

Sand and Snow: Nature's On-Going Medium for Play and Learning

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Abstract

The substances of sand and snow are examined as natural mediums that can afford learning and play in children. Emphasis is placed on Froebel's early educational use of sand, Boston's early sand gardens as a means of enjoyment and supervision for children of low socio-economic status, and the earliest use of sand in play therapy. Properties of snow and several early play activities are included that span several generations.

Keywords: affordance, Froebel, sand, sandbox, sandplay, snow

There is ample evidence that most Colonial American teachers in the 1650s began teaching in log cabin schools that rarely had wooden floors, desks, and only a shelf along one wall. The children (ranging from 3 to 12 years) sat on stiff wooden benches and when asked to write, even the youngest child was expected to take a sheet of birch-bark for paper and then dip a quill pen that had been made from a goose, duck, or crow feather and whittled sharp by the schoolmaster into a small container of homemade ink.

However, fewer teachers today are aware of the information cited in personal letters that indicate some teachers needed to rely on sand and soil to convey written content to their children. For example, Evert Pieterse, teacher of the Dutch reformed church school at New Amstel, New Jersey, wrote in a letter dated August 12, 1657 to a friend in Delaware about the lack of sufficient tools to teach the children. An extract from the letter details,

I must further tell you, that I am engaged in keeping school with 25 children in it; but I have no paper, nor pens for use for the children, nor slates, nor pencils. As soon as winter begins and they can no longer work on the soil, old and young will come to school and learn to read, write (and cypher). But I have nothing from which to teach them. (Allen, 1931, p. 88)

The use of sand as a medium for learning, therapy, and later play took its largest jump

forward when Friedrich Froebel struck upon the concept in the early to mid-1800s. Although one cannot definitively attribute the original rationale for sand play to Froebel, his ideas and concept of the Kindergarten Philosophy contributed greatly to the ideals of children engaging with this natural substance (Frost, 1989). It is therefore fitting that sand would have a place in Froebel development of “kindergarten” especially since the term is loosely translated from German to English as ‘children’s garden.’

Having studied the ideas of Johann Pestalozzi early in his career, Froebel developed his own thinking towards children’s early education and the value of play. In 1837, the first documented involvement of sand was identified as an ‘occupation’ in his educational ideas. Occupations were items that children could manipulate like sand, clay, paper and even dirt. Gifts were objects such as blocks that could be used with occupations (LeBlanc, 2010). The difference between a ‘gift’ and an ‘occupation’ are that a gift can be returned to its original form after play but an occupation cannot. For example, crafts, painting or playing with sand cannot return to its original state.

Froebel opened his first kindergarten in 1840, by using these natural elements along with free play, songs, stories, crafts and games to help foster and harness the young child’s imagination. These planned interactions with natural substances and expressive arts stimulated all areas of the child’s development. Subsequently, Froebel became a recognized pioneer in a child-centered approach to education for young children. This was an unusual concept in an ever-increasing industrialized world where early education was not the norm. At this time in history, education for children of any age was not the main focus of life. Many young children were found working full days, particularly if they were reared in poverty-ridden homes or even in families of working-class backgrounds. Despite this, kindergarten facilities slowly became accepted as an alternative to physical work for children, and Froebel’s kindergartens were open to children of all social classes (Urban & Wagner, 2004).

As his concept continued to gain popularity, it was not long before a growing number of kindergartens opened across Germany and by 1849 Froebel was training teachers in his methods (Froebel Web, 2008). Most notably, Froebel (1885) put forth his ideas and rationale for early education in his publication, ‘The Education of Man.’ He believed that to teach effectively, one needed to awaken the child’s soul through nature and play, and from this, an internal yearning for learning would ignite. A mounting interest of his ideas began to spread internationally by the late 1800’s reaching beyond Germany to the rest of the world. These countries included Russia, the United Kingdom, Italy, Japan, Canada, Austria and the United States (Froebel Web, 2008).

Froebel’s influence in the United States was perhaps best realized in 1856, when Margarethe Schurz brought the concept of his teaching methods with her from Germany after also having opened a kindergarten in Tavistock, London. While living in the United States and caring for her child, Mrs. Schurz also cared for additional children. Upon seeing her calming influence on children and the employment of the playful methods studied under Froebel’s teachings, parents encouraged her to open a small kindergarten in Watertown, Wisconsin (Fleming, 2009).

Conceptual Framework

By 1892, Froebel’s theories and use of natural elements had become progressively more respected in the USA. Within this period, the value of sand in school settings was increasingly featured as an open-ended resource for small groups of children to busily occupy their inquisitive natures while exploring the texture and versatility of sand. Utilizing different tools, water, stones, and pebbles to create projects both individually and collectively as part

of a group further enhanced this natural open-ended resource. Larger playthings could include filling, carrying about, and unloading toy carts with heaps of sand (Frost, 2010).

Children also used sticks collected from nature in place of a rudimentary pencil to make their marks in the sand. The ease at which marks in the sand can be wiped, raked or brushed away lends itself perfectly for exploration of playful learning. Froebel (1904) discussed how through the use of sticks a child explored shape formation which leads to letter recognition and consequently to reading and writing. The ease of movement through sand or dirt allows experimentation of early marks, lines, and shapes that provide preparation for developing dexterity skills and hand-eye coordination required for writing. He discussed how children can trace and re-write letters and shapes in the sand and slowly move on to paper and pencil or chalk to re-create the basic shape formation to form letters which subsequently, lead to reading and writing. Wiggin and Smith (1896) also comment that any smooth surface of sand, snow, dirt, or mud can offer an irresistible attraction for young children markings and sketches.

Sand in Public Settings

The origin of using sand in public playgrounds is possibly best found when investigating the historical development of ‘Sand Gardens’ in Boston, Massachusetts in 1885 and in 1886. The introduction of this concept is credited to Dr. Marie Zakrzewska, whom after seeing similar sand gardens in Berlin, Germany, believed they could serve a great purpose for low-income immigrant children in the poorer areas of Boston (Oliva, 1985). The early need for play space was especially true in the overly crowded and industrialized areas of Boston. In agreement with Boston Women’s Club, it was arranged that a giant pile of sand would be delivered for the children to explore and manipulate. This space was also to be supervised by an adult volunteer, thus creating a purposeful place for children to play in a safe environment (Frost, 2010). Without these spaces, many children would be left to entertain and care for themselves, since their parents were most often workers within Boston factories.

The sand garden was a dwelling where children whose parents could not afford playthings could have some ownership of space and could create all types of imaginary worlds. The sand gardens also fostered friendships, increased the verbal communication between age levels, sparked imaginative play ideas, enhanced the child’s physical development, improved poorly developed fine motor control, and served as the foundation for creative construction-based ideas. Some equipment was provided, and early photographs exist that depict children using wheelbarrows, spades, rakes, buckets, cans, and planks of wood to move or shape the sand (Frost, 2010).

The importance of sand play for children of less financial means should not be underestimated. This is especially true if considering the need for overall good health to prevent the spreading of diseases during the rapid population increase in the USA’s early cities. Likewise, the Massachusetts Emergency and Hygiene Association agreed to procure the services of unoccupied school yards during the summer vacation as additional locations for sand gardens. This aided the swift expansion of sand gardens within the Boston area and subsequently to other major cities such as New York and Chicago. Ultimately, the creation of a dedicated play space for children that utilized the natural component of sand sparked the initial interest in more elaborate playground development. Later this increased attention would become known as the American Playground Movement (Oliva, 1985).

In 1887, psychologist G. Stanley Hall published his observations of two children playing with a sand-pile during summer vacation. The *Story of a Sand Pile* was an exploration of the children’s behavior and attention to play over the summer. From these

summer observations, Hall concluded that sand play held an immense educational value that encouraged social, physical and symbolic play. The success of the sand gardens led to smaller versions such as sand boxes measuring approximately 10' x 12' x 1' or indeed bigger depending on space availability. The proportions of a sand table described by Wiggin and Smith (1896) are "a water tight box about five by three foot, and at least a foot-deep, set on short stout legs with rollers and filled with sand to within two inches of the top" (p. 294).

The oblong table would be watertight and of sufficient height for young children to easily access. Since the sand table was sealed to prevent liquids from escaping, water was frequently added to enable the manipulation of sand for modelling, creating tunnels, waterways, sandcastles, hills, mounds, and landscapes. The sand table provided ample and almost endless possibilities for Froebel's gifts and most occupations to be utilized and explored (Wiggin & Smith, 1896). In contrast, a sand tray is proportioned to be much smaller measuring approximately 19.5 x 28.5 x 2.75 inches in size (Kalff, 1991, p.2). This size provided a small-scale opportunity for individual sand play, and sand trays have become a useful tool in sand therapy (Kalff, 1991).

Sand in Play Therapy

From these early interactions of sand play and the recorded benefits of engagement with natural materials, alternative uses for sand began to emerge. Most notable is 'Sandtray Therapy' created and developed by Margaret Lowenfeld in 1929, commonly known as the 'The World Technique.' This idea utilized the use of two sand trays or boxes, one filled with dry sand and the other wet sand. In addition to the box, the therapy added a 'wonder box' containing a range of miniature toys and figures (Lowenfeld, 1970; Mechling, 2016). These items could be placed in the sand and children would create pictures in the sand. This type of therapeutic play allowed children the opportunity to communicate their internal feelings and thoughts. Children could express themselves with little or no communication by creating their worlds in the sandboxes or trays. Through this form of therapeutic play, the child was encouraged to freely express both acceptable and improper thoughts, feelings and behaviors throughout the session (Lowenfeld, 1970).

In the 1950s, Dora Kalff developed another form of sand therapy, for which she used the term, 'Sandplay.' Kalff had studied at the Jung Institute and completed her analysis personally with Carl Jung. Although much of her early studies were with adults, she had a natural affinity with children. Kalff became aware of the therapeutic work of Margaret Lowenfeld and traveled to the United Kingdom to study her technique with children. Kalff was also influenced by eastern practices and philosophies particularly Tibetan Monks and Zen Buddhism. With these three influences on her work, Kalff integrated these elements together and created her therapeutic play method called, 'Sandplay' (Kalff, 2003; Mitchell & Friedman, 1994; Homeyer & Sweeney, 2005).

The Sandplay Therapists of America (2017) was formed in 1987. The group's mission has been to train, support and promote professional development in Sandplay based on Dora Kalff's understanding of Carl Jung's theories. At this time, there are affiliates based in Taiwan, Israel, Germany, Canada, Britain, Italy, and England. Individuals can also participate in six-day intensive training in Sandplay in Johannesburg, South Africa.

Early Sandbox Construction

According to the *New Oxford American Dictionary*, sand is defined as a "loose granular substance from the wearing down of siliceous rocks and found on the seashore, riverbeds, and deserts" ("Sand," 2010, p. 1546). It is typically a pale yellowish-brown color

resulting from the erosion of other rocks whereas soil or dirt is typically black or dark brown due to organic remains. Soil is defined as being “the upper layer of earth consisting of disintegrated rock where plants can grow” (“Soil,” 2010, p. 1660).

During the 1950s, parents learned that the easiest way to provide a sand or dirt play area was to purchase an inexpensive child’s wading pool and fill it with sand and a child’s favorite plastic toys. If backyard sand was not available, parents shopped for sand at a gravel or home landscaping company. As a rule, the best type of sand has been the sand that brushes off quickly and not builder’s sand that is typically used for construction. Additional sensory experiences for children included collecting pine cones, smooth rocks, leaves or pea gravel for older children. Pea gravel was not suggested for very young children since some children were tempted to put it in their nose, ears, and mouth. The malleability and softness of sand makes it one of the child’s most popular play materials (Moore & Wong, 1997).

Larger neighborhood sandboxes were easily made by using four planks of wood, as much as eight inches wide, set edgewise on the ground in a box formation, and nailed together at the corners. Parents learned that when shopping for sand for a bigger play area, sand is most often sold by the cubic yard. To determine the amount needed for a large play area, parents simply multiplied the length (in feet) times the width (in feet) times the depth (in feet). This basic calculation provided the number of cubic feet needed to fill a large neighborhood sandbox. For every 27 cubic feet of play space - one cubic yard of sand is needed (Sunset Books Editorial Staff, 1969, p. 63). Today, there are many internet calculators to assist a parent in finding the volume of sand required to fill a sandbox if a person knows the width, length, and depth the parent can easily determine the cubic yards needed for their project. For example, a backyard neighborhood sandbox that is ten feet wide, twelve feet long, and one foot deep would be calculated: $10' \times 12' = 120 \times 1' = 120$ square feet divided by $27 = 4.4$ cubic yards. For this neighborhood size box, five cubic yards of sand is needed. Kosanke and Warner (1990) also suggested that parents could create a triangle effect by simply dumping a pile of sand in a corner and holding back the sand by using a long 2 X 4 board (p. 32).

Beginning in the 1950s more attention was given to children of special needs. During this period, parents were reminded that wheelchair-bound children should also be able to gain access to the sandbox by providing a transfer deck. Therefore, an incline ramp could be added to assist wheelchair users and toddlers. It was also wise to secure a cover for the sand pool or sandbox, such as an inexpensive plastic tarp or canvas, weighted down with bricks to keep the sand or dirt clean and dry when not in use (Moore & Wong, 1997).

During the 1950s like today, children enjoyed a variety of plastic toys such as pails and toy shovels to dig, pound, sculpture, mix, sift, dump, and draw in the sand. A large bucket of water set outside the sand play area enticed the child to create structures such as mountains, river systems, tunnels, hills, and valleys. As a rule, parents were encouraged to replace the sand every year with fresh sand and told not to sanitize the material with chemicals. The most harmful material being Crystalline silica, a carcinogen, that was used in industry but avoided with young children because of the possibility of inhaling the dust-like substance (Enge, 2006).

Modern Sand Play

Fast-forward to the present day, the rapid advancement in technology coupled with the proliferation of social media enables worldwide events to be organized with comparative ease. Once such movement, ‘Days of the Year’ has been gaining popularity since its inception in 2009. This website’s core concept is to bring together unique and global holidays that can be enjoyed worldwide (“Days of the Year,” 2018).

One such event, *Play in the Sand Day*, is celebrated in several countries on August 11th. August is the month for many children's summer holiday so is a perfect opportunity for not just children but adults alike to engage in a day of sand play. Historically, this event was a contest of artistic expression of epic sandcastles and soft sculptures ranging from intricate sand art designs to monumental sand pieces. Contests are held in many countries, and the astounding works of art inspire children and adults, families and friends to come together and enjoy the beauty and sensory experience of play and creating in the sand. Its primary goal is to use sand as a means to bring people together one day of the year to celebrate this natural resource with more than one generation. Parents are encouraged to re-ignite the joyous creative moments of their childhood, and also create new memories for their children and future generations of children ("Days of the Year," 2018).

Kinetic Sand

Today's Kinetic Sand provides an additional exploration of sand. Kinetic Sand is made up of 98 % typical sand with 2 % poly (dimethylsiloxane). This component enables the sand to take on a different texture which many people find hard to explain (Widener, 2015). This sand defies conventional rules of sand, it is easily moldable but at the same time free flowing. When grasping a handful of this sand and squeezed together it becomes a solid mass, yet upon release, it melts back to its original state in mesmerizing fashion. It sticks to itself but not to a child's or person's hands and it has the properties associated with wet sand, but no wetness is felt, a contradiction on all fronts. Perhaps, it is this element which makes it so engaging for children and adults alike. Kinetic Sand is not only used as a form of play but also has an added value of sensory experience and therapeutic significance due to its versatility.

Due to its properties, Kinetic Sand can assist children who have sensory difficulties and children who are on the Autism Spectrum, since the texture varies slightly to that of beach sand and it will not stick to the child's hands. This additional property can open a new world for children who are adversely resistant to messy play (Widener, 2015). Kinetic sand can also readily be used with childhood figures since it will not stick to plastic or wood.

Kinetic Sand is also an effective way to increase fine motor skills since it allows children increased flexibility to that of normal sand. The simple techniques of squeezing, poking, pinching, pounding, rolling, flattening, and scooping are easier to master. The child's hands are also strengthened when using simple tools, such as a rolling pin to advance bilateral skills. Grasping spoons, ice cream scoops, small plastic cups and molds develop and strengthen the muscles in the fingers and hand.

After these skills are developed, children naturally move on to more advanced physical challenges with the sand. The opportunity to explore pre-writing skills within a full sensory experience can enhance the child's early dexterity and other pre-writing skills. The child's early math skills take place as he or she gains a firsthand experience with depth, shapes, spacing, patterns, and gravity through the creation of play worlds. These play worlds can make use of natural objects such as leaves, pine cones, twigs, and rocks. Kinetic sand allows for easier construction since it holds its form better with less mess than normal sand. Some children also benefit from increased attention from playing and exploring with kinetic sand, which allows them to be more engaged with other educational activities. Some teachers describe the interaction with the material as de-stressing. The calming qualities that it brings to children are one factor why educational facilities, play therapists, and parents of motor delayed children are readily purchasing the substance.

Magic Sand

This magic sand is very similar to kinetic sand but undergoes a slightly different process in production for its magical properties to be realized under water. The fabrication of this sand adds silicon dioxide and a thin layer of a chemical called trimethylhydroxysilane, a special coating that enables it to repel water (Widener, 2015). It is this component that turns the sand into a magical property when it comes into contact with water. Instead of the sand dissolving, going cloudy and floating away in water; magic sand holds in binding properties thus enabling the user to create underwater worlds with sand. The added feature of this product is that when the water is poured away the sand structures melt away, but the sand is completely dry to touch and can be used like kinetic sand (Widener, 2015).

This product can also stimulate and invigorate a child's play and enhance their educational learning much the same way as kinetic sand. The real joy, intrigue, and fascination for a child is seeing how the sand reacts with water. When placed in condiment bottles the magic sand is easier to manipulate and control when creating underwater sculptures, play worlds, and letter formation. A clear plastic bowl, play tray or transparent sand box enables the child to see their formations in 360-degree glory. Both Kinetic and Magic sands come in array of colors adding additional visual stimulation and exploration.

Snow as a Medium for Learning and Play

Most individuals might also be surprised to learn that Froebel used snow as an example of how the growing child can "gain power" by manipulating materials (1885, p. 64). In his epic book, the *Education of Man*, he discusses childhood thoughts on how

boards, boughs, slots, and poles can be put together to form a hut or house; how deeply-fallen snow can be rolled to form the walls and ramparts of a fort; and how the rough stones on a hill can be grouped together to make a castle. (1885, p. 66)

Also, some of Froebel's followers suggested that a child could use of one of his gifts consisting of varying lengths of 6-12 small sticks to create symmetrical combinations of figures to represent snow crystals (Wiggin & Smith, 1895). Subsequently, snow (much like sand and clay) were substances identified in Froebel's suggested pedagogical practices and in his followers' lessons for young children.

From an etiological standpoint, the *New Oxford English Dictionary*, well known for its being a historical dictionary, defines snow as "an atmospheric water vapor frozen into ice crystals and falling in light white flakes or lying on the ground as a white layer" ("Snow," 2010, p. 1655). The word stems from the Old English *snāw*, of Germanic origin; related to Dutch *sneeuw* and German *Schnee*, from an Indo-European root and finally English *snow* (Ayto, 1990. p. 486). Children throughout history have merely discussed snow as the white flakes (i.e., snowflakes) that fall from the sky and form piles or drifts of snow. When this happens, they trudge along it, dig into, mold the snow into shapes, and when the temperature is just right they burrow into the snow to form tunnels.

It is not surprising that Inuit children, having been reared in communities found in the Arctic areas of Alaska, Siberia, Greenland, and Canada, acquired a keen sense of the uses of snow for survival and as a medium for play. Very early on, the Inuit peoples realized that when the sun reflected off the snow, their survival depended on being able to see. They managed to avoid sun blindness by creating snow goggles made from caribou antlers, whale bone, or wood. Narrow slits cut into the mask-like creations cut from wood or animal fur and

held on by thin strips of caribou skin enabling adults and children to shade their eyes from the snow's glaring brightness (Dwyer & Burgan, 2012, p. 26). With this early ability to move freely outdoors during long months of sunlight, Inuit communities developed annual arctic winter games to promote their culture's survival skills and physical prowess. These cultural games and activities still exist today for adults and adolescents, while younger Inuit children continue to use snow as a medium for making snow angels, pulling sleds with riders, and take part in the creation of snow huts, forts, and searching for animal footprints in the snow (Issaluk, 2012). They also participate in a chase and flee game called, "Raven." In this activity, one child is the hunter who chases the remaining children who assume the role of fleeing ravens (Dwyer & Burgan, 2012, p. 26).

Properties of Snow

The science behind snow is closely associated with the natural element of rain. Simply put, children learn at a young age that the white clouds we view in the sky are composed of water droplets and water vapors. When a cloud passes through an area where the sun is less visible and the temperature decreases and becomes colder, the tiny water molecules begin to form crystals. After an ice crystal is formed, it freezes water vapor from the surrounding air and enlarges into a snow crystal. This crystal falls to the ground or on the mittens or tongue of some young child waiting to catch his or her first snowflake. Each snowflake is clusters of ice crystals (Cassino & Nelson, 2009).

Adults first learned of the intricacies of snowflakes in the late 1800's when Vermont born, Wilson Alwyn Bentley photographed thousands of snowflakes by using a microscope. His work in 1885 caused people to believe that no two snowflakes are alike, even though some scientists have since argued that claim. Bentley's photographs did, however, show that all snowflakes contain six sides (i.e., a hexagon structure) because of the way that they are naturally formed with one oxygen and two hydrogen atoms in the simple process of crystallization. The six sides or arms of a snowflake are called dendrites (Cassino & Nelson, 2009). Each dendrite grows independently from the other five. Today's scholars understand that this process is nothing more than the internal order of the water molecules as they arrange themselves in the solid state. However, for young children (and even animals) viewing snow falling for the first time can provide an innate urge to explore the properties of snow in a playful way. For the very young child, this first experience with snow can seem magical.

When investigating the properties of snow and ultimately playing with snow, the greatest attention is focused on the outdoor temperature. Snow falls when the temperature in the atmosphere is at or below 32 degrees Fahrenheit or 0 degrees Celsius, and there is at least some moisture in the air (Libbrecht, 2010). Most people are surprised to learn that those very cold and dry areas in the world never or hardly ever receive snowfall. This occurs because snow requires at least some water vapor to form. In fact, the greatest amount of snow tends to fall to the ground when there is a mix of warm air with moisture near the ground. When the air temperature of the ground is less than freezing, the precipitation begins to fall in the form of snow. Since it is falling into cold air, the snow crystals do not melt on the way down and they reach the ground in the form of snow.

Parents are surprised to learn that the temperature of the surface of snow is completely controlled by the outside air temperature. This is especially true for the top layer of snow and it remains at that temperature for twelve to eighteen inches deep. Beyond eighteen inches, the snow can be warmer because heat is stored in the ground over the summer months and the snow serves as an insulator keeping in the heat (Armstrong & Brodzik, 2002).

The fact that an adult body can maintain its core temperature (within a few degrees of

98.6 Fahrenheit or 37degrees Celsius) lends itself to recreational pursuits in a snow-covered environment. The American Academy of Pediatrics identifies that the normal body temperature for healthy children is between 97 and 100 degrees Fahrenheit or 36 to 38 degrees Celsius, although it varies somewhat with age and the time of day (Shelov & Altmann, 2014). This is true for an adult and a child's homeostasis regardless of the temperature outside. So, as long as the child (or adult) is dressed to protect his or her body from adverse cold, the child's natural body temperature allows him or her to enjoy the white fluffy substance. Subsequently, most children and fur-bearing animals find snow invigorating which facilitates the desire to move about. It may also explain why children enjoy different forms of play activities regardless of the different types of snow.

Wet Snow

Many people would agree that the "snowball" has the distinction of being one of the very oldest play objects. This time memorial play item has been continuously created by packing wet snow until a compressed ball has formed that is ideal for throwing. At some point in history, children learned that a damp snowball could be rolled along the ground so that it gathered more snow and naturally became larger. These larger objects were combined to shape human figures, forts, tunnels, and sculptures. Traditional large-scale sculptures include complex snow houses, space ships, castles, igloos, snow monsters, cars, and a variety of fanciful clowns, snow people, and animals, such as whales and seals. Overtime more attractive artistry occurred by using spray containers filled with water and colored food dye. Surprisingly, liquid food coloring has existed for centuries (Mathewson, 2012), but when this was not available, early children decorated their sculptures with natural objects such as twigs, small rocks, and leaves.

Elementary school children have also been interested in using wet snow to form snow faces on brick walls, or have used their fingers, a foot, or a stick to write words or names in the snow. They have also developed snow imprints such as foot tracks and angels in the snow and have participated in skateless skating. This is performed by simply wearing their boots to shuffle along on frozen snow or ice while pretending to skate by placing their hands behind their backs.

Older elementary children have participated in a variety of games involving small groups. These can include playing Hit the Icicle in which snowballs are used to knock icicles down from the tree branches or housing roof gutters. Snowball Ten Pins, unlike the primary skills used in bowling, it required throwing snowballs at plastic pins to topple them over. Snow kickball, snow soccer, and snow softball (where snowballs are the projectiles being propelled for distance) are all modified sport related games played in the last few generations in local parks and recreation settings (Martin & Clements, 1998).

However, there are distinctive activities that have spanned several earlier generations. For example, "Snap the Whip" also called "Crack the Whip," has an origin going back to the 1800's. In this game, five or six children stand side by side holding hands and the child at the end of the line (usually the strongest) served as the Anker (Opie, I. & Opie, P. 1969). The remaining line of players run as fast as they can around the stationary anker in order to "whip" the end or final child forward so that he or she loses their hand grip and goes flying into the snow. Winslow Homer's (1872) painting shows children playing in green fields. However, since this game has remained popular with youth overtime, it is safe to conclude that many children have played this game in the soft snow instead of grass or soil.

The second historic game that has spanned the globe in areas of cold climates is "Fox and Geese." This game is known in the Scandinavian countries as being a Board game (Carlisle, 2009). However, it also has a long history for being an outdoor winter active game

that makes use of snow pathways in the shape of a large circle. This circle is created by either tramping down the snow or by shoveling pathways to make the large room size shape. The large circle resembles a wheel after participants add four or five spokes inside the circle. A small hub in the wheel's center is also added to connect all of the pathways. At some point, a "fox" player is appointed to chase the remaining children who assume the role of "geese" as they try to escape by using different pathways. The only safety that a goose has is in the middle area hub but only one goose can be in the hub at a time, and only for a brief while. If one of the geese is tagged by the fox or runs outside the circle or steps outside a spoke, then that individual becomes the new fox and takes chase.

Crusty Snow

The third noted play activity involves sliding down a snowy hill or incline. The activity is more accurately called "sledding" by generations of parents and children. Individual children have battled frigid temperatures for the opportunity to carry or pull a sled up some incline to whizz down the snow-covered terrain. Early sleds were homemade devices consisting of shod with hard-wood runners, although some children had the local blacksmith add iron runners to their sleds (Clifton, 1907). Sleds have consisted of cardboard boxes, inflatable inner tubes, and steel runner sleds with wooden seats and thin metal runners, aluminum round saucers or tea trays that do not have runners and large wooden or plastic toboggans that can hold six or more children safely.

The term for "sledding" varies widely throughout the world. In the USA and Canada, tobogganing is limited to the long flat glider that can accommodate five to six neighborhood friends or family members. The Swiss prefer the word "coasting" but are also known for their use of "snow-running" which is a precursor to the adult sport of Bob-Sledding and the Swiss Luge sled (Dier, 1912). Regardless, the goal has always been to run and increase the amount of speed one can get by jumping on and gliding along the snow. Sledding has been appreciated by numerous cultures living in cold climates because it allows children to physically test themselves when moving at different speeds over varying snow surfaces.

Sand and Snow Affording Exploration

It is important to remember that long before fancy sleds were built that permitted steering, or handles were added to decrease the level of risk that children experience when sledding, young children used snow as a medium for play by simply running and sliding along the surface using only their winter shoes or boots, and wearing a winter cloak or coat, a cap or hat, and perhaps some mittens or gloves. In short, the nature of frozen snow afforded the child the means to explore its properties in a playful way. Likewise, children continue to scratch starting lines to conduct barefoot footraces along the beach (Martin & Clements, 1998), and they continue to discover the inherent properties of sand, by only using a cupped hand.

Fjortoft (2001) reminds educators that the primary principle guiding a child's exploration of their environment is that of "affordance" (p. 111). The ability to handle, sift through and discover hundreds of ways that both substances can be used are excellent mediums to observe the affordance principle that was first introduced by the cognitive psychologist, James J. Gibson in 1979. In his theory, Gibson described affordances as all "action possibilities" concealed in the natural environment. In its simplest form, affordance refers to the user-specific relationship between an object or event and an animal of a given kind. His most common example is the chair since we can stand or sit on a chair because the

affordances are obvious to the observer. This may be one explanation why young children are very comfortable when using child-size furniture. It is not only because they have seen adults sitting in chairs, it is more likely that they immediately perceive the object as relating to their body in a positive way. Concerning snow, Gibson used the igloo as an example of affording shelter to members of a particular race, though he stressed that the igloos are only used by those humans living in a natural environment that provides temperatures for its existence.

However, it is the work of experimental psychologist Eleanor Gibson (James's wife), that may be of greater value to early childhood teachers. Her book, written with Anne E. Pick, *An Ecological Approach to Perceptual Learning and Development* (Gibson & Pick, 2004) explores the topic of affordances much further. From Eleanor's perspective, specific objects are distinctive to children beginning soon after birth because they naturally afford a greater number of particular actions and later more advanced locomotor movements. This may be one factor to explain why young children never seem to lose interest in playing with a rubber ball since it affords many physical skills and simple games as the young child grows from birth to becoming an adult.

In the case of sand and snow, the child can use his or her hand, a spoon or a small shovel to dig, scoop, stir, pound, and pat and create numerous objects that appeal to their interest and level of development. The sand, snow, spoon and shovel act as affordances to the child's interest and exploration. And while, James and Eleanor Gibson's theory of affordance and perception is much more complex than can be discussed here, it does provide a rationale for why sand and snow continues to have such appeal into a person's adulthood as the young child matures into winter sport activities involving snow, and recreational summer activities where sand is common. Both substances should never be overlooked as a medium for instruction, therapy, social interaction, and even increased physical fitness, for to do so would rob the next generation of these natural substances that are very special for learning and play.

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