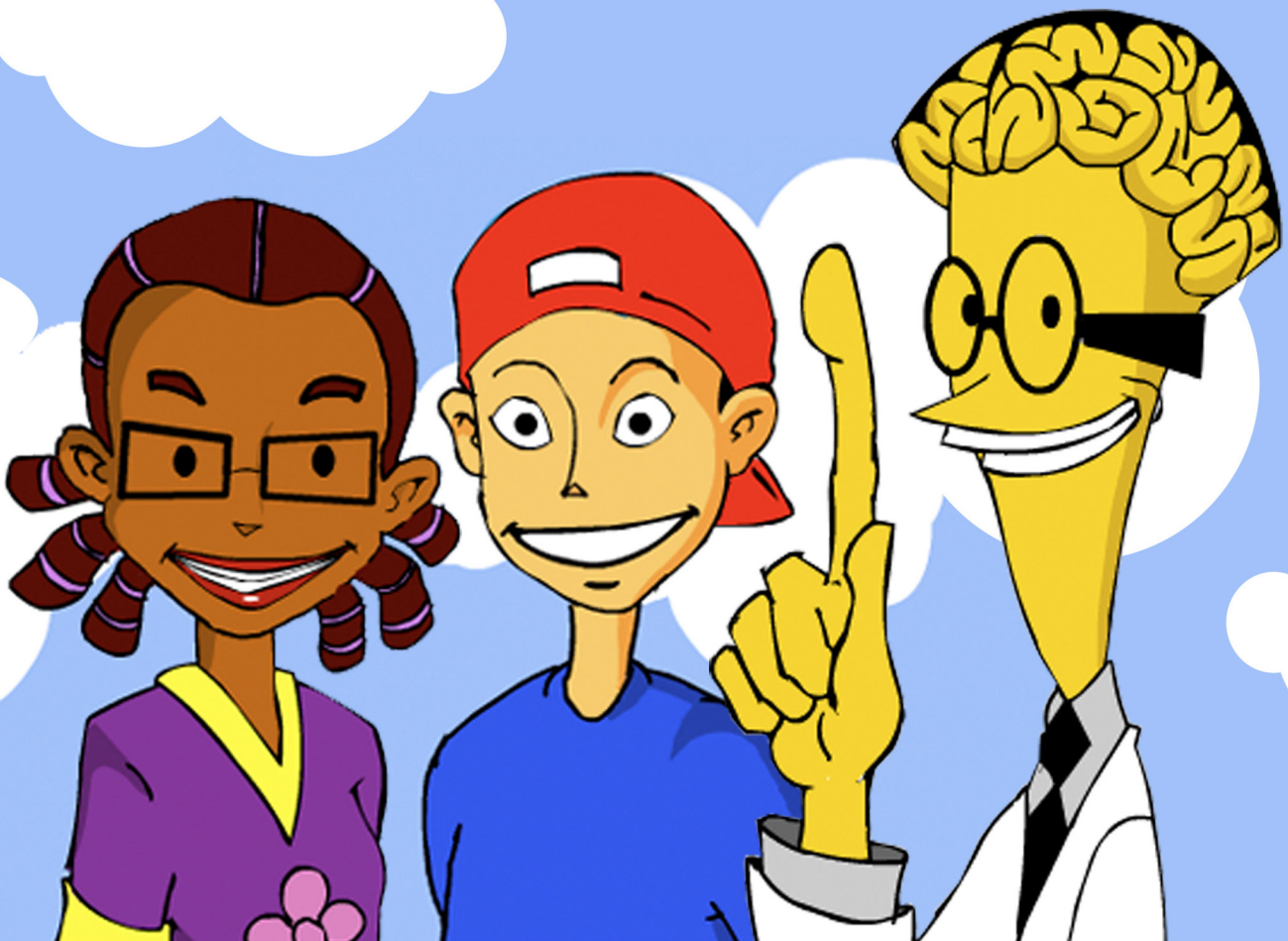


Brainology®

FOR HOME



Brainology® Curriculum
Guide to Implementation



Introductory Unit Lesson 3, “Practice It”: You Can Grow Your Intelligence

Description: An introductory article about brain science with a follow up activity

Objective: Children will learn about the concept of expandable intelligence.

Length: Approximately 30 minutes

Instructions:

There are 2 versions of the article: Option A (Plain Text Version) and Option B (Interactive Text Version). Choose the one most appropriate for your learners.

Instructions for Option A (Plain Text Version):

1. To activate children’s prior knowledge, ask them to generate research questions about intelligence. Record the research questions on chart paper. (Some examples are below.)
 - a. What is intelligence?
 - b. Do all humans have equal intelligence? How do we know?
 - c. What are the most “intelligent” animals on Earth?
 - d. What are the best ways to measure intelligence? How do we know?
2. Ask your children if they would like to learn how to grow their intelligence, and explain that they will be learning today about how to grow their intelligence.
3. Children will draw 6 pictures to help the students’ brains add this new information to their long-term memories.
4. Pass out copies of the worksheet and discuss non-linguistic representations of concepts (works of art) 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.
5. Read the first section and model the drawing with a rough sketch and a response to the first one.
6. Ask your child to read silently the next section and complete the second drawing. Let them know this only needs to be a rough sketch. They should focus more on the main points than the drawing.
7. Have your child check for understanding with a partner using these frames:
 - a. I made a connection to the article when I read... because...
 - b. The article explores my research question... when it talks about...
 - c. The article raises a new question for me, which is... because...



Differentiating Instruction: Option A

Content & Process

This lesson contains content intended for On-Level and Advanced Learners. The text is chunked by use of the graphic organizer. Much of the lesson requires the student to read the text independently, but discuss ideas together. There are scaffolding suggestions as well as extension opportunities.



Introductory Unit Lesson 3, “Practice It”: You Can Grow Your Intelligence, cont.

Instructions for Option B (Interactive Text Version):

1. To activate your child’s prior knowledge, ask them to generate research questions about intelligence. Record the research questions on chart paper. (Some examples are below.)
 - a. What is intelligence?
 - b. Do all humans have equal intelligence? How do we know?
 - c. What is animal intelligence measured as compared to human intelligence?
 - d. What are the most “intelligent” animals on Earth?
 - e. What are the best ways to measure intelligence? How do we know?
 - f. Why are some people more intelligent than others?
2. Ask children if they would like to learn how to grow their intelligence, and explain they they will be learning today about how to grow their intelligence.
3. Pass out the copies of the Interactive Text and read together as your child completes the prompts and thought bubbles.



Differentiating Instruction: Option B

Content & Process

This lesson contains content intended for Below-Level Learners. The text is chunked throughout the article with built-in processing boxes and language response frames. The process is best delivered with some read-alouds by the parent and the child taking turns.

FEEDBACK CORNER

Try responding to students who...

are making progress with,

“I see you using your strategies/tools/notes/etc. Keep it up!”

succeed with strong effort with,

“All that hard work and effort paid off! Congratulations! You just got smarter!”

Brainology® Intro Unit Lesson 3, “Practice It”: Reading for Lesson - Option A

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.

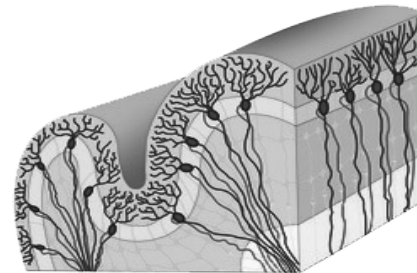
Everyone knows that when you lift weights, your muscles get bigger and you get stronger. A person who can't lift 20 pounds when they start exercising can get strong enough to lift 100 pounds after working out for a long time. That's because the muscles become larger and stronger with exercise. And when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



© 2010 Mindset Works

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.

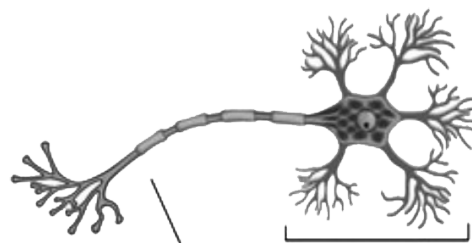
HEALTH & SCIENCE News You Can Use



A section of the cerebral cortex

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.

1



Axon

Dendrites

© Fotoserach

A typical nerve cell

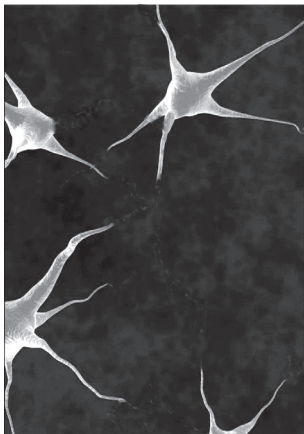
When you learn new things, these tiny connections in the brain actually multiply and get stronger. The more that you challenge your mind to learn, the more your brain cells grow. Then, things that you once found very hard or even impossible to do—like speaking a foreign language or doing algebra—seem to become easy. The result is a stronger, smarter brain.

2

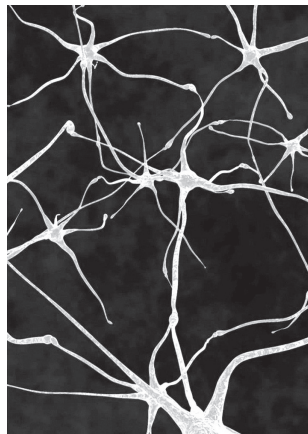
Brainology® Intro Unit Lesson 3, “Practice It”: Reading for Lesson - Option A, cont.***How Do We Know the Brain Can Grow Stronger?***

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.

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 to get along with the other animals.

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

Animals who lived in an enriched environment 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.

HEALTH & SCIENCE News You Can Use

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

3***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!

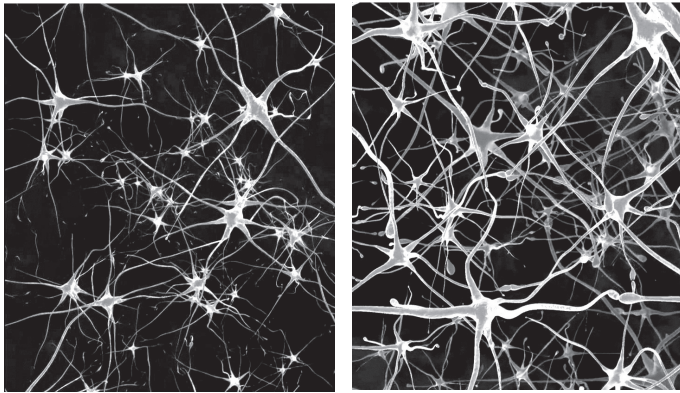
From the first day they are born, babies are hearing people around them talk—all day, every day, to the baby and to each other. They have to try to make sense of these strange sounds and figure out what they mean. In a way, babies are exercising their brains by listening hard.

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.

4

Brainology® Intro Unit Lesson 3, “Practice It”: Reading for Lesson - Option A, cont.**Growth of neuron connections in a child from birth to 6 years old**

At birth

At age 6

©2010 Mindset Works

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 of as 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 student learned to speak at least one whole language already—something that grownups find very hard to do. They just need to build up their “reading muscles”, too.

5***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 hurts! But when you feel yourself get better and stronger, all the work is worth it!

6

Brainology® Intro Unit Lesson 3, “Practice It”: Plain Text Version - Option A

You Can Grow Your Intelligence

Directions: 1) Read each section. 2) When you get to a number, stop reading and 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.

1	This picture of a _____ represents the main idea because _____ _____ _____ _____ _____ _____
2	My picture represents the branches (dendrites) growing between brain cells because _____ _____ _____ _____ _____ _____
3	My picture represents the difference between animals who had toys and stimulation and those animals that did not because _____ _____ _____ _____ _____ _____

Brainology® Intro Unit Lesson 3, “Practice It”: Plain Text Version - Option A, cont.

4	The way babies learn to speak is represented in my picture because _____ _____ _____ _____ _____ _____ _____
5	Everyone has a brain that can be exercised, and what I drew shows _____ _____ _____ _____ _____ _____ _____
6	Summary: Things that I learned from this article are _____ _____ _____ _____ _____ and are represented by my picture because _____ _____ _____

Brainology® Intro Unit Lesson 3, “Practice It”: Plain Text Version - Option A, cont. ANSWER KEY

“You Can Grow Your Intelligence”

Directions: 1) Read each section. 2) When you get to a number, stop reading and 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.

1	This picture of a <u>cerebral cortex (or a drawing resembling a tree, e.g.)</u> represents the main idea because <u>the cortex of the brain contains billions of tiny nerve cells called neurons that are connected by branches. The branches allow the cells to communicate and enable us to think and solve problems.</u>
2	My picture represents the branches (dendrites) growing between brain cells because <u>the brain is learning something new and the dendrites between brain cells are multiplying and becoming stronger.</u>
3	My picture represents the difference between animals who had toys and stimulation and those animals that did not because <u>in the brains of the animals that had toys, the branches and connections between the neurons/nerve cells are thicker (i.e. stronger) and more numerous. The neurons in the brains of the animals without toys don't even have branches that connect with other neurons.</u>

Brainology® Intro Unit Lesson 3, “Practice It”: Plain Text Version - Option A, cont. ANSWER KEY

4	<p>The way babies learn to speak is represented in my picture because <u>as babies learn to talk, the neurons in their brains grow dendrites (branches) that are thicker and stronger. By the time most children are age 3, the neurons in their brains are much more strongly connected than at birth, enabling them to speak in complete sentences.</u></p>
5	<p>Everyone has a brain that can be exercised, and what I drew shows <u>a brain prior to learning something new, when the neurons and dendrites were few and not well-connected. After learning a new skill (math, reading, piano, a sport), the neurons will be bigger, more numerous and more strongly connected with other nearby nerve cells.</u></p>
6	<p>Summary: Things that I learned from this article are <u>that everyone can grow their brains and become smarter, but it takes practice and hard work</u>, and are represented by my picture because <u>the neurons that I've drawn represent a brain after learning a new skill/becoming better at math, reading, etc. The neurons are bigger, and the dendrites connecting them are thicker and more numerous.</u></p>

Brainology® Intro Unit Lesson 3, “Practice It”: Reading for Lesson - Option B

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.

What do YOU think?

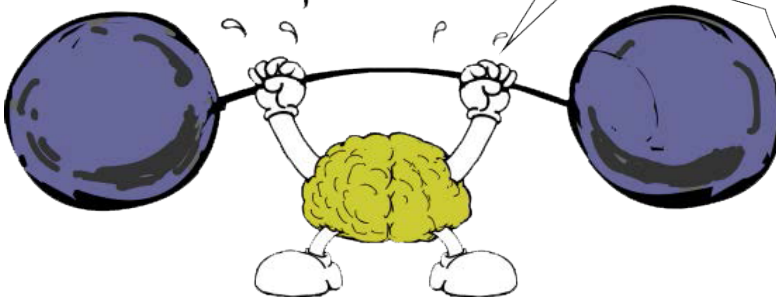
GUESS WHAT?

New research shows that the brain is more like a muscle—it changes and gets stronger when you use it!

Everyone knows that when you lift weights regularly, your muscles get bigger and you get stronger.

But what happens to your muscles when you STOP lifting weights?

I think that when you stop lifting weights...



Brainology® Intro Unit Lesson 3, “Practice It”: Reading for Lesson - Option B, cont.**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.

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

So here is an analogy: Muscle is to exercise as the brain is to _____.

In other words... Muscles will grow with exercise and the brain will grow with _____.

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.

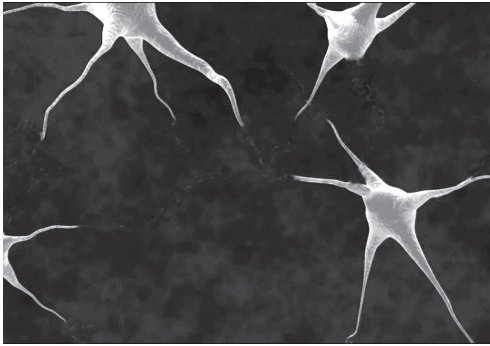
If you continue to strengthen these connections, things that you once found very hard to do—like remembering information for a test or doing algebra—seem to become easy. The result is a stronger, smarter brain.

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

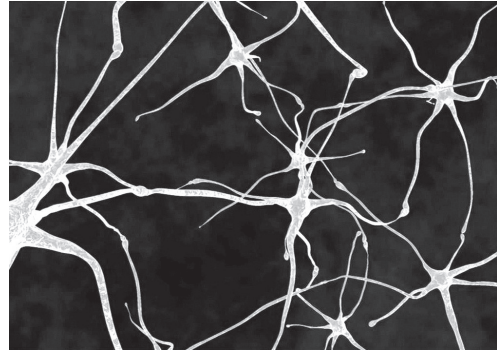
IF...		THEN...
--------------	---	----------------

Brainology® Intro Unit Lesson 3, “Practice It”: Reading for Lesson - Option B, cont.**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.



Nerves in brain of animal living in bare cage
(non-stimulating environment)



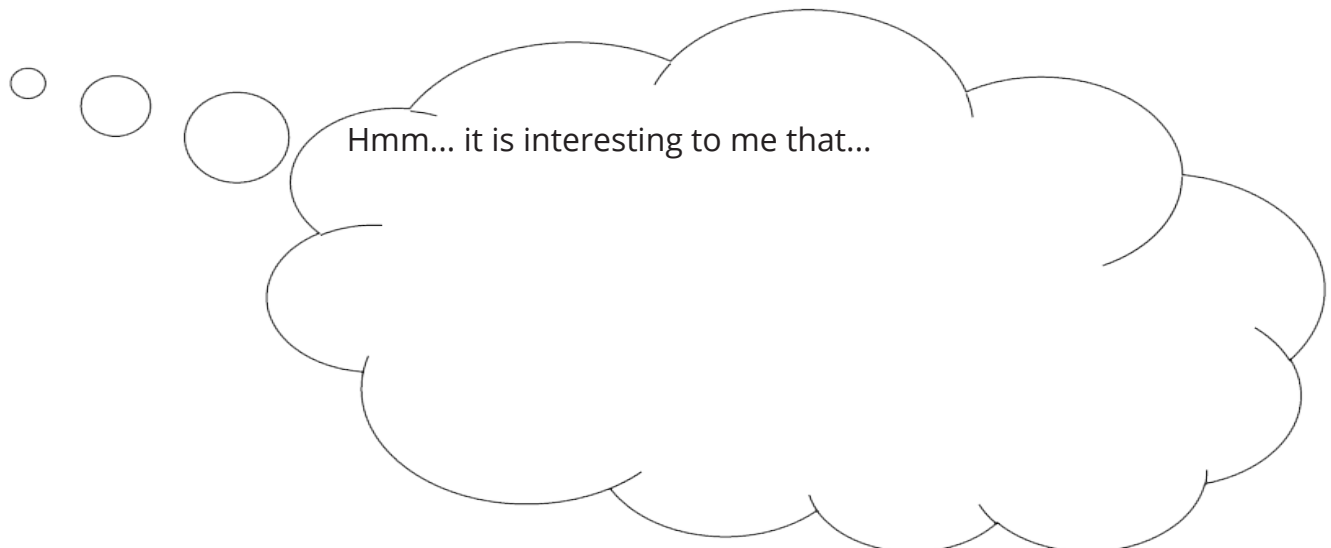
Brain of animal living with other animals and toys
(stimulating environment)

© 2002-2013 Mindset Works, Inc. All rights reserved

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%.

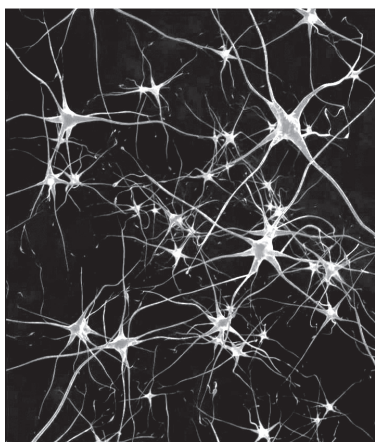


Brainology® Intro Unit Lesson 3, “Practice It”: Reading for Lesson - Option B, cont.

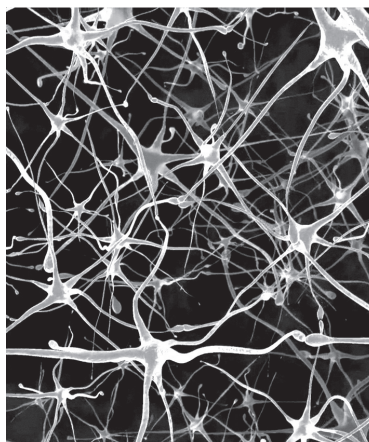
Children’s Brain Growth

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?

Neuron connections in a child from birth to 6 years old



At birth



At age 6

© 2002-2013 Mindset Works, Inc. All rights reserved

Do you think this child developed strong language skills by the age of six? Why or why not?

How do you think this child grew all of those neuron connections and pathways?

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 YOU 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.

Brainology® Intro Unit Lesson 3, “Practice It”: Reading for Lesson - Option B, cont.

Why doesn't EVERYBODY do this?

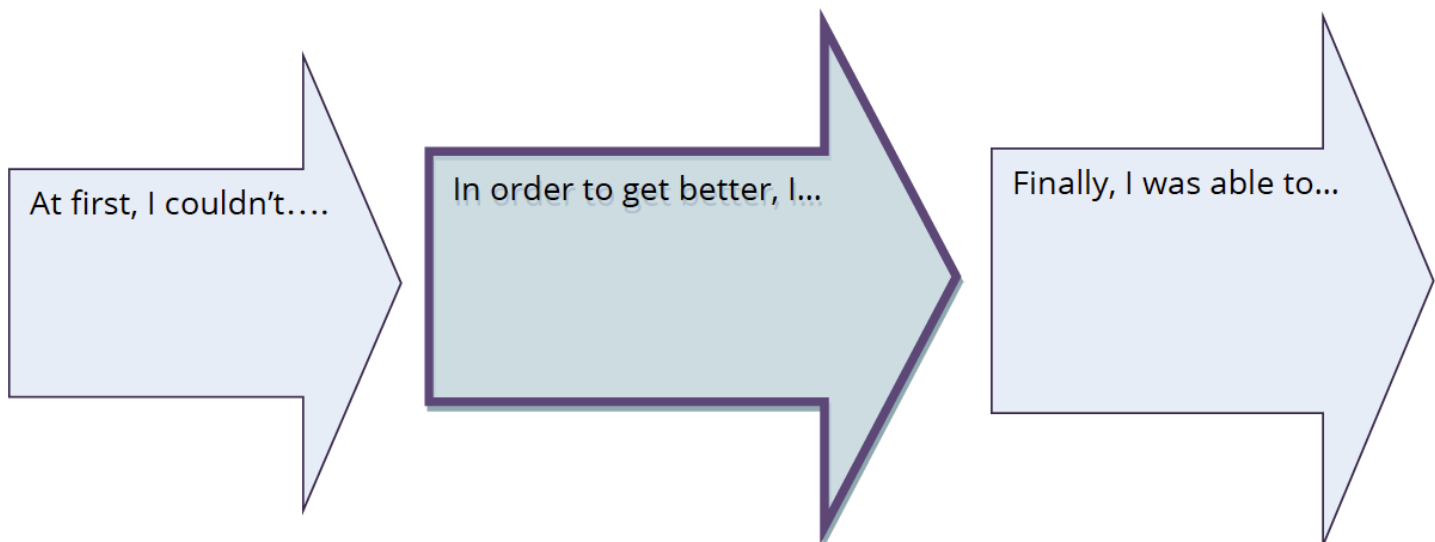
Many people miss out on the chance to grow a stronger brain because

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

Reflection: Remember a time when you worked extremely hard on something that was at first difficult,

Can you relate?

but after practice and effort you were able to succeed.



How did you feel when you were successful?

Was it worth the effort? Explain.

Brainology® Intro Unit Lesson 3, “Practice It”: Reading for Lesson - Option B ANSWER KEY

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.

What do YOU think?

Subjective - responses may vary.

GUESS WHAT?

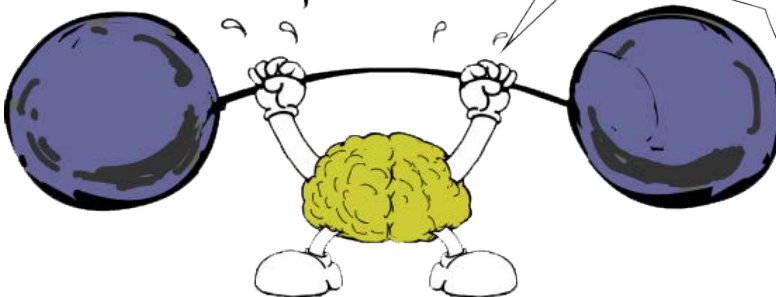
New research shows that the brain is more like a muscle—it changes and gets stronger when you use it!

Everyone knows that when you lift weights regularly, your muscles get bigger and you get stronger.

But what happens to your muscles when you STOP lifting weights?

I think that when you stop lifting weights...

Your muscles will get weaker and smaller.



Brainology® Intro Unit Lesson 3, “Practice It”: Reading for Lesson - Option B, cont. ANSWER KEY**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.

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

So here is an analogy: Muscle is to exercise as the brain is to studying.

In other words... Muscles will grow with exercise and the brain will grow with studying and learning.

Here’s the secret:

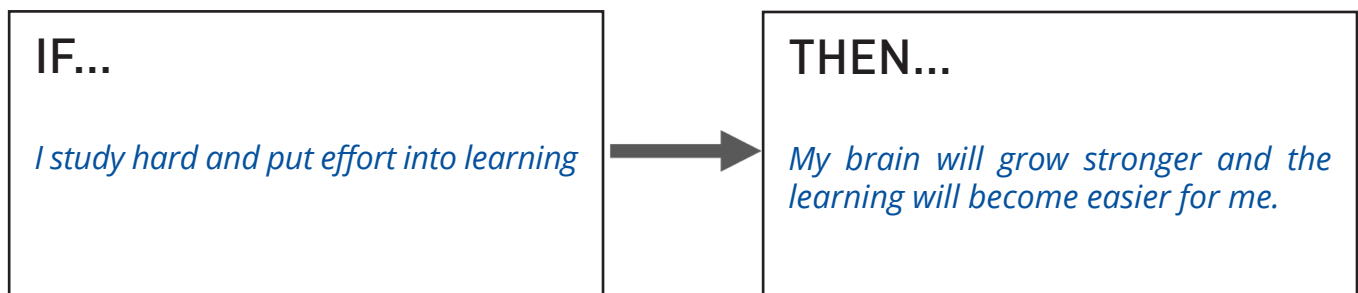
Inside the cortex of the brain are billions of tiny nerve cells called neurons. The nerve cells have branches connecting them to each other in a complicated network. Communication between these brain cells is what allows us to think and solve problems.

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.

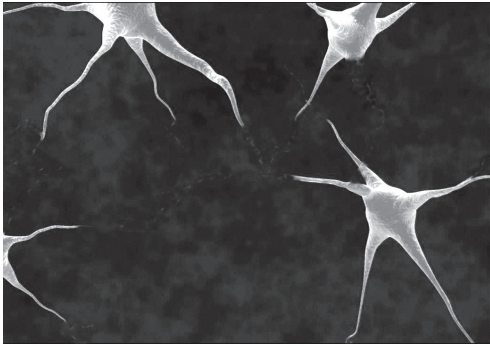
If you continue to strengthen these connections, things that you once found very hard to do—like remembering information for a test or doing algebra—seem to become easy. The result is a stronger, smarter brain.

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

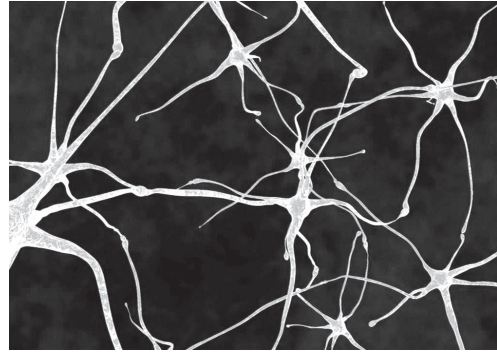


Brainology® Intro Unit Lesson 3, “Practice It”: Reading for Lesson - Option B, cont. ANSWER KEY**The Secret... continued**

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.



Nerves in brain of animal living in bare cage
(non-stimulating environment)



Brain of animal living with other animals and toys
(stimulating environment)

© 2002-2013 Mindset Works, Inc. All rights reserved

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%.

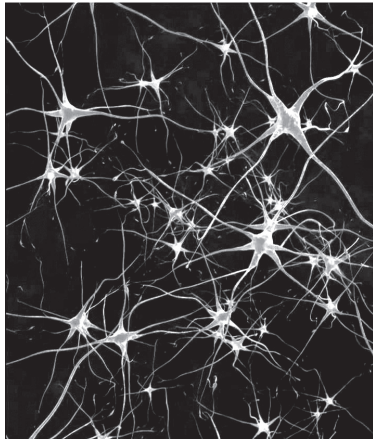
Hmm... it is interesting to me that...

Subjective - responses may vary.

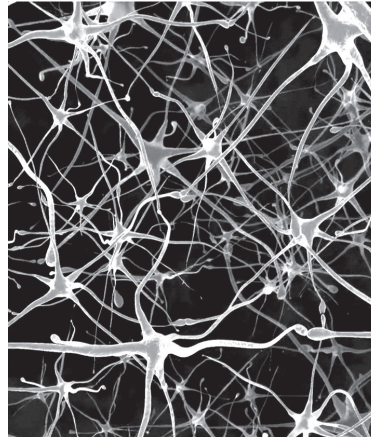
Brainology® Intro Unit Lesson 3, “Practice It”: Reading for Lesson - Option B, cont. ANSWER KEY**Children’s Brain Growth**

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?

Neuron connections in a child from birth to 6 years old



At birth



At age 6

© 2002–2013 Mindset Works, Inc. All rights reserved

Do you think this child developed strong language skills by the age of six? Why or why not?

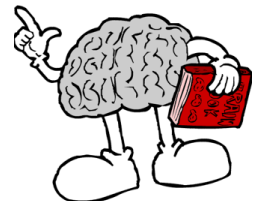
Yes, because of the numerous and thick (strong) connections between the neurons in the child’s brain.

How do you think this child grew all of those neuron connections and pathways?

The child spent years listening to others speaking and then attempting to speak himself/herself. Learning a language requires much practice and makes the brain stronger.

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 YOU 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.

Brainology® Intro Unit Lesson 3, “Practice It”: Reading for Lesson - Option B, cont. ANSWER KEY

Why doesn't EVERYBODY do this?

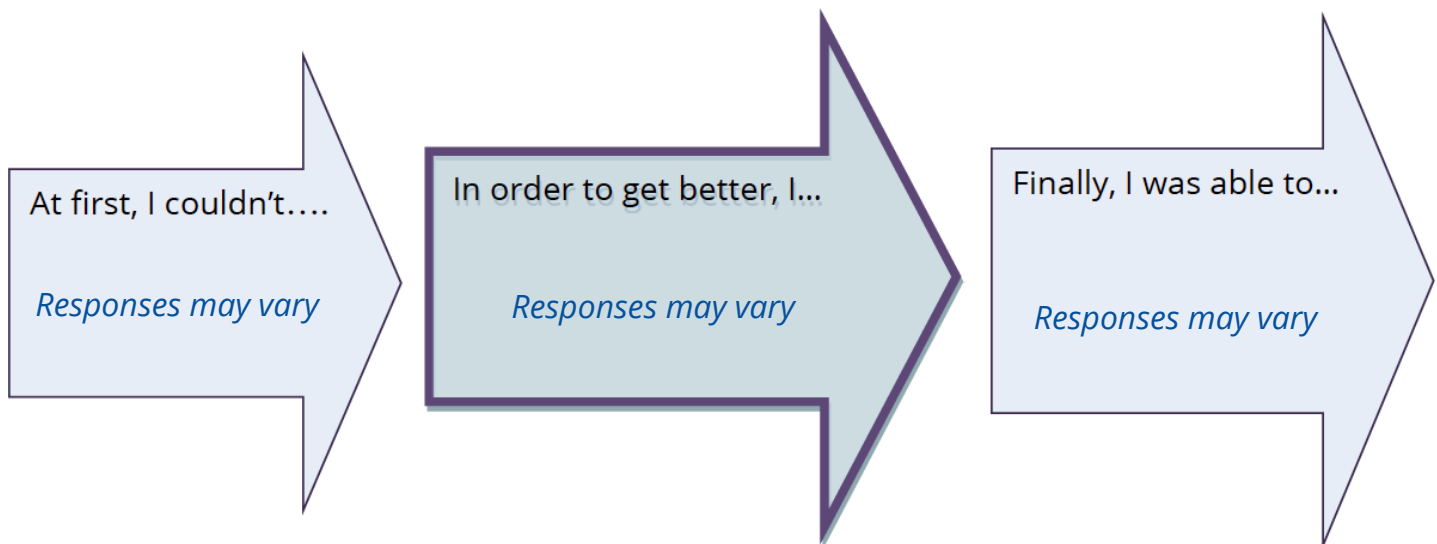
Many people miss out on the chance to grow a stronger brain because

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

Reflection: Remember a time when you worked extremely hard on something that was at first difficult,

Can you relate?

but after practice and effort you were able to succeed.



How did you feel when you were successful?

Responses may vary

Was it worth the effort? Explain.

Responses may vary

Other Mindset Works® Programs

Mindset Works® programs help students and educators become more motivated and effective learners.



Brainology® FOR SCHOOLS

Brainology® for Schools is a blended learning curriculum that teaches students how to develop a growth mindset. The program includes online animated instructional units as well as offline classroom activities. Brainology® for Schools also comes with a Spanish language option: Brainology® en Español!



Brainology® FOR HOME

Brainology® for Home is a blended learning curriculum that teaches students how to develop a growth mindset. The program includes online animated instructional units as well as offline activities.



MindsetMaker™ Online Professional Development

This online Professional Development course for teachers provides tools and resources needed to shift teachers' practice and cultivate a growth mindset culture of teaching and learning within their classroom.



GEM™ Growing Early Mindsets™

Growing Early Mindsets™ (GEM™) is an early learning curriculum designed to integrate growth mindset into the PreK-3 classroom.



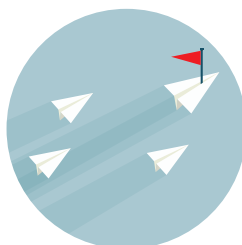
SchoolKit

Mindset Works® SchoolKit is a suite of resources (including Brainology® for Schools, MindsetMaker™, and LeaderKit™) developed to cultivate a growth mindset school culture. It contains tools for administrators, teachers, and students to learn, teach, and live the growth mindset.



Live Training

Our professional learning specialists deliver engaging, high-quality talks and workshops to help your school or district learn how to cultivate a growth mindset culture. Using reflection, discussion, activities, games, videos, and practical tools and resources, we can promise an interactive session that has lasting impact for both immediate and future change.



LeaderKit™

The LeaderKit™ is a valuable resource for school leaders to use to help foster a growth mindset across a school. When leaders model a growth mindset, it sets the stage for all stakeholders to follow.



Learn more about Mindset Works® programs at:

www.mindsetworks.com

About Mindset Works

Mindset Works was co-founded by one of the world's leading researchers in the field of motivation, Stanford University professor Carol S. Dweck, Ph.D. and K-12 mindset expert Lisa S. Blackwell, Ph.D. The company translates psychological research into practical products and services to help students and educators increase their motivation and achievement.

Our award-winning interactive program provides students, parents and educators with a better approach to learning.

Brainology® program is a fun, interactive, award-winning, online program that helps middle school students learn about how the brain works, how to strengthen their own brains and how to better approach their own learning. In the process, the Brainology® program helps them cultivate a growth mindset whereby they think of their intelligence as something they can develop through study and learning rather than as something fixed. The core belief in the malleability of the mind triggers motivation and learning-oriented behavior in various aspects of life.



Visit www.mindsetworks.com for more growth mindset resources, tools, articles, and videos. Contact us at info@mindsetworks.com.



Copyright © 2002-2017 by Mindset Works, Inc. All rights reserved.

No part of this publication may be reproduced or transmitted in any form or by any means, electronic, mechanical, photocopying, scanning, or otherwise, without prior permission of the publisher, unless permitted under Section 107 or 108 of the 1976 United States Copyright Act. Requests to the publisher for permission should be addressed to support@mindsetworks.com or mailed to:

Licensing at Mindset Works
340 S. Lemon Ave. # 6463
Walnut, CA 91789

Certain pages from this book are designed for use in a group setting and may be reproduced for educational purposes only. The copyright notice on such pages may not be changed or deleted and it must appear on all reproductions. This permission is restricted to paper reproduction solely for the purpose of education. It does not permit large-scale reproduction, distribution, transmission, electronic reproduction, modification or inclusion in any other publication, nor does it permit any use for commercial purposes.

Mindset Works and Brainology are registered trademarks of Mindset Works, Inc.