

# **Autism and Autism Spectrum Disorders: Disorders Extending Beyond the “Norm”**

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## **Summary**

Students develop an understanding of autism and autism spectrum disorders (ASDs) by being exposed to and making observations about items that create sensory extremes. Using an inquiry-based discussion, students discover the wide range of defining characteristics of ASDs. Then, students create posters about developmental characteristics that might occur in children with developmental disorders.

## **Learning Outcomes**

- Students will be able to describe six areas of development (e.g., sensory, communication) in which people with ASDs display a range of characteristics.
- Students will understand that people with ASDs possess a wide spectrum of behaviors, so a strict definition of autism is not useful.
- Students will discuss the characteristics of developmental disorders and use information from computers with Internet access to create and present a poster about developmental disorder awareness for a particular age group of children.

## **Materials**

1. Burlap sacks for use as smocks (cut holes for head and arms)
2. Headphones
3. Audiotape with background noise (or music)
4. Sour candy
5. Garlic and onions
6. Blindfolds
7. *Thinking in Pictures* by Temple Grandin
8. The movie *Rain Man*
9. Computers with Internet access
10. Large poster paper
11. Colored pencils, markers, and other art supplies
12. LCD or overhead projector

## **Total Duration**

2 hours, 50 minutes

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## **Procedures**

### **Teacher Preparation**

Prepare the classroom by setting up five stations for the first activity. Station 1 has several burlap sacks with holes cut out for the head and arms. Station 2 has several headphones set up with an audiotape playing a loud noise (e.g., a loud beeping noise). Station 3 has a bowl of very sour candy. Station 4 has a bowl of freshly cut garlic and onions. Station 5 has several blindfolds (the blindfolds are optional; students could cover their eyes instead).

For background information about people with ASDs, refer to the “Autism Information” website from the Centers for Disease Control and Prevention (CDC) (see Web Resources). Familiarize yourself with the book *Thinking in Pictures*, by Temple Grandin, used in Step 4 of the lesson. Download, print, and copy all supplemental documents. Also, prepare the LCD or overhead projector for use.

### **Web Resource**

Title: Autism Information

URL: [www.cdc.gov/ncbddd/dd/aic/about/default.htm](http://www.cdc.gov/ncbddd/dd/aic/about/default.htm)

Description: This CDC website has information about autism and ASDs, including symptoms and prevalence. There are also links to other websites with information about autism.

### **Step 1**

**Duration: 15 minutes**

Distribute the “How Sensitive Are You?” document to the students. Divide students into five groups. Each group will start off at one of the five stations set up around the room. Following instructions from the worksheet, students will complete each sensory task and rate themselves on how sensitive they are to each task. As groups complete their tasks, they will move around the room until they have visited all the stations.

### **Supplemental Document**

Title: How Sensitive Are You?

Description: This is a worksheet for students to rate, on a numbered scale, how sensitive they are for each sensory task. Each item describes what students are required to do to successfully complete each task.

### **Step 2**

**Duration: 15 minutes**

As a preassessment, allow students five minutes to quickly write down any pre-existing knowledge they might have about autism and ASDs. Ask for student volunteers to share their answers with the class, keeping in mind that this might be a sensitive topic for some students. This exercise will give you an idea of what the students already know about autism and allow you point out any misconceptions the students might have about autism. Explain to students that autism is part of a group of disorders known as autistic spectrum disorders or ASDs. People with ASDs display a wide range of behaviors, and it is difficult to describe a “typical” person with autism, but people with ASDs share unusual ways of communicating and interacting with others, and they often have unusual behaviors and interests. Use the “Autism Myths and Facts” website listed below for information about common myths regarding autism. The CDC “Autism Information” website listed below can also provide information for a class discussion about ASDs.

### **Web Resources**

Title: Autism Myths and Facts

URL: [www.scautism.org/myths.html](http://www.scautism.org/myths.html)

Description: This website from the South Carolina Autism Society lists facts about autism and ASDs and describes many myths people have about autism.

Title: Autism Information

URL: [www.cdc.gov/ncbddd/dd/aic/about/default.htm](http://www.cdc.gov/ncbddd/dd/aic/about/default.htm)

Description: This CDC website has information about autism and ASDs, including symptoms and prevalence. There are also links to other websites with information about autism.

### Step 3

**Duration: 15 minutes**

After getting an initial idea of what students know about autism, help the students gain an understanding of the wide range of sensitivities all people possess. Display the “Class Sensitivity Results” supplemental document using an overhead or LCD projector. Quantify the results of the student sensitivity ratings from the introductory activity by asking for students to raise their hands for their respective rating.

Mediate a whole class discussion by asking the students:

- What do you notice about the class sensitivities? Is there a wide range?
- Where do you think people with ASDs would fit onto this spectrum? (Hopefully, students will identify that people with ASDs would fit into all areas of the spectrum including outside the spectrum.)
- How do you think life would be if “normal” sounds sounded like what you listened to at the listening activity station, and “normal” clothes felt like the burlap sack, etc...?

### Step 4

**Duration: 35 minutes**

To show students some examples of how people with ASDs might react to ordinary sensations in a different way, have students read the following excerpts from the book *Thinking in Pictures* by Temple Grandin:

Touch: pp. 65–66

Auditory: pp. 65–74

Visual: p. 74

Smell and Taste: p. 75

Show a short clip from the movie *Rain Man* to gain an insight on the ranges of characteristics that people with ASDs might have.

Ask students the following question: “Now that we know that some people with ASDs might have over- or underactive sensory experiences, what other ranges of characteristics do you think people with ASDs might display?”

Help the students realize that people with ASDs may show symptoms in many areas. Students should identify five more areas. The first three areas listed here are the core symptoms of ASDs.

- Social interactions (ranging from very anti-social to very social, but having inappropriate social interactions)
- Communication (ranging from completely nonverbal to overly talkative, but usually at inappropriate times)
- Behavior (ranging from being highly focused on one thing to being hyperactive)
- Motor (ranging from not coordinated at all to normally coordinated)
- Intelligence (ranging from mentally disabled to very intelligent, usually in a specific area)

### Supplemental Document

Title: Class Sensitivity Results

Description: This chart is used to quantify the class results for each sensitivity test.

**Step 5****Duration: 25 minutes**

Begin a short, whole class discussion about ASDs as a developmental disorder. Questions you could ask the students include:

- Can we define autism? Help the students to create a definition of ASDs as a developmental disorder. The students should get a good idea that ASDs might include several developmental disabilities that share a core of unusual social, communication, and behavioral development.
- What do you think are some warning signs that a baby or young child might have autism or another developmental disorder? Some possible answers could be the child is nonverbal, or the child does not seem to respond to their name by age 7 months. Inform students that early detection is extremely important in helping children with developmental disorders, because the earlier they are detected, the sooner they can get the help and treatment they need.
- What are some ways in which we could inform people of the warning signs of ASDs and other developmental disorders so that they are detected early? Students should come up with examples such as posters, TV commercials, etc.

**Web Resource**

Title: What are the symptoms of ASDs?

URL: [www.cdc.gov/ncbddd/autism/asd\\_symptoms.htm](http://www.cdc.gov/ncbddd/autism/asd_symptoms.htm)

Description: This CDC website has information about the symptoms of ASDs and could be useful in creating a class definition of ASDs.

**Step 6****Duration: 35 minutes**

Divide students into seven groups. Each group will be assigned to a different age group to create a poster that illustrates important developmental milestones in a growing child. The ages are 3 months, 7 months, 1 year, 2 years, 3 years, 4 years, and 5 years. Students will use the CDC “Act Early” website to identify normal child development and warning signs of a disorder for the age group they are assigned. Using this information, students will create a poster. Distribute the “Developmental Milestone Awareness Rubric” to students to help guide them through their poster preparation. Give students at least 30 minutes to work on their posters.

**Web Resource**

Title: Important Developmental Milestones

URL: [www.cdc.gov/ncbddd/autism/actearly](http://www.cdc.gov/ncbddd/autism/actearly)

Description: This CDC website has information about normal development in children at various ages, and it lists signs to watch for that might be indicative of a developmental disorder.

**Supplemental Document**

Title: Developmental Milestone Awareness Rubric

Description: This is a detailed rubric that contains evaluation criteria for the group poster. It could be used to guide students in creating their poster and for teacher grading.

**Conclusion****Duration: 30 minutes**

Have students demonstrate what they have learned about people with ASDs. Each group will present its developmental poster to the rest of the class. Use the “Developmental Milestone Awareness Rubric” included in Step 6 to grade the poster and presentation. Posters could be displayed around the room, school, or community.

## Assessment

In Steps 3, 4, and 5, students are formatively assessed based on responses given during the class discussion about ASDs.

In Step 6, students created a poster about awareness of developmental disorders for children at various ages. The posters are assessed using the “Developmental Milestone Awareness Rubric” found in Step 6.

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## Modifications

### **Extension**

Have students read a journal article about Einstein and Newton that suggests they possessed autistic characteristics. They will then research a historical or famous figure who they believe might have possessed characteristics indicative of a developmental disorder, including autism. Students will write a one- to two-page paper about their historical figure using the questions listed on the “Autism Prevalence Rubric.” This rubric will help to guide students during the writing process.

### **Learning Outcomes**

- Students will identify autistic characteristics among people who have made significant contributions in society.
- Students will realize the impact these characteristics have played in society.

### **Web Resource**

Title: Einstein and Newton showed signs of autism

URL: [www.newscientist.com/article.ns?id=dn3676](http://www.newscientist.com/article.ns?id=dn3676)

Description: This journal article, from NewScientist website, suggests that Albert Einstein and Sir Isaac Newton might have showed signs of autism.

### **Supplemental Document**

Title: Autism Prevalence

Description: This is a detailed rubric about what should be included in students’ papers about a historical figure that possesses autistic characteristics.

### **Additional Modification**

Students can be assigned to read the entire Temple Grandin book. Students can be formatively assessed based on whole class or small group discussions. A summative assessment for this activity could be for students to keep a journal about what they have learned and how their thoughts have changed since before reading the book.

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## Education Standards

### **National Science Education Standards**

SCIENCE AS INQUIRY, CONTENT STANDARD A:

As a result of activities in grades 9–12, all students should develop

- **Abilities necessary to do scientific inquiry**
- Understandings about scientific inquiry

LIFE SCIENCE, CONTENT STANDARD C:

As a result of their activities in grades 9–12, all students should develop understanding of

- The cell
- Molecular basis of heredity
- Biological evolution
- Interdependence of organisms
- Matter, energy, and organization in living systems
- **Behavior of organisms**

SCIENCE IN PERSONAL AND SOCIAL PERSPECTIVES, CONTENT STANDARD F:

As a result of activities in grades 9–12, all students should develop understanding of

- **Personal and community health**
- Population growth
- Natural resources
- Environmental quality
- Natural and human-induced hazards
- Science and technology in local, national, and global challenges

## How Sensitive Are You?

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Kelly Day, CDC's 2005 Science Ambassador Program

**Station 1:** Try on one of the burlap sacks provided. Walk around the room. On a scale of 1–5 (1 being the most uncomfortable, and 5 being comfortable), rate how you felt wearing the burlap sack.

My rating: \_\_\_\_\_

**Station 2:** Put on a pair of headphones and turn on the tape player. For the next minute, try to have a conversation with another student. On a scale of 1–5 (1 being "extremely difficult to concentrate on the conversation" and 5 being "no difficulty concentrating on the conversation"), rate how you felt during the conversation.

My rating: \_\_\_\_\_

**Station 3:** Suck on a piece of sour candy for the next few minutes. On a scale of 1–5 (1 being "so sensitive you had to spit it out," and 5 being "you tasted little to no flavor at all"), rate yourself on how sensitive you were to the taste of the candy.

My rating: \_\_\_\_\_

**Station 4:** Sit at the station with the cut up garlic and onions. Make sure to breathe in the odors coming from the dish. On a scale of 1–5 (1 being "you had tears coming from your eyes," and 5 being "the smell didn't bother you at all"), rate yourself on how sensitive you were to the smell.

My rating: \_\_\_\_\_

**Station 5:** Sit at this station and put on a blindfold. Count to 60 seconds and take the blindfold off. When you take off the blindfold, try not to blink for 30 seconds. On a scale of 1–5 (1 being "you had to rub your eyes, and your eyes started to tear up," and 5 being "you felt no discomfort at all"), rate yourself on how sensitive your eyes were to the light.

My rating: \_\_\_\_\_

### Class Sensitivity Results

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Tally up the class sensitivity results. Add up the number of students who responded to each sensitivity station for each corresponding sensitivity rating.

	<b>Touch</b>	<b>Hear</b>	<b>Taste</b>	<b>Smell</b>	<b>See</b>
	<b>Station 1</b>	<b>Station 2</b>	<b>Station 3</b>	<b>Station 4</b>	<b>Station 5</b>
<b>1 Extremely Sensitive</b>					
<b>2 Very Sensitive</b>					
<b>3 Somewhat Sensitive</b>					
<b>4 A Little Sensitive</b>					
<b>5 Not At All Sensitive</b>					

**Developmental Milestone Awareness Poster Rubric**

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<b>Criteria</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>
<b>Typical Developmental Milestones</b>	Students included at least 10 typical developmental milestones for their assigned age group. Typical milestones are indicative of at least three areas of development (social and emotional, visual, movement, etc...)	Students included at least 10 typical developmental milestones for their assigned age group. Typical milestones are indicative of only two areas of development.	Students included less than 10 typical milestones for their assigned age group. Typical milestones are indicative of only one or two areas of development.	Students included less than 10 typical milestones for their assigned age group. Typical milestones are not indicative of any of the areas of development.
<b>Developmental Warning Signs</b>	Students included at least six warning signs that might be indicative of a developmental disorder for their assigned age group. Warning signs are indicative of at least three areas of development.	Students included at least six warning signs that might be indicative of a developmental disorder for their assigned age group. Warning signs are indicative of only two areas of development.	Students included at least six warning signs that might be indicative of a developmental disorder for their assigned age group. Warning signs are indicative of only one or two areas of development.	Students included less than six warning signs that might be indicative of a developmental disorder for their assigned age group. Warning signs are not indicative of any of the areas of development.
<b>Poster Design</b> -Organized -Neat -Creative -Easy to Read	Poster included all four components.	Poster included three of the components.	Poster included two of the components.	Poster included one or none of the components.

### Autism Prevalence Rubric

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Criteria	4	3	2	1
<b>Who is the person? What is he or she famous for? When and where did he or she live?</b>	All four questions were answered.	Three questions were answered.	Two questions were answered.	One question was answered.
<b>What special characteristic(s) does this person possess? How does this characteristic relate to having a developmental disorder such as autism?</b>	Characteristic is well-defined, and the connection of the characteristic to a developmental disorder is explained well and is correct.	Characteristic is well-defined, but the connection of the characteristic to a developmental disorder is unclear.	Characteristic is partially defined. The connection of the characteristic to a developmental disorder is unclear.	Characteristic is not defined at all. There is no connection of the characteristic to a developmental disorder.
<b>Imagine the world without the contributions this person has made. How different would it be if this person had not been able to work to his or her full potential?</b>	Thoughtful and meaningful response making clear the impact (either positive or negative) the person has had on the world.	Response is somewhat thought-out. Impact person had on world is clearly defined.	Response is not well thought-out. Impact person had on world is not very clear.	Little or no thought put into response, or response completely absent.
<b>What are the references? At least two different references in proper bibliographic format.</b>	At least two references are present and in the proper format. At least one reference is not an Internet resource.	At least two references are present and in the proper format. Both references are Internet resources.	At least two references are present, but the format is incorrect. Both references are Internet resources.	Only one reference is present, and the format is incorrect.