



health**CARE**TM

(Cultivating **A**cceptance and **R**espect through **E**ducation)

Unit 3: Autism Spectrum Disorders

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For information on the Cleveland Clinic Office of Civic Education Initiatives, please visit: <http://www.clevelandclinic.org/CivicEducation>

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Program Overview

healthCARE™ (Cultivating Acceptance and Respect through Education) is a dynamic educational program designed to teach children ages 5 through 10 about diversity and individual differences. Developed by the Cleveland Clinic Theatre Company and the Office of Civic Education Initiatives, the program provides free educational resources, including the script and the video of the award-winning children's play *Tall Tale*, as well as an accompanying lesson plan that meets state and national standards in a variety of subjects. healthCARE™ also offers disease-specific lessons so teachers can address diversity and individual differences as they relate to specific medical conditions.

The **Cleveland Clinic Theatre Company** is an award-winning theatre troupe devoted to educating and entertaining audiences of all ages through the use of the performing arts. Since it was established as a program of the Community Relations Department in the spring of 2004, the Company has written, performed and produced an impressive body of work, including interactive educational plays, radio and TV public service announcements, children's theatre programs, improvisational performances, and an educational CD. As a part of Cleveland Clinic's new Office of Civic Education Initiatives, the group has taken on even larger, more ambitious projects, including the video production of *Tall Tale*.

The **Office of Civic Education Initiatives** was established to fulfill the Cleveland Clinic's commitment to promote education throughout Northeast Ohio. In partnership with area schools, local businesses, and fellow nonprofit organizations, the Office creates innovative programs designed to enhance children's learning in the areas of math, science, health and wellness, the arts, and innovation.

Cleveland Clinic, located in Cleveland, Ohio, is a not-for-profit multispecialty academic medical center that integrates clinical and hospital care with research and education. Cleveland Clinic was founded in 1921 by four renowned physicians with a vision of providing outstanding patient care based upon the principles of cooperation, compassion and innovation. U.S. News & World Report consistently names Cleveland Clinic as one of the nation's best hospitals in its annual "America's Best Hospitals" survey. Approximately 1,500 full-time salaried physicians at Cleveland Clinic and Cleveland Clinic Florida represent more than 100 medical specialties and subspecialties. In 2005, 2.7 million patients came for treatment from every state and 100 countries. Cleveland Clinic's website address is www.clevelandclinic.org.

AUTISM SPECTRUM DISORDERS

Autism is a neurological disorder with a wide range of manifestations and degrees of severity. It is estimated that one of every 166 people in the U.S fall somewhere within the autism spectrum. People with milder forms of the disorder are often diagnosed with Asperger's Syndrome (AS). Most children with autism or AS have significant developmental delays or impairment in the areas of communication and social behavior. These children may also have sensory impairments, poorly developed gross and fine motor skills and multiple allergies or food sensitivities. It is undeniably difficult to manage a child with so many special needs in the regular classroom setting.

However, children with autism often make significant gains while being taught in the company of typical students. Many such children learn to read write and calculate at grade level or above. In fact, some students with autism communicate better through writing than through speech. The lessons below are designed to help the teacher of a student with autism educate other students about the disorder and to teach them how to respond to the manifestations of autism that can make social interactions a challenge. These lessons are designed to be fun and engaging for all students and to incorporate exercises that will develop skills in reading, writing, math, science, social studies and the visual arts.

Unit Objectives: *Students will*

- *Learn about autistic spectrum disorders*
- *Develop skills that will improve interactions with students with autism*
- *Understand some of the more common manifestations of autism*
- *Become more compassionate, learning to help those with the disorder*

Students will also meet many state and national standards in science, social studies, math, language arts and fine arts as listed at the end of this unit.

Pre-Assessment: Read one of the books listed below aloud to the class:

- For younger students or classes with a more severely autistic child, read *Ian's Walk: A Story About Autism* by Laurie Lears
- For older students, read *To Be Me: Understanding What It's Like to Have Asperger's Syndrome* by Rebecca Etlinger.

Both books are available at most libraries or may be purchased from Amazon. "To Be Me" can be purchased at a significant savings by clicking on the "Where to buy" icon on the author's website at <http://www.aspergersbook.com/>. After reading the book, help students make connections between circumstances in the book and difficult situations that may arise in your classroom. List these connections on the board. Expand the list to include other aspects of student behavior that are sometimes problematic – do not focus solely on issues pertaining to a student with autism. Use the following drama exercise to help students develop appropriate responses to problematic situations that will make the classroom a more productive and friendly environment for everyone.

Lesson 1: Performing Arts - Tableau

Tableau is an exercise in creative drama showing a frozen moment in time. This exercise gives students a way to communicate their ideas for handling a classroom situation that could cause problems for one or more students. Many children learn best by moving their bodies (kinesthetic learning). The physical expression of abstract concepts such as patience or kindness helps students to internalize these ideals, a necessary first step towards developing behaviors that embody these ideals.

Part I - Teacher-led:

Choose four or five situations from those outlined on the board previously to use in this exercise. For each situation, instruct students to think about the best possible response to that situation. Ask them to consider the following questions:

- What kind of behavior would best resolve the situation?
- How would that behavior look if it were frozen in time?
- What type of expression would show how they feel in that situation?

Have students stand in a circle (or stand up beside their desks if there is not enough space) while you describe a scenario that fits the situation. At the end of the description, tell students they have five seconds to assume a position that appropriately illustrates constructive behavior in the given situation. Encourage students to use their whole body, not just their faces. Then say, “five...four...three...two...one...FREEZE”. With the students frozen in place, go around the room, commenting on the positive aspects of the students’ poses. Choose one or two students to remain frozen while the rest of the class unfreezes. Instruct the student to focus on their classmates who are still frozen in time. Point out what these students are communicating with their bodies and expressions. Comment on how much can be expressed through body language. Try to choose different students to remain frozen for each situation dramatized.

Part II – Student-led:

Divide the class into groups of four or more. Give the students several minutes to choose a situation or scenario to depict using a “frozen moment in time”. After choosing the situation, students should discuss how they will communicate the emotions and feelings surrounding the situation and practice or “rehearse” how they will get themselves into their tableau.

When the students are ready, have the groups come up one at a time to adopt their pose. Have the class give the countdown for each group. When the students are frozen in place, allow the class to comment on what they see. Focus the discussion on the emotions and feelings conveyed through the students’ expressions and body language. Relate this to the resolution of problematic situations through appropriate behavior. Use this to show how a student’s response to a situation can affect the feelings of everyone involved. At the end of the exercise, you may wish to give the actors a minute to discuss what they were trying to convey through their pose.

Extension: Students might have fun using tableau to explore some of the scenes and emotions from the Tall Tale about Frankie and the Schmarzians. How might Frankie have looked when she was being teased by Duke? How would Duke have looked? How does Frankie's situation relate to some of the problems experienced by students in your classroom? For a copy of the Tall Tale script, to access the Lesson plan that accompanies the play or to order the video production, go to:

- <http://www.clevelandclinic.org/civiceducation/healthCARE.asp>

Teacher Resources:

Websites

- www.clevelandclinic.org/health/
Type in "autism" where it says, "search by topic". This will lead you to a list of comprehensive pages discussing autism and Asperger Syndrome.
- www.autism-society.org
This site was designed with parents in mind, but has a tremendous amount of good information for teachers as well. Go to the "About Autism" link and click on "education".
- www.aspieinfo.com/10%20Things%20article.doc
This extremely valuable article offers perspective on Autism for everyone who interacts with a child within the autistic spectrum.
- www.autism.org/temple/tips.html
Written by Temple Grandin, an author and accomplished scientist with autism, this article offers hints on how to teach a child with autism.
- www.pediatricneurology.com/autism.htm
Very thorough description of the speech patterns and communication difficulties of children with autism, AS, and other learning problems.
- www.udel.edu/bkirby/asperger/teachers_guide.html
A helpful list of do's and don'ts for teachers of students with AS or autism

Books

- *Leo the Late Bloomer* by Robert Kraus. Sweet story of a young tiger who does not seem to be keeping up with his peers. While the story does not address autism directly, it deals with many of the issues and emotions children with autism encounter. There are many online lesson plans for this book as well.
- *Freaks, Geeks & Asperger Syndrome: A User Guide to Adolescence* by Luke Jackson. This funny, quirky book was written by a 13 year old with Asperger Syndrome. It has a lot of practical advice for teens with or without AS.
- *Asperger Syndrome and Difficult Moments* by Brenda Smith Myles and Jack Southwick. Thorough discussion of behavior typical of those with Asperger Syndrome and many practical suggestions for teachers.
- *Educating Children with Autism* by the Committee on Educational Interventions for Children with Autism. This book for education professionals gives an overview of instructional strategies for children who fall under the autism umbrella. "An excellent compendium of the scientifically based knowledge in the field" - *Metapsychology Online Review*, June 2003

Lesson 2: Science - Brain Anatomy

Children with autism often have different sensory experiences than those without the disorder. For instance, most children with autism react very strongly to bright lights and loud sounds. Students with autism can be easily overwhelmed with input from their senses in situations that arise frequently. Background noises that go unnoticed by most people such as the sound a pencil make as it writes on paper can seem impossibly distracting to these students, as is the flicker of a fluorescent light. It is thought that this may be caused by an overgrowth of neurons (nerve cells) in the brains of people with autism.

In some cases, it also appears that there may be some sensory crossover, where signals from one sense are transmitted to the wrong area of the brain. Some people with autism report that they can “taste” certain colors or “feel” certain sounds. Ask students to think about what would happen if the nerves (connections) from one sense organ led to the wrong area in the brain, or if nerves from a sense organ connected to two different areas.

In this modeling exercise, students will create a model of the brain from a potato, with the connections from the brain to the various senses represented by colored string. Students will see how information from the eyes, ears, nose tongue and fingers travel to the brain. When students have completed their models, explain to the students that a person with autism may have many times more neurons connecting the sensory areas of their brains. These extra connections make it difficult to live in our noisy, colorful, smelly world.

Resources: Brain Anatomy Websites

- http://teens.drugabuse.gov/mom/tg_brain.asp#
This website was designed for a drug education course, but is full of excellent drawings and concise descriptions of brain anatomy and function.
- www.wright.edu/honorsinstitute/brain/mysteries.html
Nice brain map and description of the functions of each part of the brain.
- www.bbc.co.uk/science/humanbody/body/interactives/organs/brainmap/
This site has a highly interactive brain map enabling kids to hook up each sense with its location in the brain. It might be best suited to older students.

Websites for Younger Students:

- http://www.kidshealth.org/kid/body/brain_SW.html
Nice overview of the brain. Click on the “side view” on the brain diagram.
- http://www.kidshealth.org/kid/health_problems/brain/autism.html
This site explains autism in language most children will understand.

Introduction:

Pass out the brain map and worksheet to students. Have students color and label the brain map on their worksheet, adding the appropriate labels. This worksheet will be the legend for their potato brain model. Please note that the students are likely to have significant difficulty in reading and pronouncing the names of each brain lobe on their brain map. However, if they persist, they will learn to locate and pronounce each lobe correctly, and will feel quite proud of themselves. Have students spend some time studying the brain map before proceeding to the activity below.

Activity

Materials for each student group: one sharp pencil, one large white potato, five colors of string, tape, tacks or pins, pencil holder*

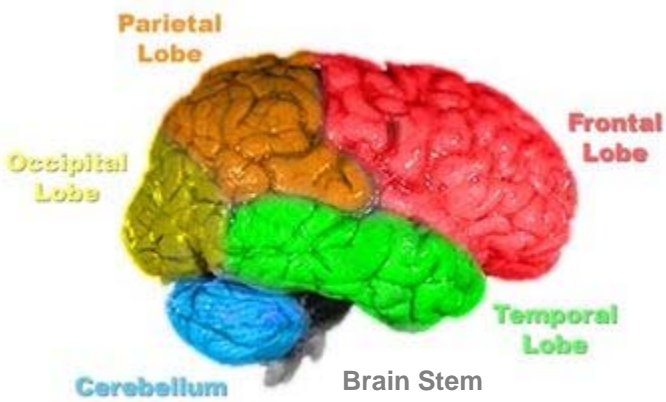
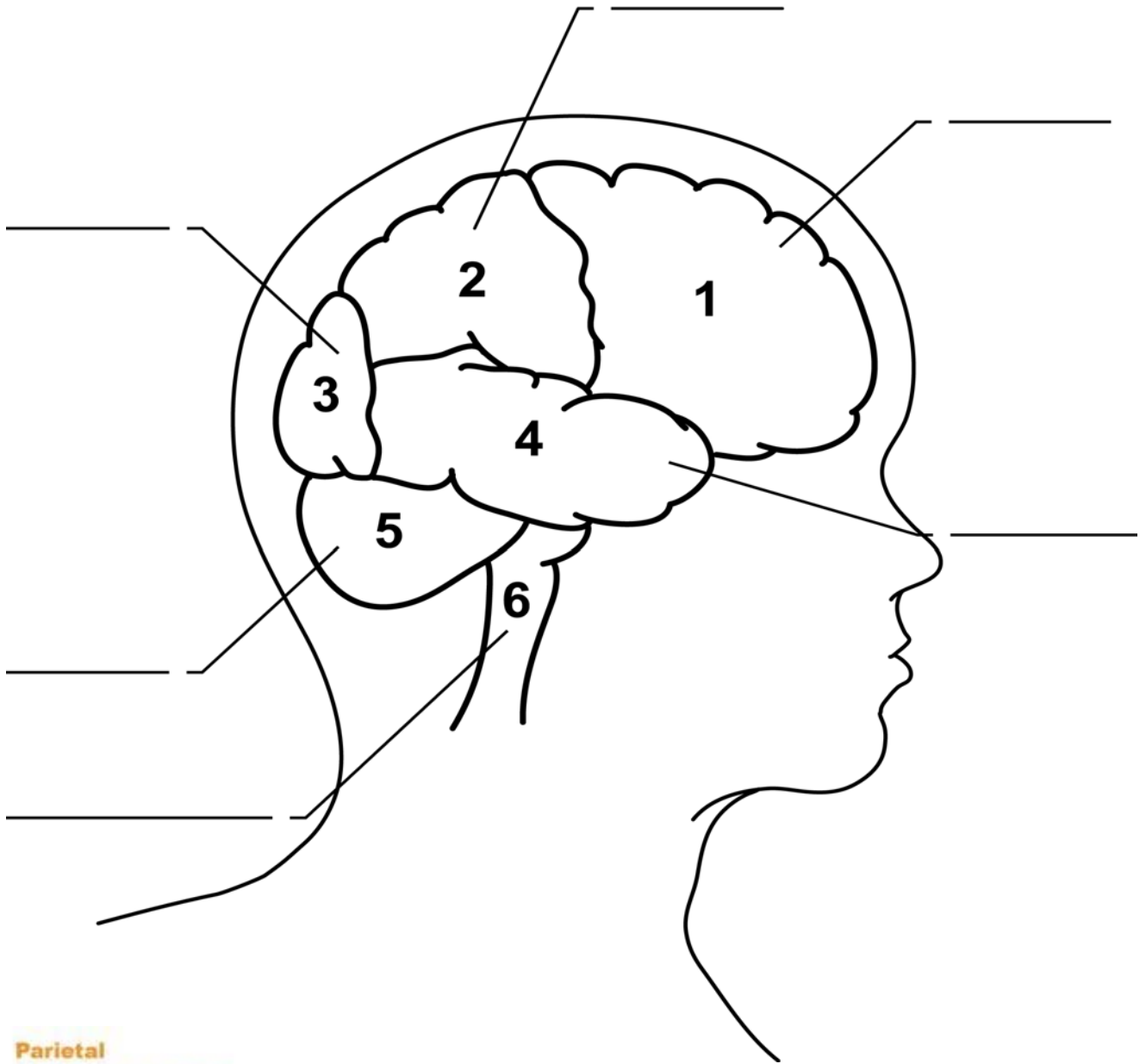
** A cup filled with sand or a large lump of clay will work to hold the pencil upright, serving as the base of the model.*

Have students do the following:

1. Place pencil into holder eraser-side down.
2. Impale potato (brain) onto pencil.
3. Tack or pin their colored face to the front of the brain (potato).
4. Pin or tack the labels in place on the brain, using the brain map for guidance.
5. Fold the hand and arm cut-out in half, and tape to the back of the pencil so that the hands stick out towards the front of the model.
6. Tape one end of a string to the back of each eye and connect to the occipital lobe on the brain with pins or tacks.
7. Using a different color of string, connect the back of the nose to the lower portion of the parietal lobe.
8. Also on the parietal lobe, just above this connection, run another color of string to the tongue.
9. Using a fourth color of string, connect the ears to the sides of the temporal lobes, one ear to each side.
10. Use the last color of string to connect the hands to the top of the parietal lobe.
11. Fill in all the blanks on the student hand-out.

Extension: After this lesson would be an ideal time to explore the workings of the five senses with your students. The following websites should be very helpful resources. The Cleveland Clinic website features an interactive tour of the eye. The other site contains a set of fun lesson plans to learn about each of the five senses.

- http://www.clevelandclinic.org/eye/patient_info/eyeanatomy.asp
Take an interactive tour of the eye at this site.
- <http://www.sedl.org/scimath/pasopartners/senses/welcome.html>
Comprehensive lesson plans for teaching about the five senses.

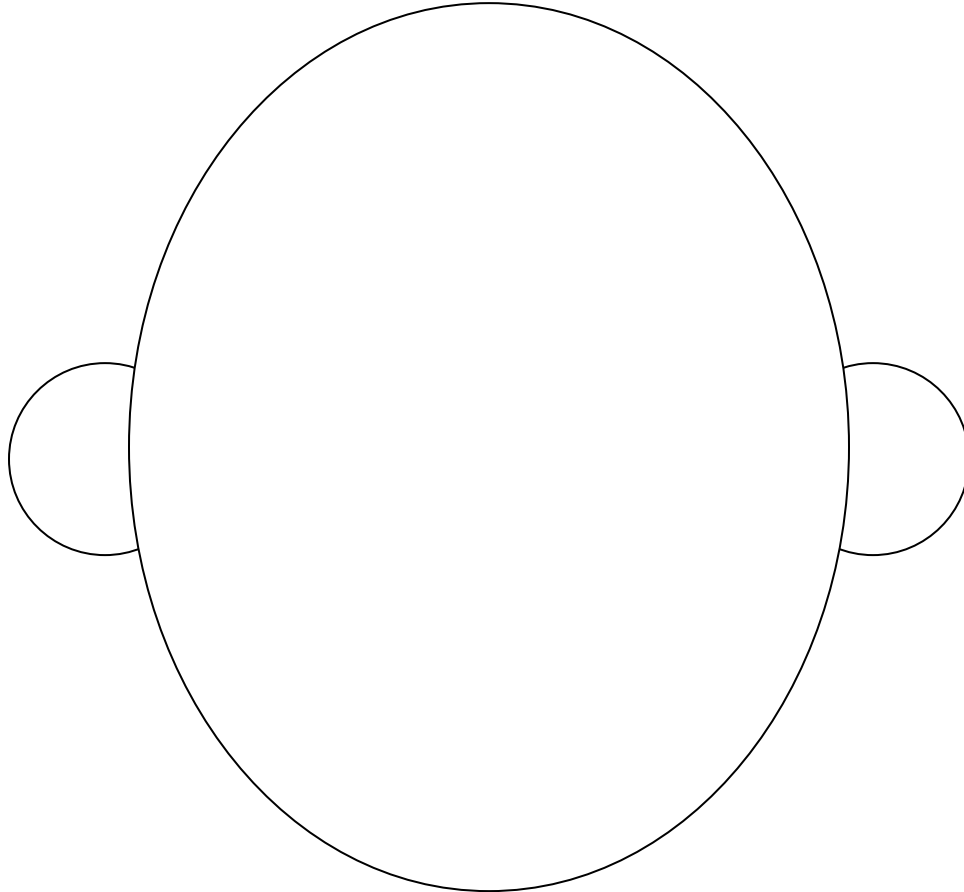


Brain location for each sense:

- Sight = Occipital lobe
- Hearing = Temporal lobe
- Touch = Parietal lobe
- Taste = Parietal lobe
- Smell = Olfactory bulb, in the center of the brain, behind the frontal and temporal lobes

Directions:

1. Place the pencil into the holder eraser-side down.
2. Impale the potato on the pencil (stick it to the point of the pencil).
3. Complete the face below. Draw in some eyes, a nose and a mouth.
4. Cut out and attach the colored face to the front of the potato.



5. Cut out the labels and pin them to the correct spot on your potato brain.

Frontal
Lobe

Parietal
Lobe

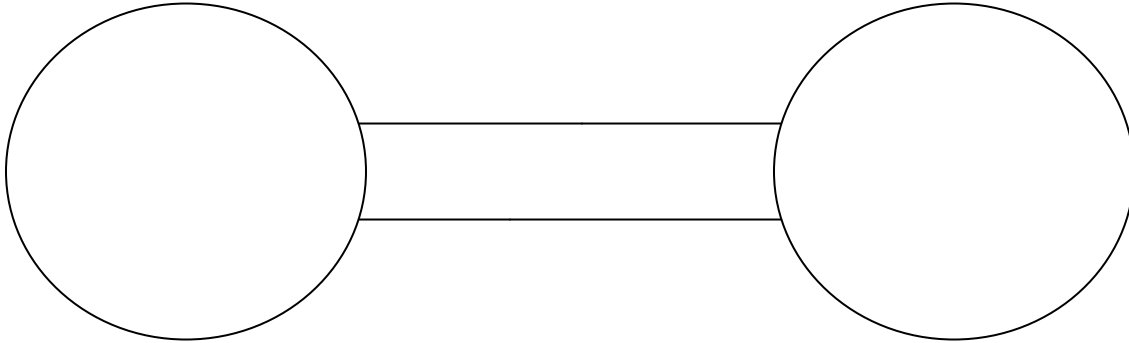
Cerebellum

Temporal
Lobe

Occipital
Lobe

Brain Stem

6. The circles and lines below are the hands and arms for your model. Cut them out and tape the center of the arms to the middle of the pencil on your model.



7. Now you can use string to show how each sense organ (eye, ear, nose tongue and hand) is connected to its area of the brain. Use a different color of string for each sense.

<u>Sense Organ</u>	<u>String Color</u>	<u>Brain Area</u>
Eye (vision)	_____	_____
Ear (hearing)	_____	_____
Nose (smell)	_____	_____
Tongue (taste)	_____	_____
Hands (touch)	_____	_____

8. Look closely at your model. What part of the body does each of these things represent?

Potato _____

String _____

Pencil _____

Lesson 3: Social Studies – Accommodating Differences

Children with autism spectrum disorders experience the world differently. Often these children have a hard time knowing which signals from their senses are important to pay attention to and which can be ignored. For example, to a child with autism, a noisy cafeteria can be overwhelming because there is too much going on. The senses are bombarded with the sounds of cooking, eating and talking, the sights of many people all moving in different directions and the smells of many different types of food being prepared. This can cause the child to become anxious and upset, or to tune out auditory stimuli by covering the ears. A child with autism who does not respond to verbal directions or questions in such a situation is not misbehaving. He or she simply cannot distinguish the sound of one voice from among the many other sensory stimuli.

Distinguishing Sounds

To give students a sense of how difficult it can be for a child with autism to attend to one particular voice when many people are talking, have students try the following exercise. Copy this page and cut out the passages below. Assign a student to read each passage aloud to the class. Give the students time to read the passage over silently for practice.

When they are ready, have the students read their passages aloud to the class simultaneously. After they have finished, ask the class to try to answer the questions that follow. The students should notice that it is very difficult to pick out the details of one story when it is competing for their attention with other auditory stimuli. Now have the same students read each passage aloud one at a time. Ask the class to attempt to answer the questions again. It should be much easier this time!

Passage 1: Clarissa loves pets. She has three dogs and a cat at home. One of her dogs is all white with a pink nose. She also has a small goldfish named Swimmy. Of all of her pets, she likes the cat best.

Passage 2: Rafael visits his grandmother in New Orleans every summer. She loves to cook for Rafael when he comes to visit. She makes corn fritters and the best gumbo in the world! But Rafael likes her apple pie better than anything!

Passage 3: Tom and Joe are brothers who share a room. Their mother says they have too many toys. They always fight over whose turn it is to put away the toys. Their sister thinks they make too much noise when they fight.

Questions:

1. Which pet is Clarissa's favorite?
2. Name two things Rafael's grandmother can cook.
3. What is the name of Joe's brother?

Explain to the students that to someone with autism, every sound seems equally important. That is why a student with autism may not respond to a directive or question when there are other things going on in the room. Some children with autism do not even understand that words are used for communication and may only respond to visual communication methods (signing or pictures). When communicating with a child with autism, it is best to try to establish eye contact first, and then speak directly to the child's face. It is important to keep the classroom as free from distracting sounds and sights as possible.

Work with the students to come up with a set of classroom rules that will make it easier for everyone, not just the child with autism, to attend to a person who is speaking to the whole class. Ask the students to consider the following questions:

1. Why is it important to follow these rules?
2. How are classroom rules like the laws that govern our land?
3. Should there be a separate set of rules or laws for each person or group of people, or is it possible to create a set of laws that can be applied equally to protect everyone's rights?

Extension:

Everyone's brain reacts to stimuli in a unique way. While some people are afraid of dogs and shy away from them, others love dogs and love to play with them. Some kids like watching scary movies or riding roller coasters, while others prefer watching comedies or playing video games. Earl's Garage is a website (link below) that explains how the body and mind react to certain stimuli such as stress, caffeine, eating breakfast, etc.

Allow students to spend some time visiting Earl's garage. Then go around the classroom and have each student describe their personal reaction to a stimulus from the website. Point out contrasts in the way students react to the same stimulus. For example, one student may say, "If I drink a Coke before bed, I can't fall asleep until midnight" while another student may say, "I could drink three Cokes and it would not affect me at all." Different people do, in fact, react differently to caffeine. Help students to understand that everyone has peculiarities in how they perceive and react to the outside world. It is these exceptions to the rule that make the world a more diverse and interesting place to live.

Earl's Virtual Garage:

- <http://cms.clevelandclinic.org/heartbrain/> - click on icon to the right

Lesson 4: Math - Creative Problem Solving

All children are more motivated to learn when the subject they are learning about is one of great interest to them. Children with autism will often make great strides in math or calculation if the lesson is centered on a topic they find fascinating. In fact, math is often an area where children with autism can excel. The following lesson will increase the allure of learning a new math concept or reinforcing a newly learned math skill, while allowing students to educate others about a topic they find interesting.

In this lesson, students work to create math problems that incorporate information about a topic of interest to them. For example, if a student is fascinated by space travel, and the concept currently being covered in the math curriculum is dividing large numbers, the student may want to calculate how long it would take to travel to Mars, given a speed of 18,000 mph and a distance of 54,000,000 miles (3000 hours – how many days is this?). A little research would tell this student that the distance between the Earth and Mars varies depending upon where each planet is in its orbit around the sun. Thus, the distance from Earth to Mars could be as large as 235 million or as small as 48 million. What would be the shortest time it could take to get to Mars? What if a new space ship were developed that could go 25,000 mph? Students can take these calculations as far as they like, practicing their math skills all the while.

Using the attached student worksheet, help students develop a series of math problems to present to the class. Then, use the rubric below to assess student learning. Students who share similar interests may want to work together. At the end of the lesson, the series of math problems could be bound into a book of math exercises that could be used from year to year! Share the results of the project with other classes as well!

Math Create-a-Problem Rubric

Excellent (18 – 20 points): An original math problem was created based on sound facts. Calculations are correct and appropriately written out. A related bonus question is included. The student successfully answered a classmate's math problem.

Good (16 – 18 points): An original math problem was created based on reasonable information. Calculations are correct and appropriately written out. An attempt was made to create a bonus question. The student tried to answer a classmate's problem.

Fair (14 – 16 points): An original math problem was created, but facts may be somewhat questionable, **OR** the calculations are correct, but may not be fully written out. An attempt was made to create a bonus question and to answer a classmate's problem.

Poor (less than 14 points): The math problem was not original or was based on misinformation. Calculations were not correct or were not written out. A bonus question was not included. The student made no attempt to solve a classmate's math problem.

Math is more fun when you get to make up the problems! Today, you can be the teacher. You will design three or more problems related to a topic that interests you. The examples below will help get you started.

1. Topic: Space Travel

Fact 1: Mars is about 48,000,000 miles from Earth

Fact 2: The Space Shuttle travels about 16,000 miles per hour

Question: How long would it take the Space Shuttle to get to Mars from Earth?

Answer: $48,000,000 \text{ miles} \div 16,000 \text{ miles per hour} = 3000 \text{ hours}$

Bonus: How many days is that? ($3000 \text{ hours} \div 24 \text{ hours per day} = 125 \text{ days}$)

2. Topic: Horses

Fact 1: Horses eat a pound of food for every 50 pounds of body weight

Fact 2: Amanda's horse weighs 900 pounds.

Question: How much food should Amanda feed her horse every day?

Answer: $900 \text{ pounds} \div 50 \text{ pounds} = 18 \text{ pounds of food}$

Bonus: If the food costs 4 cents/pound, how much does it cost to feed Amanda's horse for one day? ($18 \text{ pounds} \times 4 \text{ cents per pound} = 72 \text{ cents}$)

Write your topic of interest here: _____

Now write two facts about your topic. You may wish to do some research about your topic first, so that you can be sure your facts are accurate!

Fact 1: _____

Fact 2: _____

Create a question about your topic that requires a mathematical calculation. Then figure out the answer and write it in on the space provided. Be sure to write out the full equation. See if you can come up with a bonus question too!

Question: _____

Answer: _____

Bonus: _____

Trade math problems with a classmate. Can you come up with a super-hard math problem? You can use the back of this sheet to write it out. Can you teach a classmate how to solve it?

EDUCATIONAL STANDARDS MET

LANGUAGE ARTS

Ohio Language Arts Standards:

Communication: Oral and Visual

GRADES K – 2

A, B, C

GRADES 3 - 4

A, G

National Language Arts Standards:

Standard 2: Understanding the human experience

Standard 4: Communication skills

Standard 5: Communication strategies

Standard 12: Applying language skills

FINE ARTS

Ohio Fine Arts Standards: Drama/Theater

Creative Expression and Communication

Analyzing and Responding

Valuing Drama/Theater/Aesthetic Reflection

Connections, Relationships and Applications

GRADES K – 4

A

A, B, C

A, B

A, B

GRADES 5 - 8

A

A, B, C

A, B

A, C

National Fine Arts Standards: Theater, Grades K - 4

Standard 2: Acting by assuming roles and interacting in improvisations

Standard 4: Directing by planning classroom dramatizations

Standard 7: Analyzing and explaining personal preferences and constructing meanings from classroom dramatizations

Grades 5 – 8

Standard 1: Script writing by the creation of improvisations and scripted scenes based on personal experience and heritage, imagination, literature, and history

Standard 2: Acting by developing basic acting skills to portray characters who interact in improvised and scripted scenes

Standard 4: Directing by organizing rehearsals for improvised and scripted scenes

Standard 7: Analyzing, evaluating, and constructing meanings from improvised and scripted scenes and from theatre, film, television, and electronic media productions

SCIENCE

Ohio Science Standards:

Life Sciences

Scientific Ways of Knowing

GRADES K – 2

B, C

B, C

GRADES 3 - 5

B

D

National Science Standards:

Unifying Concepts and Processes

Life Science

Science in Personal & Social Perspectives
History and Nature of Science

GRADES K – 4 and 5-8

Systems, order and organization

Evidence, models and explanation

Form and function

Characteristics of organisms (K-4)

Structure and function in living systems (5-8)

Regulation and behavior (5-8)

Personal health

Science as a human endeavor

SOCIAL STUDIES

Ohio Social Studies Standards:	<u>GRADES K – 2</u>	<u>GRADES 3 - 5</u>
Government	C	B
Citizenship Rights and Responsibilities	A, B	A, B
Social Studies Skills and Methods	D	D

National Social Sciences Standards: GRADES K - 4

What is Government	A, C, E, F
Roles of the Citizen	C, D, E, F

MATHEMATICS

Ohio and National Math Standards:

Standards met will vary depending upon the math problems created by the students. Teachers can influence the standards met by specifying areas of focus for the students. Teachers may choose to use this lesson to reinforce an area of mathematics just recently studied. This lesson also provides an opportunity for students to explore areas of mathematics beyond the planned curriculum and for peer-to-peer teaching. This lesson is particularly useful for fostering growth in the following areas of the National Mathematics Standards:

- Standard 1: Number and Operation
- Standard 2: Patterns, Functions and Algebra
- Standard 6: Problem Solving
- Standard 8: Communication
- Standard 9: Connections