrounds were by the same playground equipment company. The main play structure of Midvale Elementary School playground was from the same provider as Granite and Sunrise Elementary Schools, which can explain some of the similarities, but there are other play spaces that were incorporated in the playground that support the different affordances that Midvale Elementary School scored above on. For example, the community garden and type of vegetation throughout the playground encourage the use of fine motor, social-emotional, and sensory skills that some of the other playgrounds are lacking.

Endeavor Elementary School has a rope based main structure which encourages the use of fine motor, relationship skills, executive function, visual, and tactile skills. This playground had the least amount of play components, but this could be due to the two main net structures being considered one component instead of being broken apart as it was hard to differentiate between components and each piece built upon each other. For the most part, each component of the structure supports the same affordances which were gross motor, fine motor, self-awareness, relationship skills, pragmatic communication, visuospatial, executive functioning, vestibular, and proprioceptive skills.

Like Endeavor, Guadalupe Elementary School's main play structure is net-based and provides opportunities to use the associated developmental skills. The smaller playground provides more social-emotional, communication, and sensory experiences which is why Guadalupe Elementary school scored above average in these developmental affordances. These play spaces consisted of picnic benches, two playhouses, toy cars, a sand area, sand toys, and vegetation that encourages play activities. Without the small playground, the developmental opportunities would be similar to the other elementary schools.

Redwood Elementary School playground provided the least amount of play components for each affordance. This could be due to Redwood Elementary School not having enough funding to provide the play opportunities that are available at the other schools. The age of the playground could also be a factor. The equipment is older and the newer equipment on other playgrounds has been designed with recent research in developmental opportunities. Redwood Elementary School has few developmental opportunities for a lot of the affordances.

Nature Explore Classrooms

SLCC Nature Playground had play opportunities for every developmental affordance. There were 10-4 opportunities for self-management, social-awareness, receptive communication, recent memory, language, auditory, taste, and olfaction. The playground scored above the nature explore classroom average in gross motor, fine motor, self-management, relationship skills, expressive communication, pragmatic communication, visuospatial, executive functioning, visual, vestibular, auditory, and

tactile. The playground scored below the average in self-awareness, social-awareness, responsible decision making, receptive communication, language, proprioceptive, taste, and olfaction. The playground scored the average in recent memory.

Little Brigham Aggies Play Garden had play opportunities for every developmental affordance. There were 10-4 opportunities for self-management, recent memory, auditory, and taste. The playground scored above the nature explore classroom average in self-awareness, social-awareness, responsible decision making, receptive communication, language, proprioceptive, taste, and olfaction. The playground scored below the average in gross motor, fine motor, self-management, relationship skills, expressive communication, pragmatic communication, visuospatial, executive functioning, visual, vestibular, auditory, and tactile. The playground scored the average recent memory.

The SLCC Nature Playground had a lot of play spaces for building, exploring, and creating. The Little Brigham Aggies Play Garden had a lot of opportunities for building, socializing, and creating. None of the play spaces include the typical play equipment found on playgrounds, but consist of natural materials like tree stumps, vegetation, and sticks. These play spaces encourage open ended play. The play settings are diverse, which is one reason why there are many opportunities for all of the developmental affordances. Additionally, both provided play materials to enhance the play activities. Both this playground and Little Brigham Aggies Play Garden are rich in developmental opportunities, especially when compared to the elementary schools.

The space for Little Brigham Aggies Play Garden is smaller than that of the SLCC Nature Playground, but the playground still provides almost as many play

activities. The play spaces don't encourage as much exploration as the SLCC Natural Playground and there aren't as many different play spaces. With the given area though, the playground provides many opportunities for children to engage with natural materials that encourage many of the developmental affordances.

Similarities and Differences Between Playgrounds

Primary Affordance(s)

For the most part, the affordances that the elementary schools scored high for, compared to the other affordances, were the affordances that the nature explore classrooms also had high scores for. The nature explore classrooms do have a greater balance in providing for the other developmental affordances while the elementary schools don't. Additionally, the nature explore classrooms provided at least 4 play opportunities for each developmental affordance, while the elementary schools provided less than 4 or no opportunities for some of the developmental affordances.

The elementary school playgrounds didn't average a higher score than the nature explore classrooms in any of the developmental skills. They did average 1-5 play components below the nature explore classroom average in recent memory, vestibular, proprioceptive, and auditory. A couple of the elementary schools individually scored about 1-4 play components above the nature explore classrooms in visuospatial, vestibular, and proprioceptive.

Using table 4 (Developmental Affordances Composition) the elementary school playgrounds averaged higher than the nature explore classrooms in four of the developmental affordances; gross motor (24% difference), visuospatial (18% difference), vestibular (20% difference), and proprioceptive (19% difference). The nature explore

classrooms averaged higher than the elementary school playgrounds in sixteen of the developmental domains; fine motor (39% difference), self-awareness (12% difference), self-management (8% difference), social-awareness (9% difference), relationship skills (14% difference), responsible decision making (5% difference), receptive communication (6% difference), expressive communication (20% difference), pragmatic communication (14% difference), language (6% difference), executive functioning (21% difference), visual (13% difference), tactile (37% difference), auditory (5% difference), taste (7% difference), and olfaction (8% difference). Both have the same average for one of the developmental domains; recent memory (4% average).

The primary supported affordances by the elementary schools reflects past research: the elementary schools support higher percentages of gross motor activities than other affordances. The visuospatial, vestibular, and proprioceptive affordances are supported in many of the settings that encourage the use of gross motor skills, which could be a reason that the elementary schools averaged higher in these affordances. Most of the play components and spaces are typical play features. There were the play structures with equipment like slides, ladders, and rock walls. This was typically surrounded by play spaces for activities like hopscotch, basketball, and soccer. These play spaces support the developmental affordances that most of the elementary schools scored high on; gross motor, relationship skills, pragmatic communication, visuospatial, vestibular, and proprioceptive skills.

Though these play spaces are great for the development of these skills, they don't provide many opportunities for the use of the other developmental affordances. These opportunities are few and not intended as the primary affordance of the play components.

The elementary schools averaged less than 5 play components for fine motor, responsible decision making, and tactile. They averaged less than 3 play components in self-awareness, self-management, social-awareness, receptive communication, expressive communication, recent memory, language, visual, auditory, taste, and olfaction.

The nature explore classrooms support higher percentages of social-emotional, communication, cognitive, and sensory skills. As stated earlier, the nature explore classrooms were more balanced in providing opportunities for each developmental affordance. The play spaces within these playgrounds are not found on a traditional playground. The general spaces consisted of a gathering space, gardening area, art area, building area, exploration area, music area, sand area, water play area, hill area, and play spaces to interact with the vegetation and dirt. The playgrounds use natural materials to encourage play activities. Additionally, both playgrounds provided different materials that could be added to the play spaces; these consisted of materials like wheeled toys, sand toys, wood blocks, baby dolls, pool noodles, hula hoops, art materials, and sidewalk chalk. These materials encourage social interactions, self-exploration, fine motor development, and sensory experiences.

The nature explore classrooms scored lower in table 4 for gross motor skills because there is greater balance within these playgrounds for providing opportunities for all the developmental affordances. There are play spaces that encourage gross motor activities, but these are a smaller portion of the playground in comparison to the elementary schools.

All the elementary playgrounds offered asphalt games; hopscotch, funnel ball, basketball, etc. The nature explore classrooms offered sidewalk space for chalk art

encouraging children to make their own hopscotch and sidewalk games. This provides an open-ended play experience and unique opportunity for children to create their play.

These spaces were smaller and could only be used for smaller asphalt games. The elementary school playgrounds had bigger spaces for asphalt games which encourages different social and physical experiences. Both types of spaces are beneficial.

None of the elementary schools had auditory experiences while the nature explore classrooms included musical instruments, water play, and vegetation. The number of auditory play components in the nature explore classrooms are few, but this does not mean that these spaces are not providing enough opportunities for the development of auditory skills.

Granite, Sunrise, and Redwood Elementary Schools provided minimal vegetation that doesn't support many play activities. Guadalupe Elementary School provided vegetation that would encourage several of the developmental affordances. From the elementary schools, Endeavor and Midvale Elementary School provided the most vegetation that had the greatest potential in encouraging many of the developmental domains. Overall, the nature explore classrooms had the most vegetation that supported many of the developmental domains. The amount and type of vegetation was not recorded in the evaluation, which if included could have resulted in different averages for some of the affordances like fine motor, taste, tactile, olfaction, and relationship skills. The average would have been higher because each plant and different type of plant provides more opportunities for the developmental skills to be used. Vegetation encourages the use of the developmental skills that most of the playgrounds scored low on as can be seen through the results of the playgrounds that have supportive vegetation.

Secondary Affordances

The elementary school playgrounds averaged higher than the nature explore classrooms for vestibular as a secondary affordance. The nature explore classrooms averaged higher in all the other affordances. Some of the elementary schools individually scored 1-8 play components below the nature explore classrooms in vestibular and proprioceptive. This is similar to the primary affordances averages and as with the primary affordances, the nature explore classrooms support more secondary developmental opportunities.

Using Table 4.4, the elementary school playgrounds averaged higher than the nature explore classrooms in fine motor (4% difference), self-management (7% difference), relationship skills (7% difference), receptive communication (3% difference), expressive communication (5% difference), recent memory (3% difference), vestibular (12% difference), and proprioceptive (5% difference). The nature explore classrooms averaged higher than the elementary school playgrounds in gross motor (6% difference), self-awareness (5% difference), social-awareness (28% difference), responsible decision making (15% difference), pragmatic communication (3% difference), language (4% difference), visuospatial (6% difference), executive functioning (13% difference), visual (30% difference), tactile (3% difference), auditory (10% difference), and olfaction (6% difference). Both have the same average for taste, which is a 0%.

The secondary affordances show that there are play spaces within the playgrounds that encourage the developmental affordances that received lower scores as a primary affordance. The differences between the averages of the two types of playgrounds is smaller for the secondary affordances than the primary affordances. The affordances that

the elementary school playgrounds averaged higher for both primary and secondary affordances are vestibular and proprioceptive. The affordances that the nature explore classrooms averaged higher for both primary and secondary affordances are self-awareness, social-awareness, responsible decision making, pragmatic communication, language, executive functioning, visual, tactile, auditory, and olfaction. The elementary school playgrounds support gross motor activities, while the nature explore classrooms support more social, cognitive, and sensory experiences for many of the affordances.

Combined Primary and Secondary Averages

The nature explore classrooms scored higher in every affordance, except vestibular, for the combined average scores: 29.2 difference for gross motor, 53 difference for fine motor, 28 difference for self-awareness, 12.5 difference for self-management, 50.2 difference for social-awareness, 47 difference for relationship skills, 31.7 difference for responsible decision making, 21 difference for receptive communication, 45.2 difference for expressive communication, 53.2 difference for pragmatic communication, 8.8 difference for recent memory, 23.3 difference for language, 23.5 difference for visuospatial, 68 difference for executive functioning, 53.5 difference for visual, 5.5 difference for proprioceptive, 47.7 difference for tactile, 18.7 difference for auditory, 6.3 difference for taste, and 17 difference for olfaction. There was a 2.3 difference for vestibular in favor of the elementary school playground average. The nature explore classrooms had more play opportunities and materials that supported all the developmental domains.

Using table 4, the elementary school playgrounds scored higher than the nature

explore classrooms in gross motor (18% difference), recent memory (3% difference), visuospatial (13% difference), vestibular (33% difference), and proprioceptive (26% difference). This reflects the results of the primary affordances, except for the inclusion of recent memory. The nature explore classrooms scored higher than the elementary school playgrounds in fine motor (35% difference), self-awareness (17% difference), social-awareness (36% difference), relationship skills (7% difference), responsible decision making (20% difference), receptive communication (2% difference), expressive communication (15% difference), pragmatic communication (16% difference), language (11% difference), executive functioning (34% difference), visual (43% difference), tactile (40% difference), auditory (15% difference), taste (7% difference), and olfaction (16% difference). The difference between the percentages is greater in the combined averages than between just the primary affordance averages.

The nature explore classrooms provide more opportunities and are more balanced than the elementary school playgrounds. The conclusions provided in the results of the primary affordances are supported by the combined averages.

Summary

In conclusion, elementary school playgrounds mainly support a couple of the developmental affordances while the nature explore classrooms provide many opportunities for each affordance. Most of the play areas in the elementary schools supported gross motor, relationship skills, pragmatic communication, visuospatial, executive functioning, vestibular, and proprioceptive affordances. The elementary schools don't have as many play components that encourage the use of developmental

skills as the nature explore classrooms. Additionally, the nature explore classrooms have a better balance between the affordances and the number of play opportunities for each. Overall, the nature explore classrooms have more opportunities for developmental growth in each domain.

School Ranking

The schools were chosen by rank to see if there would be a difference in the results of the evaluation between high performing schools, low performing schools, and nature explore classrooms. The academic performance of the nature explore classrooms is unknown, though the SLCC Nature Playground is part of an accredited program.

The average for the safety evaluation was 25.8/34. The evaluation shows: the best performing school received one of the lowest scores, the two lowest scores were received by two of the low performing schools though the highest score was received by the other low performing school, and the nature explore classrooms both received scores above the average.

The average for the accessibility evaluation was 46.5/50. The evaluation shows: the highest score was received by one of the top performing schools though the other two schools scored lower than the average, the lowest score was received by a low performing school and the other two received scores higher than the average, and the nature explore classrooms both received scores below the average.

The differences in developmental opportunities does not show relation to the schools rank. The percentages of each affordance are more dependent on the type of playground and play components than the performance of the school.

In conclusion, the ranks of the schools do not seem to have a relation to the results of the evaluations. Other conditions are influencing the results. These could be the age of the playground, the amount of maintenance that the playground receives, or the resources available to the schools for their playground. For a correlation to be seen, there would need to be a larger pool of schools in the study. Additionally, evaluating an elementary school with a natural playground would remove the limitations in this study that result from evaluating early child care playgrounds.

Nature Playground Play Spaces List

The natural play spaces list is found in Appendix D. It provides natural play spaces that can be incorporated into an elementary playground. This can be used to ensure that there are developmental opportunities for each developmental affordance so that children can have access to play spaces that help them grow in each developmental domain.

This list was derived from the play spaces found in the nature explore classrooms and case studies in Robin Moore's (2014) and Rusty Keeler's (2008) books on natural playgrounds. The play spaces from the two nature explore classrooms were taken from the developmental affordances evaluation. The case studies in Robin Moore's (2014) book were playgrounds that were Nature Play and Learning Areas that were designed and built upon the guidelines that Robin Moore (2014) lays out in his book. The case studies in Rusty Keeler's (2008) book were master plan designs of natural playgrounds that Keeler designed.

Nature Explore Classrooms

The safety, ADA, and developmental affordances evaluations provide the background for the nature explore classrooms. The play spaces from both playgrounds are included in the nature playground play spaces list under their associated developmental affordance(s).

- Eccles Early Childhood Development Lab School Natural Playground, Salt Lake Community College (SLCC Nature Playground)
- Little Brigham Aggies Play Garden, Utah State University Brigham Early Care and Education Center

Robin Moore case studies. Robin Moore provides basic information and primary play settings for each case study. The primary play settings were incorporated into the nature playground play spaces list. For additional context and insight, the following information was included in this study for reference.

- Hill and Dales Nature Play Area, Kettering, Ohio – Primary settings are the entrances with bulletin boards, woodchip pathways, prepared loose parts, hand-tool station, child-created hideaways, fort-building places, small pond and creek for exploration. The major challenges for this playground were organizational support and concern the environment, child safety, and governmental approval.
- El Sereno Arroyo Playground, Los Angeles, California – Primary settings are the entry plaza, concrete perimeter walking path, natural play area, open lawn, picnic area, play equipment, fitness zone, decomposed granite hillside walking path, and mosaic artwork. An evaluation of the park revealed that is well visited and connected to the community. Additionally, the community reported higher levels of neighborhood satisfaction and safety. The major challenge this playground faced was gaining approval for the property to become a park.
- Teardrop Park (North), New York, New York – Primary settings are a shadbrush hill, tunnel, water play, slide hill, sand lot, sand cove, amphitheater, overlook, marsh (children's natural hideaway), lawn bowl, geologic section, beech grove, reading circle, ice wall, witchhazel dell, and diverse pathways. The major challenges for this playground are the restrictions of the physical

site; microclimate limitations and size of the property.

- North Canyon Nature Play and Learning Areas, SE Sublimity, Oregon – Primary settings are looped trails with adventure play pods with emphases on animal habitats to encourage games, physical activities, exploration, and play with loose parts. The major challenges for this playground were safety, maintenance issues, and creating unique design solutions.
- Nature Play Zone Indiana Dunes National Lakeshore, Lakeshore, Gary, Indiana – Primary settings have vegetation; dune grasses, grapevines, small oaks, cottonwoods, horsetail, and native species. The major challenge for this playground was getting rid of poison ivy.
- Marge and Charles Schott Nature PlayScape, Milford, Ohio – Primary settings are a stream, gathering terrace, pathways, wetland, hills, rocky places, tunnel, cave, fallen logs, forest and field habitats, willow tunnel, loose parts play, multipurpose lawn, seasonal vegetation, entrance pavilion with seating. The major challenge for this playground was making the users realize that there is risk involved in the play features and must be judged by the user.
- Fillmore Discovery Park, Holland, Missouri – Primary settings are a gravel parking area, gazebo with seating, restroom, natural playground structures, sledding hill, benches, fishing dock, and accessible trails. The major challenges were fundraising and maintenance issues with invasive plants.
- kidZone, North Carolina Zoological Park – Primary settings are an entry stick sculpture, stream, sand/dirt play, mud café, campfire circle, treetop trail, woodland exploration, animal habitat/fort building, artist cove, wildlife attraction pond, play house, grassy area, vegetable garden, and a music area. The major challenges for this playground were fundraising, organizational support, and helping parents see the value of play with nature.
- The Museum Backyard and Nature Club House, Santa Barbara, California – The primary settings are a boulder pathway, creek, bamboo poles for fort building, water course with hand pumps, stone plank with bridge, gathering on stumps, fallen log, and a stage. The major challenges were managing play materials and having to require an onsite employee.
- Blanchie Carter Discover Park, Southern Pines, North Carolina – The primary settings are naturalized equipment-based play areas, pathway system, open field, running track, vegetated hill, gazebo, bird blind, log cabin playhouse, council circle, vegetable garden, orchard, labyrinth, sandpit, and a picnic area. The major challenges were management, maintenance, and incorporating the playground into the school curriculum.

- The Arlitt Nature PlayScape, Cincinnati, Ohio – The primary settings are an entry way with seating and signage, vegetated edges, pathways, treehouse, multiuse lawn, grassy banks, decks, puppet-theater, tunnels, play niches, arbors, hammock, full body contact vegetation, gross motor settings, earth and sand play, loose parts, herb and butterfly garden, vegetable and flower garden, fruiting trees, stream, art projects, storage base, and observation areas. The major challenges were meeting campus design standards and funding. (Moore, 2014)

The common challenges that many of the case studies faced were funding, maintenance, organizational support, and concerns for safety (Moore, 2014). These are issues that the playgrounds have had to overcome. These are barriers that elementary schools will probably face if they want to incorporate nature playground play spaces. The maintenance challenge is supported by both the safety and ADA evaluations of this study. The funding, organizational support, and safety concerns are social barriers that are not explored in this study but would be an issue that would need to be addressed.

Rusty Keeler case studies. Rusty Keeler describes the design inspiration for the case studies that he presents. He does not provide any information regarding the functionality of the designs. The purpose of these is to offer ideas for the design of a natural playground. The following play spaces were included in the nature playground play spaces list.

- Preschool Play Meadow, Asheville, North Carolina – Special design features were an amphitheater, tunnel island, tree house playhouses, huge sand area, and water creek/pond.
- SoundGarden, East Setauket, New York – Special design features were a sound entrance way, soft gathering spot with benches and shade tent, a path network with sound incorporated into the design, thunder way, bamboo calypso corner, and giant metallophone.
- Playscape Plateau and Windscape, Syracuse, New York – Special design features were ornamental grass nook, poplar tree berm, lookout hill, dinosaur nest, storage shed, covered gazebo, huge log, and woods.

- Tribal Toddler Playscape, Cherokee, North Carolina – Special design features were trees and plantings, trike track, carved benches and sculptures, large sand area, seven-sided tree house, mini-smoky mountains, and corn row plateau.
- Elementary School Pocket Playscape, Ithaca, New York – Special design features were hill slide, seating, marimba music corner, benches throughout, 4 directions stone circle, small hill, nature trail, thornless raspberries, gathering gazebo, playhouse, sand and water play, and a mural.
- Natural Preschool Playscape, Sequim, Washington – Special design features were entrance gate, welcome trellis, mini-orchard, little village, the runway track, willow tunnel, arts spot, and a pumpkin patch and sensory garden.
- Summer and Winter Playscapes, Ontario, Canada – Special design features were giant hill, hill slide, sand area, playhouse, tire swing, circulation pathway, meadow maze, treehouse, gathering gazebo, hangout spots, and sports area. (Keeler, 2008)

In addition to the natural playground play spaces list, handouts were developed of five essential nature playground play spaces and the domain definitions. These were developed to provide easy access to 5 essential natural play spaces that can and should be incorporated into a playground because of the developmental benefits. Together, these five play spaces provide at least one opportunity for each developmental skill. These five play spaces were derived from the nature playground play spaces list and chosen because of the developmental opportunities that they offer individually and in comparison to each other. These handouts are an additive of the natural playground play spaces list and were developed to be easier and quicker to use and more in depth than the list. Including these five essential natural playground play spaces in an elementary playground will ensure that there are growth opportunities for each developmental affordance. Figures 4.1-4.5 are the handouts and the additional handouts are found in Appendix E.

Vegetable Garden

Natural Play Space



Vegetable gardens are a great opportunity for children to connect with plants and experience taking care of something that grows over time. The children get to interact with plants; feel, smell, taste, and see them change seasonally. Additionally, children get to participate in physical and social activities.

Supported Developmental Skills

Gross Motor
Fine Motor
Responsible Decision Making
Receptive Communication
Pragmatic Communication
Executive Functioning
Visual
Tactile
Taste
Olfaction

Potential Design Elements

- 1 Pathways
- 2 Materials Shed
Gardening Tools
- 3 Vegetable Beds
- 4 Orchard
- 5 Corn Rows
- 6 Gathering/Learning Area

Vegetable gardens provide a unique space for children to connect to and realize where their food comes from. There are educational and growth opportunities for the classroom and individual.

“The glory of gardening: hands in the dirt, head in the sun, heart with nature. To nurture a garden is to feed not just the body, but the soul.”

- Alfred Austin



Figure 4.1. Vegetable Garden, five essential natural play spaces handouts.

Music Area

Natural Play Space



Music areas provide a space for self-expression, cooperation, and sensory experiences. Music provides a way to discover, explore, and express through a medium that is different than typical methods of communication. Music areas are unique within a playground because it provides greater sensory than physical benefits.

Supported Developmental Skills

Fine Motor
Self-Awareness
Expressive Communication
Executive Functioning
Tactile
Auditory
Proprioceptive

Potential Design Elements

- 1 Drums
- 2 Chimes, Wind Chimes
- 3 Xylophone
- 4 Guitar
- 5 Jump on Sound Cushions
- 6 Bell Tower
- 7 Giant Metallophone
- 8 Jingle Bell Arch
- 9 Talk Tubes
- 10 Voice Cones

“Music is about communication, creativity and cooperation. By studying music in school, students have the opportunity to build on these skills, enrich their lives and experience the world from a new perspective.”

- President Bill Clinton



Figure 4.2. Music Area, five essential natural play spaces handouts.

Art Area

Natural Play Space



Art areas are a great opportunity for self-expression, communication, and tactile experiences. Here children can create and communicate what might not easily be expressed in words. They can gain confidence and learn talents that they have or could develop.

Supported Developmental Skills

Gross Motor
Fine Motor
Self-Awareness
Social-Awareness
Relationship Skills
Responsible Decision Making
Expressive Communication
Pragmatic Communication
Executive Functioning
Tactile

Potential Design Elements

- 1 Sidewalk Chalk Area
- 2 Seating/Benches
- 3 Art/Gathering Pergola
- 4 Picnic Tables
- 5 Art Materials
 - Twigs
 - Yarn and Ribbon
 - Stickers
 - Paints
 - Bubble Stuff
 - Markers

An art area within a playground provides a setting outside of the classroom for children to express, invent, and communicate freely.

“Art is unquestionably one of the purest and highest elements in human happiness. It trains the mind through the eye, and the eye through the mind. As the sun colors flowers, so does art color life.”

- John Lubbock

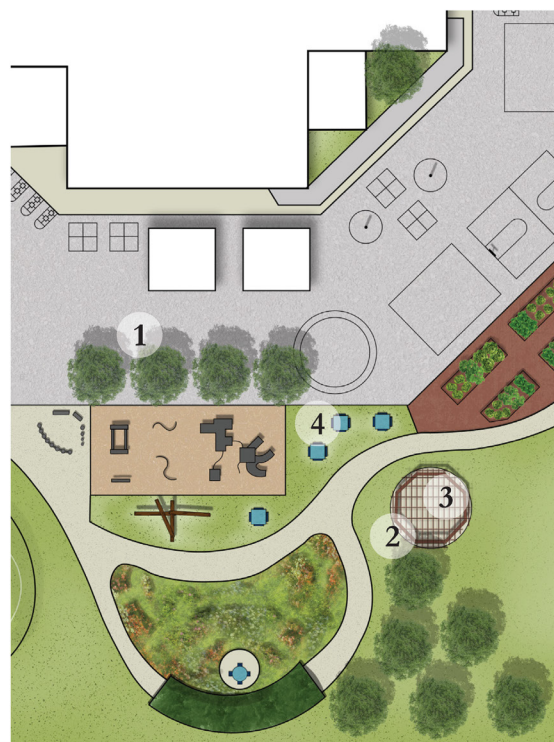


Figure 4.3. Art Area, five essential natural play spaces handouts.

Gathering/Learning Space

Natural Play Space



“This is the power of gathering: it inspires us, delightfully, to be more hopeful, more joyful, more thoughtful: in a word, more alive.”

- Alice Waters

Supported Developmental Skills

Fine Motor
Self-Awareness
Self-Management
Social-Awareness
Relationship Skills
Responsible Decision Making
Receptive Communication
Expressive Communication
Pragmatic Communication
Recent Memory
Language
Executive Functioning

Potential Design Elements

- 1 Wooden Dome/Gathering Focus
- 2 Garden Learning Space
- 3 Council Circle
- 4 Tables
- 5 Benches/Seating
- 6 Learning Materials
- 7 Art Materials

A gathering/learning space extends the classrooms into the playground as well as being a space to gather during play activities. It could be the base for social games, art activities, or dramatic play.

The space could have learning materials that could show the application of something that the class learned about in the classroom. These could be used by the classes or by an individual during recess.

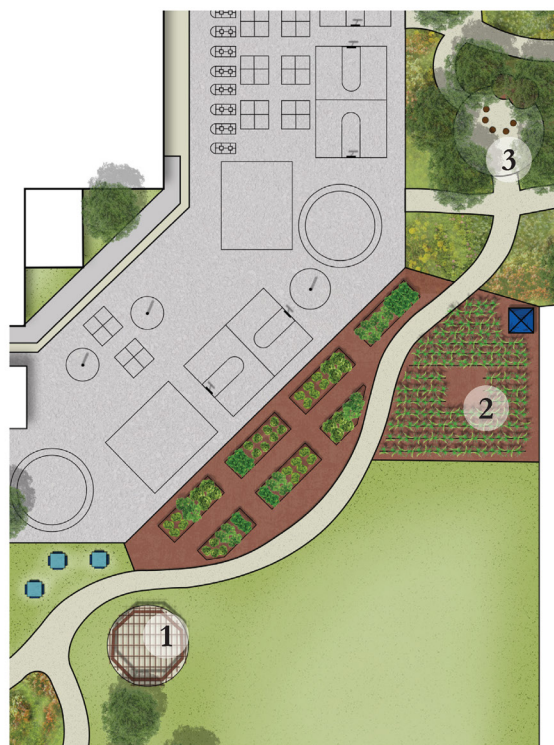


Figure 4.4. Gathering/Learning Space, five essential natural play spaces handouts.

Adventure Hill

Natural Play Space



An adventure hill provides many opportunities for physical and social activities, exploration, and observation. These can be used as a lookout spot or for rolling down. A hill encourages different physical activities than typical playground components or elements.

Supported Developmental Skills

Gross Motor
Fine Motor
Self-Awareness
Relationship Skills
Responsible Decision Making
Pragmatic Communication
Visuospatial
Executive Functioning
Visual
Vestibular
Proprioceptive
Tactile

Potential Design Elements

- 1 Grassy Hill(s)
- 2 Tunnels
- 3 Boulders
- 4 Tree Stumps
- 5 Vegetation on the Hill
- 6 Sledding Hill
- 7 Bridge
- 8 Slide Built into the Hill

Children are given the freedom to create how they interact with a hill. It provides countless possibilities for how it can be utilized for physical, dramatic play, and social activities.

“If you wish your children to think deep thoughts, to know the holiest emotions, take them to the woods and hills, and give them the freedom of the meadows; the hills purify those who walk upon them.”

- Richard Jefferies

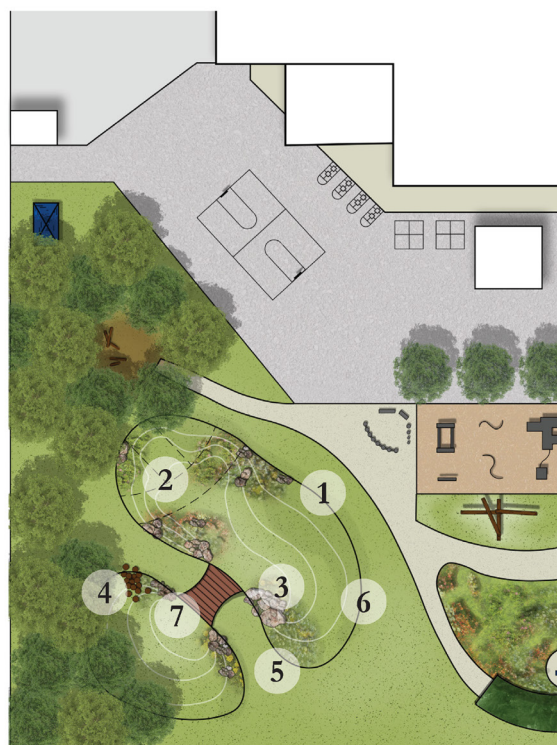


Figure 4.5. Adventure Hills, five essential natural play spaces handouts.

Playground Design Exploration

The playground design exploration aims to answer the fourth research question: how can these natural play spaces be incorporated into an existing elementary playground? One of the aimed users of the nature playground play spaces list are those who are looking at redesigning their existing elementary playground. The following section is a redesign of an existing elementary playground to show how the play spaces list can be used to introduce more developmental opportunities and enrich the play environment. The chosen playground from the design exploration was Sunrise Elementary School. This was one of the evaluated elementary school playgrounds from earlier in the study. It was chosen because of the lack of play opportunities for many of the developmental affordances.

The conclusions learned from the safety and ADA evaluation will be used during this design process. The safety concerns were the wear and storage of play features and materials and ensuring that the vegetation chosen does not pose safety issues. To address these issues, adequate storage will be located by the play spaces that require it. Because the design exploration does not dictate the specific vegetation that will be in a play space, the second issue is not applied during this process. Other designs would need to consider this issue. The ADA problems were making every play feature accessible and planning for access within the play components. To address these issues, pathways will be ADA accessible and play features will allow for accessibility.

The developmental affordances evaluation revealed that Sunrise Elementary School playground currently provides great play opportunities for are gross motor,

relationship skills, pragmatic communication, visuospatial, executive functioning, vestibular, and proprioceptive. The developmental affordances that the playground lacks play opportunities for are fine motor, self-awareness, self-management, social-awareness, responsible decision making, receptive communication, expressive communication, recent memory, language, visual, tactile, auditory, taste, and olfaction. The redesign introduces play spaces that encourage the developmental affordances that this playground is lacking.

The following steps were done in the design exploration process. (1) Using the basemap and site images (Figures 4.6-4.10), existing site features and play features layer were developed (Figure 4.11). The entrances into the school were noted to ensure access was maintained.



Note. 1 = Main playground structure; 2 = Open fields; 3 = Asphalt play area; 4 = Side playground area.

Figure 4.6. Before design exploration.



Figure 4.7. Main playground looking West.



Figure 4.8. Main playground looking Southeast.



Figure 4.9. Side playground area.



Figure 4.10. Asphalt play area.

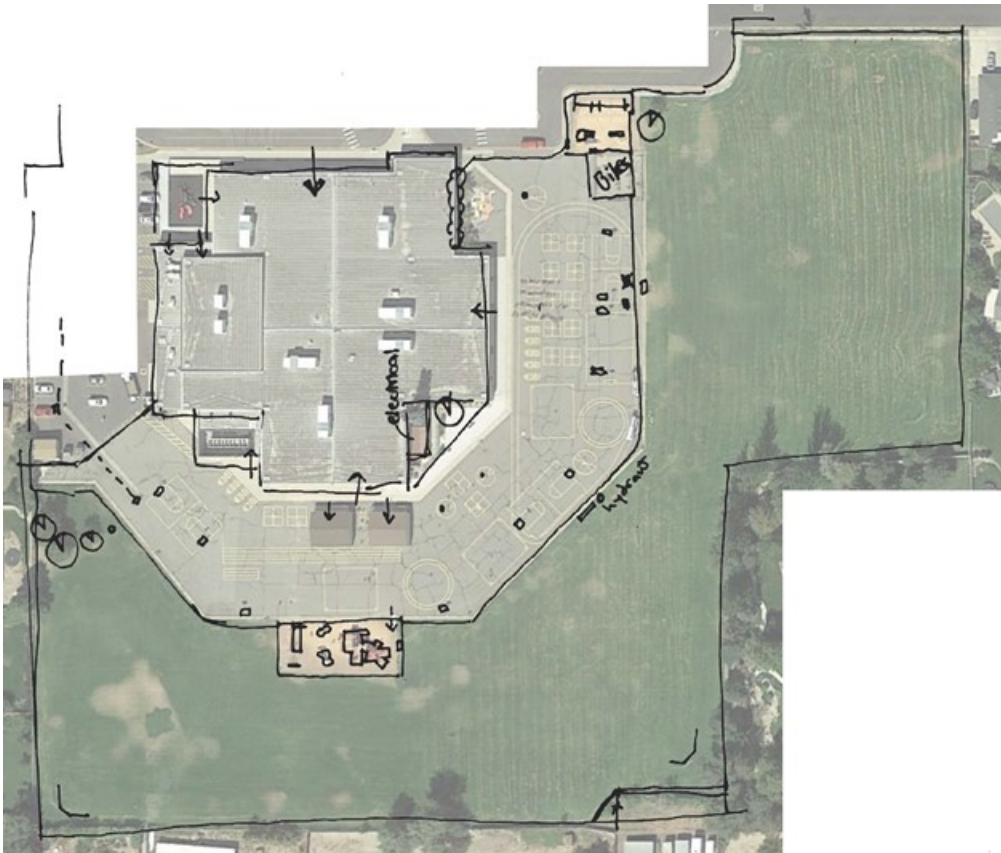


Figure 4.11. Existing site features.

Any site features were noted to ensure that they could be considered throughout the design process. These were the fenced electrical area, fire hydrants, benches, and bike racks. Any existing play features were noted so these could be incorporated into the design. These consisted of the main playground structure, small playground area, basketball courts and hoops, tetherball poles, baseball fence, fields, and the asphalt play area. (2) Using the Nature Playground Play Spaces List, a list of play spaces (Table 4.5) that could be incorporated into this playground was developed. (3) The play spaces were applied to the playground and after many iterations the final design (Figure 4.12) was finished. 4) The new design for Sunrise Elementary School was evaluated on the developmental affordances that it provided. The results are given in table 6.

Table 4.6 shows a comparison of the developmental affordance opportunities before and after the redesign of the playground. Before the redesign, Sunrise Elementary School playground mostly encouraged gross motor, relationship skills, pragmatic communication, visuospatial, executive functioning, vestibular, and proprioceptive skills.

With the redesign, the playground offers more than double the number of play opportunities. The lowest increases were gross motor (72% increase), visuospatial (82% increase), vestibular (65% increase), and proprioceptive (60% increase). The other developmental affordances increased more than 100%: fine motor (2700% increase), self-awareness (1500% increase), self-management (1100% increase), social-awareness (1400% increase), relationship skills (213% increase), responsible decision making (300% increase), receptive communication (350% increase), expressive communication (900% increase), pragmatic communication (173% increase), recent memory (200% increase), language (450% increase), executive functioning (279% increase), visual

Table 4.5
Introduced Play Spaces

Play Spaces	Map #	Supported Developmental Affordances	Play Spaces	Map #	Supported Developmental Affordances	Play Spaces	Map #	Supported Developmental Affordances
Hills	1	pg, seb, serm, cop, cv, ce, sb, sp, st	Playhouse with fence and trellises	15	pf, sea, sem, sesa, seb, serm, cor, coe, cop, cr, cl, ce, so	Clock	tp	cor, cl, ce
Small Open Grass Area	2	pg, pf, seb, serm, cop, ce, sb	wind chimes	tp	pf, sea, coe, ce, st, sau	puppet theater	tp	pf, seb, cop, cl
Boulders	tp	pg, seb, cop, cv, sb	wind wheel/wind sculpture	tp	ce, sv, sau	kitchen stuff	tp	pg, pf, sem, seb, ce, sp
Tree stumps	tp	pg, cv, ce, sb	Bird Habitat Gathering Space	16	pf, sesa, serm, ce	balls	tp	pg, seb, serm, cop, cv, ce, sb, sp
Bridge between hills	3	pg, seb, cop	Tree covered sidewalk chalk art area	17	pg, pf, sea, sesa, seb, serm, cop, coe, ce, st	jump ropes	tp	Pg, Sem, Seb, coe, cop, cv, ce, sb
Tunnels	4	pg, seb, serm, cop, cv, ce, sb, sp, st	artwork mosaic	18	cor, cv, sv, st	bug catcher	tp	pf, sesa, serm, coe, ce
Lookout spot	5	sea, sv	Gathering Space	tp	sea, sem, seb, cop, sv	scooters	tp	pg, sesa, seb, cop, cv, ce, sb, sp
Animal Habitat	tp	pf, sesa, serm, ce	Drums	19	pf, sea, coe, ce, st, sa	dolls, cradle	tp	pf, seb, sesa, coe, cop, ce
willow tunnel	6	pg, seb, cv, sp, st	xylophone	19	pf, sea, coe, ce, st, sa	bubble stuff	tp	pf, seb, coe, cop, ce, st
Trellis	tp	cv, sv, cop, st	chimes	19	pf, sea, coe, ce, st, sa	magnet wall	tp	pf, coe, cl, ce
Art Area - Wooden Structure Dome	7	pf, sea, sem, sesa, seb, serm, cor, coe, cop, cr, cl, ce	voice cone	19	pf, sea, coe, ce, st, sa	building materials	tp	pg, pf, sem, seb, ce, sp
Forest	8	pg, pf, seb, cop, st	Vegetation - seasonal change, textures, smells, Seating - log bench, boulders, benches, picnic tables	tp	pg, pf, seb, cop, sv, st	sidewalk chalk	tp	pf, sea, seb, coe, ce, sp, st
Fort Building Area	9	pg, pf, sem, seb, ce, sp	Seating - log bench, boulders, benches, picnic tables	tp	Pg, cv, Sb	art materials	tp	pg, pf, sem, seb, ce, sp, st
Fort building shed	10	sesa, coe, ce	water fountain	tp	sea, sc	Gardening Shed	24	sesa, coe, ce
Grass Pathway	11	pg, seb, serm, cv, ce, se, st, so	picnic area	20	pf, sea, Seb, coe, cop, cl, st, so	Gardening Tools	tp	pg, pf, sem, seb, ce, sp
Primary Circulation Pathway	12	pg, sem, seb, sesa, cop, cv, ce, sb	orchard	21	pg, sesa, seb, serm, cop, cv, sv, sc	Council circle gathering space	25	pf, sea, sem, sesa, seb, serm, cor, coe, cop, cr, cl, ce, so
Grasses	13	pg, seb, cv, sp, st, sau	Vegetable beds	22	pf, serm, cor, cop, ce, sv, st, sc, so	Tree Stump Stage	26	sea, seb, cop, ce, sb
stepping stones	13	pg, seb, cop, cl, cv, ce	Corn rows	23	pg, sesa, serm, cv, sv, sc	Area signage	tp	cor, cl, ce
Balance logs and boulder	14	Pg, cv, Sb						

pg = Gross Motor; pf = Fine Motor; sea = Self-Awareness; sem = Self-Management; sesa = social awareness; seb = Relationship Skills; serm = Responsible Decision Making; cor = Receptive Communication; coe = Expressive Communication; cop = Pragmatic Communication; cr = Recent Memory; cl = Language; cv = Vestibular; sb = Visual; st = Tactile; sau = Auditory; se = Taste; so = Olfaction; tp = throughout playground

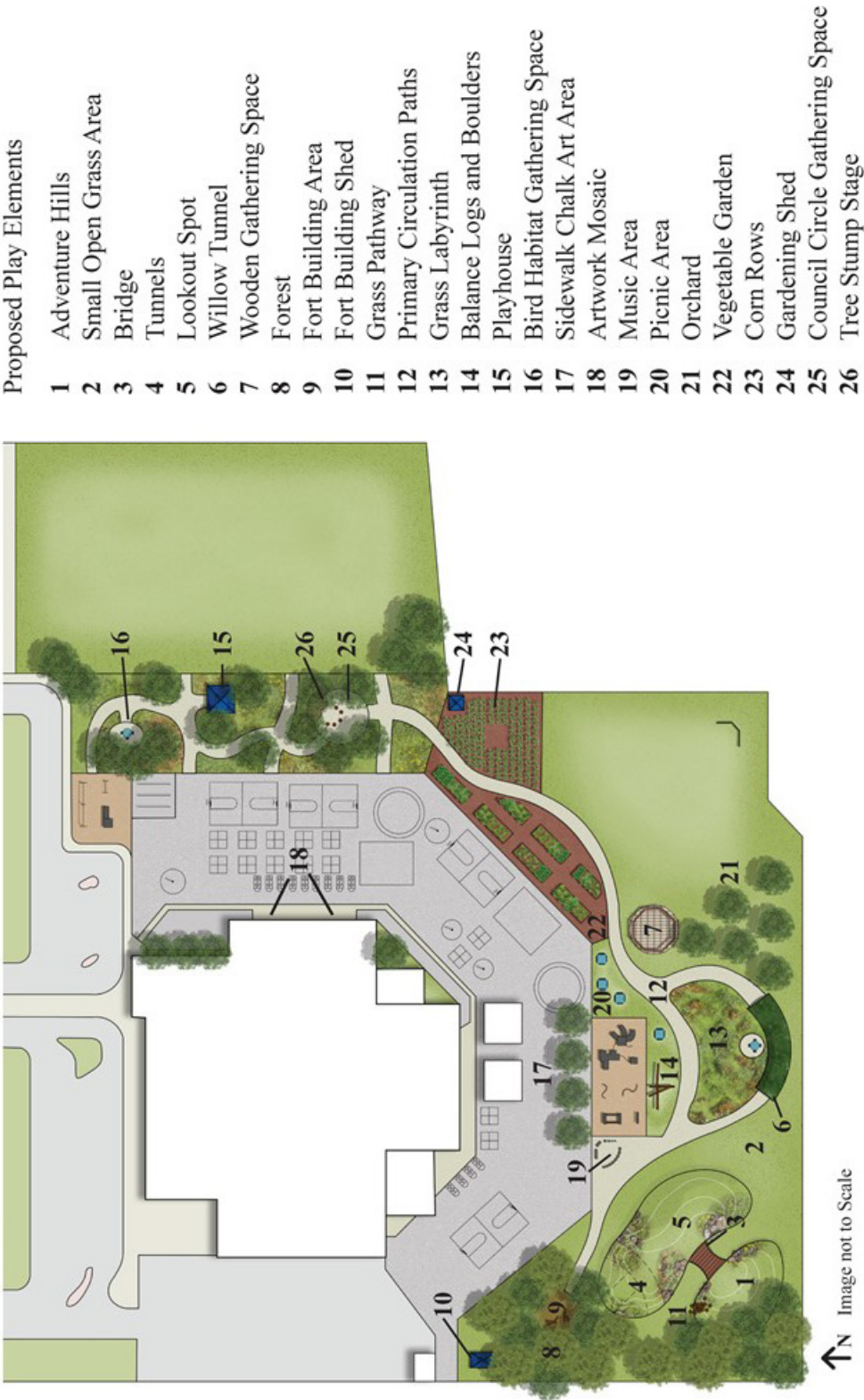


Figure 4.12. Design exploration of Sunrise Elementary School.

Table 4.6
Sunrise Elementary School Design Exploration Developmental
Affordances

Developmental Affordance	Pri Before	Pri Intro	Pri After	% Pri Before	% Pri Intro	% Pri After	Rate of Increase
Physical Domain							
Gross Motor	39	28	67	87%	47%	70%	72%
Fine Motor	1	27	28	2%	46%	29%	2700%
Social-Emotional Domain							
Self-Awareness	1	15	16	2%	25%	17%	1500%
Self-Management	1	11	12	2%	19%	13%	1100%
Social-Awareness	0	14	14	0%	24%	15%	1400%
Relationship Skills	16	34	50	36%	58%	52%	213%
Responsible Decision Making	5	15	20	11%	25%	21%	300%
Communication Domain							
Receptive Communication	2	7	9	4%	12%	9%	350%
Expressive Communication	2	18	20	4%	31%	21%	900%
Pragmatic Communication	15	26	41	33%	44%	43%	173%
Cognitive Domain							
Recent Memory	2	4	6	4%	7%	6%	200%
Language	2	9	11	4%	15%	11%	450%
Visuospatial	22	18	40	49%	31%	42%	82%
Executive Functioning	14	39	53	31%	66%	55%	279%
Sensory Domain							
Visual	0	9	9	0%	15%	9%	900%
Vestibular	20	13	33	44%	22%	34%	65%
Proprioceptive	20	12	32	44%	20%	33%	60%
Tactile	0	20	20	0%	34%	21%	2000%
Auditory	0	2	2	0%	3%	2%	200%
Taste	0	5	5	0%	8%	5%	500%
Olfaction	0	5	5	0%	8%	5%	500%
Total # of Play Components	45	59	104				
Note: Pri Before = Number of play components before redesign; Pri Intro = Number of play components introduced with redesign; Pri After = Number of play components after the redesign; % Pri Before = The percent that each developmental affordance is of the playground before the redesign; % Pri Intro = The percent that each developmental affordance is of the introduced play spaces; % Pri After = The percent that each developmental affordance is of the playground after the redesign							

(900% increase), tactile (2000% increase), auditory (200% increase), taste (500% increase), olfaction (500% increase). The number of play opportunities for some of the developmental affordances are still less than 10 but these would increase if some of the introduced play components were weighed to show the number of opportunities the play component would really encourage. These play components were the sensory garden, forest, garden beds, hills with the different play features, vegetation, and different play materials. Additionally, other play materials could be included within these spaces that would enhance the developmental opportunities. Overall, there is an increase in play

opportunities for all the developmental domains, which would provide children with the chance to use all the developmental skills within the elementary school playground.

The nature playground play spaces list was refined throughout the design exploration process to add more description so that it can be more user friendly. It's a tool that can be used to help ensure that there are play opportunities for each developmental affordance.

Some challenges that might hinder the incorporation of these play spaces are the funding and maintenance that would be required to install and maintain them. These were some of the major challenges that the case studies given by Robin Moore faced. A future study could explore the impacts that these spaces would have financially, on maintenance, and for the children. In conclusion, the nature playground play spaces list can be used to guide a design of an elementary playground to provide more developmental opportunities, though the impacts on funding and maintenance are unknown.

CHAPTER 5

CONCLUSIONS

Play environments provide opportunities for children to learn and practice developmental skills. Playgrounds should provide play activities for each developmental domain: physical, social-emotional, communication, cognitive, and the sensory domain. Elementary School playgrounds lack play activities for some of the developmental affordances. Natural playgrounds are designed to provide play activities for each developmental affordance. This study sought to answer (1) What developmental affordances are currently available on an elementary playground? (2) What natural play spaces can potentially be incorporated into an elementary playground? (3) What are the developmental affordances of these natural play spaces? (4) How can these natural play spaces be incorporated into an existing elementary playground?

Elementary school playgrounds and nature explore classrooms were evaluated on safety requirements, ADA requirements, and what developmental affordances were supported by the playground. The safety evaluation revealed that both the elementary school and nature explore classroom playgrounds faced safety issues, though most of the problems could be fixed through constant maintenance. The nature explore classrooms were better maintained than the elementary school playgrounds. The ADA evaluation revealed that all the playgrounds met most of the ADA requirements, though this didn't mean that the play features were ADA friendly. The elementary school playgrounds require transferring from the wheelchair to use the play features while the play features accessible within the nature explore classrooms could be experienced from the

wheelchair. There were more play opportunities for those with disabilities on the nature explore classrooms than the elementary school playgrounds. The developmental affordances evaluation revealed that the elementary school playgrounds supported a couple of developmental affordances while the nature explore classrooms were more balanced and provided play opportunities for all the developmental affordances. The nature explore classrooms were purposefully designed to provide opportunities for each developmental affordance.

When considering incorporating natural play spaces into an elementary playground, the evaluations and case studies showed common issues that might have to be overcome. The safety evaluation showed that the wear of a play feature and selection of safe vegetation are the common safety issues. These issues could be countered through constant maintenance and careful planning. The ADA evaluation showed that adequate access throughout the whole playground and to/within play features is the common ADA problem. These issues could be countered through careful planning and consideration of accessible needs. The case studies provided by Robin Moore showed that funding, maintenance, organizational support, and concerns for safety are the common challenges that were faced (Moore, 2014).

Even though there are challenges that will be required to overcome when incorporating nature playground play spaces into an elementary school playground, there are developmental benefits that result from the inclusion of these spaces. The explorative design showed that the number of play components more than doubled and that the playground now has play opportunities for each developmental affordance. The playground became a richer play environment with the redesign. Children need

developmental opportunities for each affordance within their play environment, and this can be accomplished by purposefully designing with the developmental affordances in mind.

Limitations

This study faced a few limitations. The first is the differences between the evaluated elementary school playgrounds and nature explore classrooms. The nature explore classrooms are part of private early child care centers while the school playgrounds are part of public elementary schools. This limits the comparability of the two types of playgrounds. Additionally, only two nature explore classrooms were included in the evaluation process. Future studies could include more natural playgrounds to be able to generalize the results for nature playgrounds. There are also factors, like the age of the playground, that were not controlled for that could have impacted the results. Within the evaluations, each rule was weighed the same. For example, a small safety issue was found on one playground and a bigger safety issue was found on another playground. The weight was not considered in the scoring process and both received a 0. Future research could fine tune the evaluations to be sensitive to the differences in and the impacts of the rules and requirements. Last, the playground design exploration was hypothetical and did not consider the financial and maintenance impacts that incorporating these play spaces would have. A future study could explore the impacts incorporating nature playground play spaces would have on the children, financial capacity, and maintenance requirements.

Implications

This study shows the potential that natural play spaces have in providing developmental opportunities for elementary school playgrounds. A list and handouts were created to help designers access what types of play spaces support each developmental affordance. This study can be used to guide one who is designing or redesigning an elementary school playground and is concerned about providing adequate play opportunities for each developmental domain. Questions that arise as a result of this study are: What barriers are there to the implementation of natural play spaces? What are the impacts of safety and ADA issues on the play experience for children without and with disabilities?

Children need play spaces that provide opportunities to engage in all the developmental domains and natural play spaces can be incorporated into elementary school playgrounds to provide these opportunities and enrich the play environment.

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APPENDICES

Appendix A
Developed Evaluation Sheets

Safety Evaluation

Safety Checklist	
Equipment	
Platforms allow a change of directions to get on/off structure	
Elevated structures, like platforms and ramps, have guardrails.	
Supporting structures and equipment design prevents climbing outside the structure.	
All play structures are 30" high, 8' or lower, and at least spaced 9' apart.	
There is a fence at least 4' high surrounding the playground and it is in good repair. The gates can be secured and are functioning properly.	
The swings aren't excessively heavy and have no protruding parts such as animal noses or legs.	
Equipment is free of cracks, bending, warps, rusting, or breakage of any component. The equipment is functioning safely.	
Children can't reach crush points, pinching points, or shearing actions such as hinges, see-saws, or undercarriages.	
There aren't any sharp edges, broken or missing parts, or loose/protruding bolts.	
There are no frayed cables, worn ropes, open hooks, or chains. The chains on swings are securely attached.	
There is no chipping or peeling paint on all toys, equipment, and buildings.	
There is no splintering wood on play equipment, picnic tables, slide, and wooden fences.	
There are no protrusions that could catch clothing.	
Metal slides don't become too hot when the sun shines on them.	
Portable toys such as tricycles and wagons are in good repair.	
There is at least a 6' fall/use zone around all play equipment.	
No foreign objects or obstructions exist in the fall/use zones.	
There are no spaces that could trap children, such as openings in guardrails or between ladder rungs. Openings are less than 3.5" or more than 9".	
Surface	
There is at least 12" of resilient ground cover in the fall/use zone around all play equipment.	
The surface material isn't displaced and free of holes or tears.	
The resilient ground cover extends 6' in all directions from play equipment.	
Surfacing around swings extends in back and front twice the height of the suspending bar.	
General	
There is signage indicating the age group for equipment within the playground.	

The rules of expected behavior are posted on the playground.	
The playground is checked regularly to see that equipment and surfacing are in good condition.	
There is adult supervision when children are on the equipment. The children can easily be viewed on equipment and in crawl spaces.	
The adult-to-child ratio equals the ratio required for indoor activity.	
There is no vandalism.	
The grass, trees, and shrubs are in good condition and are not in need of care.	
There are no thorny bushes or plants within the playground.	
There are no toxic materials on the playground.	
Within sand and play areas there are not any animal feces, poisonous plants, or mushrooms.	
There are no collections of water anywhere on the playground and equipment. There are no poor drainage areas or containers of standing water that could pose a drowning hazard.	
Any electrical hazards, such as switch boxes and powerlines, are out of reach of children and secured.	
There are no obstructions that interfere with normal play activity.	
There are no slipping hazards, such as sand on walkways.	
There are no tripping hazards, such as exposed concrete footings, tree stumps, and rocks. Concrete footings are secure and covered.	

Notes:

ADA Evaluation

Accessibility Checklist

Ground Level Accessible Routes

The playground had an accessible route(s). The route is accessible if it meets the following standards:

- All accessible routes and ADA use zones comply with ADA surface standards.
- The ground level accessible route is at least 60" wide minimum; It may narrow down to 36" for 5' to allow for design features; If the playground is less than 1000 square feet it can be at least 44" wide.
- Any openings on the accessible route less than 1/2" wide and perpendicular to the travel direction.
- Any vertical changes along the ground level accessible route are no greater than 1/2" and treated if between 1/4" and 1/2".
- The cross slope of the ground level accessible route is less than 1:48 and the running slope is less than 1:16.
- The ground accessible route is free of any protrusion at least 80" above the ground surface.

There is at least one accessible route connecting the playground to site arrival points and other buildings, facilities, and elements of the site.

There is an accessible route connecting each play area.

There is an accessible route connected to the entry and exit points of at least one of each type of ground level play component.

There is a transfer access to at least 50% of the elevated play components.

There are no objects (fire extinguishers, drinking fountains, signs) that protrude no more than 4" into the path.

Elevated Level Accessible Routes

If there is an elevated accessible route, it meets the following standards:

- The surface of the route is firm, stable, and slip resistant.
- The route is at least 36" wide.
- There is a passing space no less than 5x5' if the route is greater than 200' in length and less than 60" wide.
- Grates and openings are no larger than 1/2" and the long dimension is perpendicular to the direction of travel.
- There are no changes in level greater than 1/2" on the accessible route.
- The cross slope of the accessible route is 1:48 or less.

Landings

The landing is at least 60" long and as wide as the ramp.	
There is a slope no steeper than 1:48 in all directions.	
There is a landing if the ramp changes directions and it is a minimum of 60" wide.	
Handrails	
The top of the handrail gripping surface is no less than 22" and no greater than 38" above the ramp surface.	
If the handrail gripping surface is circular it is no less than 1.25" and no greater than 2" in diameter.	
If the handrail gripping surface is non-circular the perimeter is no less than 4" and no greater than 6.25".	
The cross section is no greater than 2.25".	
The handrail gripping surface is continuous and not obstructed along the top and sides.	
There is a min of 1.5" between the handrail gripping surfaces and adjacent surfaces.	
The handrail extends at least 12" horizontally beyond the top and bottom of the ramp and returns to the wall, guard, or landing surface.	
The surface of the ramp extends at least 12" beyond the inside face of the handrail.	
There is a curb or barrier that prevents the passage of a 4" diameter sphere.	
Ramps	
If there are 20 or more elevated play components, there is a ramp to at least 25% of the elevated play components. The ramp meets the following standards:	
Openings on the ramp surface are less than 1/2" wide and perpendicular to the travel direction.	
The ramp accessible route is at least 36" wide.	
The ramp is clear of any changes in level greater than 1/2".	
The cross slope of the ramp is 1:48 or less.	
The running slope is no greater than 1:12.	
If the running slope is greater than 1:20 there are landings and handrails.	
The rise of the ramp connecting elevated play components is no greater than 12".	
If the ramp has a rise higher than 6" there are handrails on both sides.	
Transfer Platforms and Systems	
If the playground has 20 or less total elevated play components, a transfer platform or system can be used instead of a ramp. The transfer platform(s) or systems(s) meet the following standards:	
<ul style="list-style-type: none"> ○ The top of the transfer platform is no less than 11" and no greater than 18" from the ground. 	
<ul style="list-style-type: none"> ○ The transfer platform is at least 14" deep and 24" wide. 	
<ul style="list-style-type: none"> ○ The transfer steps are at least 14" deep, 24" wide, and no higher than 8". 	

○ There is a clear transfer space at least 30"x48" adjacent to the platform with the longer dimension centered on and parallel to the 24" min long side of the platform and clear of any obstructions.	
○ There is at least one means of support for transferring provided on and off and up and down the platform.	
Play Components	
There is at least one of each play type of play component provided in the play area on the accessible route.	
There is the right ratio between the ground level play components and elevated play components. (refer to chart)	
There is a clear space (within the play component area) for a person in a wheelchair to turn around. A circle of at least 60" in diameter or t-shaped within a 60" square.	
The swings have a clear space for a person in a wheelchair to turn around adjacent to at least one swing.	
There is clear ground/floor space at least 30" wide and 48" long at each elevated and ground play component on the accessible route.	
Play tables have no tops of rims, curbs, or other obstructions no greater than 31" above the ground and has a clear space of at least 30" wide and 48" long for a parallel approach.	
There is clear knee space underneath: at least 24" high, 17" deep, and 30" wide.	
For play components that requires transfer to entry points or seats it is no less than 11" and no greater than 24" (18" is recommended) from the clear ground space with at least on means of transfer support.	
Reach ranges for forward and side ranges are 18-40" for 5 to 8 year-olds and 16-44" for 9 to 12 year-olds.	

Notes:

The following table would be filled in while evaluating the playground and identifying the play spaces. The number of play spaces may go beyond the table provided.

[illegible]

Appendix B
Playground Site Pictures

Granite Elementary School



Main Playground Structure



Metal Playground Area



Small Playground Structure



Bad Drainage from Parking Lot in Playground (reference safety evaluation results section)

Sunrise Elementary School



Main Playground



Side Playground Area



Small Playground



Asphalt Play Area

Endeavour Elementary School



Asphalt Area



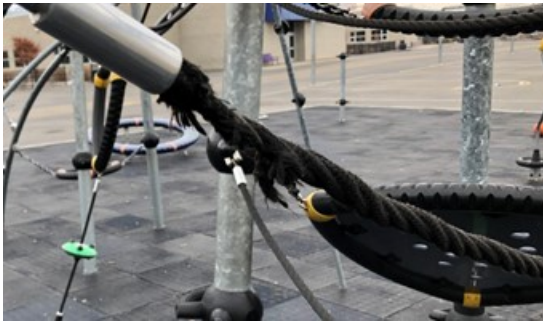
Main Structure 1



Main Structure 2



Gathering Space Area



Left Image: Frayed Rope; Right Image: Vandalism



Midvale Elementary School



Main Playground Area



Main Playground Structure



Left Image: Asphalt Area; Right Image: School Garden



Small Playground Structure

Redwood Elementary School

Main Structure 1



Main Structure 2



Left Image: Swings; Right Image: Wear and Tear Example



Asphalt Area

Guadalupe Elementary School



Main Playground Structure



Grass Area



Concrete Area



Left Image: Wear of Toys; Right Top Image: Small Playground; Right Bottom Image: Playhouse.

SLCC Nature Playground



Main Playground 1



Main Playground 2



Left Image: Labyrinth; Right Image: Vegetable Garden



Left Image: Willow Tunnel; Right Image: Secret Garden



Music Area

Little Brigham Aggies Play Garden



Main Playground 1



Main Playground 2



Infant Area



Left Image: Storage Shed; Right Image: Mud Kitchen

Appendix C
Recorded Evaluations

Recorded Safety Evaluation

Safety Checklist						
Safety Requirement	Granite	Sunrise	Endeavour	Midvale	Redwood	
Equipment						
Rule 1: Platforms allow a change of directions to get on/off structure		1	1; n/a		1	1
Rule 2: Elevated structures, like platforms and ramps, have guardrails.		1	1; n/a		1	1
Rule 3: Supporting structures and equipment design prevents climbing outside the structure.		1	1; n/a		1	1
Rule 4: All play structures are 30" high, 8" or lower, and at least spaced 9" apart.		1	1	1	1	1
Rule 5: There is a fence at least 4' high surrounding the playground and it is in good repair. The gates can be secured and are functioning properly.	0; Small playground has a fence 3' high		0; Small Playground has a fence 2-3' high	1	1	1
Rule 6: The swings aren't excessively heavy and have no protruding parts such as animal noses or legs.		1	1; n/a	1; n/a		
Rule 7: Equipment is free of cracks, bending, warps, rusting, or breakage of any component. The equipment is functioning safely.	0; chains have a tear, sand benches have rust.		0; chains have a break in the plastic, rusty bolts and tether ball poles, waro in the rock wall	0; rusting bolts	1	0; Rust on swings and play set, stairs have a break
Rule 8: Children can't reach crush points, pinching points, or shearing actions such as hinges, see-saws, or undercarriages.		1	1	1	1	0; bridge hinges could catch kids and clothing
Rule 9: There aren't any sharp edges, broken or missing parts, or loose/protruding bolts.		1	1	1	1	0; missing cap on play structure, stairs have a break
Rule 10: There are no frayed cables, worn ropes, open hooks, or chains. The chains on swings are securely attached.		1	1		1	
Rule 11: There is no chipping or peeling paint on all toys, equipment, and buildings.		1	0; chipping paint on the first playground	1	1	0; there is peeling paint on the play structure
Rule 12: There is no splintering wood on play equipment, picnic tables, slide, and wooden fences.		1	1; n/a		1	1; n/a
Rule 13: There are no protrusions that could catch clothing.		1	1	1	1	1
Rule 14: Metal slides don't become too hot when the sun shines on them.	1; n/a	1; couldn't tell at the time that I evaluated	1; n/a	1; n/a	1; n/a	1; n/a
Rule 15: Portable toys such as tricycles and wagons are in good repair.	1; n/a	1; n/a	1; n/a	1; n/a	1; n/a	1; n/a
Rule 16: There is at least a 6' fall/use zone around all play equipment.		1	1	1	1	1; n/a
Rule 17: No foreign objects or obstructions exist in the fall/use zones.		1	1	1	1	1
Rule 18: There are no spaces that could trap children, such as openings in guardrails or between ladder rungs. Openings are less than 3.5" or more than 9".		1	1	1	1	1
Surface						
Rule 19: There is at least 12" of resilient ground cover, such as turf or wood fiber, in the fall/use zone around all play equipment.	1; Small playground has a 8' fall height tiles	1; Small playground has a 8' fall height tiles	1; Small playground has a 8' fall height tiles	1; Small playground has a 8' fall height tiles	1; 6" turf with sand base	
Rule 20: The surface material isn't displaced and free of holes or tears.	0; displaced woodchips and tears and gaps in tiles	0; displaced		1	0; gaps underneath the net structure	0; burns and tears
Rule 21: The resilient ground cover extends 6' in all directions from play equipment.		1	1	1	1	1
Rule 22: Surfacing around swings extends in back and front twice the height of the suspending bar.		1	1; n/a	1; n/a		1
General						
Rule 23: There is signage indicating the age group for equipment within the playground.		0	1	1	1	0
Rule 24: The rules of expected behavior are posted on the playground.		0	0	0	0	1
Rule 25: There is no vandalism.	0; vandalism on the green rock wall	0; vandalism on the green rock wall	0; vandalism	0; vandalism	0; swings have vandalism	
Rule 26: The grass, trees, and shrubs are in good condition and are not in need of care.		1	1	0; there is a low spot in the grass that has mud	0; trees, dying pine tree, grass	0; grass has mud pits
Rule 27: There are no thorny bushes or plants within the playground.		1	1	1	1	1
Rule 28: There are no toxic materials on the playground.	0; drainage is shared for the parking lot and playground. Water pockets have elements from the parking lot		1	1	1	1
Rule 29: Within sand and play areas there are not any animal feces, poisonous plants, or mushrooms.		1	1	1	1	0; goose poop on parking lot
Rule 30: There are no collections of water anywhere on the playground and equipment. There are no poor drainage areas or containers of standing water that could pose a drowning hazard	0; slide has water, parking lot and asphalt area has pockets of water		1	0; low spot near fire hydrant - picture	0; puddle in basketball court	1
Rule 31: Any electrical hazards, such as switch boxes and powerlines, are out of reach of children and secured.		1	1	1	1	1
Rule 32: There are no obstructions that interfere with normal play activity.		1	1	1	1	1
Rule 33: There are no slipping hazards, such as sand on walkways.	0; sand on walkways		1	1	1	0; mud
Rule 34: There are no tripping hazards, such as exposed concrete footings, tree stumps, and rocks. Concrete footings are secure and covered.	0; displaced surface is a tripping hazard	0; water boxes, holes in field		1	1	0; tree stump hole
Playground Total		24	27	28	29	23

Safety Checklist Cont.

Safety Requirement	Guadalupe	SLCC	Little Aggies	Rule Frequency
Equipment				
Rule 1: Platforms allow a change of directions to get on/off structure		1 1; n/a		1 8
Rule 2: Elevated structures, like platforms and ramps, have guardrails.		1 1; n/a		1 8
Rule 3: Supporting structures and equipment design prevents climbing outside the structure.		1 1; n/a	1; n/a	8
Rule 4: All play structures are 30" high, 8' or lower, and at least spaced 9' apart.		1 1; n/a	1; n/a	8
Rule 5: There is a fence at least 4' high surrounding the playground and it is in good repair. The gates can be secured and are functioning properly.		1	1	1 6
Rule 6: The swings aren't excessively heavy and have no protruding parts such as animal noses or legs.		1 1; n/a	1; n/a	8
Rule 7: Equipment is free of cracks, bending, warps, rusting, or breakage of any component. The equipment is functioning safely.	0; rusting chain	0; broken balance beam, rust, ripping fabric on hill	0; rust on ramp and pergola	1
Rule 8: Children can't reach crush points, pinching points, or shearing actions such as hinges, see-saws, or undercarriages.		1	1	1 7
Rule 9: There aren't any sharp edges, broken or missing parts, or loose/protruding bolts.	0; missing bolt	0; ripping fabric on hill		1 5
Rule 10: There are no frayed cables, worn ropes, open hooks, or chains. The chains on swings are securely attached.		1	1	1 7
Rule 11: There is no chipping or peeling paint on all toys, equipment, and buildings.		1	1	1 6
Rule 12: There is no splintering wood on play equipment, picnic tables, slide, and wooden fences.	0; table with loose bolts		0; side table by the nature art area is splintered and peeling	1 6
Rule 13: There are no protrusions that could catch clothing.		1	1	1 8
Rule 14: Metal slides don't become too hot when the sun shines on them.	1; n/a	1; n/a	1; n/a	8
Rule 15: Portable toys such as tricycles and wagons are in good repair.	0; broken toys		1	1 7
Rule 16: There is at least a 6' fall/use zone around all play equipment.		1 1; on big lump hill but not the gentle	0; slide rock and balance beams don't have a large fall zone	7
Rule 17: No foreign objects or obstructions exist in the fall/use zones.	0; picnic table in slide fall zone		1	1 7
Rule 18: There are no spaces that could trap children, such as openings in guardrails or between ladder rungs. Openings are less than 3.5" or more than 9".		1	0; less than 3.5" between pergola and sand box, bench and rocks	7
Surface				
Rule 19: There is at least 12" of resilient ground cover, such as turf or wood fiber, in the fall/use zone around all play equipment.	0; surface is grass	1; woodchips	0; woodchips don't go 12" deep	6
Rule 20: The surface material isn't displaced and free of holes or tears.		0	1	1 3
Rule 21: The resilient ground cover extends 6' in all directions from play equipment.		0	1	1 7
Rule 22: Surfacing around swings extends in back and front twice the height of the suspending bar.		0 1; n/a	1; n/a	7
General				
Rule 23: There is signage indicating the age group for equipment within the playground.		1	0	0 3
Rule 24: The rules of expected behavior are posted on the playground.		0	0 one sign at the door about parking but not other rules	1
Rule 25: There is no vandalism.		1	1	1 3
Rule 26: The grass, trees, and shrubs are in good condition and are not in need of care.		1	1	1 5
Rule 27: There are no thorny bushes or plants within the playground.		1 0; there is a thorny rose bush on the gate archway		1 7
Rule 28: There are no toxic materials on the playground.		1	1	1 7
Rule 29: Within sand and play areas there are not any animal feces, poisonous plants, or mushrooms.		1	1	1 7
Rule 30: There are no collections of water anywhere on the playground and equipment. There are no poor drainage areas or containers of standing water that could pose a drowning hazard.	0; play kitchen collects water		1	1 4
Rule 31: Any electrical hazards, such as switch boxes and powerlines, are out of reach of children and secured.		1	1	1 8
Rule 32: There are no obstructions that interfere with normal play activity.		1	1	1 8
Rule 33: There are no slipping hazards, such as sand on walkways.	0; mud, water in sand area		1	1 5
Rule 34: There are no tripping hazards, such as exposed concrete footings, tree stumps, and rocks. Concrete footings are secure and covered.		1 0; hole by water boxes		1 4
Playground Total		21	28	27

Recorded ADA Evaluation

Accessibility Checklist	Granite	Sunrise	Endeavour	Midvale	Redwood
Ground Level Accessible Routes					
The playground had an accessible route(s). The route is accessible if it meets the following standards:	Main playground isn't really ADA	The older playground isn't accessible; the other two are			
Rule 1: All accessible routes and ADA use zones comply with ADA surface standards.	0; There is displaced woodchips at the swings	1	1	1	1
Rule 2: The ground level accessible route is at least 60" wide minimum; It may narrow down to 36" for 5' to allow for design features; If the playground is less than 1000 square feet it can be at least 44" wide.	1	1	1	1	1
Rule 3: Any openings on the accessible route less than 1/2" wide and perpendicular to the travel direction.	1	1	1	1	1
Rule 4: Any vertical changes along the ground level accessible route are no greater than 1/2" and treated if between 1/4" and 1/2".	1	1	1	1	1
Rule 5: The cross slope of the ground level accessible route is less than 1:48 and the running slope is less than 1:16.	1	1	1	1	1
Rule 6: The ground accessible route is free of any protrusion at least 80" above the ground surface.	1	1	1	1	1
Rule 7: There is at least one accessible route connecting the playground to site arrival points and other buildings, facilities, and elements of the site.	1	1	1	1	1
Rule 8: There is an accessible route connecting each play area.	0; There isn't an accessible route to the sand area on the small playground	0	1	1	1
Rule 9: There is an accessible route connected to the entry and exit points of at least one of each type of ground level play component.	0; There is no ADA access to the sand area	1	1	1	1
Rule 10: There is a transfer access to at least 50% of the elevated play components.	0; not on the main playground	0; not the main playground	1; n/a	0; there is no access to the elevated components	0
Rule 11: There are no objects (fire extinguishers, drinking fountains, signs) that protrude no more than 4" into the path.	1	1	1	1	1
Elevated Level Accessible Routes					
If there is an elevated accessible route, it meets the following standards:					
Rule 12: The surface of the route is firm, stable, and slip resistant.	1	1	1; n/a	1	1
Rule 13: The route is at least 36" wide.	0; not wide enough on main playground	1	1; n/a	1	1
Rule 14: There is a passing space no less than 5x5' if the route is greater than 200' in length and less than 60" wide.	1; n/a	1; n/a	1; n/a	1; n/a	1; n/a
Rule 15: Gates and openings are no larger than 1/2" and the long dimension is perpendicular to the direction of travel.	1	1	1; n/a	1	1; n/a
Rule 16: There are no changes in level greater than 1/2" on the accessible route.	1	1	1; n/a	1	1
Rule 17: The cross slope of the accessible route is 1:48 or less.	1	1	1; n/a	1	1
Ramp Landings					
Rule 18: The landing is at least 60" long and as wide as the ramp.	1; n/a	1; n/a	1; n/a	1; n/a	1; n/a
Rule 19: There is a slope no steeper than 1:48 in all directions.	1; n/a	1; n/a	1; n/a	1; n/a	1; n/a
Rule 20: There is a landing if the ramp changes directions and it is a minimum of 60" wide.	1; n/a	1; n/a	1; n/a	1; n/a	1; n/a
Handrails					
Rule 21: The top of the handrail gripping surface is no less than 22" and no greater than 38" above the ramp surface.	1	1	1; n/a	1	1
Rule 22: If the handrail gripping surface is circular it is no less than 1.25" and no greater than 2" in diameter.	1	1	1; n/a	1	1
Rule 23: If the handrail gripping surface is non-circular the perimeter is no less than 4" and no greater than 6.25".	1; n/a	1; n/a	1; n/a	1; n/a	1; n/a
Rule 24: The cross section is no greater than 2.25".	1	1	1; n/a	1	1
Rule 25: The handrail gripping surface is continuous and not obstructed along the top and sides.	1	1	1; n/a	1	0
Rule 26: There is a min of 1.5" between the handrail gripping surfaces and adjacent surfaces.	1	1	1; n/a	1	0
Rule 27: The handrail extends at least 12" horizontally beyond the top and bottom of the ramp and returns to the wall, guard, or landing surface.	1; n/a	1; n/a	1; n/a	1; n/a	1; n/a
Rule 28: The surface of the ramp extends at least 12" beyond the inside face of the handrail or there is a curb/barrier that prevents the passage of a 4" diameter sphere.	1; n/a	1; n/a	1; n/a	1; n/a	1; n/a
Ramps					
Rule 29: If there are 20 or more elevated play components, there is a ramp to at least 25% of the elevated play components. The ramp meets the following standards:	1; n/a	1; n/a	1; n/a	1; n/a	1; n/a
Rule 30: Openings on the ramp surface are less than 1/2" wide and perpendicular to the travel direction.	1; n/a	1; n/a	1; n/a	1; n/a	1; n/a
Rule 31: The ramp accessible route is at least 36" wide.	1; n/a	1; n/a	1; n/a	1; n/a	1; n/a
Rule 32: The ramp is clear of any changes in level greater than 1/2".	1; n/a	1; n/a	1; n/a	1; n/a	1; n/a
Rule 33: The cross slope of the ramp is 1:48 or less.	1; n/a	1; n/a	1; n/a	1; n/a	1; n/a
Rule 34: The running slope is no greater than 1:12.	1; n/a	1; n/a	1; n/a	1; n/a	1; n/a

Accessibility Checklist Cont.

	Granite	Sunrise	Endeavour	Midvale	Redwood
Rule 35: If the running slope is greater than 1:20 then there are landings and handrails.	1; n/a	1; n/a	1; n/a	1; n/a	1; n/a
Rule 36: The rise of the ramp connecting elevated play components is no greater than 12".	1; n/a	1; n/a	1; n/a	1; n/a	1; n/a
Rule 37: If the ramp has a rise higher than 6" there are handrails on both sides.	1; n/a	1; n/a	1; n/a	1; n/a	1; n/a
Transfer Platforms and Systems					
If the playground has 20 or less total elevated play components, a transfer platform or system can be used instead of a ramp. The transfer platform(s) or system(s) meet the following standards:					
Rule 38: The top of the transfer platform is no less than 11" and no greater than 18" from the ground.	1	1	1; n/a	1	1
Rule 39: The transfer platform is at least 14" deep and 24" wide.	1	1	1; n/a	1	1
Rule 40: The transfer steps are at least 14" deep, 24" wide, and no higher than 8".	1	1	1; n/a	1	1
Rule 41: There is a clear transfer space at least 30"x48" adjacent to the platform with the longer dimension centered on and parallel to the 24" min long side of the platform and clear of any obstructions.	1	1	1; n/a	1	1
Rule 42: There is at least one means of support for transferring provided on and off and up and down the platform.	1	1	1; n/a	1	1
Play Components					
Rule 43: There is at least one of each play type of play component provided in the play area on the accessible route.	1	1	1	1	1
Rule 44: There is the right ratio between the ground level play components and elevated play components. (refer to chart)	1; kiddie 6:2; main 7:2	0; main 7:2; kiddie 7:1	1; n/a	1; kiddie 5:2; main 11:3	1; 12:3
Rule 45: There is at least one clear space (within the play component area) for a person in a wheelchair to turn around. A circle of at least 60" in diameter or t-shaped within a 60" square.	1	1	1	1	1
Rule 46: The swings have a clear space for a person in a wheelchair to turn around adjacent to at least one swing.	1	0; swings aren't accessible	1; n/a	1; n/a	1
Rule 47: There is clear ground/floor space at least 30" wide and 48" long at each elevated and ground play component on the accessible route.	1	1	1	1	1
Rule 48: Play tables have no tops of rims, curbs, or other obstructions no greater than 31" above the ground and has a clear space of at least 30" wide and 48" long for a parallel approach.	1; n/a	1; n/a	1; n/a	1; n/a	1; n/a
Rule 49: There is clear knee space underneath at least 24" high, 17" deep, and 30" wide.	1; n/a	1; n/a	1; n/a	1; n/a	1; n/a
Rule 50: For play components that requires transfer to entry points or seats it is no less than 11" and no greater than 24" (18" is recommended) from the clear ground space with at least one means of transfer support.	1	1	1; n/a	1; n/a	1; n/a
Playground Total: 50 possible	45	46	50	49	47

Accessibility Checklist at Cont

	Guadalupe	SLCC	Little Brigham Aggies	Rule Total
Ground Level Accessible Routes				
The playground had an accessible route(s). The route is accessible if it meets the following standards:				
Rule 1: All accessible routes and ADA use zones comply with ADA surface standards.	1	1	1	7
Rule 2: The ground level accessible route is at least 60" wide minimum. It may narrow down to 36" for 5' to allow for design features. If the playground is less than 1000 square feet it can be at least 44" wide.	1	0; it's wide enough by the building but not throughout the playground.	1; ramp is 60" and the rest is 44"	7
Rule 3: Any openings on the accessible route less than 1/2" wide and perpendicular to the travel direction.	1	1	1	8
Rule 4: Any vertical changes along the ground level accessible route are no greater than 1/2" and treated if between 1/4" and 1/2".	1	1	1	8
Rule 5: The cross slope of the ground level accessible route is less than 1:48 and the running slope is less than 1:16.	1	1	1	8
Rule 6: The ground accessible route is free of any protrusion at least 80" above the ground surface.	1	1	1	8
Rule 7: There is at least one accessible route connecting the playground to site arrival points and other buildings, facilities, and elements of the site.	1	1	1	8
Rule 8: There is an accessible route connecting each play area.	0	0; The route isn't wide enough to be accessible	0; the sand box isn't easily accessible and doesn't have a transfer system	3
Rule 9: There is an accessible route connected to the entry and exit points of at least one of each type of ground level play component.	0; the swings don't have an area for transfer	0	0; sand play area	5
Rule 10: There is a transfer access to at least 50% of the elevated play components.	0	1; n/a	1; n/a	3
Rule 11: There are no objects (fire extinguishers, drinking fountains, signs) that protrude no more than 4" into the path.	1	1	1	8
Elevated Level Accessible Routes				
If there is an elevated accessible route, it meets the following standards:				
Rule 12: The surface of the route is firm, stable, and slip resistant.	1; n/a	1; n/a	1; n/a	8
Rule 13: The route is at least 36" wide.	1; n/a	1; n/a	1; n/a	7
Rule 14: There is a passing space no less than 5x9' if the route is greater than 200' in length and less than 60" wide.	1; n/a	1; n/a	1; n/a	8
Rule 15: Grates and openings are no larger than 1/2" and the long dimension is perpendicular to the direction of travel.	1; n/a	1; n/a	1; n/a	8
Rule 16: There are no changes in level greater than 1/2" on the accessible route.	1; n/a	1; n/a	1; n/a	8
Rule 17: The cross slope of the accessible route is 1:48 or less.	1; n/a	1; n/a	1; n/a	8
Ramp Landings				
Rule 18: The landing is at least 60" long and as wide as the ramp.	1; n/a	1; n/a	1; n/a	8
Rule 19: There is a slope no steeper than 1:48 in all directions.	1; n/a	1; n/a	1; n/a	8
Rule 20: There is a landing if the ramp changes directions and it is a minimum of 60" wide.	1; n/a	1; n/a	1; n/a	8
Handrails				
Rule 21: The top of the handrail gripping surface is no less than 22" and no greater than 38" above the ramp surface.	1; n/a	1; n/a	1	7
Rule 22: If the handrail gripping surface is circular it is no less than 1.25" and no greater than 2" in diameter.	1; n/a	1; n/a	1	8
Rule 23: If the handrail gripping surface is non-circular the perimeter is no less than 4" and no greater than 6.25".	1; n/a	1; n/a	1; n/a	8
Rule 24: The cross section is no greater than 2.25".	1; n/a	1; n/a	1	8
Rule 25: The handrail gripping surface is continuous and not obstructed along the top and sides.	1; n/a	1; n/a	1	7
Rule 26: There is a min of 1.5" between the handrail gripping surfaces and adjacent surfaces.	1; n/a	1; n/a	1	7
Rule 27: The handrail extends at least 12" horizontally beyond the top and bottom of the ramp and returns to the wall, guard, or landing surface.	1; n/a	1; n/a	1	5
Rule 28: The surface of the ramp extends at least 12" beyond the inside face of the handrail or there is a curb/barrier that prevents the passage of a 4" diameter sphere.	1; n/a	1; n/a	0	5
Ramps				
Rule 29: If there are 20 or more elevated play components, there is a ramp to at least 25% of the elevated play components. The ramp meets the following standards:	1; n/a	1; n/a	1; n/a	8
Rule 30: Openings on the ramp surface are less than 1/2" wide and perpendicular to the travel direction.	1; n/a	1; n/a	1	8
Rule 31: The ramp accessible route is at least 36" wide.	1; n/a	1; n/a	1	8
Rule 32: The ramp is clear of any changes in level greater than 1/2".	1; n/a	1; n/a	1	8
Rule 33: The cross slope of the ramp is 1:48 or less.	1; n/a	1; n/a	1	8
Rule 34: The running slope is no greater than 1:12.	1; n/a	1; n/a	1	8

Accessibility Checklist Cont.

	Guadalupe	SLCC	Little Brigham Aggies	Rule Total
Rule 35: If the running slope is greater than 1:20 than there are landings and handrails.	1; n/a	1; n/a	1	8
Rule 36: The rise of the ramp connecting elevated play components is no greater than 12".	1; n/a	1; n/a	1; n/a	8
Rule 37: If the ramp has a rise higher than 6" there are handrails on both sides.	1; n/a	1; n/a	0; one side with handrails	7
Transfer Platforms and Systems				
If the playground has 20 or less total elevated play components, a transfer platform or system can be used instead of a ramp. The transfer platform(s) or system(s) meet the following standards:				
Rule 38: The top of the transfer platform is no less than 11" and no greater than 18" from the ground.	1; n/a	1; n/a	1; n/a	8
Rule 39: The transfer platform is at least 14" deep and 24" wide.	1; n/a	1; n/a	1; n/a	8
Rule 40: The transfer steps are at least 14" deep, 24" wide, and no higher than 8".	1; n/a	1; n/a	1; n/a	8
Rule 41: There is a clear transfer space at least 30"x48" adjacent to the platform with the longer dimension centered on and parallel to the 24" min long side of the platform and clear of any obstructions.	1; n/a	1; n/a	1; n/a	8
Rule 42: There is at least one means of support for transferring provided on and off and up and down the platform.	1; n/a	1; n/a	1; n/a	8
Play Components				
Rule 43: There is at least one of each play type of play component provided in the play area on the accessible route.	1	0; There's a connecting route, but not wide enough for ADA access	1	7
Rule 44: There is the right ratio between the ground level play components and elevated play components (refer to chart)	1	1; n/a	1; n/a	7
Rule 45: There is at least one clear space (within the play component area) for a person in a wheelchair to turn around. A circle of at least 60" in diameter or t-shaped within a 60" square.	1	0; there is space only at the building and junctions	1; space to turn at the building, shed, and intersection	8
Rule 46: The swings have a clear space for a person in a wheelchair to turn around adjacent to at least one swing.	0	1; n/a	1; n/a	6
Rule 47: There is clear ground/floor space at least 30" wide and 48" long at each elevated and ground play component on the accessible route.	1	1	1	8
Rule 48: Play tables have no tops of rims, curbs, or other obstructions no greater than 31" above the ground and has a clear space of at least 30" wide and 48" long for a parallel approach.	1	1; n/a	1	8
Rule 49: There is clear knee space underneath at least 24" high, 17" deep, and 30" wide.	0	1; n/a	0; One measurement is wrong: depth is shallow	6
Rule 50: For play components that requires transfer to entry points or seats it is no less than 11" and no greater than 24" (18" is recommended) from the clear ground space with at least on means of transfer support.	0	1; n/a	1; n/a	7
Playground Total: 50 possible	44	46	46	

Recorded Developmental Affordances Evaluation

Developmental Affordance Evaluation: Granite Elementary School

Play Component	Primary Affordance	Secondary Affordance	Play Component	Primary Affordance	Secondary Affordance
Swings	pg, sb	cv, sp	Ladder - Spiral Corkskrew	pg, sb, sp	cop, cv,
Balance Beams	Pg, cv, Sb	seb, ce	Convex Bridge	pg, seb	cop, ce, sb
Parallel Horizontal Bars	Pg, cv, sb	coe, cop, sp	Stairs	pg, cv, sp,	seb
Monkey Bars - Straight	Pg, cv, Sp	coe, cop, sb	Single Slides	pg, sb	coe, cop,
Moon Monkey Bars	Pg, cv, Sp	coe, cop, sb	Tall Twin Slide	pg, seb, cop, sb	cor, coe, cl, ce,
Bench	sea, Seb, cor, cop, cl	sem, ce, sv	Hole Rock Wall	pg, cv, ce, sb, sp	pf, sea, sem
Four-square	pg, seb, serm, cop, cv, ce, sp	pf, sem, sesa, cor, coe, cr	Rock Platform	pg, sem, serm, cop, cv, ce, sp	pf, sea, seb, cor, coe, cr, cl, sv, sb
Basketball	pg, seb, serm, cop, cv, ce, sb, sp	pf, sem, sesa, cor, coe, cr	Attached Balancing Pods	Pg, cv, Sb	seb, ce
USA Map	seb, ce	pg, cor, cr, cv	Spinning Hanging Bar	pg, ce, sb	sea, coe, cop, cv, sp
Tether ball	pg, seb, cop, cv, ce, sp	pf, sea, sem, cor, coe,	Dream Catcher - movable	pg, seb, cop, cv, sp	pf, sem, sesa, ce, sb
Track	pg, cop, sb	sea, ce, sp	Single Chain Monkey Bars	Pg, cv, Sp	coe, cop, sb
Circular Track	pg, cop, sb	ce, sp	Y Ladder	pg, cv, sp,	seb
Grass Fields - baseball fence	pg, seb, cop, cr, ce, sb	pf, sesa, serm, cor, coe, cl, cv, sp	Spinning Hanging Bars with footstools	pg, ce, sb	sea, seb, coe, cop, cv, sp
hopscotch	pg, seb, cv, ce	serm, cop, cl, sb, sp	Solid Monkey Bars	Pg, cv, Sp	coe, cop, sb
Tress	pg, pf, seb, cop, st	sesa, coe, cv, ce, sv, sau,	Slide	pg, sb	coe, cop,
Shrubs	pg, pf, seb, cop, st	sesa, coe, cv, ce, sv, sau,	Twin Slide	pg, seb, cop, sb	cor, coe, cl, ce,
Net Climbing Structure	pg, seb, cv, ce, sb, sp	pf, sea, sem, cor, coe, sv,	Play Top	seb, serm, cor, coe, cop, cl	sesa, cr, ce
White Rock Climbing Wall	pg, cv, ce, sb, sp	pf, sea, sem	Car Dashboard	pf, coe, cr, ce	seb, cop, st
Green Rock Climbing Wall	pg, cv, ce, sb, sp	pf, sea, sem	Ladder - Spiral Corkskrew	pg, sb, sp	cop, cv,
Teeter Totter	pg, sesa, seb, cop, sp,	coe, ce, sb	Slide - Sensory	pg, pf, coe, sp, st	sea, seb, cop, ce,
Small Twin Slide	pg, seb, cop, sb	cor, coe, cl, ce,	Sand Area	pg, pf, Serm, seb, cop, st	sea, sesa, coe, ce, sv, sp
Ladder - Chain	pg, cv, sp,	seb	Dream Catcher Net	pg, seb, cop, cv, sp	pf, sem, sesa, ce, sb
Stairs	pg, cv, sp,	seb	Ladder - Y	pg, cv, sp,	seb

Note: pg = Gross Motor, pf = Fine Motor, sea = Self-Awareness, sem = Self-Management, sesa = social awareness, seb = Relationship Skills, serm = Responsible Decision Making, cor = Receptive Communication, coe = Expressive Communication, cop = Pragmatic Communication, cr = Recent Memory, cl = Language, cv = Visuospatial, ce = Executive Functioning, sv = Visual, sb = Vestibular, sp = Proprioceptive, st = Tactile, sau = Auditory, sc = Taste, so = Olfaction

Developmental Affordance Evaluation: Sunrise
Elementary School

Play Component	Primary Affordance	Secondary Affordance	Play Component	Primary Affordance	Secondary Affordance
Open Fields	pg, seb, cop, cr, ce, sb	pf, sesa, serm, cor, coe, cl, cv, sp	Dream Catcher - solid	pg, seb, cop, cv, sp	pf, sem, sesa, ce, sb
USA Map	seb, ce	pg, cor, cr, cv	Twin Slides	pg, seb, cop, sb	cor, coe, cl, ce,
Four-square	pg, seb, serm, cop, cv, ce, sp	pf, sem, sesa, cor, coe, cr	Slide	pg, sb	coe, cop,
Basketball	pg, seb, serm, cop, cv, ce, sb, sp	pf, sem, sesa, cor, coe, cr	Gradient Stairs	pg, cv, sp,	seb
bench	sea, Seb, cor, cop, cl	sem, ce, sv	Stairs	pg, cv, sp,	seb
Big Bouncer	pg, sb	cop, sp	Car Dashboard Panel	pf, coe, cr, ce	seb, cop, st
Metal Straight Slide	pg, sb	coe, cop,	Convex Bridge	pg, seb seb, serm, cor, coe, cop, cl	cop, ce, sb sesa, cr, ce
Stairs	pg, cv, sp,	seb	Play Top	Pg, cv, Sp	coe, sb
Swings	pg, sb	cv, sp	Chin up Bar	pg, sp	coe, cv
Trees (skinny, against building)	pg, cv,	sv, sau, st, seb	Hanging Handle	pg, cv, sp,	seb
Stairs	pg, cv, sp,	seb	Ladder	pg, cv, sp,	seb
Ladder - Spiral	pg, sb, sp	cop, cv,	Chain Ladder	pg, cv, sp,	seb
Corkscrew					
Small Twin Slide	pg, seb, cop, sb	cor, coe, cl, ce,	Dream Catcher - movable	pg, seb, cop, cv, sp	pf, sem, sesa, ce, sb
Convex Bridge	pg, seb	cop, ce, sb	Four-square	pg, seb, serm, cop, cv, ce, sp	pf, sem, sesa, cor, coe, cr
Rock Wall Platform	pg, sem, serm, cop, cv, ce, sp	pf, sea, seb, cor, coe, cr, cl, sv, sb	Hopscotch	pg, seb, cv, ce	serm, cop, cl, sb, sp
Big Twin Slide	pg, seb, cop, sb	cor, coe, cl, ce,	Green Rock Wall	pg, cv, ce, sb, sp	pf, sea, sem
Single Slides	pg, sb	coe, cop,	White Rock Wall	pg, cv, ce, sb, sp	pf, sea, sem
Hole Rock Wall	pg, cv, ce, sb, sp	pf, sea, sem	Zipline Bars	pg, cv, sb	sea, sesa, coe, ce, sp
Attached Balance Pods	Pg, cv, Sb	seb, ce	tether ball	pg, seb, cop, cv, ce, sp	pf, sea, sem, cor, coe,
Spinning Hanging Bar	pg, ce, sb	sea, coe, cop, cv, sp	circle track	pg, cop, sb	ce, sp
Spinning Hanging bars with footstools	pg, ce, sb	sea, seb, coe, cop, cv, sp	straight track	pg, cop, sb	sea, ce, sp
Monkey Bars	Pg, cv, Sp	coe, cop, sb			

Note: pg = Gross Motor; pf = Fine Motor; sea = Self-Awareness; sem = Self-Management; sesa = social awareness; seb = Relationship Skills; serm = Responsible Decision Making; cor = Receptive Communication; coe = Expressive Communication; cop = Pragmatic Communication; cr = Recent Memory; cl = Language; cv = Visiospatial; ce = Executive Functioning; sv = Visual; sb = Vestibular; sp = Proprioceptive; st = Tactile; sau = Auditory; sc = Taste; so = Olfaction

Developmental Affordance Evaluation:
 Endeavour Elementary School

Play Component	Primary Affordance	Secondary Affordance	Play Component	Primary Affordance	Secondary Affordance
Track	pg, cop, sb	sea, ce, sp	Benches	sea, Seb, cor, cop, cl	sem, ce, sv
Four-square	pg, seb, serm, cop, cv, ce, sp	pf, sem, sesa, cor, coe, cr	Planter Boxes	pf, seb, sv, st	seb, coe, ce, sa, so
Tether Ball	pg, seb, cop, cv, ce, sp	pf, sea, sem, cor, coe, cr	Gathering Space with a flagpole	sesa, seb, cor, cop, cl	pg, ce,
Funnel Ball	pg, seb, serm, cop, cv, ce, sb, sp	pf, sem, sesa, cor, coe, cr	Swirl Pole	pg, seb, cop, sb, sp,	sesa, coe,
USA map	seb, ce	pg, cor, cr, cv	Swirl pod	pg, seb, cop, sb, sp,	sesa, coe,
Utah map	seb, ce	pg, cor, cr, cv	Circle Balance Beam	Pg, cv, Sb	seb, ce
Basketball	pg, seb, serm, cop, cv, ce, sb, sp	pf, sem, sesa, cor, coe, cr	Boulders	pg, seb, cop, cv, sb	serm, cor, coe, cl, ce, sv, st
Hopscotch	pg, seb, cv, ce	serm, cop, cl, sb, sp	Coniferous Trees	pg, pf, seb, cop, st	sesa, coe, cv, ce, sv, sau,
Open Space Fields	pg, seb, cop, cr, ce, sb	pf, sesa, serm, cor, coe, cl, cv, sp	Hill	Pg, seb, cop, cv, ce, sv	sea, cor, coe, cr, cl, sb, st
Picnic Tables	sea, Seb, cop, cl	pf, sem, coe, ce, sv	trees	pg, cv,	sv, sau, st, seb,
Net Climbing Structure	pg, pf, sea, seb, cop, cv, ce, sb, sp	sem, serm, coe, cor, cl, st	bushes and shrubs	pg, pf, seb, cop, st	sesa, coe, cv, ce, sv, sau,

Note: pg = Gross Motor, pf = Fine Motor, sea = Self-Awareness, sem = Self-Management, sesa = social awareness, seb = Relationship Skills, serm = Responsible Decision Making, cor = Receptive Communication, coe = Expressive Communication, cop = Pragmatic Communication, cr = Recent Memory, cl = Language, cv = Visiospatial, ce = Executive Functioning, sv = Visual, sb = Vestibular, sp = Proprioceptive, st = Tactile, sau = Auditory, sc = Taste, so = Olfaction

Developmental Affordance Evaluation: Midvale Elementary School					
Play Component	Primary Affordance	Secondary Affordance	Play Component	Primary Affordance	Secondary Affordance
Stairs	pg, cv, sp,	seb	Net Structure	pg, seb, cv, ce, sb, sp	pf, sea, sem, cor, coe, sv,
Sensory Slide	pg, pf, coe, sp, st	sea, seb, cop, ce,	Three Twisted Monkey Bars	Pg, cv, Sp	coe, cop, sb, seb
Box Stairs	pg, cv, sp,	seb	S1- Moon Net Structure	pg, seb, cv, ce, sb, sp	pf, sea, sem, cor, coe, sv,
Tube	pg, coe, cv	sesa, cop, cl, ce, sb, sp	S1- Straight Slide	pg, sb	coe, cop,
Swirl Slide	pg, sb	coe, cop,	S1- Spiral Spinner	pg, seb, cop, sb, sp,	sesa, coe,
Twin Slide	pg, seb, cop, sb	cor, coe, cl, ce,	S1- Curved Monkey Bars	Pg, cv, Sp	coe, cop, sb
Hopscotch	pg, seb, cv, ce	serm, cop, cl, sb, sp	S1- Ladder	pg, cv, sp,	seb
Benches	sea, Seb, cor, cop, cl	sem, ce, sv	S1- Firepole	pg, cv, sb	coe, cop,
Trees	pg, pf, seb, cop, st	sesa, coe, cv, ce, sv, sau,	Stairs	pg, cv, sp,	seb
Four-square	pg, seb, serm, cop, cv, ce, sp	pf, sem, sesa, cor, coe, cr	Small Twin Slide	pg, seb, cop, sb	cor, coe, cl, ce,
Open Grass	pg, seb, cop, cr, ce, sb	pf, sesa, serm, cor, coe, cl, cv, sp	Ladder - Sprial Corkscrew	pg, sb, sp	cop, cv,
Shrubs	pg, pf, seb, cop, st	sesa, coe, cv, ce, sv, sau,	Bridge	pg, seb	cop, ce, sb
Grass Fields; baseball fence	pg, seb, cop, cr, ce, sb	pf, sesa, serm, cor, coe, cl, cv, sp	Rock Platform	pg, sem, serm, cop, cv, ce, sp	pf, sea, seb, cor, coe, cr, cl, sv, sb
Garden	pg, pf, serm, cor, cop, ce, sv, sp, st, sc, so	sea, sesa, coe, cr, cl, cv,	Big Twin Slide	pg, seb, cop, sb	cor, coe, cl, ce,
Benches	sea, Seb, cor, cop, cl	sem, ce, sv	Single slides	pg, sb	coe, cop,
Tether Ball	pg, seb, cop, cv, ce, sp	pf, sea, sem, cor, coe,	Hole Rock Wall	pg, cv, ce, sb, sp	pf, sea, sem
Basketball	pg, seb, serm, cop, cv, ce, sb, sp	pf, sem, sesa, cor, coe, cr	Tunnel	pg, coe, cv	sesa, cop, cl, ce, sb, sp
Funnel Ball	pg, seb, serm, cop, cv, ce, sb, sp	pf, sem, sesa, cor, coe, cr	Gradient Stairs	pg, cv, sp,	seb
Four-square	pg, seb, serm, cop, cv, ce, sp	pf, sem, sesa, cor, coe, cr	Rung Ladder	pg, cv, sp,	seb
Hopscotch	pg, seb, cv, ce	serm, cop, cl, sb, sp	Wave Bars	Pg, cv, Sp	coe, cop, sb
USA Map	seb, ce	pg, cor, cr, cv	Attatched Balance Pods	Pg, cv, Sb	seb, ce
Waist High Bar	Pg, cv, Sp	coe, sb	Dream Catcher - movable	pg, seb, cop, cv, sp	pf, sem, sesa, ce, sb
Spinning Hanging bars with footstools	pg, ce, sb	sea, seb, coe, cop, cv, sp	Monkey Bars	Pg, cv, Sp	coe, cop, sb

Note: pg = Gross Motor; pf = Fine Motor; sea = Self-Awareness; serm = Self-Management; sesa = social awareness; seb = Relationship Skills; serm = Responsible Decision Making; cor = Receptive Communication; coe = Expressive Communication; cop = Pragmatic Communication; cr = Recent Memory; cl = Language; cv = Visiospatial; ce = Executive Functioning; sv = Visual; sb = Vestibular; sp = Proprioceptive; st = Tactile; sau = Auditory; sc = Taste; so = Olfaction

Developmental Affordance Evaluation: Redwood Elementary School

Play Component	Primary Affordance	Secondary Affordance	Play Component	Primary Affordance	Secondary Affordance
Stairs	pg, cv, sp,	seb	Two Pole Slide	pg, cv, sb,	coe, cop, ce
Rung Ladder	pg, cv, sp,	seb	Bridge	pg, seb	cop, ce, sb
Twin Slides	pg, seb, cop, sb	cor, coe, cl, ce,	Twin Fat Slide	pg, seb, cop, sb	cor, coe, cl, ce,
Bridge	pg, seb	cop, ce, sb	Benches	sea, Seb, cor, cop, cl	sem, ce, sv
Swirl Slide	pg, sb	coe, cop,	Hanging Rung	pg, sp	coe, cv
Fire Pole	pg, cv, sb	coe, cop,	Deep Rung Ladder	pg, cv, sp,	seb
Ladder	pg, cv, sp,	seb	Open Fields; baseball fencing	pg, seb, cop, cr, ce, sb	pf, sesa, serm, cor, coe, cl, cv, sp
Monkey Bars	Pg, cv, Sp	coe, cop, sb	Tether Ball	pg, seb, cop, cv, ce, sp	pf, sea, sem, cor, coe,
Hanging Rung	pg, sp	coe, cv	USA Map	seb, ce	pg, cor, cr, cv
Zig-Zag Ladder	pg, cv, sp,	seb	Trees	pg, cv,	sv, sau, st, seb
Deep Rung Ladder	pg, cv, sp,	seb	Track	pg, cop, sb	sea, ce, sp
Panel - Climbing Hole	pg, cv, sp,	seb, coe, cop, sb	Four-square	pg, seb, serm, cop, cv, ce, sp	pf, sem, sesa, cor, coe, cr
Swings	pg, sb	cv, sp	Circle Tracks	pg, cop, sb	ce, sp
Swirl Monkey Bars	Pg, cv, Sp	coe, cop, sb	Basketball	pg, seb, serm, cop, cv, ce, sb, sp	pf, sem, sesa, cor, coe, cr
Swirl Slide	pg, sb	coe, cop,	Line-up lines	sesa, cor	cr, ce, cl
Stairs	pg, cv, sp,	seb	Baseball fencing	pg, seb, serm, cop, cv, ce, sb, sp	pf, sem, sesa, cor, coe, cr
hopscotch	pg, seb, cv, ce	serm, cop, cl, sb, sp			

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Developmental Affordance Evaluation: Guadalupe Elementary School

Play Component	Primary Affordance	Secondary Affordance	Play Component	Primary Affordance	Secondary Affordance
Bushes	pg, pf, seb, cop, st	coe, sv	Water/Sand Toy	pg, pf, Sem, seb, cop, st	sea, sesa, coe, ce, sv, sp
Rocks	pf, st	seb, cop, sv	Kitchen	pf, sem, seb, coe, cop, ce, st	sesa, cor, cl, sp
Trees	pg, cv,	sv, sau, st, seb,	Sand Area	pg, pf, Sem, seb, cop, st	sea, sesa, coe, ce, sv, sp
Basketball	pg, seb, sem, cop, cv, ce, sb, sp	pf, sem, sesa, cor, coe, cr	Trees	pg, pf, seb, cop, st	sesa, coe, cv, ce, sv, sau
Grass Open Space	pg, seb, cop, cr, ce, sb	pf, sesa, sem, cor, coe, cl, cv, sp	Bushes	pg, pf, seb, cop, st	sesa, coe, sv
Hopscotch	pg, seb, cv, ce	sem, cop, cl, sb, sp	Rocks	pf, st	seb, cop, sv
Four-square	pg, seb, sem, cop, cv, ce, sp	pf, sem, sesa, cor, coe, cr	Grass Open Area	pg, seb, cop, cr, ce, sb	pf, sesa, sem, cor, coe, cl, cv, sp
Funnel Ball	pg, seb, sem, cop, cv, ce, sb, sp	pf, sem, sesa, cor, coe, cr	Detatched Slide	pg, sb	coe, cop,
Net Sturcture:	pg, pf, sea, seb, cop, cv, ce, sb, sp	sem, sem, coe, cor, cl, st	Sand toys; bucket, shovel, pot, strainer	pg, pf, Sem, seb, cop, st	sea, sesa, coe, ce, sv, sp
Swivel Bowl	pg, coe, sb,	seb, cop, sv	Playhouse with windows and grass underneath	pg, pf, seb, cor, coe, cop, ce, sv	sea, sem, sesa, sem, cr, cl,
Big spinner; merry-go-round esq	pg, seb, cop, sb, sp,	sesa, coe,	Playhouse with windows and sand underneath	pg, pf, seb, cor, coe, cop, ce, sv	sea, sem, sesa, sem, cr, cl,
Spinner - Merry-go-round esq	pg, seb, cop, sb, sp,	sesa, coe,	Rock Walls	pg, cv, ce, sb, sp	pf, sea, sem
Benches	sea, Seb, cor, cop, cl	sem, ce, sv	Single Slides	pg, sb	coe, cop,
Picnic Tables	sea, Seb, cop, cl	pf, sem, coe, ce, sv	ABC and Number Panel	cr, ce, cl	sea
Push Cars	pg, sesa, seb, cop, cv, ce, sb, sp,	sem, cor, coe, cr, cl,	Steering Wheel	pf, sea, coe, ce	sea, seb, cop, sv, st
Shuffle car	pg, sesa, seb, cop, cv, ce, sb, sp,	sem, cor, coe, cr, cl,	Ladders	pg, cv, sp,	seb
Tricycle	pg, sesa, seb, cop, cv, ce, sb, sp,	sem, cor, coe, cr, cl,	Swings	pg, sb	cv, sp
Crates	pg, seb, cop, ce	pf, sem, sem, coe, sv, sp	Baby Swing	pg, sb	coe, cor, seb, cv, sp
Movable Tree Stumps	pg, seb, cop, cv, ce, sb	sesa, cl, sv,	Handle Bar Swing	Pg, cv, Sp	coe, cop, sb
Garden - Flower Beds	pg, pf, sem, cor, cop, ce, sv, sp, st, so	sea, sesa, coe, cr, cl, cv,			

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Developmental Affordance Evaluation: SLCC Nature Playground

Play Component	Primary Affordance	Secondary Affordance	Play Component	Primary Affordance	Secondary Affordance
Bug catcher, butterfly	pf, sesa, serm, coe, ce	pg, sea, cop,	dirt path	pg, sv, st,	cop, cv, ce
toys for sand	pg, pf, sem, seb, ce, sp	sea, sesa, serm, coe, cop	woodchips by beds	pf, sv, st,	coe, cop, cv, ce
balls	pg, seb, serm, cop, cv, ce, sb, sp	pf, sem, sesa, cor, coe, cr	rock gathering spot	pg, seb, cop	cor, cl, ce, sv, sb
wheel toys	pg, sesa, seb, cop, cv, ce, sb, sp,	serm, cor, coe, cr, cl,	raised planted beds	pf, serm, cop, ce, sv, st, so	sesa, coe, sau
wheel barrows	pg, sesa, seb, cop, cv, ce, sb, sp,	pf, serm, cor, coe, cr, cl,	arch, gate w/ climbing roses	pg, seb, cv, sp, st	pf, sem, sesa, ce, sv, sau, so
rack, shovels, spades, gardening tools	pg, pf, sem, seb, ce, sp	sea, sesa, serm, coe, cop	Main trellis with bench and vines that are thornless	pf, sea, sem, sesa, seb, serm, cor, coe, cop, cr, cl, ce, so	sv
chalk art	pf, sea, seb, coe, ce, sp, st, sea, Seb, coe, cop, cl	cop, cl, cv, sv	trees	pg, pf, seb, cop, st	sesa, coe, cv, ce, sv, sau
chairs	pf, seb, coe, cop, ce	sem, ce, sv	dogwood	pg, pf, seb, cop, st	sesa, coe, cv, ce, sv, sau, so
basket	pf, seb, sesa, coe, cop, ce	pg, cor, serm	winding rock border	pg, seb, cop, cv, sb	serm, cor, coe, cl, ce, sv, st
cradel	pf, seb, sesa, coe, cop, ce	pg, cor, serm	perennials	pf, seb, cop, st, sv, so	sesa, coe, cv, ce
table	sea, Seb, cop, cl	pf, sem, coe, ce, sv	5 tree trunk gathering space w/ medium rocks for fabric forts	pf, seb, cop, sp	sesa, cor, coe, cr, cl, ce
wagon	pg, sesa, seb, cop, cv, ce, sb, sp,	pf, serm, cor, coe, cr, cl,	tall grasses	pg, seb, cv, sp, st, sau	pf, sesa, cop, ce, sv
small hoops	pf, coe, cv, ce	pg, seb, serm, cop	tree stump space	pg, seb, cop, cv, ce, sb, sp	sesa, cl
guitar	pf, sea, coe, ce, st, sau	sesa, seb, cop,	Big tree stump	sea, seb, cop, ce, sb	pg, sesa, cl, cv, sv,
drums	pf, sea, coe, ce, st, sau	sesa, seb, cop,	sand area	pg, pf, Serm, seb, cop, st	sea, sesa, coe, ce, sv, sp
Bubble stuff	pf, seb, coe, cop, ce, st	pg, serm, cor,	sand area - stepping stones	pg, cv, ce	sesa, seb, cop, sv
pool noodles and boats	pf, seb, coe, cop, ce	pg, serm, cor,	sand area - sand table	pf, Serm, seb, cop, st	sea, sesa, coe, ce, sv, sp
Outdoor art - stamps, paper, markers, acrons, twigs, scissors, oil pastels	pg, pf, sem, seb, ce, sp, st	sea, sesa, serm, coe, cop	sand area - shade sail	sv, ce, st	n
sandbags	pg, seb, coe, cop, ce	pf, serm, cor,	garden area - woodchips	pf, sv, st,	coe, cop, cv, ce
wood pieces for art	pf, seb, coe, cop, ce	pg, serm, cor,	garden area - witches, yellow	pg, pf, seb, cop, st	sesa, coe, cv, ce, sv, sau, so
yarn and ribbon	pf, seb, coe, cop, ce	pg, serm, cor,	garden area - small trees	pg, pf, seb, cop, st	sesa, coe, cv, ce, sv, sau
stickers, paints and paint material	pg, pf, sea, coe, cv, ce, st	seb, sesa, serm, cop	garden area - boulders	pg, seb, cop, cv, sb	serm, cor, coe, cl, ce, sv, st
wood pieces and building sticks	pg, pf, sem, seb, ce, sp	sea, sesa, serm, coe, cop, st	garden area - pathway	pg, sv, ce	cop, cv
rubber ramp set	pg, pf, sem, seb, ce, sp	sea, sesa, serm, coe, cop, st	water - troughs going to drainage pit	pg, seb, cop, cv, ce, sv, st, sau	sea, sesa, serm, coe, cr, cl, sp
magnet wall	pf, coe, cl, ce	pg, seb, serm, cor, cop,	water play area	pg, pf, seb, cop, cv, ce, st	sea, sesa, serm, coe, cr, cl, sv, sp, sau

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Developmental Affordance Evaluation: SLCC Nature Playground Cont.

Play Component	Primary Affordance	Secondary Affordance	Play Component	Primary Affordance	Secondary Affordance
Big tree	pg, pf, seb, cop, st	sesa, coe, cv, ce, sv, sau	grass hill w/ tunnels, rocks	pg, seb, serm, cop, cv, ce, sb, sp, st	pf, sea, sem, sesa, cor, coe, cl, sv, sau
japanese maple	pg, pf, seb, cop, sv, st	sesa, coe, cv, ce, sau, so	rock hill tunnels	pg, seb, serm, cop, cv, ce, sb, sp, st	pf, sea, sem, sesa, cor, coe, cl, sv, sau
box hedges	pg, pf, seb, cop, st	sesa, coe, cv, ce, sv, sau	rock hill - grasses	pf, sp, st, sau	pg, seb, sesa, cop, ce, sv
shrubs	pg, pf, seb, cop, st	sesa, coe, cv, ce, sv, sau, so	rock hill - boulders	pg, seb, cop, cv, sb	serm, cor, coe, cl, ce, sv, st
brunnera	pf, seb, cop, st	sesa, coe, cv, ce, sv, sau, so	rock hill - woodchips	pf, st,	coe, cop, cv, ce, sv
roses- thornless	pf, seb, cop, st, so	sesa, coe, cv, ce, sv, sau	rock hill- tree stumps	pg, cv, ce, sb	sea, seb, sv
small fence	pg, serm, sv,	ce,	rock hill- platform	coe, sv	cop,
woodchips	pf, sv, st,	coe, cop, cv, ce	rock hill - stone space	pg, seb, cop	cor, cl, ce, sv, sb
planter boxes	pf, serm, cor, cop, ce, sv, st, se, so	sea, sesa, coe, cr, cl, cv,	rock hill- shade sail	sv, ce, st	n
kid doorway	pg, serm, sv,	ce,	hedges w/stepping stones	pg, seb, cv, st	pf, sesa, cop, ce, sv
trellis	cv, sv, cop, st	sea, sem, cor, coe, ce, so, sau	water pump	pg, seb, cop, ce, st, sa,	pf, sesa, serm, cl, sv
gravel path	pg, pf, sv, st,	coe, cop, cv, ce	splash pad	pg, seb, cop, ce, sb, st	sea, sesa, cr, sv, sp, sa
shed	sesa, coe, ce	seb, cop, sv	small trees	pg, pf, seb, cop, st	sesa, coe, cv, ce, sv, sa,
grass open space	pg, seb, cop, cr, ce, sb	pf, sesa, serm, cor, coe, cl, cv, sp	grapes	pf, cor, coe, st, se, so	sesa, ce, sv, sau
small tree trunks - pic	pg, pf, sem, seb, ce, sp	sea, sesa, serm, coe, cop, st	big trees	pg, pf, seb, cop, st	sesa, coe, cv, ce, sv, sau
pine trees	pg, pf, seb, cop, st	sesa, coe, cv, ce, sv, sau, so	boulders	pg, seb, cop, cv, sb	serm, cor, coe, cl, ce, sv, st
weeping tree	pg, pf, seb, cop, st	sesa, coe, cv, ce, sv, sau, so	music xylophone	pf, sea, coe, ce, st, sa	sesa, seb, cop,
willow archway	pg, seb, cv, sp, st	pf, sem, sesa, ce, sv, sau, so	music drums	pf, sea, coe, ce, st, sa	sesa, seb, cop,
Drainage platform	coe, sv	cop,	music chimes	pf, sea, coe, ce, st, sa	sesa, seb, cop,
balance logs	Pg, cv, Sb	seb, ce	mucis tree stump chairs	pg, seb, cop, cv, ce, sb	sesa, cl, sv,
stepping stones	pg, seb, cop, cl, cv, ce	sea, sem, sesa, sv	wind wheel	ce, sv, sau	cr
middle gathering space	sea, sem, seb, cop, sv	serm, coe, cl	gathering space structure with table, chairs, woodchips	pf, sea, sem, sesa, seb, serm, cor, coe, cop, cr, cl, ce	pg, sv
Grasses w/ space to run between lines	pg, seb, cv, sp, st, sa	pf, sesa, cop, ce, sv	open grass area	pg, seb, cop, cr, ce, sb	pf, sesa, serm, cor, coe, cl, cv, sp
water fountain	sea, se	pf, sv, st	shrubs in mock oranges	pg, pf, seb, cop, st	sesa, coe, cv, ce, sv, sau, so
grass path w/ vine trellises	pg, seb, serm, cv, ce, se, st, so	pf, sem, sesa, sv	signage	cor, cl, ce	sv
teepee	pg, seb, cor, coe, cop, cl, ce	sem, serm, cr, st	cement open space for chalk	pg, pf, sea, sesa, seb, serm, cop, coe, ce, st	cor, cr, cl, sv, sp,
garden boxes	pg, pf, serm, cor, cop, ce, sv, sp, st, so	sea, sesa, coe, cr, cl, cv,	drinking fountain	sea, se	pf, sv, st
bridge	pg, seb	cop, ce, sb	forsythias	pg, pf, seb, cop, st	sesa, coe, cv, ce, sv, sau, so

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Developmental Affordance Evaluation: Little Aggies Play Garden

Play Component	Primary Affordance	Secondary Affordance	Play Component	Primary Affordance	Secondary Affordance
Stairs	pg, cv, sp,	seb	circulation path	pg, sem, seb, sesa, cop, cv, ce, sb	pf, sea, sv, sp, st
archway with vines	pg, seb, cv, sp, st	pf, sem, sesa, ce, sv, sa, so	Scooters	pg, sesa, seb, cop, cv, ce, sb, sp,	serm, cor, coe, cr, cl,
dedication plaque	cor, cl, ce	sesa	pool noodles	pg, seb, cop, ce	pf, serm, cor,
perennial garden	pf, seb, cop, st, sv, so	sesa, coe, cv, ce	bird feeders	pf, sesa, serm, ce	pg, sea, cor
grasses	pg, seb, cv, sp, st, sau	pf, sesa, cop, ce, sv	helmets	pg, sea, ce	sesa, sem, cor
area signs	cor, cl, ce	sv	kitchen supplies	pg, pf, sem, seb, ce, sp	sea, sesa, serm, coe, cop
balance log	Pg, cv, Sb	seb, ce	hula hoops	pg, coe, cv, ce, sp	pf, seb, serm, cop
boulder slide	pg, seb, serm, cop, cv, sb, sp,	sea, ce, sv, st	fabric for treehouse	pf, seb, cop, coe, cv, ce	pg, sea, serm, st, sv
woodchips	pf, sv, st,	coe, cop, cv, ce	sand toys	pg, pf, sem, seb, ce, sp	sea, sesa, serm, coe, cop
trees	pg, pf, seb, cop, st	sesa, coe, cv, ce, sv, sau	frisbee golf T	pg, pf, seb, cop, cv, ce, sp	sem, serm, cor, coe
tree house platform - they have fabric that they use	pf, sea, sem, sesa, seb, serm, cor, coe, cop, cr, cl, ce, so	sv	push mower toy	pg, sesa, seb, cop, cv, ce, sb, sp,	serm, cor, coe, cr, cl,
big shrub	pg, pf, seb, cop, st	sesa, coe, cv, ce, sv, sau, so	baby dolls	pf, seb, sesa, coe, cop, ce	pg, cor, serm
little shrubs	pg, pf, seb, cop, st	sesa, coe, cv, ce, sv, sau, so	Sand trucks	pg, pf, Serm, seb, cop, st	sea, sesa, coe, ce, sv, sp
drinking fountain	sea, sc	pf, sv, st	Sidewalk chalk	pf, sea, seb, coe, ce, sp, st,	cop, cl, cv, sv
hose	pg, pf, seb, cop, ce, st, sa,	sesa, serm, cl, sv	wood building yoyo's	pg, pf, sem, seb, ce, sp	sea, sesa, serm, coe, cop
water mister	sea, sesa, st	seb, cop	organizers	pf, ce,	coe, cop
bench	sea, Seb, cor, cop, cl	sem, ce, sv	jump ropes	Pg, Sem, Seb, coe, cop, cv, ce, sb	sea, serm, cor, cr, cl
veggie barrels	pf, serm, cor, cop, ce, sv, st, se, so	pg, sea, sesa, coe, cr, cl, cv,	stroller	pg, sesa, seb, cop, cv, ce, sb	serm, cor, coe, cr, cl,
bridge	pg, seb, sv	cop, ce, sb	basket ball hoop	pg, seb, cop, cv, ce, sp	pf, sem, serm, cor, coe
stepping stone	pg, seb, cop, cv, ce	sea, sem, sesa, cl, sv	tries	pg, sesa, seb, cop, cv, ce, sb, sp,	serm, cor, coe, cr, cl,
bird house	pf, sesa, serm, ce	pg, sea, cor	balls	pg, seb, serm, cop, cv, ce, sb, sp	pf, sem, sesa, cor, coe, cr
strawberries	pf, cor, coe, st, sc, so	sesa, ce, sv	traffic cones and small colored cones	pg, seb, serm, cor, cop, cr, cv, ce, sb	sea, sesa, cl
2 hills	Pg, seb, cop, cv, ce, sv, sb	pf, sea, serm, cor, coe, cr, cl, sp, st	tree house fabric	pf, seb, cop, sp	sesa, cor, coe, cr, cl, ce
grape vines	pf, cor, coe, st, se, so	sesa, ce, sv, sau	tunnel - kind of like a dog tunnel	pg, coe, cv	sesa, cop, cl, ce, sb, sp
stone well	cor, cl, sv	seb, ce	buckets	pg, pf, sem, seb, ce, sp	sea, sesa, serm, coe, cop
gate	sv	ce, pg	Fence	ce, sv,	serm,
mud kitchen - with toys	pf, sem, seb, coe, cop, ce, st	sesa, cor, cl, sp, so	Grass	pg, seb, cop	pf, sesa, serm, coe, cv
mud/dirt garden	pg, pf, serm, cor, cop, ce, sv, st, sc, so	sea, sesa, coe, cr, cl, cv,	Trees (one has suckers)	pg, pf, seb, cop, st	sesa, coe, cv, ce, sv, sau

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Developmental Affordance Evaluation: Little Aggies Play Garden Cont.

Play Component	Primary Affordance	Secondary Affordance	Play Component	Primary Affordance	Secondary Affordance
leaves	pf, sv, st,	coe, cop, cv, ce	Shrubs	pg, pf, seb, cop, st	sesa, coe, cv, ce, sv, sau, so
small table	sea, Seb, cop, cl	pf, sem, coe, ce, sv	Grape Vines	pf, cor, coe, st, se, so	sesa, ce, sv, sau
stone work - marbles	ce, st	sv	herb bed	pg, pf, cor, coe, st, se, so	sesa, ce, sv
shed	sesa, coe, cop, cr, cl, ce	seb, sv	planting boxes	pf, serm, cor, cop, ce, sv, st, se, so	pg, sea, sesa, coe, cr, cl, cv,
clock	cor, cl, ce	n	shed	sesa, coe, cop, cr, cl, ce	seb, sv
snow paint	pf, sea, seb, coe, ce, sp, st,	cop, cl, cv, sv	rocking horse	Pg, coe, cop, sb	sesa, seb,
hopscotch	pg, seb, cv, ce	serm, cop, cl, sb, sp	water wheel	pf, seb, cop, cv, ce, sb, sp	pg, sem, sesa
table	sea, Seb, cop, cl	pf, sem, coe, ce, sv	basketball hoop	pg, seb, serm, cop, cv, ce, sb, sp	pf, sem, sesa, cor, coe, cr
picnic benches	pf, sea, Seb, coe, cop, cl, st, so	sem, sesa, cor, ce, sv	log bench	sea, Seb, cor, cop, cl	sem, ce, sv
pergola with seats	sea, Seb, cop, cl, st	pf, sem, coe, ce, sv	bouler	pg, seb, serm, cop, cv, sb, sp,	sea, ce, sv, st
sand pit	pg, pf, Serm, seb, cop, st	sea, sesa, coe, ce, sv, sp	sand box	pg, pf, Serm, seb, cop, st	sea, sesa, coe, ce, sv, sp
ramp	pg, seb, cop, sb	sea, cor, cv, ce, sv	mobile sand baxes	pg, pf, Serm, seb, cop, st	sea, sesa, coe, ce, sv, sp
wind Chimes	pf, sea, coe, ce, st, sau	sesa, seb, cop,	dedication plaque	cor, cl, ce	sesa
xylophone	pf, sea, coe, ce, st, sau	sesa, seb, cop,	pergolla with benches	sea, Seb, cop, cl, st	pf, sem, coe, ce, sv
Plum treess	pg, pf, seb, cop, st	sesa, coe, cv, ce, sv, sau	coat hooks	pf, ce,	n
music	pf, sea, coe, ce, st, sau	sesa, seb, cop,	chimes	pf, sea, coe, ce, st, sa	sesa, seb, cop,
ball	pg, seb, serm, cop, cv, ce, sb, sp	pf, sem, sesa, cor, coe, cr			

Note: pg = Gross Motor; pf = Fine Motor; sea = Self-Awareness; sem = Self-Management; sesa = social awareness; seb = Relationship Skills; serm = Responsible Decision Making; cor = Receptive Communication; coe = Expressive Communication; cop = Pragmatic Communication; cr = Recent Memory; cl = Language; cv = Visiospatial; ce = Executive Functioning; sv = Visual; sb = Vestibular; sp = Proprioceptive; st = Tactile; sau = Auditory; se = Taste; so = Olfaction

Appendix D

Nature Playground Play Spaces List

Physical Domain

Gross Motor Play Spaces – Learning to and developing the use of large muscle groups for activities like running, jumping, and climbing.

- Open Grass Field
- Natural Meadow
- Hills
 - Grassy - gentle or steep, could support sledding
 - Tunnels built into the hill
 - Boulders, tree stumps, and vegetation on the hill
 - Slide built into the hill
- Vegetation that encourages active social games.
 - Trees for climbing, chasing, and other social games
 - Forest/Woodland Exploration
 - Tree Grove/Dell
 - Tree Berm
 - Orchard
 - Corn Rows
 - Pumpkin Patch
- Garden
 - Vegetable Bed
 - Exploration Garden – paths, stepping stones, benches
- Rock/Boulder and Log Climbing/Balancing Area
- Polished Boulder Slide
- Building Area
 - Fort Building Area - Hideout
 - Hand Tool Station
 - Loose Parts Building Area – within a wood/forest
- Treehouse with slide, bridge, and ladder
- Play Materials
 - Buckets
 - Movable Tunnel
 - Traffic Cones
 - Balls
 - Wheeled Toys - Tricycles, Scooters, stroller, push mower, wheel barrow, wagon
 - Jump ropes
 - Basketball hoop
 - Wood building toys
 - Sand trucks
 - Frisbee golf T
 - Sand toys – sand bags, racks, shovels, spades
 - Hula hoops
 - Kitchen supplies

- Pool Noodles
- Water
 - Splash Pad and water troughs
 - Water pump into sand pit
 - Hose
 - Pond
 - Wetland/Marsh
 - Creek/Stream – allow for loose materials that can be used to dam up the stream
- Mud Kitchen/Café
- Sand Area
 - Sand Pit
 - Sand play coupled with water hand pump
 - Geological Exploration
 - Sand Toys
- Artwork
 - Walk through Stick Sculpture
- Music
 - Jump on sound cushions
 - Bell tower
 - Jingle Bell Arch
- Circulation Paths – primary, secondary, tertiary
 - Accessible – ramps, ADA surface material
 - Garden Path
 - Tree Stump Path
 - Boulder/Stepping Stone Path
 - Boardwalk
 - Tunnels
 - Willow Arch Tunnel
 - Stone Plank Bridge
 - Vehicular play paths
 - Runway/Straight Track
- Labyrinth
- Tree Stump Area
- Cougar Climber and Hawk Nest
- Tire Swing

Fine Motor Play Spaces – Learning to and developing the use of small muscle groups, fingers and tongue, for precise movements like grasping and manipulating objects, speech, and hand-eye coordination.

- Vegetation that encourage manipulation with hands or other small muscles.
 - Ornamental Grass Labyrinth
 - Hill with perennials and ornamental grasses
 - Perennial and Annual Garden

- Garden Bed
- Sensory Garden
- Veggie Barrels
- Edible Vine covered Arbor
- Forest/Woodland Exploration
- Play Materials
 - Kitchen supplies
 - Fabric for treehouse/fort building – yarn, ribbon
 - Wood building toys
 - Water toys – pool Noodles, Toy Boats
 - Sand Toys
 - Organizers
 - Buckets
 - Bug Catcher
 - Sidewalk Chalk
 - Art Materials – stickers, stamps, paper, markers, acorns, twigs, scissors, oil paint
 - Basket
 - Small Hoops
 - Instruments
 - Bubble Stuff
 - Magnet wall
- Puppet Theater
- Water
 - Hose
 - Water pump into Sand Pit
 - Water toys
 - Interactive Creek/Stream
- Building Area
 - Loose Parts Building – sand, sticks, rocks, water, mud
 - Hand Tool Station
- Compost Pile – searching/exploration
- Mud Kitchen
- Sand Area
 - Sand Toys
 - Sand play with water hand pump
 - Geological Section
- Art Area
 - Sidewalk Art Area
 - Art tables
 - Art Pergola with tables and benches
- Music
 - Wall chimes
 - Giant metallophone
 - Drums - Thunder Drum

- Xylophone
- Guitars
- Labyrinth/Edible Maze
- Open Grass Areas for games with balls
- Animal habitat
 - Dinosaur Nest
- Nature Clubhouse
 - Educational Equipment
- Microscopes
- Books
- Insects
- Bug catcher

Social-Emotional Domain

Self-Awareness Play Spaces – Learning to recognize one’s emotions, thought, and control over oneself. This involves the recognition of strengths, limitations, and confidence.

- Art Area
 - Sidewalk Chalk
 - Art tables
 - Art Materials – stickers, stamps, paper, markers, acorns, twigs, scissors, oil paint, snow paint
- Sitting/Observation Spots
 - Chairs
 - Benches – Log Bench
 - Picnic Tables
 - Cozy Place – Observation nooks
 - Lookout-point on a hill
 - Gathering Spaces the encourage self-expression and self-reflection
 - Rock Sitting Space
 - Wooden Globe Gathering Space
 - Multipurpose Lawn
 - Tree Grove/Dell
 - Nature Clubhouse
 - Pavilion/Pergola/Gazebo – vine covered
 - Council Circle – reading, tree stumps, boulders, campfire
- Music
 - Guitars
 - Drum
 - Xylophone
 - Chimes
 - Voice cone

- Water Fountain
- Water Mister
- Stage
 - Big Tree Stump
 - Boulder
- Treehouse and Playhouse
- Play Materials
 - Art Supplies
 - Instruments
 - Sidewalk Chalk

Self-Management Play Spaces – Learning to regulate emotions, thoughts, and behaviors. “This includes managing stress, controlling impulses, motivating oneself and setting and working toward achieving personal and academic goals” (PlayCore, 2016).

- Art Area and Materials – stamps, paper, markers, acorns, twigs, scissors, oil paint
- Building Area
 - Wood pieces for building – small tree trunks
 - Fort Building Area
 - Hand Tool Station
- Gathering Space
 - Main Trellis Space
 - Wooden Dome Structure
 - Picnic Tables and Benches
 - Reading/Observation Alcove
- Treehouse Platform
- Mud Kitchen
- Circulation Pathways
- Play Materials
 - Kitchen Supplies
 - Jump Ropes
 - Buckets
 - Rubber Ramp Set
 - Sand Toys – rack, shovel, spades, gardening tools
 - Balls for games
- Pond with a Fishing Pier
- Nature Clubhouse – learning environment

Social-Awareness Play Spaces – Learning to empathize with others and understand social norms and the resources available from one’s community.

- Play Materials
 - Bug Catcher

- Wheel Toys – bikes, scooters, tricycles, wheel barrow, wagon
- Cradle, Baby Dolls
- Art Materials – stamps, paper, markers, acorns, twigs, scissors, oil paint
- Storage Shed
- Gathering Spaces
 - Pergola/Pavilion/Gazebo
 - Wooden Dome Structure
 - Multipurpose Lawn
 - Council Circle
 - Tree Stumps
 - Boulders
 - Campfire
 - Reading
- Water Mister
- Vegetation
 - Orchard
 - Corn Rows
 - Pumpkin Patch
 - Homestead
 - Vegetable Garden
 - Edible Maze
- Animal Habitat
 - Bird House
 - Bird Feeder
 - Bird Bath
 - Bird Blind
- Nature Clubhouse
- Playhouse
 - Log Cabin
 - Homestead
 - Treehouse Platform
- Circulation Pathways – Primary, Secondary, Tertiary

Relationship Skills Play Spaces – Learning to establish and maintain relationships with others. This involves communicating, listening, negotiating, and helping and receiving help.

- Play Materials
 - Sand Toys – racks, shovel, spades, gardening tools, sandbags
 - Kitchen Toys
 - Water Toys – pool noodles and boats
 - Balls for games
 - Frisbee Golf T
 - Basketball Hoop

- Jump Ropes
- Social Wheel Toys – wheel barrows, wagons, push mower, stroller, tricycles
- Sidewalk Chalk
- Snow Paint
- Art Supplies – Stamps, paper, markers, acorns, twigs, scissors, oil paint, stickers, paints, yarn and ribbon
- Basket
- Buckets
- Cradle and Baby Dolls
- Bubble Stuff
- Fabric for Playhouse
- Wood Pieces for Building
- Rubber Ramp Set
- Hopscotch
- Seating
 - benches, chairs, tables
 - Log Bench
- Vegetation that encourage social games like hide-and-go-seek.
 - Big Tree for social games – Maples, Pine Trees
 - Weeping Small Tree that encourages playing house – Japanese Maple
 - Fruit Trees - Orchard
 - Shrubs – box hedges, roses, perennials, dogwood, forsythias
 - Willow Archway Tunnel
 - Grass Labyrinth
 - Arch Way/Gate with Climbing Roses
- Exploration Garden
 - Native Garden
 - Woodland/Forest Exploration
 - Sensory Garden
- Gathering Space
 - Open Grass Area
 - Rock Gathering Area
 - Pergola/Pavilion/Gazebo
- Building Area
 - Small Tree Trunks/Sticks
 - Fort Building Area
- Pathways
 - Stepping Stones
 - Grass pathway with Vine Trellises
 - Winding Rock Path
 - Continuous Circulation Path
- Talk Tubes
- Playhouse
 - Teepee

- Log Cabin
- Fort Building Area
- Puppet Theater
- Tree Trunk Playhouse
- Tree Stump Area
- Stage/Amphitheater
 - Big Tree Stump
 - Treehouse Platform
- Sand Area
 - Sand Table
 - Mobile Sand Box
 - Sand Pit
 - Geological Section
- Water Play
 - Water Troughs
 - Hand Pump
 - Splash Pad
 - Hose
- Hill
 - Hill with tunnels, boulders, tree stumps, vegetation
 - Hill with slide
 - Sledding
- Music Area with tree stumps
- Boulder Slide
- Mud Kitchen
- Tire Swing

Responsible Decision Making Play Spaces – Learning “to make constructive and respectful choices about personal behavior and social interactions” (PlayCore, 2016). This includes considering choices based upon norms, personal standards, and consequences.

- Animal Habitat
 - Bug Catcher
 - Dinosaur Nest
 - Bird Blind
 - Bird Bath
 - Bird Feeder
 - Bird House
- Play Materials
 - Balls for social Games
 - Traffic Cones
 - Basketball Hoop
 - Sand Toys

- Water Toys
- Small Fence and a kid sized doorway
- Vegetation
 - Planter/Garden Boxes – Raised, Ground Level
 - Veggie Barrels
 - Grass path with Vine Trellises
 - Orchard
 - Pumpkin Patch
 - Corn Rows
 - Homestead
- Pond with Fishing Pier
- Gathering Spaces
 - Pergola/Pavilion/Gazebo
 - Wooden Dome Structure
 - Treehouse Platform
 - Multipurpose Lawn
- Water Play Area
 - Water Toys
- Sand Area
 - Sand Table
 - Sand Toys
 - Sand Pit
 - Mobile Sand Boxes
- Hill
 - Hill with tunnels, boulders, tree stumps, vegetation
 - Open Grass Hill

Communication Domain

Receptive Communication Play Spaces – Learning to understand and comprehend language. This includes focusing attention, understanding vocabulary and questions, and following directions.

- Vegetation that require direction from others to care for.
 - Planter/Garden Boxes – raised, ground level
 - Edible Vegetation – Strawberries, Grape Vines, herb bed
 - Veggie Barrels
- Teepee
- Gathering Spaces
 - Pergola/Pavilion/Gazebo
 - Wooden Dome Structure
 - Rock Gathering Space
 - Multipurpose Lawn
 - Picnic Area

- Council Circle
- Tree Stumps
- Boulders
- Campfire
- Signage
 - Area Signage
 - Dedication Plaques
 - Clock
- Traffic Cones
- Seating
 - Bench – log bench
 - Picnic Table
- Nature Clubhouse – Educational Center
- Artwork with words
 - Entryway signage
 - Mosaic
- Talk Tubes
- Playhouse
 - Treehouse Platform
 - Log Cabin
 - Homestead
 - Fort Building Area

Expressive Communication Play Spaces – Learning how to communicate wants and needs through the use of language. This involves using facial expressions and gestures, vocabulary, and complex utterances.

- Play Materials
 - Bug Catcher
 - Sidewalk Chalk
 - Basket
 - Cradle, Baby Dolls
 - Hula Hoops
 - Small Hoops
 - Bubble Stuff
 - Water Toys – pool noodles, boats
 - Sand Toys – sandbags,
 - Art Supplies – twigs, yarn and ribbon, stickers, paints, snow paint
 - Fabric for playhouse
 - Magnet wall
 - Jump ropes
 - Mobile tunnel
 - Balls for social games
- Storage Shed

- Seating
 - Chairs, Benches
 - Picnic tables
- Vegetation
 - Edible plants – strawberries, fruit vines, herb bed
- Music
 - Guitars
 - Drums
 - Xylophone
 - Chimes
 - Voice cone
 - Talk tubes
 - Bell tower
- Stage/Amphitheater
 - Treehouse Platform
 - Big Tree Stump
- Mud Kitchen
- Playhouse
 - Teepee
 - Treehouse platform
 - Log Cabin
- Gathering Space
 - Pergola/Pavilion/Gazebo
 - Wooden Dome Structure
 - Rock Gathering Space
 - Multipurpose Lawn
 - Picnic Area
 - Council Circle
 - Tree Stumps
 - Boulders
 - Campfire

Pragmatic Communication Play Spaces – Learning how to use language in a social setting. This includes listening and talking, recognizing and using language to talk to a teacher differently than a peer, and other communication skills like negotiating and resolving issues.

- Play Materials
 - Balls for social games
 - Wheel Toys – wheel barrows, wagon, push mower, stroller, Tricycle
 - Traffic Cones
 - Frisbee Golf T
 - Basketball Hoop
 - Basket

- Cradle, Baby Doll
- Bubble Stuff
- Water Toys – pool noodles, boats
- Sand Toys – sandbags, sand trucks
- Art Supplies – twigs, yarn and ribbon, stickers, paints
- Fabric for treehouse
- Jump Ropes
- Art Area
 - Sidewalk Art Area
 - Art Pergola with picnic tables and benches
- Seating
 - Benches – log bench
 - Chairs
 - Picnic Table
 - Boulders and Rocks
- Vegetation
 - Big Tree for social games – Maples, Pine Trees
 - Weeping Small Tree – Japanese Maple
 - Fruit Trees - Orchard
 - Shrubs for social games – box hedges, roses, perennials, dogwood, forsythias
 - Ornamental Grasses
 - Willow Archway Tunnel
 - Grass Labyrinth
 - Arch Way/Gate with Climbing Roses
 - Garden/Plater Boxes – raised, ground level
- Gathering Space
 - Open Grass Space
- Pathways
 - Stepping Stones
 - Winding Boulder Pathway
 - Playhouse
 - Teepee
 - Log Cabin
 - Fort Building Area
 - Puppet Theater
 - Tree Branch Fort
- Gathering Space
 - Pergola/Pavilion/Gazebo
 - Wooden Dome Structure
 - Rock Gathering Space
 - Multipurpose Lawn
 - Hammock Area
 - Picnic Area
 - Council Circle

- Tree Stumps
- Boulders
- Campfire
- Tree Stump Area
- Building Area
 - Loose Parts Building Area
 - Fort Building Area
 - Woodland/Forest Building Area
- Sand Area
 - Sand Table
 - Sand Pit
 - Mobile Sand Box
- Water Play Area
 - Water Troughs
 - Water Hand Pump
 - Splash Pad
 - Hose
- Hills
 - Grassy, gentle or steep – could support sledding
 - Tunnels built into the hill
 - Boulders, tree stumps, and vegetation on the hill
 - Slide built into the hill
- Music area with tree stump seats
- Polished Boulder Slide
- Mud Kitchen
- Storage Shed
- Continuous Circulation Pathway
- Nature Clubhouse

Cognitive Domain

Recent Memory Play Spaces - “The ability to learn and recall information” (Gromisch, 2011). This includes learning, reasoning, and comprehension skills.

- Gathering Space
 - Pergola/Pavilion/Gazebo
 - Wooden Dome Structure
 - Rock Gathering Space
 - Multipurpose Lawn
 - Hammock Area
 - Picnic Area
 - Council Circle
 - Tree Stumps
 - Boulders

- Campfire
 - Treehouse Platform
 - Storage Shed
 - Labyrinth/Edible Maze
- Nature Clubhouse
 - Educational Resources – microscopes, books, insects
 - Language Play Spaces – Learning to comprehend and express through the use of language.
- Seating
 - Benches – log bench
 - Chairs
 - Picnic Table
 - Boulders and Rocks
 - Observation Areas – Cozy Place
- Balls for social games
- Magnet wall
- Playhouse
 - Teepee
 - Log Cabin
 - Fort Building Area
 - Puppet Theater
 - Tree Branch Fort
 - Treehouse Platform
- Stage/Amphitheater
 - Big Tree Stump
 - Big Boulder
 - Treehouse Platform
- Gathering Space
 - Pergola/Pavilion/Gazebo
 - Wooden Dome Structure
 - Rock Gathering Space
 - Multipurpose Lawn
 - Hammock Area
 - Picnic Area
 - Council Circle
 - Tree Stumps
 - Boulders
 - Campfire
 - Area Signage
 - Dedication Plaque
 - Clock
 - Nature Clubhouse

Visuospatial Play Spaces - Learning to identify, comprehend, and manipulate visual

information and spatial relationships (PlayCore, 2016). This influences movement and the perception of depth, distance, and spatial orientation (euronUp, n.d.).

- Play Materials
 - Balls for games
 - Wheel Toys – wheel barrow, wagon, scooter, push mower, Tricycle
 - Traffic cones
 - Frisbee Golf T
 - Basketball Hoop
 - Jump Rope
 - Small hoops
 - Hula Hoops
 - Fabric for playhouse
 - Mobile Tunnel
- Entryway
 - Vine covered Trellis
 - Willow Archway
 - Arch Gateway with vines
- Pathways
 - Primary, Secondary, Tertiary
 - Willow Tunnel Archway
 - Stepping Stones – winding through vegetation
 - Grass path with trellises
 - Winding Boulder Pathway
 - Continuous Circulation Path
 - Runway/Straight Track
- Labyrinth/Maze
- Cougar Climber and Hawk Nest
- Rock and Log Climbing Area
- Balance Logs
- Polished Boulder Slide
- Fort Building Area
- Hopscotch
- Stairs
- Labyrinth/Edible Maze - vegetated
- Vegetation
 - Tall Ornamental Grasses
 - Woodland/Forest Exploration
 - Living Tree Trellis
 - Orchard
 - Corn Rows
- Tree Stump Space
- Sand Area
- Water Play Area

- Water Troughs
- Hose
- Splash Pad
- Integrative Creek/Stream
- Hills
 - Grassy, gentle or steep – could support sledding
 - Tunnels built into the hill
 - Boulders, tree stumps, and vegetation on the hill
 - Slide built into the hill
- Artwork
 - Entryway
 - Mosaic
 - Wind Sculpture
 - Executive Functioning Play Spaces – Learning to problem solve, plan, organize, and focus.
- Play Materials
 - Bug Catcher
 - Sand Toys – rack, shovels, spades, gardening tools, sandbags
 - Water Toys – Pool Noodles, boat toys
 - Kitchen Supplies
 - Balls for games
 - Wheel Toys – wheel barrow, wagon, scooters, push mower toy, stroller, tricycles
 - Traffic Cones
 - Sidewalk Chalk
 - Art Supplies – stamps, paper, markers, acorns, twig, scissors, paints, yarn and ribbon, snow paint
 - Cradle and Baby Dolls
 - Buckets
 - Hula Hoops
 - Small Hoops
 - Bubble Stuff
 - Fabric for Playhouse
 - Frisbee Golf T
 - Basketball Hoop
 - Organizers
 - Magnet Wall
 - Jump Ropes
 - Rubber Ramp Set
- Animal Habitat
 - Bird House
 - Bird Feeders
- Music
 - Guitar
 - Drums

- Xylophone
- Chimes
- Music Tree Stump Gathering Area
- Building Area
 - Small Tree Trunks
 - Wood Building Materials
 - Fort Building Area
- Vegetation
 - Planter/Garden Boxes – raised, ground level
 - Grass Open Space
 - Veggie Barrels
- Storage Shed
- Hopscotch Area
- Pathways
 - Stepping Stones
 - Winding Boulder Pathway
 - Grass Pathways with trellis
 - Garden Pathway
 - Continuous Pathway
- Fence
- Labyrinth/Edible Maze
- Playhouse
 - Teepee
 - Treehouse Platform
- Gathering Space
 - Pergola/Pavilion/Gazebo
 - Wooden Dome Structure
 - Rock Gathering Space
 - Multipurpose Lawn
 - Council Circle
- Tree Stumps
- Boulders
- Campfire
- Tree Stump Space
- Wind Chimes
- Wind Wheel
- Area Signage/Dedication Signage
- Shade Sail
- Water Play Area
 - Water troughs
 - Water Pump paired with a sand pit
 - Splash Pad
 - Hose

- Hills
 - Grassy, gentle or steep – could support sledding
 - Tunnels built into the hill
 - Boulders, tree stumps, and vegetation on the hill
 - Slide built into the hill
- Mud Kitchen
- Storage Shed
- Clock
- Nature Clubhouse

Sensory Domain

Visual Play Spaces – Learning to understand the surrounding environment visually.

- Vegetation – Seasonal Changes
 - Flowering Weeping Tree
 - Planter/Garden Boxes – raised, ground level
 - Perennial Garden
 - Veggie Barrels
 - Orchard
 - Corn Rows
 - Pumpkin Patch
 - Exploration Garden
- Entryway and Fence
 - Child Fence
 - Child Doorway
 - Gateway
 - Trellis
- Pathways
 - Woodchip path
 - Gravel Path
 - Dirt Path
 - Garden Pathway
 - Bridge
- Observation Spots/Gathering Areas
 - Lookout Hill
 - Treehouse Platform
 - Pavilion/Pergola/Gazebo
 - Picnic Area
 - Labyrinth with a sitting space in the center
- Shade Sail
- Creek/Stream
- Ice Wall – A wall that has water dripping down it that freezes during the winter.
- Wind Wheel

- Artwork
 - Wind Sculpture
 - Mosaic
 - Entryway
- Nature Clubhouse

Vestibular Play Spaces – Learning to interpret information about movement and balance that originates from an area in the inner ear. This influences the comprehension of the head and body in relation to the ground, changes in direction, gravity, speed and direction, and eye movement.

- Play Materials
 - Wheel Toys – wheel barrow, wagon, scooters, tricycles, push mower, stroller
 - Balls for games
 - Jump Ropes
 - Basketball hoop
- Grass Open Space
- Polished Boulder Slide
- Rock and Log Climbing Area
- Balance Logs
- Cougar Climber and Hawk Nest
- Tree Climbing – full body contact vegetation
- Tire Swing
- Hammock Area
- Pathway
 - Winding Rock Border
 - Boulder/Stepping Rocks
 - Tree Stump Pathway
 - Ramp
 - Continuous Circulation Pathway
 - Runway/Straight Track
- Tree Stump Area
- Hills
 - Grassy, gentle or steep – could support sledding
 - Tunnels built into the hill
 - Boulders, tree stumps, and vegetation on the hill
 - Slide built into the hill
- Water Play Area
 - Splash Pad

Proprioceptive Play Spaces – Learning to understand body position and movement. This originates from sensory receptors throughout the body the influence movement and body parts relations to each other. This involves stretching, bending, pulling, and other similar.

- Play Materials
 - Sand Toys – rake, shovel, spades, gardening tools
 - Water Toys
 - Kitchen Supplies
 - Balls for games
 - Hula Hoops
 - Frisbee Golf T
 - Basketball Hoop
 - Wheel Toys – wheel barrow, wagon, scooters, tricycles, push mower
 - Sidewalk Chalk
 - Snow Paint
 - Fabric for Playhouse
- Art Area
 - Sidewalk Chalk Area
- Building Area
 - Wooden Building Materials
 - Hand Tool
- Pathways
 - Willow Tunnel Arch
 - Archway gate with vine plant
- Labyrinth/Edible Maze
- Polished Boulder Slide
- Vegetation
 - Garden/Planter Boxes – raised, ground level
 - Tall Grasses
- Playhouse
 - Tree Branch Fort
- Tree Stump Area
- Hills
 - Grassy, gentle or steep – could support sledding
 - Tunnels built into the hill
 - Boulders, tree stumps, and vegetation on the hill
 - Slide built into the hill
 - Tactile Play Spaces – Learning to recognize changes in textures/surfaces and being touched.
- Play Materials
 - Sidewalk Chalk
 - Art Supplies – twigs, stamps, paper, markers, acorns, scissor, paints
 - Bubble Stuff
 - Snow Paint
- Music Area
 - Guitar
 - Drums
 - Xylophone

- Chimes
- Vegetation – with different Textures
 - Trees – Big and small, pine trees
 - Weeping Tree – Japanese maple
 - Shrubs – box hedges, dogwood
 - Ornamental Grasses
 - Perennial Garden
 - Sensory/Exploration Garden
 - Herb Bed
 - Garden/Planter Boxes
 - Trellis with vegetation
- Woodchips
- Seating
 - Log Benches
 - Boulder Seat
- Pathway
 - Loose Material Pathway
 - Willow Arch Pathway
 - Grass Path with Trellis
- Sand Play Area
 - Sand Pit
 - Sand Table
 - Mobile Sand Boxes
 - Geological Section
- Compost Pile – searching/exploration
- Water Play Area
 - Water troughs
 - Splash Pad
 - Water Pool
 - Water Pump
 - Hose
 - Water Mister
 - Waterfall, cascade
 - Ice Wall
- Artwork
 - Mosaic
 - Walk Through Stick sculpture
- Hills
 - Grassy Hill
 - Boulders, tree stumps, and vegetation on the hill
- Mud Kitchen
- Campfire Circle
- Nature Clubhouse
 - Educational Resources that utilize textures

Auditory Play Spaces – Learning to understand and detect sound vibrations. These vibrations provide information about volume, pitch and rhythm.

- Music Area
 - Guitar
 - Drums – Thunder Drum
 - Xylophone
 - Jump on Sound Cushions
 - Chimes
 - Bell Tower
 - Giant metallophone
 - Jingle Bell Arch
 - Talk Tubes
 - Voice Cones
- Wind Chimes
- Wind Wheel
- Vegetation that interacts with the wind
 - Tall Grasses
- Water Play Area
 - Water Trough
 - Creek/Stream
 - Waterfall/Cascade
 - Taste Play Spaces – Learning to recognize and understand chemical reaction within the mouth.
- Vegetation that is edible
 - Veggie Barrel
 - Edible Maze
 - Herb Bed
 - Planter/Garden Boxes
 - Grass Path with trellis
 - Grape Vines
 - Orchard
 - Corn Rows
 - Pumpkin Patch
 - Vegetable Garden
- Water Fountain
- Picnic Area with Picnic Tables

Olfaction Play Spaces – Learning to recognize and understand chemical responses through the nose.

- Vegetation that smells (Flowers)
 - Rose Bushes or Climbing
 - Planter/Garden Boxes

- Veggie Barrels
- Grass Path with trellises
- Gathering Pergola with Climbing vines
- Perennial Garden
- Exploration/Sensory Garden
- Picnic Benches
- Play Materials
 - Art Supplies – twigs, paints, oil paints

Appendix E

Incorporating Natural Play Spaces Handouts

Incorporating Natural Play Spaces

5 Essential Natural Play Spaces for Elementary School Playgrounds

“Play environments provide opportunities for children to learn and practice developmental skills. Playgrounds should provide play activities for each developmental domain: physical, social-emotional, communication, cognitive, and the sensory domain... and natural play spaces can be incorporated into elementary school playgrounds to provide these opportunities and enrich the play environment.” - Ariel Wright

The following pages are products of the master's thesis “Incorporating Natural Play Spaces into Elementary Playgrounds for Child Developmental Benefits” by Ariel Wright. The purpose is to provide designers/schools with 5 essential natural play spaces that can be incorporated into the playground to provide rich developmental opportunities. The domain definitions are given first then followed by the 5 essential natural play spaces.



Developmental Domains with Definitions

Physical Domain

Gross Motor

Use of large muscle groups; running, jumping, and climbing.

Fine Motor

Use of small muscle groups; grasping and manipulating objects, speech, and hand-eye coordination.

Social-Emotional Domain

Self-Awareness

Recognize one's emotions, thought, and control over oneself.

Self-Management

Regulate emotions, thoughts, goals, and behaviors.

Social-Awareness

Empathize with others and understand social norms and resources.

Relationship Skills

Learning to establish and maintain relationships with others.

Responsible Decision Making

Make “constructive and respectful choices about personal behavior and social interactions” (“Supporting the Whole Child,” n.d.).

Incorporating Natural Play Spaces

5 Essential Natural Play Spaces for Elementary School Playgrounds

Developmental Domains with Definitions Cont.

Communication Domain	
Receptive	Learning to understand and comprehend language.
Expressive	Learning how to communicate wants and needs through the use of language.
Pragmatic	Learning how to use language in a social setting.
Cognitive Domain	
Recent Memory	"The ability to learn and recall information" (Gromisch, 2011).
Language	Learning to comprehend and express through the use of language.
Visuospatial	Identify, comprehend and manipulate visual information and spatial relationships.
Executive Functioning	Learning to problem solve, plan, organize, and focus.
Sensory Domain	
Visual	Learning to understand the surrounding environment visually.
Vestibular	Comprehension of the head and body in relation to the ground, changes in direction, gravity, speed and direction, and eye movement.
Proprioceptive	Learning to understand body position and movement; this involves stretching, bending, pulling, and other similar movements.
Tactile	Learning to recognize changes in textures/surfaces and being touched.
Auditory	Learning to understand and detect sound vibrations.
Taste	Learning to recognize and understand chemical reactions within the mouth.
Olfaction	Learning to recognize and understand chemical responses through the nose.

