

TEACHING AUTISM SPECTRUM DISORDER LEARNERS:
IMPROVING OUTCOME BY INTEGRATING THE OUTDOORS

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Teaching ASD Learners: Improving Outcome by Integrating the Outdoors

Teachers currently face incredible challenges as the Individuals with Disabilities Education Act (IDEA) mandates mainstreaming disabled learners into the least restrictive environment. More learners diagnosed with autism spectrum disorder (ASD) inevitably means more of these different learners will be in the regular classroom. A fundamental issue facing elementary teachers of ASD children is accommodating wildly varying abilities and considering those differences to create a successful classroom experience for all by building and maintaining positive relationships.

Each child will have different interests, capabilities, and special needs, which must be considered during planning and implementation. Teachers that focus on creating meaningful relationships and producing an inviting and nurturing classroom community that is consistent and safe will draw out the best from each child and provide learning experiences that are positive and memorable. All students should feel valued for the unique individuals they are from the moment the teacher warmly greets each child at the doorway, through each carefully-orchestrated sequence both indoors and out, until the end of the day when learners depart.

ASD learners exhibit two unusual kinds of behaviors: deficits in communication and social interaction, and restricted or repetitive behaviors. Violent tantrums can erupt, communicating that the child is not okay with any deviations to his or her schedule, disrupting the entire lesson and classmates as well. Repeated tantrums or aggressive actions further deteriorate any relationships between the child and others in proximity as they seek to avoid extreme behaviors. Unintentionally reinforcing evasive behaviors can teach the child how to avoid undesired activities by hitting, biting, or other aggression.

How can teachers seek to avoid these meltdowns? No Child Left Behind mandates evidence-based strategies, meaning that there must be "...clear and unambiguous evidence that the use of a strategy resulted in improvements in student responding" (Egel, Holman, & Barthold, 2012). Using positive reinforcements and discrete trial training have been demonstrated to provide consistent behavior improvement and management. Incorporating nature has not yet been empirically proven; however, this strategy has been utilized successfully with various ASD learners. Visual schedules developed with Special Education professionals that contain frequent breaks using "First I..."Then I" structure provide clear and comprehensible messages to the child. Taking the child outdoors for breaks can help the child regain control and act as an incentive or reward for appropriate responses. Giving responsibility to the child by making him the line leader or the caboose may trigger beneficial reactions and behaviors. "...teachers must encourage "personal processing time" or "settling time" after new learning so that material can solidify" (Jensen, 2005). Is it possible to avoid tantrums or aggression resulting from perceived deviations in scheduling? Before the child escalates to aggressive behavior, he/she can take a break by walking to the window and redirecting his attention. Avoiding surprises has been shown to help by preparing the child for what lies ahead. Classroom teachers can show the child the picture representing outdoors on his schedule, and explain that when he/she needs a break he/she can earn extra time outdoors through compliant behaviors.

Successful inclusion of ASD learners requires best practices that have been empirically supported along with those characteristics of patience, perseverance, and pedagogical expertise inherent in excellent teachers already. A teacher who focuses on developing positive relationships based on mutual respect that are relevant to the learner will find success.

Nature and Autism Spectrum Disorder

Autism and autism spectrum disorder (ASD) are increasingly prevalent in our world. ASD encompasses a wide range of neurodevelopmental differences, and people exhibit varying degrees of difficulty with communications and social behaviors, repetitive or stereotypical behaviors and interests, sensory issues, and cognitive delays in some cases. At the same time, our society is moving further and further away from the natural world. Children would rather stay inside on a beautiful sunny Saturday playing on their gaming consoles. In “Last Child in the Woods,” author Richard Louv makes a compelling case for “saving our children from Nature-Deficit Disorder” (Louv, 2008). Louv cites numerous case studies, which show benefits of the natural environment on children and adults alike, but there is not much information on the proven benefit of nature for children diagnosed with ASD. More recently, Scott Sampson describes “How to Raise a Wild Child: The Art and Science of Falling in Love with Nature,” published in 2015. Sampson, perhaps best known for his work on PBS’s “Dinosaur Train,” builds on the work of Louv and others. Sampson notes adults and children after being in nature have “...reduced levels of stress and depression...improved concentration and problem solving skills” (2015, p. 35). Dr. Sampson includes data from a Japanese study indicating practitioners of shinrin-yoku (“forest bathers”) have lowered blood pressure and cortisol levels and increased their immune system capabilities. “At least a portion of these effects appears to be due to chemicals emitted by the plants” (2015, p.32). The power of the natural environment on enhancing learning for kids with ASD is a natural extension; after all, they are people, too. Much research has been done on the best practices for teaching kids with ASD; that best practice is currently “applied behavior analysis” (ABA). ABA can provide real and proven progress for kids with ASD, according to Christina Whalen, author of “Real Life,

Real Progress for Children with Autism Spectrum Disorders.” Whalen states, “...intensive ABA intervention that relies heavily on DTI (discrete trial instruction) has been shown to be dramatically effective” (Ashcroft, Argiro, & Keohane, 2010). After each trial, there is a break; it is suggested that child and teacher walk to a different corner of the room to provide this break. Teachers might consult with building professionals to determine whether or not breaks might be given by going to a window, fish tank or simply walking outside. Going outside to teach using ABA is generally considered distracting for kids with ASD. A single child was studied by comparing four identical activities both inside and out which showed no difference between the natural versus indoor environment (von Kampen, 2011). If the child doesn’t already have recess, teachers can consider adding regular unstructured outdoor time to the schedule. “Beyond the obesity, stress, and other negative effects of remaining indoors, recent research indicates that unstructured play in natural settings is essential for children’s healthy growth” (Sampson, 2015).

Effective teaching practices should integrate brain research and get children outside to experience with all of their senses and develop a relationship with the outdoors. “Nature-deficit disorder describes the human costs of alienation from nature, among them: diminished use of the senses, attention difficulties, and higher rates of physical and emotional illnesses” (Louv, 2008) Practical suggestions for lesson plans that can be used to encourage children to put down their electronics and go outside should improve child comfort and contact with nature. “...natural environments offer unbelievable benefits for our health. As neuroscience develops at a rapid pace, researchers are uncovering functional aspects of the intricate anatomy and physiology of the human brain, allowing them to have a clearer picture of the true depths to which environmental factors influence cognitive and mental health. So far, the results suggest

that we have completely underestimated the way in which the human brain is influenced by its physical environment...” (Selhub, 2012)

Autism Spectrum Disorder

In the May 2013 publication of the [DSM-5 diagnostic manual](#), all autism disorders were merged into a single umbrella diagnosis of ASD. Previously, they were recognized as distinct subtypes, including autistic disorder, childhood disintegrative disorder, pervasive developmental disorder-not otherwise specified (PDD-NOS) and Asperger syndrome (Appendix A).

ASD is usually first noticed by parents or pediatricians who note differences or difficulties in attaining typical milestones. A child might not make eye contact, may fail to talk or respond to his name, or play with a toy in unusual ways. Autism is thought to be present from birth; however, in certain situations, problems don't become apparent until later, after the child is three. Because ASD is a spectrum disorder, a child may show mild to severe impairments. “Each person with a diagnosis of ASD has a unique combination of characteristics related to verbal and nonverbal language (communication), interacting with others (social skills), and repetitive, narrow, and restricted interests (behavior)” (Ashcroft, Argiro, and Keohane, p.2).

A formal diagnosis of ASD requires a complete evaluation of language, cognition, and behavior, plus neurological and physical assessments through interviews with parents about developmental history and current abilities, along with consultation of various professionals. According to CDC data, the global prevalence of autism spectrum disorders has increased “twentyfold to thirtyfold” since the earliest epidemiological studies conducted in the late

1960's and early 1970's. Numbers of people diagnosed with ASD have skyrocketed from about one in 2500 to present estimates of one in 68. This is an average of boys and girls diagnosed with ASD; boys are at increased propensity for ASD and receive the diagnosis 4.5 times as much as girls. Based on 2012 data, one in 42 boys and one out of 189 girls were affected. A National Health Statistics Report determined an increase to 3.23% for boys and 0.7% for girls. In a building of 500 students, 16 kids will have ASD differences (Blumberg, 2012).

The CDC has plans to further study prevalence and other concerns through the Autism and Developmental Disabilities Monitoring (ADDM) Network, the only collaborative network to monitor the number and characteristics of children with autism spectrum disorder (ASD) and other developmental disabilities in multiple communities throughout the United States (Figure1).

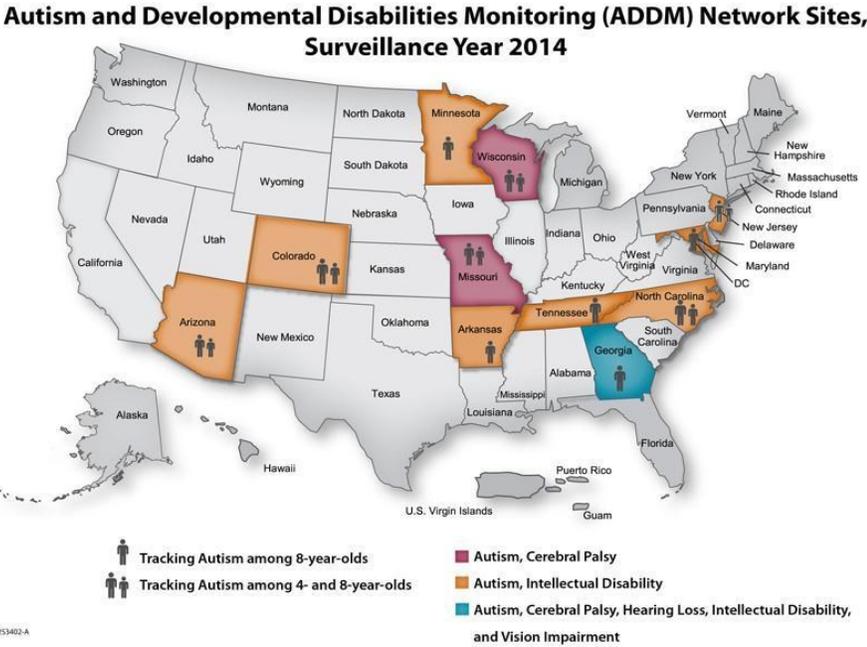


Figure 1. States with an Autism Spectrum Disorder monitoring network.

“Thanks to the infrastructure we’ve built over the past decade, we know so much more about the number and characteristics of children with autism. Continuing this important work will help us shed light on emerging issues, such as the impact of the new DSM-5 diagnostic criteria on prevalence and gaps in early identification of children with autism,” says Dr. Coleen Boyle, Director of the National Center on Birth Defects and Developmental Disabilities. In addition to tracking, sites will also conduct analyses of the data to better understand increases over time in the number of children identified with ASD, and carry out education and outreach activities in their local communities.

It is interesting to note that, of the eleven sites chosen for study, The Colorado Department of Public Health and the Environment is the only one not affiliated with a university. Criteria utilized for site determination are also unclear. The sites are:

- Colorado Department of Public Health and Environment
- Johns Hopkins University, Baltimore
- Rutgers, The State University of New Jersey
- The University of Wisconsin-Madison
- University of Arizona
- University of Arkansas for Medical Sciences
- *University of Minnesota
- University of North Carolina at Chapel Hill
- *Vanderbilt University in Nashville
- Washington University in St. Louis

*New Sites

Why is it that our world seems to have increasing numbers of people, primarily boys, being diagnosed with autism spectrum disorder, or ASD? Many causes have been speculated,

including but not limited to genetics, allergies, infectious disease, irregularities in brain development, immune deficiencies, malnutrition, abnormal levels of neurotransmitters, and the infamous mercury-based preservative used in some vaccines called thimerosal. According to the Center for Disease Control, “[*Autism spectrum disorder \(ASD\)*](#) is a developmental disability that is caused by differences in how the brain functions. People with ASD may communicate, interact, behave, and learn in different ways. Recent estimates from [*CDC's Autism and Developmental Disabilities Monitoring Network*](#) found that about 1 in 68 children have been identified with ASD in communities across the United States. CDC is committed to providing essential data on ASD, searching for causes of and factors that increase the risk for ASD, and developing resources that help identify children with ASD as early as possible.”

<http://www.cdc.gov/vaccinesafety/concerns/autism.html>

There is apparently no causal link between the MMR vaccine and autism or between thimerosal and autism. Three special federal court cases concluded that these do not cause autism (Ashcroft, Argiro, & Keohane, 2010). The claim is that thimerosal, a mercury-based preservative, has been safely used in vaccines since the 1930's, and “Research does not show any link between thimerosal in vaccines and [*autism*](#), a neurodevelopmental disorder. Many well-conducted studies have concluded that thimerosal in vaccines does not contribute to the development of autism. Even after thimerosal was removed from almost all childhood vaccines, autism rates continued to increase, which is the opposite of what would be expected if thimerosal caused autism.” CDC

<http://www.cdc.gov/vaccinesafety/Concerns/thimerosal/index.html>

In spite of the CDC's assurances, some parents have decided to forgo vaccinations of their children for fear of causing ASD, leaving these babies at risk for measles, mumps and

rubella. There does appear to be a genetic link; parents who have one child with autism are at increased risk of having another child with autism. And ASD runs in families. Some relatives or parents may "...show mild impairments in social and communicative skills or engage in repetitive behaviors." (Ashcroft, Argiro, and Keohane, 2010, p. 11) Perhaps several factors combine, given an environmental trigger of unknown nature.

Empirically-Supported Best Practices for Teaching ASD Learners

Since the exact causes of ASD remain up for debate and precise genes have not yet been isolated, teachers must use best practices to help ASD kids learn effectively. Currently, applied behavioral analysis (ABA) is widely considered to be most appropriate to help teach students with ASD. ABA is a method of instruction that "... focuses on improving behaviors of social significance to a meaningful degree; it is rooted in the principles of behavior such as positive reinforcement and extinction, and systematically utilizes behavior change tactics derived from those principles; it targets behaviors that are observable and measurable, and is driven by data; and it is generalizable, striving to have outcomes that last over time" (Johnson, 2013, p. 18). According to Whalen, "Everyone on the spectrum has difficulty in communicating and verbally expressing him- or herself...All behavior is communication" (2013, p.xiv). Early intervention has been shown to be most effective with disparities in abilities, communications, and generalization targeted and individualized. Strengths are used to provide a sense of accomplishment and achievement as they bridge to deficits. Those with ASD have difficulty making generalizations; an effective program teaches a child how to extend to novel situations.

Students diagnosed with ASD are protected under the Individuals with Disabilities Education Act, or IDEA. “IDEA is a federal law, requiring each state that receives federal funds to have a corresponding law regarding, among other things, nondiscriminatory evaluation procedures. These laws vary from state to state, so the definition of autism might be slightly different in each state” (Ashcroft, et al, p. 10). In Colorado, once ChildFind is informed about a parental concern over a child’s development, the child is evaluated according to the DSM-V criteria. If the assessment team determines that the child can’t succeed in general education without special education, he will be identified as having autism.

ASD people share certain characteristics in various combinations and degrees:

1. communication difficulties, both in comprehension and conveyance;
2. social skill deficits that impair relationship capabilities;
3. unusual stereotypic motor movements and/or ritualistic, odd, or inappropriate behaviors which are generally considered socially unacceptable;
4. significant anxiety about any variations to routine or environment;
5. have a tendency to focus on a specific detail that may not be vital to understanding a concept;
6. need visual support to verbal instruction because of auditory processing difficulty;
7. have atypical responses to sensory input, or unusual vestibular and kinesthetic requirements;
8. struggle with understanding social cues, including body language, facial expression, intonation, voice volume, and cadence (fail to make eye contact or lack empathy);
9. show concrete or literal interpretations of statements or situations; and
10. may have executive function issues that make organizing tasks and transitions difficult.

Each child with ASD will have a unique mixture of these characteristics, and an effective educational program should enhance those individual strengths. (Ashcroft, Argiro, & Keohane, 2010) All IEP's must comply with the six major principles of IDEA:

1. Zero reject: every child has a right to a free and appropriate public education (FAPE);
2. Nondiscriminatory classification: every child has a right to a complete and fair evaluation so correct placement and programs can be developed.
3. Appropriate education: every child has a right to a meaningful education designed to meet his or her unique needs.
4. Least restrictive environment: every child has a right to be education with nondisabled children to the maximum extent appropriate.
5. Parent participation: every child has the right to have the family involved in making educational decisions.
6. Due process: every child has a right to challenge any aspect of his or her educational program. (Ashcroft, Argiro, & Keohane, 2010)

Clarification from the Supreme Court regarding these provisions include what constitutes an appropriate education; schools must provide the opportunity for the child to make progress, but do not need to ensure the child maximize his or her potential. The 2004 addition that schools implement scientifically proven instruction to the extent practical has caused teachers and parents to make judgements about best methodologies and strategies. "Educational practices that are likely to be effective are those found to be successful in research studies that have been replicated and reviewed by professional peers in the field" (Ashcroft, Argiro, & Keohane, 2010). Educational goals for ASD children are to improve and increase the child's

social and language skills and minimize behaviors that interfere with the child's functioning and learning.

Behaviors must be observable and quantifiable. It is necessary to consider why certain interfering behaviors are occurring, and in what context. Frequency, rate, and duration are determined and possible causes are suggested. Skills may be learned using ABA. All behaviors (B) are affected by antecedents (A) and consequences (C). Word association, called "pairing," helps a child learn language. A pleasant consequence is called positive reinforcement, and tends to cause repetition of behaviors. A negative consequence is called punishment, and is intended to stop a behavior. Five important goals are accomplished using ABA:

1. New skills may be taught with systematic reinforcement;
2. Behaviors the child already exhibits may be strengthened, improved, or increased;
3. Productive behaviors may be perpetuated;
4. Skills may be generalized or transferred to other situations; and
5. Interfering behaviors may be minimized (Ashcroft, Argiro, & Keohane, 2010)

Teachers must know what serves as a reinforcement for each particular child, since consequences will not be considered reinforcers unless they increase the likelihood that a behavior will be repeated. Showing the child a visual "first this, then that" can help the child make connections between a behavior and its consequence. Behaviors can also be modeled and shaped. Prompts can be used to teach a new skill or to build positive behavior momentum during high stress situations. In the early stages of learning a new skill, providing "errorless learning" allows the child to perform the skill with assistance and success. This is effective according to Sousa, too; the child maintains positive self-esteem (Sousa, 2011). Prompts

should be gradually faded to avoid a disruption in the desired behavior (Ashcroft, Argiro, & and Keohane, 2010). Differential reinforcement can help minimize inappropriate behaviors by rewarding the learner for appropriate behavior. Time Out On The Spot (TOOTS) can be used for 10 or 15 seconds (using a timer) for undesired behaviors. The teacher says, “No hitting. Put your head down.”

No time-out procedure should seclude or confine the child alone in a room or area without supervision. The Council for Children with Behavioral Disorders (CCBD, 2009a, 2009b) has developed position statements which are explicit concerning the use of seclusion in a school setting. Seclusion does not include chill-out rooms, de-stimulation areas, safe places, or cool-down room provided as a place for children who choose to be alone. A student should only be secluded when the behavior is so out of control or dangerous that he presents a danger to himself or others (CCBD, 09). Teachers need to understand the function of the behavior prior to using time-out with an ASD child. If the behavior is to escape a task, then time-out would reinforce this, possibly strengthening inappropriate actions. As soon as the child is calm and in control, it is critical to resume the task. Creating positive behavior momentum by a faster delivery of reinforcement or making the task manageable often will help the child calm down and continue the task until a break can be given.

Using Nature

Outdoor time can be used as incentive or to provide breaks. A brisk walk outside is an effective activity to start the day, and according to Sousa, “Even short, moderate physical exercise can improve brain performance” (Sousa, 2011). Learners then come to the room ready to begin new material. In Finland, ranked at or near the top in global assessments, students

often get fifteen minutes of outdoor play between lessons, in addition to their regular recess. Most play occurs outdoors, in natural settings; stark contrast to American trends of longer school days, with less time for lunch and recess, and much more high-stakes testing (Sampson, 2015).

Sousa recommends short 15- to 20-minute lessons covering three or four “chunks” as optimal for retention. This is corroborated by Jensen, who says 2 to 5 minutes of processing or settling time is required to teach novice learners (Jensen, 2005). Frequent breaks are typically built into the ASD child’s schedule, as are lots of repetitions and review to ensure mastery. “Nature play is superior at engendering a sense of self and a sense of place, allowing children to recognize both their independence and interdependence. Play in outdoor settings also exceeds indoor alternatives in fostering cognitive, emotional, and moral development” (Sampson, 2015). Being outside and exposed to greenery has other demonstrated benefits. Exposure to evergreen emissions of phytoncide gained by simply walking in forested areas have been demonstrated to lower levels of cortisol and increase immune response (Selhub, 2012). People who had green plants in their hospital rooms or saw natural scenes had faster recovery times from operations (Louv, 2008). If it is not practical to go outside every 15 minutes for a break, plan to go to the window and have students play “I Spy with My Little Eye” something alive, green, a bird, or insect. Have students draw what they saw, paying attention to the details they observe.

Instructional Strategies

“One of the most critical components of any teaching program for students with ASD is the systematic presentation of reinforcement for socially appropriate behavior” (Egel, Holman,

& Barthold, 2012). Tangibles or privileges paired with social praise are typically used. Ideally, the tangibles can be gradually faded; the teacher should vary reinforcers to maintain high levels of motivation and compliance. Teachers can use activities that are a natural fit for learning; for example, using recess preparation as a time to practice putting on a coat, or snack time as appropriate for requesting skills (Egel, Holman, & Barthold, 2012). Additional suggestions include: immediate reinforcement for compliance, only providing the reinforce upon compliance, and being creative in choice of reinforcers (Egel, Holman, & Barthold, 2012).

Discrete Trial Teaching has been demonstrated to improve responses, but may cause the student to become dependent on the cue or extending responses to novel situations. Naturalistic Teaching relies on events that occur naturally, such as dressing, eating, or bathing. A teacher might hand the child a spoon for snack, but not include any food; this creates impetus for the child to verbalize the request (Egel, Holman, & Barthold, 2012). Picture Exchange Communication System is the actual exchange of the picture from one person to another. “In addition to increasing communication, using an alternative form of communication also helped increase social skills and reduce problem behaviors” (Egel, Holman, & Barthold, 2012).

Peer modeling and video modeling are strategies that help teach appropriate behaviors and social skills (Egel, Holman, & Barthold, 2012). Visual supports and structured work systems can help ASD learners “...organize and sequence tasks in a concrete way” (Egel, Holman, & Barthold, 2012). Comprehensive Treatment Models (CTMs) encompass expressive and receptive communication, imitation, matching and sorting, and social behaviors. Ivar Lovaas was one of the first to utilize a CTM for ASD learners. “At present,

the Lovaas model has the most evidence for effectiveness, with at least three studies supporting that individuals make better gains with this model than other, more eclectic, interventions (Egel, Holman, & Barthold, 2012).

“No matter what type of strategy is chosen, teachers and parents must consider how they will ensure that students apply what they learned to the right environment” (Egel, Holman, & Barthold, 2012). ASD learners seem to have difficulty in extending their behaviors and learning to different situations; even though they know what to do in the classroom, they don't know what to do in a novel situation.

Positive Behavior Support (PBS) has been found to be most effective for handling extreme behaviors such as aggression, tantrums, or rigid adherence to routines. Reasons for problem behaviors are initially assessed using Functional Behavioral Assessment (FBA). Acceptable alternatives are then taught and reinforced. “The fact is that if a student is repeatedly engaging in problem behavior, that behavior is probably being reinforced in some way” (Egel, Holman, & Barthold, 2012). Kids misbehave for attention, escape, access to items, or a reason known as automatic reinforcement which isn't easily measured. The FBA determines possible triggers for the misbehavior and reinforcements are eliminated. Removing consequences for problem behaviors is known as extinction. The child must be taught what to do instead of acting out or the child might replace one problem with another. “It might be better to teach the student to ask for a break when she feels overwhelmed” (Egel, Holman, & Barthold, 2012). If the child exhibits self-injury or severe aggression, seek the help of a qualified behavior analyst.

Summary

Teaching children with autism spectrum disorders poses many challenges for the general education teacher. Recognizing that all children are special, with unique learning styles and strengths, can help classroom teachers provide carefully planned learning opportunities so that each learner may grow to maximize his or her potential. It is important to focus on the whole child, not just on his or her communication or behavior impairments, and see strengths and abilities as well. Redirecting a child before a tantrum or other extreme behavior occurs can allow for positive relationships within the classroom community to develop or continue. By utilizing the natural world and moving away from technology, teachers can provide health benefits and opportunities for growth with little or no cost. Taking the child outside for fresh air or unstructured play is beneficial for all involved. Using nature can teach observational abilities and help ASD learners see the big picture and focus on what is important. Adhering to routines provides a sense of structure and continuity for the child, so outdoor time should be integrated into the daily schedule from the first day of school. Each of our children is important, and we don't know what they are capable of unless and until we give them wings to fly.

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Appendix A

The American Psychiatric Association's Diagnostic and Statistical Manual, Fifth Edition (DSM-5) provides standardized criteria to help diagnose ASD.

Diagnostic Criteria for 299.00 Autism Spectrum Disorder

A. Persistent deficits in social communication and social interaction across multiple contexts, as manifested by the following, currently or by history (examples are illustrative, not exhaustive; see text):

1. Deficits in social-emotional reciprocity, ranging, for example, from abnormal social approach and failure of normal back-and-forth conversation; to reduced sharing of interests, emotions, or affect; to failure to initiate or respond to social interactions.
2. Deficits in nonverbal communicative behaviors used for social interaction, ranging, for example, from poorly integrated verbal and nonverbal communication; to abnormalities in eye contact and body language or deficits in understanding and use of gestures; to a total lack of facial expressions and nonverbal communication.
3. Deficits in developing, maintaining, and understand relationships, ranging, for example, from difficulties adjusting behavior to suit various social contexts; to difficulties in sharing imaginative play or in making friends; to absence of interest in peers.

Specify current severity:

Severity is based on social communication impairments and restricted, repetitive patterns of behavior.

B. Restricted, repetitive patterns of behavior, interests, or activities, as manifested by at least two of the following, currently or by history (examples are illustrative, not exhaustive; see text):

1. Stereotyped or repetitive motor movements, use of objects, or speech (e.g., simple motor stereotypes, lining up toys or flipping objects, echolalia, idiosyncratic phrases).
2. Insistence on sameness, inflexible adherence to routines, or ritualized patterns of verbal or nonverbal behavior (e.g., extreme distress at small changes, difficulties with transitions, rigid thinking patterns, greeting rituals, need to take same route or eat same food every day).
3. Highly restricted, fixated interests that are abnormal in intensity or focus (e.g., strong attachment to or preoccupation with unusual objects, excessively circumscribed or perseverative interests).
4. Hyper- or hyporeactivity to sensory input or unusual interest in sensory aspects of the environment (e.g. apparent indifference to pain/temperature, adverse response to specific sounds or textures, excessive smelling or touching of objects, visual fascination with lights or movement).

Specify current severity:

Severity is based on social communication impairments and restricted, repetitive patterns of behavior.

- C. Symptoms must be present in the early developmental period (but may not become fully manifest until social demands exceed limited capacities, or may be masked by learned strategies in later life).
- D. Symptoms cause clinically significant impairment in social, occupational, or other important areas of current functioning.
- E. These disturbances are not better explained by intellectual disability (intellectual developmental disorder) or global developmental delay. Intellectual disability and autism spectrum disorder frequently co-occur; to make comorbid diagnoses of autism spectrum disorder and intellectual disability, social communication should be below that expected for general developmental level.

Note: Individuals with a well-established DSM-IV diagnosis of autistic disorder, Asperger's disorder, or pervasive developmental disorder not otherwise specified should be given the diagnosis of autism spectrum disorder. American Psychiatric Association. Diagnostic and statistical manual of mental disorders. 5th ed. Arlington, VA: American Psychiatric Association; 2013.

Appendix B

Nature Journal. Provide a nature journal that children use to record their observations. Pre-literate students should draw the scene, since ASD learners tend to focus on insignificant details; specify that learners need to include at least five living and five non-living things.

Playground Stewardship. Go outside and pick up trash. Award students based on effort with a peppermint—also demonstrated to improve thought function, as long as it contains real peppermint oil.

Wonder Bowl. Keep a “wonder bowl.” Have students describe their discoveries (Louv, 2008)

Adopt a tree. The Take a Child Outside campaign (takeachildoutside.org/activities) suggests taking pictures for events such as the first snowfall. Make bark rubbings using crayons and paper. Track which animals use the tree. (Louv, 2008) Tell the tree’s story and life cycle, from seed germination all the way until today. Describe what is inside. Pre-literate children might draw a picture or sing a song about their tree (Taber, 2016).

Meet a Tree. A classic senses outdoor education activity appropriate for all ages (Jackson, 2016)

Concepts, skills, and qualities taught: Forest appreciation, sensory awareness, empathy

When and where to play: Day / forest

Number of people needed: For 2 or more people

Suggested age range: Ages 4 and up

Materials needed: Blindfolds



Trees, said Buddha, have unlimited kindness and benevolence, and uplift the human spirit. Scientific studies show that trees calm us and provide spiritual and creative inspiration.

Explore:

Meet a Tree connects us with trees in a memorable way. To play, divide the group into pairs and have one of each pair wear a blindfold. The seeing player—if old enough—leads the blindfolded player to a special tree, one that has intriguing characteristics. Upon meeting the tree, the blindfolded player feels the texture of the tree’s bark, sees how big the tree is by putting his arms around it, and explores the tree’s branches and leaves. The guide can silently guide the player’s hands to interesting places on and around the tree.

Explain:

One Sharing Nature leader in Japan often tells children, “In this forest there is a tree that has been waiting to meet you since before you were born.” The children, touched by these words, are honored and eager to meet their tree.

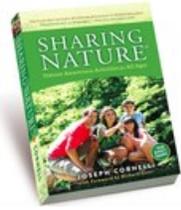
Elaborate:

After getting to know their trees, the blindfolded players are brought back to the starting point, where their blindfolds are removed. They then try to find their tree. Most adults and children (except for the very young) who have walked blindfolded thirty yards or more to a tree, can find it later with open eyes. Leaders should, however, adapt the distance to the age, mobility, and the ability of the players to orient themselves in nature.

Faces of both children and adult players immediately glow with elation when they recognize their tree—it is as though two dear friends have reunited.

Children younger than twelve should probably be paired with an adult. Young children may

also want to guide their adult friends: if so, the adult can look as needed for safety purposes.



From Sharing Nature: Nature Awareness Activities for All Ages, © 2015 Joseph Bharat

Cornell

Mud Sculptures-

Engage/Explore/Explain: talk about sink vs float, provide students with common objects to test in small bowls of water, discuss commonalities- can they predict what will sink or float?

Elaborate/Evaluate: Have students use natural materials to make boats, which natural materials will sink or float based on what we learned? Ideally, provide a kiddie pool for testing and then a flowing stream for races! We do often let kids use a biodegradable stuing like hemp for tying boat parts together! (Jackson, 2016)

Wolf Lesson. Wolf Lesson outline and associated documents- A lesson better for older kids, but with enough merit to warrant an adaptation for younger students. Studying and sharing observations about the way wolves, or even domestic dogs communicate can really bring a lot of kids out and give them an external focus for their conversations.

Grade Level: 4th grade and up

Setting: outdoors

Overview: Students will focus on pop culture preconceptions of wolves, then work to dispel them through role playing wolves to “track” an animal by smell and act out other scenes common to wolf life with body language.

Objectives:

Standards:

Materials:

- White board and marker
- 1 spray bottle per small group
- 1 “scent” per small group (vanilla, mint, perfume)

- Wolf postures sheets
- Wolf roles sheets
- Live Wolves! Go on a trip or invite guest speakers- do not attempt to trap on your own ;)

Vocabulary:

- Alpha
- Beta
- Omega

Background:

Lesson:

Engage

1. Ask students to share several pop culture or older cultural references that include the word wolf.
2. Include the meanings of the phrases if the phrase is new to students. Are they positive or negative phrases?
Examples: • Wolf down food • Wolf in sheep's clothing • Cry wolf • Lone wolf • Wolf • Throw to the wolves

1. Many of the people who originally came up with these phrases frequently made their living by raising livestock, grain farming, hunting and gathering, and/or fishing. How could this affect how they viewed wolves?

1. Today we will try to dispel some of the negative ideas that surround wolves

Explore:

Use spray bottles, water, and interesting scents (mint vanilla, perfume) so that students in small wolf packs can use their noses to follow scent trails to find several different stuffed animals at the end of different scent trails sprayed on vegetation.

Explain:

Talk about how the students worked together to follow the scent . Was someone the leader? The best smeller? Discuss roles in a wolf pack. Divide students into wolf pack groups and give them each scenarios to act out for other students who will be observing wolf researchers. Give students tail postures and body postures sheets to practice their skits with. Do a demo skit as staff, let students practice, then put on the real shows.

Skit ideas:

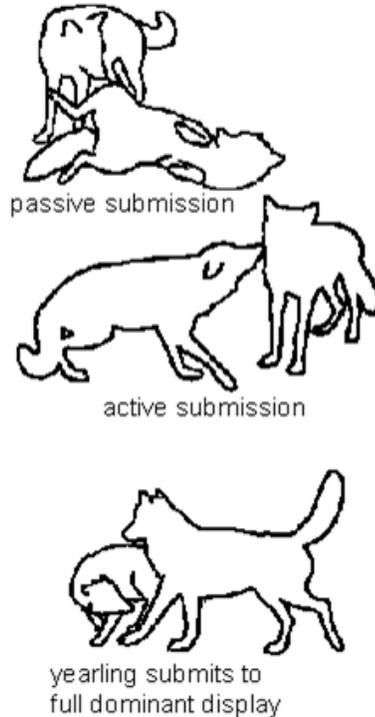
Beta finds a dead deer(carrion) and gathers other pack members to eat

Evaluate: Re-visit the pop culture wolf phrases? Are wolves really all lonely, viscous etc....? What can students do to help wolves?

Elaborate:

Observe live wolves!

Identify the roles each wolf plays in the pack. Hypothesize what they are communicating to one another. What caused you to draw this conclusion? (Jackson, 2016)



Alpha Male and Female

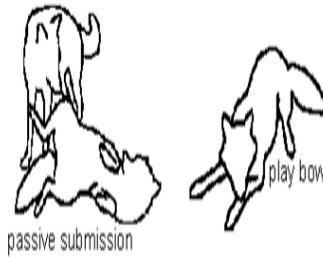
The alpha male and female wolves are the leaders of the pack. Hold your head, ears and tail high, you are in charge!

Other wolves should submit to you by lowering themselves just a bit when you meet. If they don't, put them in their place by being taller than they are, staring at them, or putting a paw on their shoulder and pushing them down. They should give up and submit. Then you have won and can put your attention elsewhere.

Puppies in the pack are a different story. They are probably your kids. You can put them in their place if they are getting way out of line, but don't hurt them, they are your future! You can leave them with the omega wolf/babysitter of the pack if you want to leave for a hunting date ;) The omega may try to follow you and get out of babysitting. Put the omega in place



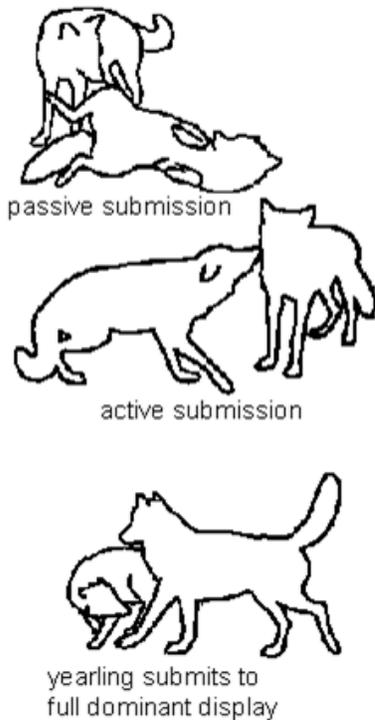
with a stare and go off on your hunting date!



If there is food, you are the first two to eat.

If you're happy and you know it wag your tail!

You lead the pack in howling!

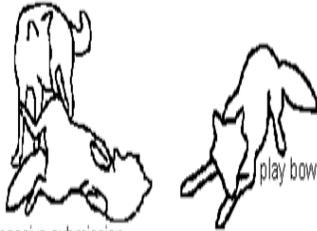


Beta Male and Female

You are the second wolves in command, ready to police the pack and put others in their place if they get out of line or into fights with each other. Back up the Alpha wolves, they are counting on you to be the strong wolves you are. One day, if you keep becoming swift, strong, and smart, you will be the leaders of the pack.

Other wolves, except the alphas, should submit to you by lowering themselves just a bit when you meet. If they don't, put them in their place by being taller than they are, staring at them, or putting a paw on their shoulder and pushing them down. They should give up and submit. Then you have won and can put your attention elsewhere.

Puppies in the pack are a different story. They are probably your alpha's kids. You can put them in their place if they are getting way out of line, but don't hurt them, they are the pack's future!

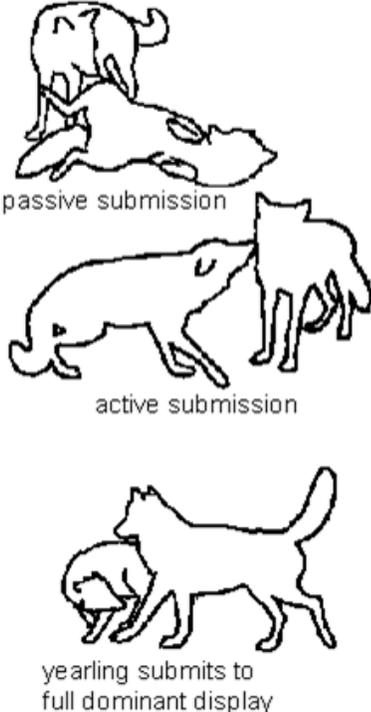


If there is food, you eat after the two alphas.



If you're happy and you know it wag your tail!

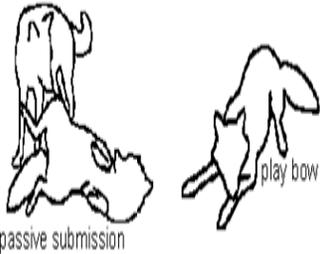
In a pack howl, chime in after the alphas



Omega

You are the low wolf in the pack, but still play an important role, like a rodeo clown. If you see higher ranking wolves starting to get into a fight, try to distract them with a snapping attack, a roll around and a play bow and try to lighten the mood. Often this works and the pack is happy. Sometimes this does not work and there is a fight. If it looks like a fight is certain, be submissive, crouch, or roll belly up in full submission.

You are also the babysitter of the pack. Alphas may leave pups with you while they go off to hunt. If you want to hunt too, try to follow the alphas. They will stare you down if they don't want you to follow.

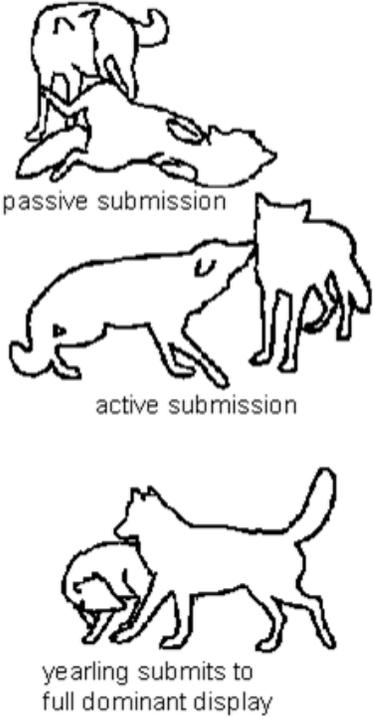


If there is food, you are last to eat.



If you're happy and you know it wag your tail!

You are last in a pack howl.



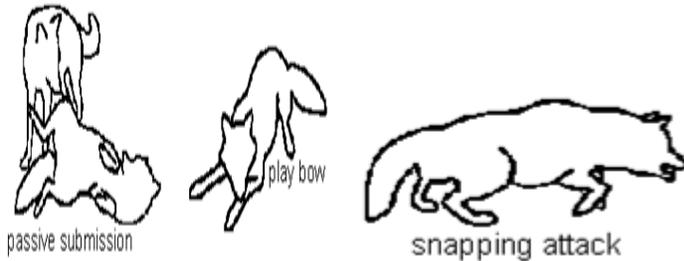
Puppies

You are the little kids of the wolf pack. You can do whatever you want to any wolf in the pack, climb on them, jump around, give plenty of play bows and chase each other. Other pack members may put you in your place, but they won't hurt you. If you know you're in trouble, roll over and admit it, then apologize and find somewhere else to play.

You are happy almost all the time, so wag your tail lots!

If there is food, you eat after all the grown up wolves, except for the omega who is last to eat.

In a pack howl, come in after all the grown up wolves except for the omega, who is last.



Role Play Scenarios

Food to Go: Have the audience name the alpha, beta, omega, and puppy members of the pack.

Chase a bunny, kill, and eat it in pack order.

Beta or Omega? Have audience members name the beta, omega, and winning subordinate wolves.

Two subordinate wolves start to get into a fight over a stick. A beta and an omega separately try to break up the fight. Choose one of the subordinates to win before you start the play.

Howl Now: Have the audience name the alpha, beta, omega, and puppy members of the pack.

Babysitter: Have the Audience name the alphas, puppies, and omega

Start the skit with the wolf pack asleep. Puppies wake up and ask the alphas to play. The alphas play for a little bit, then wake up the omega and make him or her babysit while they leave to hunt. (Jackson, 2016)