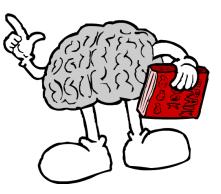


Building Students' Confidence, Fulfillment, and Achievement Through the Understanding of Expandable Intelligence



GO! Part III. Lessons & Material Guide for Teachers Introductory Unit



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Part III. Lessons & Material Guide for Teachers

Overview

This section of the Implementation Guide contains detailed information about the content of each unit of the Brainology[®] Online Curriculum, as follows:

- The Introduction to Brainology[®] presents the curriculum and its purpose, the characters that will guide the students throughout the program and the tools available (e.g. the e-Journal, Map, Brain Book and Help). Users also create an inventory of their personal challenges so they can more easily relate the Brainology[®] lessons to their lives.
- Unit 1: Brain Basics introduces the basics of brain structure and function. This unit also explains what is required to maintain readiness to learn and how attention and concentration are supported. This unit teaches students the physical aspect of thinking and learning, which underlie a growth mindset.
- In Unit 2: Brain Behavior, students learn that the brain functions by sending chemical messages through a network of nerve cells, and that these cells are responsible for thought. This insight provides a foundation for understanding how learning changes the brain. They also learn how emotions can influence the brain and are taught strategies for managing their negative emotions and enhancing their positive ones.
- In Unit3: Brain Building, students discover how learning changes the brain through the growth of connections in neural networks with repeated use, the key to the growth mindset. Students learn that intelligence can be developed through mental exercise, and they are introduced to activities that promote learning.
- Unit 4: Brain Boosters extends the concept of the malleable brain to understand the processes of memory. The unit introduces a variety of study strategies to capitalize on the way the brain works and learns to deepen and reinforce the students' understanding of the growth mindset, and to guide the student to the study skills resources.
- The Mindset Study Tips Guide for Students presents the key concepts of Brainology and a set of study strategies organized by topic: Attention & Concentration, Organization, Learning & Memory, Emotion & Motivation, and more.

Each unit of the Teachers' Guide contains the following sections:

- Get Ready! provides a description of the instructional goal of the unit, the key challenge in student motivation, recommended readings, and key content contained in the unit.
- Get Set! has suggestions for teacher practice, and an explanation of the researchbased principals underlying these recommendations, and a sample outline of lessons for that unit.
- **Go!** contains instructions and printable materials for classroom activities that support the learning of the key concepts in that unit of Brainology. These activities are organized as follows:

Connect It activities are intended to be used before the introduction of a new unit of Brainology[®]. In these activities, students activate their own (and their peers') prior knowledge and/or prior learning in the Brainology[®] program to heighten their readiness to learn and interest in the content of the upcoming unit. These activities connect to students' lives, to their experiences with other texts or learning, and to other lessons in this program.

Practice It activities are provided for the purpose of deep practice. In these lessons, students have the opportunity to interact with the information at an instructional level towards the goal of increasing understanding of the content and learning to use their knowledge independently.

Reinforce It activities may be used to reinforce student's knowledge of the unit. Active learning strategies are used in order to enhance memory and move new knowledge from short term to long term memory.

Apply It activities can be used to enhance metacognition by allowing students to apply their new knowledge in a variety of ways. These scenarios can also be used to assess the depth of student understanding in relation to the content in BrainologyTM.

Check It quizzes are provided for the purpose of using as a formative assessment. The teacher can diagnose the extent to which students have grasped the information in each unit. If the *Check It* shows that students have gaps in their understanding and need further practice, the teacher can use more of the materials in A-D, or use supplementary materials.

Supplemental Activities and Materials deepen students' understanding of the key concepts and provide opportunities both to express this understanding through a wider variety of learning modalities, and to apply them to their own learning.

INTRODUCTORY UNIT: INTRODUCING MINDSETS

- Unit Goal Students complete a survey which is intended to probe their thinking regarding how many fixed mindset and/or growth mindset beliefs they hold. Use as a preand post-program activity, with the expectation that once students finish the Brainology® program, they will have moved toward a growth mindset. Additionally, students begin to learn how to grow their intelligence by reading an introductory article on the malleability of the brain and intelligence.
- Activities Students take the survey and reflect on their responses. They view the Introductory Unit of Brainology®, and read and comprehend the article: "You Can Grow Your Intelligence."
- Key Concepts Growth vs. Fixed Mindsets

Background: Suggested Teacher Reading

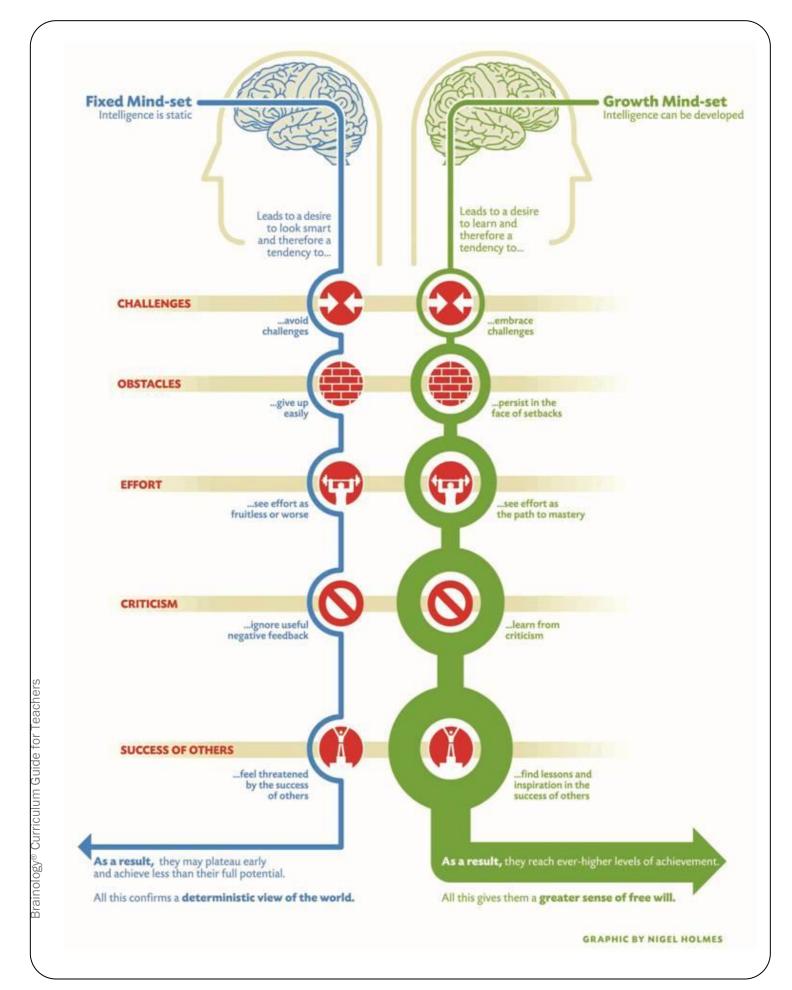
Dweck, Carol (2010). <u>Mindsets and Equitable Education</u>. *Principal Leadership*, pp. 26-29. <u>http://ebookbrowse.com/mindsets-equitable-education-pdf-d76527752</u>

Introduction to Mindsets

Mindsets are beliefs individuals hold about their most basic qualities and abilities. In a **Growth Mindset**, people believe they can develop their brain, abilities, and talents. This view creates a love for learning, a drive for growth and a resilience that is essential for great accomplishments. On the contrary, people with a **Fixed Mindset** believe that basic qualities such as intelligence and abilities are fixed, and can't be developed. They also believe that talent alone creates success, and see effort as a sign of weakness rather than as an effective strategy needed to reach one's full potential.

Research has shown that students who hold a Growth Mindset perform better than those with a Fixed Mindset, especially under conditions of challenge (Blackwell, Trzesniewski, & Dweck, 2007). However, these mindsets themselves are learned, and they can be changed. Adult feedback can influence students' mindset and performance in powerful ways (Mueller & Dweck, 1998). And when students are taught that the brain develops and gets smarter with effort and learning, they become more motivated in school and perform better (Blackwell, Trzesniewski, & Dweck, 2007; Good, Aronson, & Inzlicht, 2003.)

The following diagram shows how people with different views of intelligence respond in different situations:



Sample Outline of Sessions - Introductory Unit

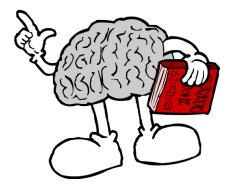
Session	Activity	Pages	Approx.Time
4	Mindset Assessment Profile survey & debrief	7-10	30-40 min.
1	Create student login codes (see Section 2: Get Set!)	N/A	10-15 min.
Bridge*	Mindset Survey Reflection	11-12	10-20 min.
	Brainology [®] Online Introductory Unit	N/A	10-15 min.
2	<i>"You Can Grow Your Intelligence"</i> Reading & Activity (Option 1, 2, or 3)	13-26	30-60 min.

* *Bridge* activities can be used as exit activities at the end of class, as homework between classes, or as "Do Now" activities at the beginning of the next class.





Introductory Unit: Printable Activities and Materials



8 | P a g e

Mindset Assessment Profile Tool

Description: Survey for getting a quick assessment of the students' mindsets

Objective: Students will complete survey and reflection

<u>Timeline:</u> Before beginning Brainology® – 20-30 minutes

Instructions:

- Explain to the students that they are about to take a survey. A survey is a tool to gather information—in this case, your opinions about intelligence, performance, learning, effort, and challenges. It may look like a test or quiz, but in fact it is not! Answer honestly and say what you believe. There will be no grade attached to the survey and the "score" you receive is not a percentage correct. Afterwards, we will discuss the questions and the different ways that people think about them.
- Complete the survey.
- You will have time to reflect on your answers
- The class will learn more about the statements in the survey as we go through the Brainology[®] program.

After the survey

Debrief with your class after they complete the survey. Ask:

- Were there any questions that surprised you?
- Which questions were difficult to answer? Why?
- Are there any questions that you were glad to have been asked?
- Are you excited to learn more about this topic? Why/Why not?

Make sure that you emphasize that the survey is a gauge (like taking a temperature with a thermometer) of their thinking right now. As we learn new things, our thinking changes. The survey is not intended to be a way to label students, but rather to get to the core of their thinking so that new learning can occur.

MINDSET ASSESSMENT PROFILE TOOL

For the Teacher: Using the Mindset Assessment Profile

This is a tool to get a quick assessment of your students' mindsets—their beliefs about the malleability of intelligence, the relative importance of learning and perfect performance, and their attitudes toward effort and mistakes.

It's important that students not feel labeled by this tool. The MAP categories just represent the way they are thinking and feeling about these questions at the present time. They can change these beliefs, and they may feel differently on different days.

You can use this assessment tool in a number of ways. For example, you can use it as an:

- 1) Individual assessment, scored by the teacher (with the result not shared with the student)
- 2) Individual assessment, scored by the teacher (with the result shared with the student)
- 3) Individual assessment, scored by the student
- 4) Individual assessment, scored by a peer

Once students have completed the assessment, you can follow up with discussions or activities to explore the issues raised. For example, you can:

- Identify students who scored in the fixed mindset range and discuss 1:1
- Ask students to select the statement where they had a Profile number of 1-3 (the "fixed mindset" range) and write or talk about it.
- Ask students to respond to question 4 about whether they feel the MAP description fits them.
- Have pairs of students exchange their profiles and discuss their beliefs.
- Present the overall percentage of students in each Profile category to the class.

Here are some questions that you might explore in any of the above formats:

• Are there some subjects where you don't feel confident that you can learn and do well?

• How do you think it feels to get a bad grade if you believe that you can't do any better?

• Can you think of a time when you learned to do something really hard? How did you learn it?

- What would you be willing to work hard to achieve if you knew it was possible?
- If you knew that you could develop your intelligence through effort, what goals would you set for yourself?

STUDENT MINDSET SURVEY

This is NOT a test! It is an opinion survey. It asks your opinion about things to do with school and being a student. It is very important that you give your own opinion, not what someone else thinks. Read each statement. Decide how much you agree or disagree with the statement and circle your answer.

Do you Agree or Disagree?	Disagree	Disagree	Disagree	Agree	Agree	Agree	Profile
	A Lot		A Little	A Little		A Lot	Number
1. No matter how much intelligence you have, you can always change it a good amount.	1	2	3	4	5	6	
2 You can learn neu things but you	1	2	2		-		
2. You can learn new things, but you cannot really change your basic amount of intelligence.	1	2	3	4	5	6	
3. I like school work best when it makes me think hard.	1	2	3	4	5	6	
4. I like school work best when I can do it really well without too much trouble.	1	2	3	4	5	6	
5. I like school work that I'll learn from even if I make a lot of mistakes.	1	2	3	4	5	6	
ی6. I like school work best when I can do it perfectly without any mistakes.	1	2	3	4	5	6	
5							
7. When something is hard, it just makes me want to work more on it, not less.	1	2	3	4	5	6	
· ·							
8. To tell the truth, when I work hard at my schoolwork, it makes me feel like I'm not very smart.	1	2	3	4	5	6	
	MBFR				•	•	

Creating Your Mindset Assessment Profile

- 1. First, determine your Profile Number for each question.
- For questions with odd numbers (1, 3, 5, 7), write the number of your answer into the boxes in the right column.
- For questions with even numbers (2, 4, 6, 8), use the table below to fill in the gray boxes in the right column.

If you chose this answer:	Then write <u>this</u> number in the gray box on the right (Profile Number).
Disagree A Lot (1)	6
Disagree (2)	5
Disagree A Little (3)	4
Agree A Little (4)	3
Agree (5)	2
Agree A Lot (6)	1

2. Now, add up all your Profile numbers.

• Add up all the numbers in the Profile column on the right, and write the total in the last box in the bottom right corner.

3. What does your Mindset Profile Number mean?

- Find the group that includes your number in the chart below and circle it.
- Now, read what it says about your MAP group.

If your profile number falls into this range:	Then your MAP (Mindset Assessment Profile) group is:	People in this MAP group usually believe the following things:
8-12 13-16	F5 F4	You strongly believe that your intelligence is fixed—it doesn't change much. If you can't perform perfectly you would rather not do something. You think smart kids don't have to work hard.
17-20 21-24	F3 F2	You lean toward thinking that your intelligence doesn't change much. You prefer not to make mistakes if you can help it and you also don't really like to put in a lot of work. You may think that learning should be easy.
25-28 29-32	F1 G1	You haven't really decided for sure whether you can change your intelligence. You care about your grades and you also want to learn, but you don't really want to have to work too hard for it.
33-36 37-40	G2 G3	You believe that your intelligence is something that you can increase. You care about learning and you're willing to work hard. You do want to do well, but you think it's more important to learn than to always score well.
41-44 45-48	G4 G5	You really feel sure that you can increase your intelligence by learning and you like a challenge. You believe that the best way to learn is to work hard, and you don't mind making mistakes while you do it.

4. Do you think the description under your MAP group matches the way you think and feel about your school work? Which parts are true for you and which are not?

Introductory Unit Survey Reflection

Description: Reflection for probing students' thinking about their mindsets

<u>Objective:</u> Students will complete reflection on survey and beginning the Brainology® program.

Timeline: 15 minutes

Instructions:

- When students finish the survey, ask them to complete the reflection. Keep the surveys and the reflections so that you can keep track of how your students were thinking when they began the program.
- Read their reflections so that you have an idea of how they are thinking in relation to the growth mindset.
- At the conclusion of the Brainology® program, re-administer the survey to measure the areas where students grew their mindset!

Class

BRAINOLOGY

Survey Reflection

Make a Prediction:

Now that you have taken this survey, what do you think we will be learning about in the Brainology[®] program?

What if we told you that Brainology[®] might teach us how to be excited about challenges, how to learn from mistakes, and how to increase your intelligence? What do you think about that?

Would you like to learn how to increase your intelligence? Why or why not?

Introductory Unit : You Can Grow Your Intelligence

<u>Description</u>: Introductory activity to learn about the concept of expandable intelligence.

<u>Timeline</u>: Before beginning Brainology® Program or directly after Introductory Unit; can also be used for re-teaching. – 40 minutes

<u>Instructions</u>: There are 2 versions of the article, and 3 versions of the activity: <u>Option 1</u>, <u>Option 2</u>, and <u>Option 3</u>. Choose the one most appropriate for <u>your</u> learners.

Instructions for Activity Option 1 – 40 minutes:

- To activate student's prior knowledge, ask them what they know about intelligence.
- Ask students if they would like to learn how to grow their intelligence.
- Explain that the class will be learning today how to grow their intelligence.
- Pass out copies of the worksheet and discuss non-linguistic representations of concepts (drawings) as a way to process and remember a new idea. You can connect the idea to the saying, "a picture is worth a thousand words" and remind students that the brain has an amazing ability to remember pictures.
- Today the class will draw 6 pictures to help the students' brains to add this new information to their long-term memories.
- Read the first section as a class and model the drawing and the response to the first section.
- Ask students to read silently the next section and complete the second drawing. Have students share the second section with a student next to them and check to see if they have the same understanding of the main ideas.

Instructions for Activity Option 2 (advanced activity - 60 minutes):

- To activate student's prior knowledge, ask them to generate research questions about intelligence. (some examples below)
 - What is intelligence?
 - Do all humans have equal intelligence? How do we know?
 - What is animal intelligence measured as compared to humans?
 - What are the most "intelligent" animals on Earth?
 - What are the best ways to measure intelligence? How do we know?
- Ask students if they would like to learn how to grow their intelligence.
- Explain that the class will be learning today how to grow their intelligence.
- Read the first section as a class. Ask students to draw connections from the article to their research questions. Were any questions answered? New questions arise?
- Ask students to read silently the next section and make connections in partners.
 - Check for understanding using these frames:
 - I made a connection to the article when I read... because...
 - The article explores my research question... when it talks about...
 - The article raises a new question for me, which is... because...
- Have students finish the article and record one research question that they would like to search for information about as independent practice (this can occur for homework or in a lab setting).
- Students can report back their findings to the class individually, with partners, or in small groups. Use this opportunity to differentiate for all levels of learners.

Reading for Activity Option 1 or 2

You Can Grow Your Intelligence New Research Shows the Brain Can Be Developed Like a Muscle

Many people think of the brain as a mystery. They don't know much about intelligence and how it works. When they do think about what intelligence is, many people believe that a person is born either smart, average, or dumb-and stays that way for life.

But new research shows that the brain is more like a muscle--it changes and gets stronger when you use it. And scientists have been able to show just how the brain grows and gets stronger when you learn.

Everyone knows that when you lift weights, your muscles get bigger and you get stronger. A person who can't lift 20 pounds when they start exercising can get strong enough to lift 100 pounds after working out for a long time. That's because the muscles become larger and stronger with exercise. And when you stop exercising, the muscles shrink and you get weaker. That's why people say "Use it or lose it!

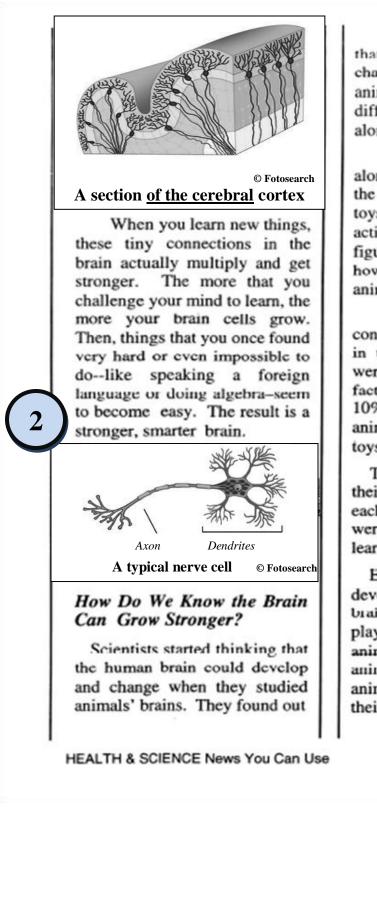
But most people don't know that when they practice and learn new things, parts of their brain change and get larger a lot like muscles do when they exercise.

HEALTH & SCIENCE News You Can Use



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Inside the cortex of the brain are billions of tiny nerve cells, called neurons. The nerve cells have branches connecting them to other cells in a complicated network. Communication between these brain cells is what allows us to think and solve problems.



that animals who lived in a challenging environment, with other animals and toys to play with, were different from animals who lived alone in bare cages.

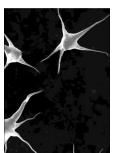
While the animals who lived alone just ate and slept all the time, the ones who lived with different toys and other animals were always active. They spent a lot of time figuring out how to use the toys and how get along with the other animals.

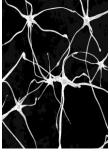
These animals had more connections between the nerve cells in their brains. The connections were bigger and stronger, too. In fact, their whole brains were about 10% heavier than the brains of the animals who lived alone without toys.

The animals who were exercising their brains by playing with toys and each other were also "smarter"--they were better at solving problems and learning new things.

Even old animals got smarter and developed more connections in their brains when drey got the chance to play with new toys and other animals. When scientists put very old animals in the cages with younger animals and new toys to explore, their brains grew by about 10%!

Effect of an enriched environment





Nerves in brain of animal living in bare cage

Brain of animal living with other animals and toys. © 2010 Mindset Works

Children's Brain Growth

Another thing that got scientists thinking about the brain growing and changing was babies. Everyone knows that babies are born without being able to talk or understand language. But somehow, almost all babies learn to speak their parents' language in the first few years of life. How do they do this?

The Key to Growing the Brain: Practice!

From the first day they are born, babies are hearing people around them talk-all day, every day, to the baby and to each other. They have to try to make sense of these strange sounds and figure out what they mean. In a way, babies are exercising their brains by listening hard.

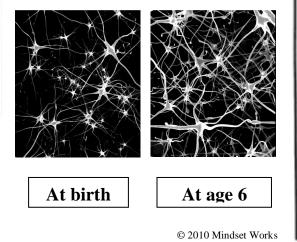
HEALTH & SCIENCE News You Can Use

Later, when they need to tell their parents what they want, they start practicing talking themselves. At first, they just make goo-goo sounds. Then, words start coming. And by the time they are three years old, most can say whole sentences almost perfectly.

Once children learn a language, they don't forget it. The child's brain has changed-it has actually gotten smarter.

This can happen because learning causes permanent changes in the brain. The babies' brain cells get larger and grow new connections between them. These new, stronger connections make the child's brain stronger and smarter, just like a weightlifter's big muscles make them strong.

<u>Growth of neuron connections in</u> <u>a child from birth to 6 years old</u>



8

The Real Truth About "Smart" and "Dumb"

No one thinks babies are stupid because they can't talk. They just haven't learned how to yet. But some people will call a person dumb if they can't solve math problems, or spell a word right, or read fast--even though all these things are learned with practice.

At first, no one can read or solve equations. But with practice, they can learn to do it. And the more a person learns, the easier it gets to learn new things-because their brain "muscles" have gotten stronger!

The students everyone thinks is the "smartest" may not have been born any different from anyone else. But before they started school, they may have started to practice reading. They had already started to build up their "reading muscles." Then, in the classroom, everyone said, "That's the smartest student in the class."

They don't realize that any of the other students could learn to do as well if they exercised and practiced reading as much. Remember, all of those other students learned to speak at least one whole language alreadysomething that grownups find very hard to do. They just need to build up their "reading muscles" too.

What Can You Do to Get Smarter?

Just like a weightlifter or a basketball player, to be a brain athlete you have to exercise and practice. By practicing you make your brain stronger. You also learn skills that let you use your brain in a smarter way--just like a basketball player learns new moves.

But many people miss out on the chance to grow a stronger brain because they think they can't do it, or that it's too hard. It does take work, just like becoming stronger physically or becoming a better ball player does. Sometimes it even But when you feel hurts! get better and yourself stronger, all is the work worth it! 6

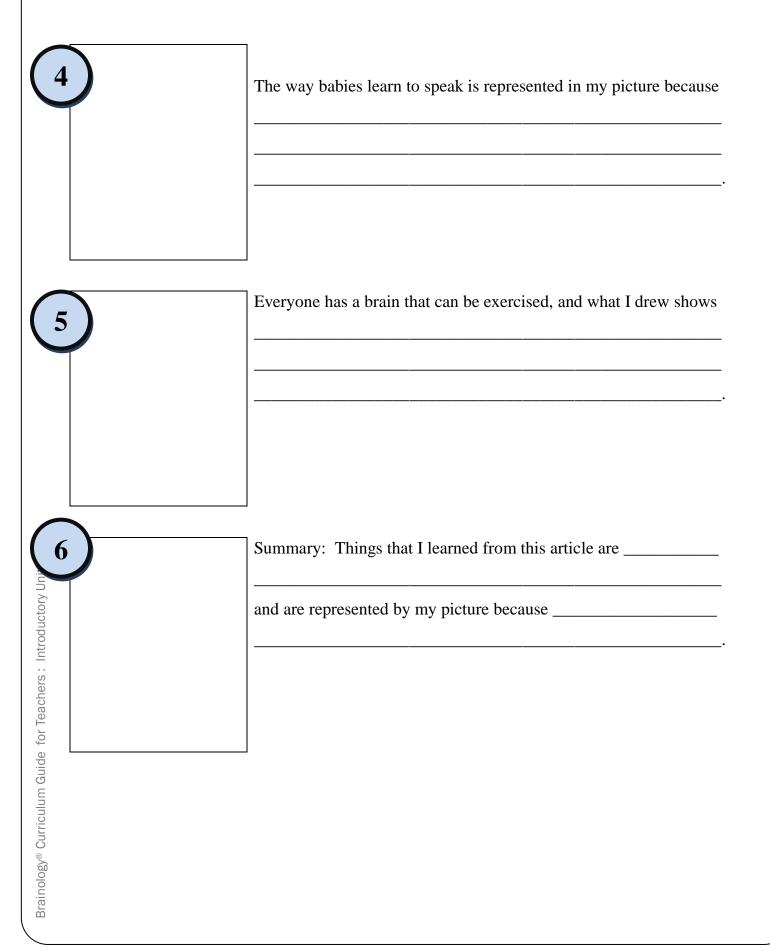
E-mail questions or comments to: <u>Growyourbrain@aol.com</u>

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"You Can Grow Your Intelligence" (Activity Option 1)

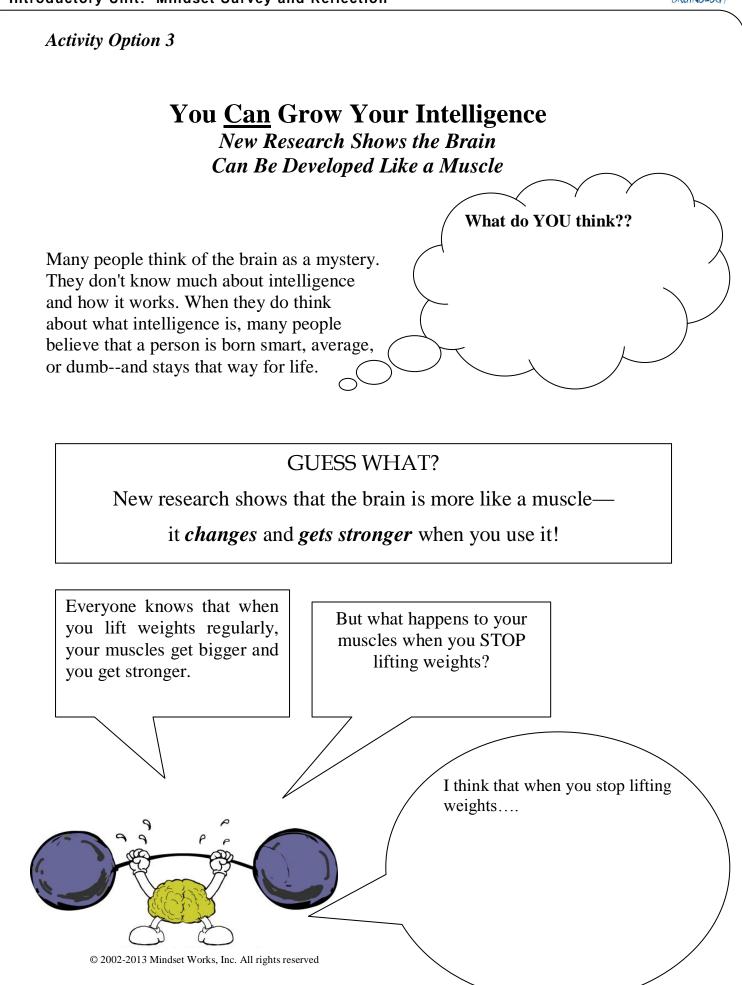
<u>Directions</u>: **①**Read each numbered section. **②**Draw a picture that represents the main ideas in that part of the article. **③**Fill in the sentence frames to explain how your picture represents the idea.

	This picture of a	represents the main i
	because	
		·
		<i></i>
2)	My picture represents the branches cells because	
		·
3	My picture represents the difference	ce between animals who had toys
$\mathbf{\mathcal{I}}$	stimulation and those animals that of	
		·



Instructions for Activity Option 3 (Interactive Text - 45 min.):

- To activate student's prior knowledge, ask them what they know about intelligence.
- Ask students if they would like to learn how to grow their intelligence.
- Explain that the class will be learning today how to grow their intelligence.
- Pass out the copies of the Interactive Text and read as a class as the students complete the prompts and thought bubbles.



Brainology® Curriculum Guide for Teachers : Introductory Unit

That's why people say, "Use it or lose it!"

Most people **don't know** that when they practice and learn new things, part of their brain changes, grows, and gets stronger and larger, a lot like muscles do when they exercise.

So here is an analogy:

Muscle is to exercise as the brain is to _____

In other words:

Muscle will grow with exercise and the brain will grow with _____

Scientists have actually been able to \underline{show} just how the brain grows and gets stronger when you learn.

Here's the secret:

Inside the cortex of the brain are billions of tiny nerve cells called neurons. The nerve cells have branches connecting them to each other in a complicated network. Communication between these brain cells is what allows us to think and solve problems.

When you learn new things, these tiny connections in the brain actually **multiply** and get **stronger**.

The more that you challenge your mind to learn, the more neuron connections you make in your brain.

If you continue to strengthen these connections, things that you once found very hard to do—like remembering information for a test or doing algebra--seem to become easy. The result is a stronger, smarter brain.

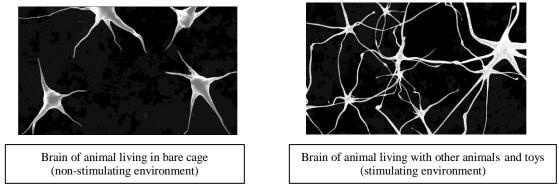
Use the information you have just read to complete the organizer below

(there are many answers, just find one!)

IF	THEN

The Secret.... continued

Scientists started thinking that the human brain could develop and change when they studied animals' brains. They found out that animals who lived in a challenging environment, with other animals and toys to play with, were different from animals who lived alone in bare cages.

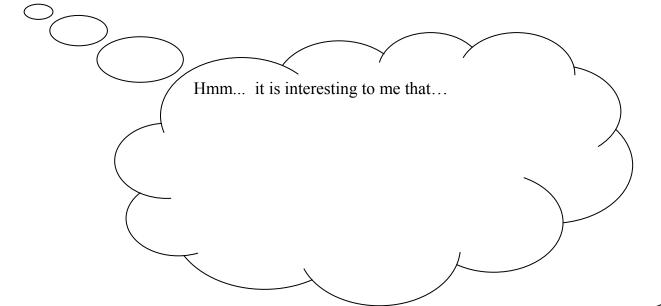


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While the animals that lived alone just ate and slept all the time, the ones that lived with different toys and other animals spent a lot more time figuring out how to use the toys and how to get along with other animals.

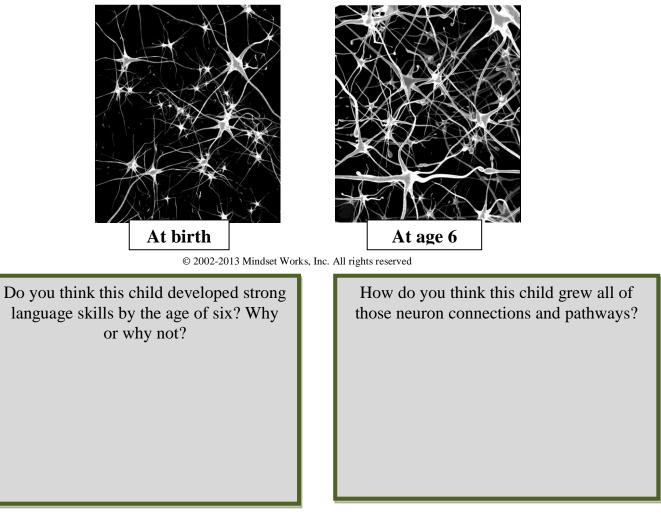
The animals who lived in the stimulating environment had more connections between nerve cells in their brains. The connections were bigger and stronger, too. In fact, their whole brains were about 10% heavier than the brains of the animals who lived alone without toys. The animals who were exercising their brains by playing with toys and each other were also "smarter" -- they were better at solving problems and learning new things.

Even old animals got smarter and developed more connections in their brains when they got a chance to play with new toys and other animals. When scientists put very old animals in cages with younger animals and new toys to explore, their brains grew by about 10%.



Another thing that got scientists thinking about the brain growing and changing was babies. Everyone knows that babies are born without being able to talk or understand language. But somehow, almost all babies learn to speak their parents' language in the first few years of life. How do they do this?

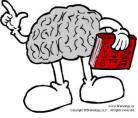




The Real Truth about "Smart" and "Dumb"

No one thinks babies are stupid because they can't talk. They just haven't learned how to yet. But some people will call a person dumb if they can't solve math problems, or spell a word right, or read fast--even though all these things are learned with practice.

At first, no one can read or solve equations. But with practice, they can learn to do it. And the more a person learns, the easier it gets to learn new things--because their brain "muscles" have gotten stronger!



What Can **<u>YOU</u>** Do to Get Smarter?

Just like a weightlifter or a basketball player, you have to exercise and practice to make your brain grow stronger. By practicing, you also learn skills that let you use your brain in a smarter way--just like a basketball player learns new moves.

Why doesn't EVERYBODY do this?

Many people miss out on the chance to grow a stronger brain because

- they think they can't do it
- they think it's too hard
- they think it's too much work

Reflection:

Can you relate?

Remember a time when you worked extremely hard on something that was at first difficult, but after practice and effort you were able to succeed.

At first, I couldn't	In order to get bette	er, I	Finally, I was able to))
How did you feel when you wer	e successful?	⁷ Was it wo	orth the effort? Explain.	