

## Lesson 4 for Grades 6–8

# Understanding Learning Differences

## Rationale

The purpose of this lesson is to increase understanding about learning differences and empathy for people who have them. Experts estimate that 6 to 10 percent of the school-aged population and nearly 40 percent of the children enrolled in the nation's special education classes have a learning disability; yet most students don't understand what learning disabilities are and those who learn differently frequently bear the stigma of being thought of as "slow," lazy, or "weird." During this lesson, students explore their own learning styles as the basis for understanding learning differences. Through simple brain research and articles, students learn the facts about learning differences, and through experiential exercises and personal testimony, students develop an appreciation for others with learning disabilities. The lesson concludes with a brief look at prominent historical and contemporary figures with learning differences and multiple intelligence theory in order to encourage an appreciation for brain diversity and emphasize the broad continuum of strengths and talents inherent in human beings.

**[NOTE:** In advance of teaching this lesson, consider whether you have any students in your class who have a disability, whether it is a visible physical disability or a learning disability which is often invisible. Sometimes students feel relieved to discuss a topic so relevant to their lives while others might feel awkward or embarrassed. This does not mean you should not discuss the topic; however, be careful not to highlight their situations, put them on the spot or use them as an example of a person with a disability. Be aware that strong feelings could arise and plan in advance for how to handle it. Also, consider talking with the students or their parents in advance. In order to appropriately define language and guide student discussion on disability issues, it is recommended that teachers carefully read ADL's resource sheets on disability prior to facilitating lesson with students.]

See the following resources for further reference:

- [Evaluating Children's Books that Address Disability](#)
- [Disability Glossary](#)
- [Communication Guidelines Relating to Ability](#)
- [Suggested Language for People with Disabilities](#)

## Objectives

- ➔ Students will receive information about learning styles and identify their own dominant learning styles.
- ➔ Students will discover what learning disabilities are, how they are caused, and how they impact individuals.
- ➔ Students will experience various learning tasks that will increase their understanding of learning disabilities and their empathy for those who have them.
- ➔ Students will learn about successful people with learning disabilities and understand the idea of multiple intelligence.

## Time

2–2½ hours or 3–4 class periods (if less time is available, conduct only Parts II and III, which can be completed in 50–90 minutes or 2 class periods)

## Key Words

Attention deficit hyperactivity disorder (ADHD)  
 Auditory  
 Brain diversity  
 Brain scan  
 Compensate  
 Confidence  
 Decode  
 Dominant  
 Dysgraphia  
 Dyslexia  
 Dysnumeria  
 Empathy  
 Genetic  
 Heredity  
 Individualized Education Program (IEP)  
 Interpersonal  
 Intrapersonal  
 Kinesthetic  
 Linguistic  
 Metaphor  
 Learning difference  
 Learning disability  
 Learning style  
 Multiple intelligence  
 Phoneme  
 Phonics  
 Remedial  
 Resource Room  
 Self-esteem  
 Spatial  
 Verbal  
 Visual

## Requirements

### Handouts and Resources:

- [Learning Styles Questionnaire](#) (one for each student)
- [What is Your Dominant Learning Style?](#) (one for each student)
- [Mystery Photo](#) (one for each student)
- [Brain Scans](#) (one for each student)
- [“Learning Disabilities”](#) (KidsHealth, October 2013, one for each student)
- [Matt’s Story](#) (one for each student)
- [My Struggle](#) (for teacher use)
- [Writing Activity: The Mechanics of Composing](#), [Decoding Activity: Recognizing Phonemes](#) or [Sequence Activity: Multistep Problems](#) (one for each student)
- [Who Am I?](#) (one for each student)
- [“Learning Disabilities and Disorders,”](#) (HelpGuide.org, for teacher use)
- [Multiple Intelligences](#) (one for each student)

### Other Material:

- chart paper, markers, overhead or LCD projector, small hand mirrors (optional)

## Advanced Preparation

- Reproduce handouts as directed above.
- Depending on which activity you choose to conduct, make enough copies of [Writing Activity: The Mechanics of Composing](#), [Decoding Activity: Recognizing Phonemes](#) or [Sequence Activity: Multistep Problems](#) for each student (see Part III #2).
  - For *Writing Activity: The Mechanics of Composing*, students will need a mirror for this exercise. Small mirrors can probably be borrowed from the science department and students can work in pairs or small groups if it is necessary to share mirrors.)
  - For *Decoding Activity: Recognizing Phonemes*, fold back along the dotted line and tape, hiding the passage translation until after students have completed the exercise.
  - For *Sequence Activity: Multistep Problems*, fold back along the dotted line and tape, hiding the answer key until after students have completed the exercise.

## Techniques and Skills

analyzing visual images, brainstorming, cooperative group work, critical thinking, forming opinions, interpreting personal testimony, large and small group discussion, reading skills, writing skills

## Procedures

### Part I: Learning Styles

1. Prior to the lesson, make the following preparations:
  - a. Prepare three sheets of chart paper and title them “Visual,” “Auditory,” and “Kinesthetic.” Divide each sheet into three columns and label them “Studying for a test,” “Learning a new game,” and “Finding a new place.”
  - b. Photocopy a class set of the following handouts back-to-back: [Learning Styles Questionnaire](#) and [What is Your Dominant Learning Style?](#)
2. Begin the lesson by telling students that you are going to administer a quiz, but not to worry—it is the kind with no right or wrong answers; in fact, they won’t even have to hand it in. Tell students that the survey will help them to explore the style of learning that is most effective for them. Distribute the [Learning Styles Questionnaire](#) and give students 5–10 minutes to fill it out.

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**NOTE:** Direct students to look only at the questionnaire and not to read the information on the back of the sheet.

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3. While students are working, post the three sheets of chart paper (“Visual,” “Auditory,” and “Kinesthetic”) in different parts of the room. When students have completed tallying their responses at the bottom of the questionnaire, instruct them to turn their pages over and read, [What is Your Dominant Learning Style?](#) Then direct students to move to the sheet of chart paper that reflects their dominant learning style (according to the questionnaire) and select a recorder for each group.

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**NOTE:** If dividing students into three large groups presents management difficulties, consider creating two groups for each learning style (six groups in all) or facilitating the following discussion as a whole class.

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4. Ask each group to discuss how they would typically approach each of the learning tasks listed on the chart paper and what strategies for taking in new information usually work best for them. As the group brainstorms, the recorder should list responses. For example, the “Visual” group might list the following responses:

**Studying for a test**

- Reading notes
- Creating charts, diagrams
- Creating pictures in my mind to help me remember facts

**Learning a new game**

- Looking at diagrams and instructions
- Watching others play
- Watching a video or TV

**Finding a new place**

- Reading or drawing a map
- Having someone show me the route
- Using landmarks to remember the way

5. Bring the whole class back together and allow each group approximately two minutes to share their responses. Use one or more of the following questions to process the activity:
- How were the results of the questionnaire consistent or inconsistent with your own ideas about the way you learn best?
  - Did you discover anything new about your learning style? What did you learn?
  - Will the questionnaire change the way that you approach new tasks? If so, how?
  - Why do you suppose that different people learn in different ways?
  - Do you think it would be better/easier if everyone learned in the same way? Why or why not?
  - Is one style of learning better than another? Why or why not?

## Part II: Understanding Learning Differences

1. Remind students that the learning styles questionnaire taken earlier highlighted our different ways of thinking and our various learning strengths and weaknesses. Point out that we all have different ways of learning, but that most of us are able to get by pretty well in school and in other learning situations. Suggest that some people’s learning differences are more severe and impact their ability to read, write, speak, and perform other tasks that are expected of them in school and other learning situations. Tell students that when learning differences are this serious, they are often referred to as *learning disabilities*.
2. Write the term, LEARNING DISABILITIES, in the center of a sheet of chart paper. Ask students to share what they know about learning disabilities (definitions, types, what they have learned from their own experiences or heard from others, etc.) Write all of the students’ responses at the end of spokes emanating from the center. Do not discuss or edit the responses at this time—simply write them down verbatim. Allow approximately five minutes for this webbing exercise.
3. Tell students that you are going to display a [Mystery Photo](#). Project the image (using an LCD projector or smartboard) and challenge students to guess what it is. After a few guesses, tell students that it is a picture of an adult brain and that the red segments represent areas that were active while a study subject performed a reading task. Project [Brain Scans](#) and explain to students that a team of medical researchers at Georgetown University scanned the brains of 38 adults while performing reading tasks, and that half of these people have dyslexia (a learning disability that makes learning to read difficult). Point out that the brain images reveal different regions of activation in people with and without dyslexia. Ask students what they think researchers learned from this.
4. Explain to students that researchers believe that dyslexia and other learning disabilities occur because of the way the brain is formed and the way it processes the information it receives. Emphasize that people with learning disabilities are not less intelligent than others, but that their brains may actually be “wired” differently. Explain that for this reason, many

people prefer the term learning *difference* (able to learn in different ways) over learning *disability* (not able to learn). Though both terms are acceptable, encourage students to try and use the term *learning difference* in the future.

5. Return to the web created earlier around the term, LEARNING DISABILITIES. If students already noted brain or information processing differences, affirm their insight; otherwise, add this information to the web. If students included references to limited intelligence, cross them out and ask if there are any other ideas that need to be rethought (e.g., people with learning disabilities are lazy, unmotivated, careless, etc.) Encourage students to return to the web as the lesson proceeds in order to correct misconceptions and to add new information that they learn.
6. Distribute the articles, [Learning Disabilities](#) and [Matt's Story](#). These articles can be read together in class or assigned as homework in order to increase students' understanding about what learning disabilities are, what causes them, and how they impact students' lives.

### Part III: Building Empathy for People with Learning Differences

1. Ask for a volunteer to read aloud [My Struggle](#) aloud. Tell students that it was written by a 9th grade boy with learning differences. Allow students a few moments to silently reflect on this piece of writing. Ask them to think about one of the following metaphors and to discuss with a partner why Matt may have evoked this imagery to describe his school experience:
  - a. tremendous, rocky mountain
  - c. steep cliffs and jagged, slippery rocks
  - d. grey and covered in dark, murky, cold clouds
  - e. strong, howling, icy winds [that] contain frigid rain

Allow a few students to share their thoughts with the whole class.

2. Tell students that, unlike physical disabilities, learning differences are usually invisible to us and it may therefore be harder to understand and empathize with the struggles of students like Matt. Lead students through one or more of the exercises below, which will help them to reflect on what it might feel like to have a learning difference. Depending upon the time available and the maturity of your students, these exercises can be facilitated by the teacher with the whole class at once or experienced autonomously by students in pairs or small groups.
  - [Writing Activity: The Mechanics of Composing](#)
  - [Decoding Activity: Recognizing Phonemes](#)
  - [Sequence Activity: Multistep Problems](#)
3. After students have experienced at least one of the exercises above, one or more of the following questions can be used to process their thoughts either through discussion or reflective writing:
  - a. How did it feel as you tried to accomplish the task?
  - b. How did time pressures or demands from the teacher/peers affect your ability to complete the task?
  - c. How do you think you would feel if this were not just an exercise, but a consistent experience with school work?
  - d. If you had a learning difference, how do you think it might impact your success at school, your self-esteem, and your relationships with others?
  - e. Do you sometimes assume that a student with learning differences is lazy or "stupid"? Do you feel any differently now?
  - f. Have you ever teased or excluded someone because of a learning difference? What might you do differently in the future?

### Part IV: Multiple Intelligence

1. Distribute the [Who Am I?](#) handout to each student. Tell students that this handout contains brief biographies of successful people (living and dead) with learning differences. Post the names of the figures in the front of the room and challenge students to match them with each biography.

Answer Key: 1. Tommy Hilfiger; 2. Richard Branson; 3. Ann Bancroft; 4. Pablo Picasso ; 5. Tom Cruise; 6. Leonard Da Vinci; 7. Thomas Edison; 8. Whoopi Goldberg; 9. Patricia Polacco

2. Ask students if they were surprised to find any particular names among this list of people with learning differences. Ask if they noticed any commonalities among the profiles. Highlight that most of these individuals had very negative school experiences and were labeled by others as unintelligent and incapable; that many of the people in their lives were not able to see past their learning differences and appreciate their talents. Pose the following question:

- Is a learning difference a problem with the individual, or a problem with the people and society around him/her?

3. Suggest to students that it is important to address the issue of learning differences at both levels. Read aloud or paraphrase the following information from the article, "[Learning Disabilities: Types, Symptoms, Diagnosis, and Causes](#)":

"Students with learning differences will have difficulty in school, so they must get help to find other ways to learn. [At the same time,] American society does not provide enough educational opportunities for people who learn differently."

"Educational institutions can serve more people if they change to meet the needs of more types of learners. Dr. Mel Levine of the All Kinds of Minds Institute says that many children have brains that are wired differently...and so they learn differently. The problem is that standard schooling tends to assume that one kind of teaching will work for all kinds of students...In the best of all worlds, Levine would like educators to discover how each child learns best and what the individual's strengths are...Every child can be successful in learning and in life, if someone just discovers and teaches to those strengths."

4. Tell students that a well-known psychologist named Howard Gardner has come up with a way to describe our different strengths and the different ways in which we learn. Distribute the handout, [Multiple Intelligences](#), to each student and review it together as a class. Point out that although school most often focuses on verbal and mathematical intelligence, there are many other ways of being smart and successful.
5. Ask students to discuss with a partner which types of intelligence are exhibited by the figures in the [Who Am I?](#) activity from earlier. Ask them to discuss where they see themselves on this continuum of intelligence and what kinds of aspirations they have for the future that might capitalize on their strengths and talents?
6. Conclude the lesson by reminding students to be open-minded and respectful of people with learning differences, and to appreciate "brain diversity" just as they would racial, ethnic, or religious diversity. Leave students with the following food for thought from Dr. Gordon F. Sherman, an expert on learning differences:

"... brain diversity may benefit our species. History and science tell us environments inevitably change. Who knows what kinds of minds our species may need in the future? [Are learning differences] a biological mishap [or] nature's design?"

### Extension Activity

Follow up on the above exploration by reading aloud or assigning a book to students that addresses learning differences. Have students do reflective writing, develop book or research reports, read aloud to younger students, or engage in other projects that will deepen their understanding about learning differences. The following resources will help you to select appropriate titles:

- [ADL's Children's Literature on Disabilities](#)
- [Evaluating Children's Books that Address Disability](#)
- [Web Links for Educators and Families About Learning Differences and Disabilities](#)

# Learning Styles Questionnaire

Name: \_\_\_\_\_

**Directions:** Check the items below that are true for you. You may check as many or as few as apply. Then, answer the three questions below.

- It's easier for me to remember names than faces.
- I create pictures in my mind to remember names.
- I remember events better than names and faces.
- I buy clothes for comfort more than appearance.
- I buy clothes for appearance more than comfort.
- I prefer to stop and ask for directions when finding my way in a new place.
- I prefer reading a map when finding my way in a new place.
- I like physically active games.
- I enjoy crossword puzzles.
- I remember a zip code or phone number by saying it aloud.
- I use my free time for physical activities.
- I prefer newspaper over radio for keeping up with news and current events.
- I prefer radio over newspaper for keeping up with news and current events.
- I spend a lot of my free time on arts, crafts, model-making, or mechanics.
- I like reading and writing games like scrabble or crossword puzzles.
- I prefer talking and listening games.
- I'm quick in learning a new physical skill.
- I'm an enthusiastic book reader.
- I enjoy talking on the phone in my free time.
- I prefer spoken directions when learning a new task.
- I follow written recipes easily when cooking.
- I tend to doodle and draw.
- I'm an outdoor person.
- I like to keep written records of things, such as a diary, journal, log book, etc.
- I like to build, construct, and fix things.
- I prefer listening to a CD over reading the same material.
- When bored, I hum, sing, or engage others in conversation.

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## Count up your responses

1. How many of the visual items did you check (*Numbers 2, 5, 7, 9, 12, 15, 18, 21, 24*)? \_\_\_\_\_
2. How many of the auditory items did you check (*Numbers 1, 6, 10, 11, 13, 16, 19, 20, 26, 27*)? \_\_\_\_\_
3. How many of the kinesthetic items did you check (*Numbers 3, 4, 8, 14, 17, 22, 23, 25*)? \_\_\_\_\_

# What is Your Dominant Learning Style?

Learning styles are simply different ways of learning. Most learners use a combination of *visual*, *auditory*, and *kinesthetic* ways of receiving information. However, one or more of these styles is usually dominant. This dominant style defines the best way for a person to learn new information. This style may not always be the same for all tasks. Learners may prefer one style of learning for one task, and a combination of others for another task.

## Visual learners

Visual learners learn best by seeing. They may need to see the teacher's body language and facial expression to fully understand the content of a lesson. They tend to prefer sitting at the front of the classroom to avoid visual barriers (e.g. people's heads). They may think in pictures and learn best from visual displays including: diagrams, illustrated text books, overhead transparencies, videos/DVDs, charts and hand-outs. During a lecture or classroom discussion, visual learners often prefer to take detailed notes to absorb the information. Visual learners may find something to watch if they are bored.

## Auditory learners

Auditory learners learn best through listening—lectures, discussions, talking things through and listening to what others have to say. Auditory learners focus in on tone of voice, pitch, speed and other aspects of verbal presentations. Written information may have little meaning until it is heard. These learners prefer to sit where they can hear, but may not pay attention to what is happening up front. They may hum or talk to themselves or others when bored. Auditory learners often benefit from reading text aloud and using a tape recorder.

## Kinesthetic/Tactile learners

Kinesthetic learners learn best through moving, doing and touching. They prefer a hands-on approach, actively exploring the physical world around them, and enjoy activities such as cooking, construction, and art. They communicate by touching and appreciate physical encouragement from others (such as a pat on the back). Kinesthetic learners remember what was done, but may have difficulty recalling what was said or seen. They may find it hard to sit still for long periods and may become distracted by their need for activity and exploration. Kinesthetic learners often need to take frequent breaks and may tinker or move around when bored. They may benefit from sitting near the door or someplace that allows them to easily get up and move around.

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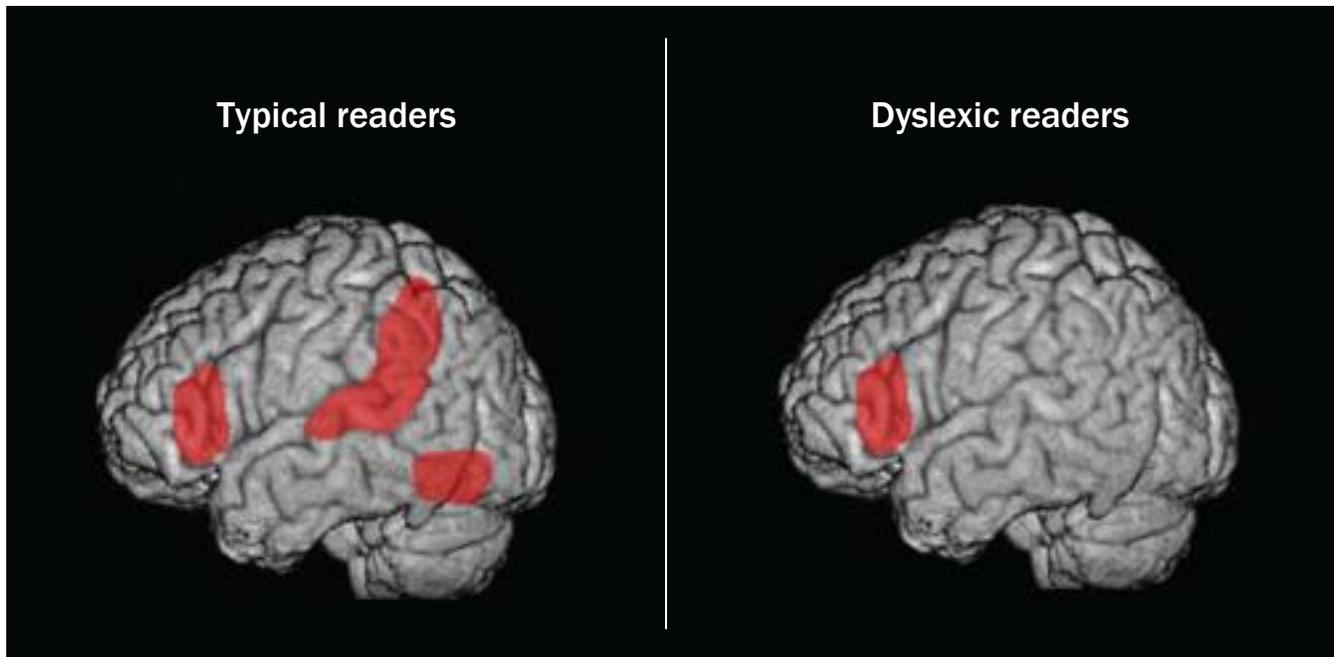
Source: LdPride, "Learning Styles and Multiple Intelligence," [www.ldpride.net](http://www.ldpride.net).

## Mystery Photo



*Image courtesy of Society for Neuroscience and Guinevere Eden*

## Brain Scans



*Image courtesy of Society for Neuroscience and Guinevere Eden*

A team at Georgetown University Medical Center in Washington, D.C. scanned the brains of 38 adults, half of whom had dyslexia—a learning disability that makes learning to read difficult and which experts estimate affects up to 17% of people in the U.S. While being imaged, participants performed tasks that required the ability to interpret the sounds, or the phonics, of language. The brain images reveal different regions of activation (red) in people with and without dyslexia.

The fact that dyslexia affects smart people (Albert Einstein was dyslexic!) once puzzled scientists. Many figured that their reading problems must be due to laziness. Brain pictures like the one above, however, have helped scientists to understand that dyslexia is about biology, not motivation.

Research shows that people with dyslexia use the brain regions that process written language differently than others. When most readers are asked to pronounce the word “bus” without the “b” sound, for example, they easily say “us,” and the brain pictures show their brains lighting up like pinball machines. The brains of people who can’t sound out words, however, show less blood flow to the brain’s language centers and less activity overall. Researchers are not sure what causes this problem, but without the ability to sound out words, the brain is stumped.

Some researchers have found that people with dyslexia can make up for the inactivity in the language part of their brain by using other areas, such as the region linked with spoken language in the front part of the brain. For example, people with dyslexia who say the words they are reading under their breath may be relying on this area to get through a passage of text.

Brain imaging technology and other research has helped scientists to understand that learning disabilities occur naturally in many people, and has enabled them to create better ways of diagnosing and treating the people who have them.

# Matt's Story

What is dyslexia? That question is part of the problem of having dyslexia—many people don't even believe it exists. And those who do accept its existence think it is only reading backwards. Dyslexia is a number of things. In education it is officially called specific language disability. For people who have not been diagnosed it is sometimes called laziness or lack of concentration. For me it means a difference in the way my brain learns and recalls information, not only that sometimes letters and numbers get jumbled or that I have a hard time remembering if the symbol I'm looking at is a 7 or 9, a g or a j, or a lot of other things you'd never believe.

For me, it started early. Kindergarten was good enough until we got to numbers and letters and, of course, remembering what they were. First grade was worse, and by second grade I was falling farther behind. That was the first of many summers I would spend inside, or at clinic, working instead of playing. By third grade I was identified as learning disabled and began to go to the Resource Room for part of the day.

I never really felt different from everyone else though sometimes I felt slow, dumb, humiliated, and very frustrated. I knew what I wanted to do, where I wanted to go, but I just couldn't get there. One of the biggest struggles was to understand that I was a little different and that was OK.

When you have a hidden disability you become a "con artist." You learn to think, you find ways to get around things. Now that by itself isn't so much of a con as a survival skill, but the way you do it and why you do it is important. For instance, one of the things that has always gotten to me is the labels they put on public restrooms, not just "Ladies" and "Men" but also "Lads" and "Lasses," "Dame" and "Herren," you name it. You have to develop the skill and the attitude to know that there is more than one way to learn something or enter a door and sometimes you just have to learn to wait a minute, look at the situation, and maybe see who's going and coming.

Luckily for me I've had some very special teachers, understanding, creative, skilled, and caring. This doesn't stop the nerves and panic whenever I start a new class with a new teacher. What will their expectations be? Will they understand my disability? Will they be willing to help me—giving me time I need, or understanding that sometimes I do things in a different way, or that no matter how hard I try sometimes I still fail? It's pretty stressful until I get to know them and see how they react to my disability. But it has also taught me a lot of things I'll need to know later on in college. Some things, like "reading" a teacher, understanding their likes and dislikes and attitudes, are skills that my classmates are only starting to learn about. It's taught me how to communicate better, something I'm still working on, but it's very important for me to do.

It's very hard to keep a healthy mental attitude. If a person hasn't been identified it can lead to loss of self-esteem and eventually in many cases to jail. But even those of us who have been diagnosed have problems. This is a hidden disability and we have to deal not only with our own feelings but also with people who don't understand and resort to verbal abuse, or make things more difficult. One example I can think of was when I applied for my first job last year. Even though I'd had my mother help me complete the forms at home, the secretary still wasn't satisfied. When I asked her to slow down and explain a little more because I was dyslexic, she became very sarcastic and asked if I was able to at least sign my name. I got over that, but it makes me concerned about how things will be in the future. It's hard to be confident about my abilities.

Perhaps that is the most important thing for dyslexics to remember, to be confident. Confident that they are intelligent and capable of doing anything they want to do. They may have to do it differently, maybe get a little help, work longer, and harder, but they can do it.

—Matt, Age 16, Ventura, CA

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Reprinted with permission from Yuri Morita, *Take A Walk In My Shoes: Guide Book for Youth on Diversity Awareness Activities* (CA: Office of Affirmative Action, Division of Agriculture & National Resources, University of California, 1996).

# My Struggle

School has been and still is something that I dread profusely. Going to school has been like climbing up a tremendous, rocky mountain with steep cliffs and jagged, slippery rocks. This mountain is very grey and always covered in dark, murky, cold clouds. I step forth to take on this task of climbing this huge mountain. Each step is a battle against strong, howling, icy winds. The winds contain frigid rain that slams against my body, trying to push me down. I keep battling my way up. Sometimes I am knocked down, and sometimes I have to stop to regain my strength. My body is numb. My hands shake like leaves in the wind as I claw myself up the mountainside. Not being able to open my eyes, I blindly claw myself up the steep cliff. I stop because I am in such great pain. I look up and see that my struggle has hardly begun. Sometimes I just do not want to go on any further.

—Matt, Grade 9, Boston, MA, October 2003

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Source: *LD Online KidZone Magazine*, [www.ldonline.org](http://www.ldonline.org)

# Writing Activity: The Mechanics of Composing

Dysgraphia is a learning disability that makes it difficult to automatically remember the movements needed to write letters or numbers. It can interfere with communication of ideas through writing by causing poor handwriting, random punctuation, spelling errors, irregular letter sizes and shapes, letter and number reversals, disordered numbering, mixture of upper/lower case letters or print/cursive letters, unfinished words or letters, and slow copying and writing. Students with dysgraphia are often misunderstood as lazy, careless, unmotivated, or “slow” when in fact they may not have control over the motor functions needed to write clearly. These students may experience high levels of frustration when they are unable to translate ideas that they can easily think and speak about on to the written page. As a result, teachers and others often have an incomplete understanding of what these students know.

The following activity may help you to understand the frustration that a student with a writing disability feels.

1. Take out a pencil and a piece of paper.
2. Have a partner hold up a mirror.
3. Put the paper against your forehead.
4. Looking into the mirror, write the word good.
5. Look at the word. Did you write it correctly?
6. Try again.

Now pretend that the teacher is standing next to you. “Hurry up!,” she says. “Everyone else is finished!” No matter how smart you are or how hard you are trying, you can’t do it right. Think of your brain as a giant computer. Like a machine, it sometimes has bad connections. A short circuit comes if the brain gets “overloaded.” It gets overloaded when too many messages come in at once from your eyes, ears, nose, and fingers. These messages get confused. You wish you had a fine tuning knob behind your ear to bring things back into focus. For learning disabled children, this “brain scramble” shows up in many ways. It shows in thinking, reading, writing and talking. You can imagine how frustrating it is to read, write, and talk with “brain scramble.” No wonder some learning disabled kids think that they are stupid or crazy.

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Adapted and reprinted by permission from Caroline Janover, *JOSH: A Boy With Dyslexia* (Bloomington: iUniverse, Inc., 2004).

# Decoding Activity: Recognizing Phonemes

**Phonemes** are the building blocks of language. Represented by letters of the alphabet, they are the component sounds of spoken words. Most people automatically hear, for example, that the word “goat” is made up of three sounds: “guh,” “oh,” and “tuh.”

Reading requires the ability to map the phonemes we hear to letters on a page, and vice versa. But what happens when this basic skill, called decoding, doesn't come automatically? Imagine struggling to sound out every word because you can't distinguish among phonemes.

## Activity

Take a few moments to familiarize yourself with this phoneme translation key. Then use it to read the passage that follows aloud to yourself or to a roomful of your peers.

### Phoneme translation key:

When you see:	Pronounce as:
q	d or t
z	m
p	b
b	p
ys	er
a, as in bat	e, as in pet
e, as in pet	a, as in bat

### Passage:

We begin our qrib eq a faziliar blace, a poqy like yours enq zine. Iq conqains a hunqraq qrillion calls qheq work qogaqhys py qasign. Enq wiqh in each one of qhese zany calls, each one qheq hes QNA, Qhe QNA coqe is axecqly qhe saze, a zess-broquceq rasuze. So qhe coqe in each call is iqanqical, a razarkaple puq veliq claiz. Qhis zeans qheq qhe calls are nearly alike, puq noq axecqly qhe saze. Qake, for insqence, qhe calls of qhe inqasqines; qheq qhey're viqal is cysqainly blain. Now qhink apouq qhe way you woulq qhink if qhose calls wyse qhe calls in your prain.

### Passage translation:

We begin our trip at a familiar place, a body like yours and mine. It contains a hundred trillion cells that work together by design. And within each one of these many cells, each one that has DNA, The DNA code is exactly the same, a mass-produced resume. So the code in each cell is identical, a remarkable but valid claim. This means that the cells are nearly alike, but not exactly the same. Take, for instance, the cells of the intestines; that they're vital is certainly plain. Now think about the way you would think if those cells were the cells in your brain.

—Excerpted from “[Journey into DNA](#),” NOVA Online

**So how did you do? Assuming you found the exercise difficult (that was our intention), consider that we disguised only eight of the forty-four known phonemes in the English language. And imagine if this weren't a game.**

Source: *Misunderstood Minds* at [www.pbs.org/wgbh/misunderstoodminds](http://www.pbs.org/wgbh/misunderstoodminds)

# Sequence Activity: Multistep Problems

Many students with math disabilities find complex, multistep math problems particularly difficult. Even children who did well in their early school years—easily learning basic arithmetic and math facts—may reach fourth grade and suddenly find math next to impossible.

Integration is an important part of school mathematics from the fourth grade on. The ability to perform multiple operations in the proper sequence (for instance, adding as well as multiplying in a long multiplication problem) or to hold on to one piece of information while remembering another is critical to a child's success in mathematics.

## Activity

The problem set below is designed to evoke in you the intimidation and frustration a young student with a math disability might feel working out a problem that requires the integration of mathematics skills. Give yourself one minute to solve all three problems.

Follow all four instructions below to solve each of the three problems. Enter your answer into the space provided.

- Multiply the third number in the first row by the seventh number in the third row.
- Add this result to the fifth number in the second row.
- Add to this total ten times the fourth number in the third row.
- Subtract the eighth number in the first row from the result.

<b>Problem 1:</b>	6 5 8 7 4 5 6 8 4	Answer: _____
	3 2 1 9 5 6 4 2 1	
	6 5 1 5 1 3 2 3 5	
<b>Problem 2:</b>	7 5 4 9 9 5 4 4 1	Answer: _____
	2 5 1 4 8 9 6 6 8	
	5 7 5 7 5 7 6 8 2	
<b>Problem 3:</b>	1 2 3 7 6 5 4 3 2	Answer: _____
	8 4 3 2 1 6 5 4 8	
	6 5 5 8 1 7 5 12 6	

Did you find the quiz difficult? The thing is, none of the calculations were difficult by themselves. They are simple math facts. Together, though, and with a little time pressure added in, simple problems may become complex and overwhelming. Success in mathematics, particularly in later grades, also depends on language and writing skills, for instance interpreting word problems or mastering complex symbolism. Imagine adding these complexities to the problems above.

Source: *Misunderstood Minds* at [www.pbs.org/wgbh/misunderstoodminds](http://www.pbs.org/wgbh/misunderstoodminds)

**Answer Key:** Problem 1: 63    Problem 2: 98    Problem 3: 93

# Who Am I?

1. Born one of nine siblings in 1951, this world-famous fashion designer reports that “I performed poorly at school...and was perceived as stupid because of my dyslexia. I still have trouble reading.” This person dreamed of working in fashion from a young age and opened his first clothing store, “The People’s Place,” in the 1970s. After the business went bankrupt, this person headed to New York City to concentrate on fashion design. Although he was a relative unknown (and short on money), this person turned down job offers from the famous designers Calvin Klein and Perry Ellis in order to pursue dreams of his own company, which today employs over 5,400 people and takes in almost \$2 billion each year.

Who am I? \_\_\_\_\_

2. This British businessman was educated at an exclusive School, but did not do well due to his nearsightedness and dyslexia. Despite these problems, he developed a national magazine and a student advisory service while he was still a teenager. After leaving school, this person started a mail-order music catalogue, which eventually led to the formation of Virgin Records, one of the largest music companies in the world. He went on to form Virgin Airlines, a mobile phone network, an internet company, and even a Cola. Known for his personal adventures, this person crossed the Atlantic in the first and largest hot air balloon to cross the ocean, and plans someday to circle the world in his hot air balloon.

Who am I? \_\_\_\_\_

3. This preeminent polar explorer was diagnosed with dyslexia in the seventh grade. Though her learning differences made school extremely frustrating, she never gave up on her dream. She is the first known woman in history to cross the ice to both the North and South Poles. She was inducted into the Women's Hall of Fame in 1995 and has received numerous other awards for her accomplishments.

Who am I? \_\_\_\_\_

4. Born in 1881 in Spain, this famous artist was both controversial and trend-setting. He attended local parochial schools, had difficulties with reading, and was labeled a dyslexic. Despite the difficulties that a learning disability posed in school, it became clear that he had an incredible talent. He had a unique sense of beauty and painted things as he saw them—out of order, backwards or upside down. His paintings—including *Guernica* and *The Young Ladies of Avignon*—demonstrated the power of imagination, emotion, and creativity.

Who am I? \_\_\_\_\_

5. This famous actor grew up poor and moved around a lot while his father looked for work. He suffered from dyslexia and was put into remedial classes at school. Though academic subjects were challenging, this person competed in many sports and appeared in a number of plays. After school he focused all his energy on developing an acting career, and never let his learning disability stand in the way of success. Today, he learns movie lines for films such as *Mission: Impossible* and *Jerry Maguire* by listening to a tape.

Who am I? \_\_\_\_\_

6. Born in Italy in 1452, this famous painter and sculptor was also was an internationally renowned inventor, scientist, engineer, architect, musician, mathematician, astronomer, geologist, biologist, and philosopher in his time. He was also believed to suffer from a number of learning disabilities, including dyslexia and attention deficit disorder. It appears that this person wrote his notes backwards, from right to left, in a mirror image (a trait shared by many left-handed dyslexic people). This person overcame his learning disabilities by funneling his creative talents into visual depictions of his thoughts. The *Mona Lisa* is one of his most famous paintings.

Who am I? \_\_\_\_\_

7. This scientist and inventor was thrown out of school at age 12 because he was thought to be terrible at mathematics, unable to focus, and had difficulty with words and speech. It was very clear, however, that this person was an extremely intelligent student despite poor performance in school. He was an avid reader of the latest research of the day and frequently contributed articles about new ideas in telegraph design to technical journals. Over the course of his career, this person patented 1,093 inventions, including the phonograph and the motion picture camera.

Who am I? \_\_\_\_\_

8. This outstanding American entertainer had a lot of difficulty in school, but did not learn until she was an adult that she has dyslexia. Growing up, this person remembers being called dumb and stupid because she had a lot of problems reading. It was clear to her teachers and family that she was neither slow nor dumb, but had some problem that had not yet been well defined. Despite dyslexia, this person has had a successful film and television career, appearing in major motion picture hits like *Ghost*, *Jumping Jack Flash*, *The Color Purple*, and *Star Trek: Generations*.

Who am I? \_\_\_\_\_

9. This well-known children's book author did not start writing until the age of 41. Diagnosed as having Dyslexia, Dyscalculia and Dysgraphia at the age of 14, she did not learn to read well until high school, when a teacher got her the additional help needed to overcome her reading problems. This person went on to major in Fine Art and receive a Ph.D. in Art History. She has written a book, called *Thank You, Mr. Falkner*, about her experiences with learning differences and the teacher who helped her. Some of her other titles include *Mrs. Katz and Tush*, *The Keeping Quilt*, and *Pink and Say*.

Who am I? \_\_\_\_\_

# Multiple Intelligences

Conceived by Howard Gardner, Multiple Intelligences are seven different ways to demonstrate intellectual ability.

## Visual/Spatial Intelligence

The ability to perceive the visual. These learners tend to think in pictures and need to create vivid mental images to retain information. They enjoy looking at maps, charts, pictures, videos, and movies.

- Their skills include: Puzzle building, reading, writing, understanding charts and graphs, a good sense of direction, sketching, painting, creating visual metaphors and analogies (perhaps through the visual arts), manipulating images, constructing, fixing, designing practical objects, interpreting visual images
- Possible career interests: Navigator, sculptor, visual artist, inventor, architect, interior designer, mechanic, engineer

## Verbal/Linguistic Intelligence

The ability to use words and language. These learners have highly developed auditory skills and are generally elegant speakers. They think in words rather than pictures.

- Their skills include: Listening, speaking, writing, story-telling, explaining, teaching, using humor, understanding the syntax and meaning of words, remembering information, convincing someone of their point of view, analyzing language usage
- Possible career interests: Poet, journalist, writer, teacher, lawyer, politician, translator

## Logical/Mathematical Intelligence

The ability to use reason, logic and numbers. These learners think conceptually in logical and numerical patterns making connections between pieces of information. Always curious about the world around them, these learners ask lots of questions and like to do experiments.

- Their skills include: Problem solving, classifying and categorizing information, working with abstract concepts to figure out the relationship of each to the other, handling long chains of reason to make local progressions, doing controlled experiments, questioning and wondering about natural events, performing complex mathematical calculations, working with geometric shapes
- Possible career paths: Scientist, engineer, computer programmer, researcher, accountant, mathematician

## Bodily/Kinesthetic Intelligence

The ability to control body movements and handle objects skillfully. These learners express themselves through movement. They have a good sense of balance and eye-hand co-ordination. (e.g. ball play, balancing beams). Through interacting with the space around them, they are able to remember and process information.

- Their skills include: Dancing, physical co-ordination, sports, hands on experimentation, using body language, crafts, acting, miming, using their hands to create or build, expressing emotions through the body
- Possible career paths: Athlete, physical education teacher, dancer, actor, firefighter, artisan

## Musical/Rhythmic Intelligence

The ability to produce and appreciate music. These musically inclined learners think in sounds, rhythms and patterns. They immediately respond to music either appreciating or criticizing what they hear. Many of these learners are extremely sensitive to environmental sounds (e.g. crickets, bells, dripping taps).

- Their skills include: Singing, whistling, playing musical instruments, recognizing tonal patterns, composing music, remembering melodies, understanding the structure and rhythm of music
- Possible career paths: Musician, disc jockey, singer, composer

## Interpersonal Intelligence

The ability to relate and understand others. These learners try to see things from other people's point of view in order to understand how they think and feel. They often have an uncanny ability to sense feelings, intentions and motivations. They are great organizers, although they sometimes resort to manipulation. Generally they try to maintain peace in group settings and encourage cooperation. They use both verbal (e.g. speaking) and non-verbal language (e.g. eye contact, body language) to open communication channels with others.

- Their skills include: Seeing things from other perspectives (dual-perspective), listening, using empathy, understanding other people's moods and feelings, counseling, co-operating with groups, noticing people's moods, motivations and intentions, communicating both verbally and non-verbally, building trust, peaceful conflict resolution, establishing positive relations with other people
- Possible career paths: Counselor, salesperson, politician, business person

## Intrapersonal Intelligence

The ability to self-reflect and be aware of one's inner state of being. These learners try to understand their inner feelings, dreams, relationships with others, and strengths and weaknesses.

- Their skills include: Recognizing their own strengths and weaknesses, reflecting and analyzing themselves, awareness of their inner feelings, desires and dreams, evaluating their thinking patterns, reasoning with themselves, understanding their role in relationship to others
- Possible career paths: Researcher, theorist, philosopher

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Source: *Learning Styles and Multiple Intelligence*, [www.ldpride.net](http://www.ldpride.net)