

BRAINOLGY[®]

Transforming Students' Motivation to Learn

Research Overview & Introduction



www.brainology.us

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Growth Mindset Research Background

Carol Dweck, Ph.D.

- **Dr. Carol Dweck is one of the world's leading researchers in the field of motivation and has devoted decades to growth mindset research. She is Brainology's co-founder and the program is based on her research.**
- **Her books include: *Mindset* and *Self-Theories***
- **More on Dr. Dweck at:**
 - <http://www.mindsetonline.com/>
 - http://en.wikipedia.org/wiki/Carol_Dweck
 - <http://www-psych.stanford.edu/~dweck/>
 - <http://www.brainology.us/about/carol.aspx>

Mindsets

Fixed Mindset

intelligence is a fixed trait

Growth Mindset

intelligence is a malleable
quality, a potential that can be
developed

Recent Research in Cognitive Psychology & Neuroscience is Supporting the Growth Mindset

a Scientific American article summarizing this research
can be found at

<http://www.sciam.com/article.cfm?id=the-secret-to-raising-smart-kids>

What Mindsets Do Goals

Fixed Mindset Students Say

Looking Smart is Most
Important

“The main thing I want when I do my school work is to show how good I am at it.”

Growth Mindset Students Say

Learning is Most Important

“It’s much more important for me to learn things in my classes than it is to get the best grades.”

What Mindsets Do

Effort Beliefs

Fixed Mindset Students Say

Effort is negative

“To tell the truth, when I work hard at my school work it makes me feel like I’m not very smart.”

Growth Mindset Students Say

Effort is positive

“The harder you work at something, the better you’ll be at it.”

What Mindsets Do

Strategies After Failure

Fixed Mindset Students Say

Helpless

“I would spend less time on this subject from now on.”

“I would try not to take this subject ever again.”

“I would try to cheat on the next test.”

Growth Mindset Students Say

Resilient

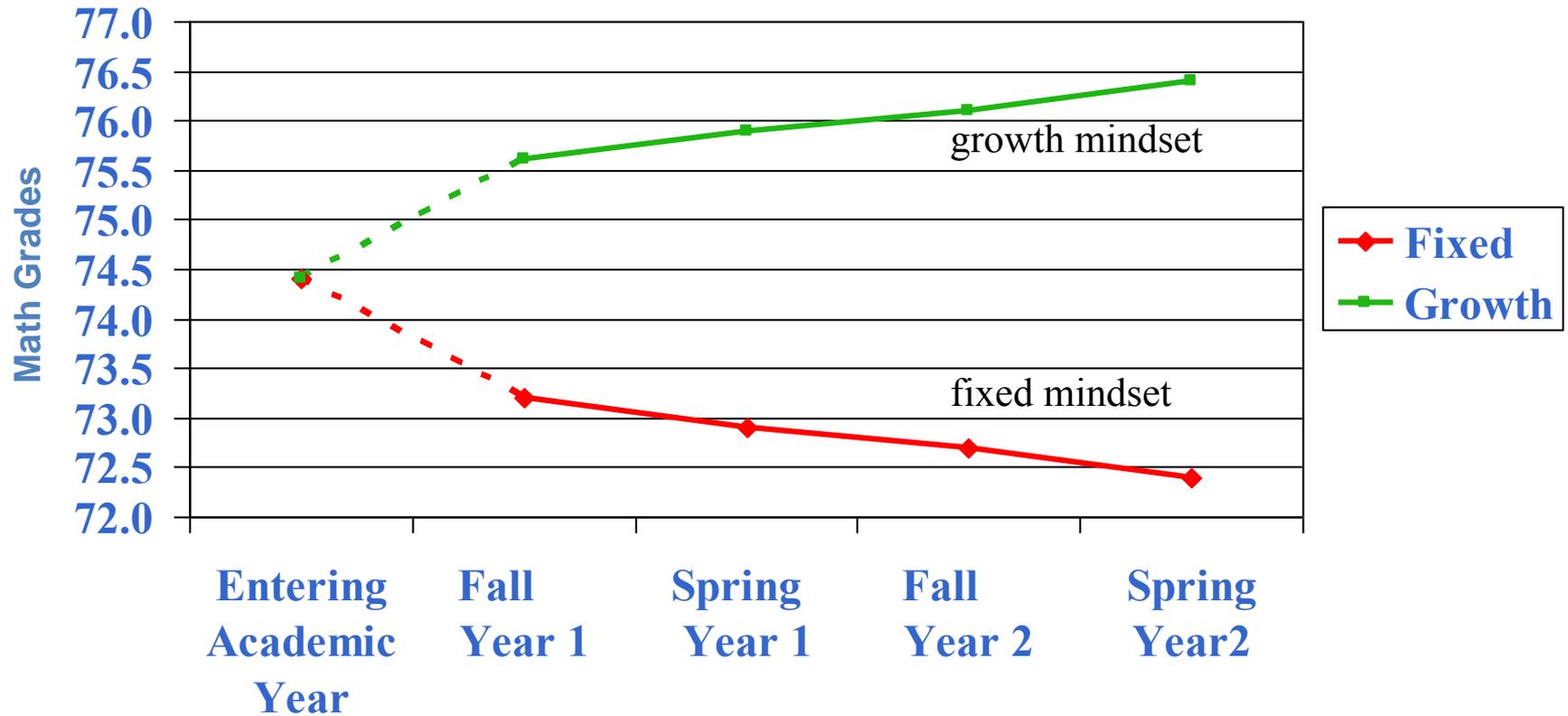
“I would work harder in this class from now on.”

“I would spend more time studying for the tests.”

Study #1 on Students Making a Transition to 7th Grade, from:

**Blackwell, L., Trzesniewski, K., & Dweck, C.S. (2007).
Implicit Theories of Intelligence Predict Achievement Across an
Adolescent Transition: A Longitudinal Study and an Intervention.
Child Development, 78. 246-263.**

Math Achievement in Junior HS



Study on How Mindsets Are Communicated from:

Mueller, C. M. & Dweck, C. S. (1998).

Intelligence praise can undermine motivation and performance.

Journal of Personality and Social Psychology, 75, 33-52..

Each student worked on a non-verbal IQ test & was given one kind of praise

Intelligence Praise

“Wow, that’s a really good score. You must be smart at this.”

Effort Praise

“Wow, that’s a really good score. You must have tried really hard.”

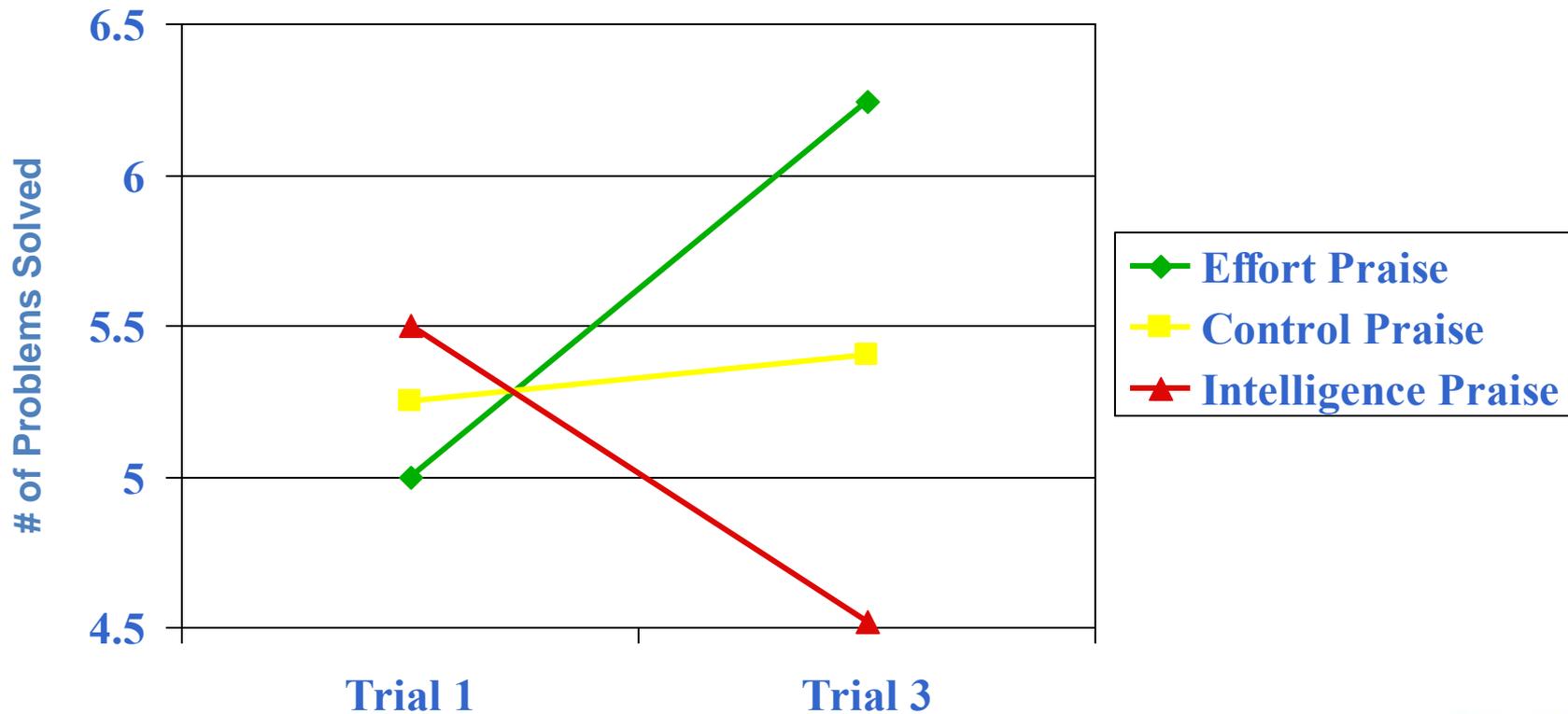
Control Group

“Wow, that’s a really good score.”

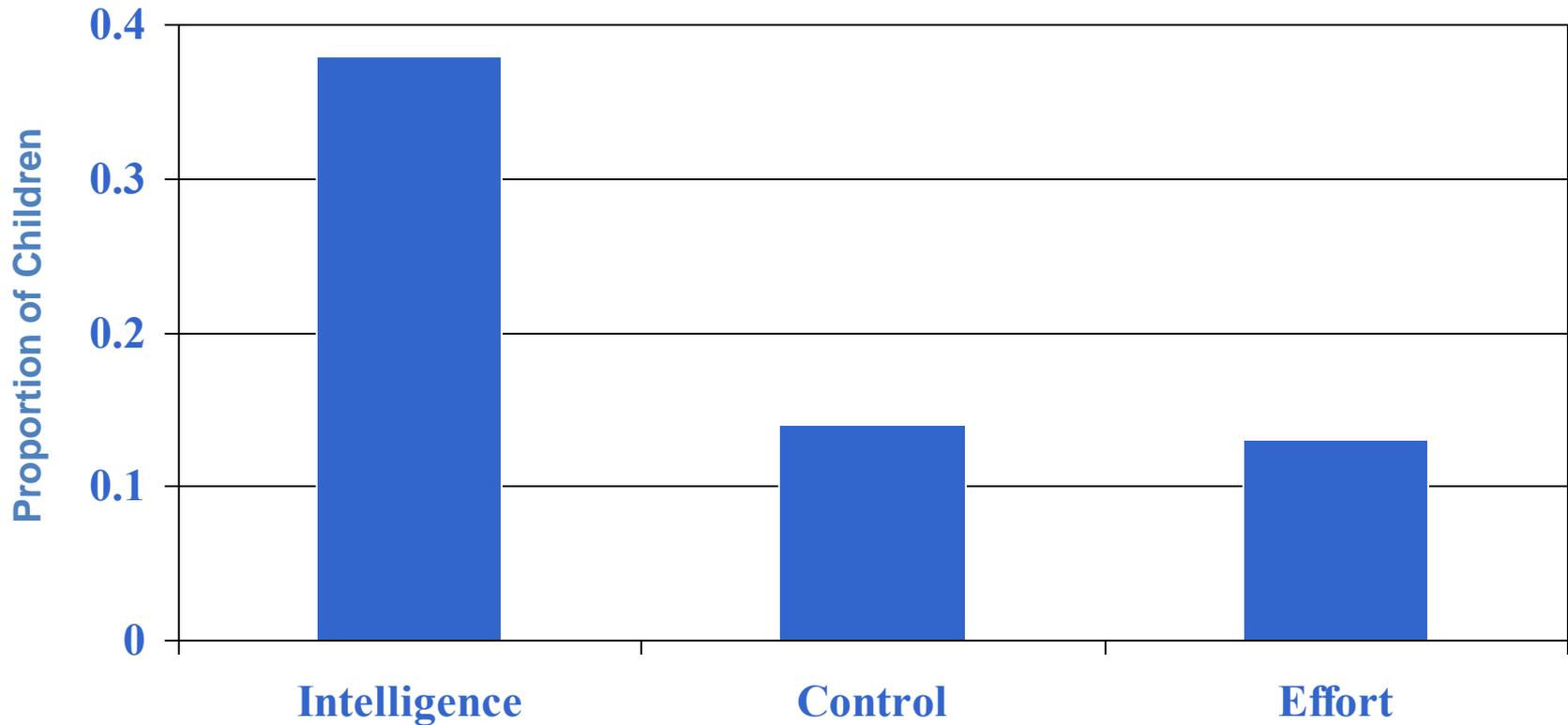
Effects of Intelligence vs. Effort Praise

		Fixed	Growth
After difficult trial	Goals	Looking Smart	Learning
	Confidence	Low	High
	Motivation	Low	High
	Performance	Decreased	Increased

of problems solved on the IQ test Trial 1 (before failure) and Trial 3 (after failure)



Lying: Students who misrepresented their scores

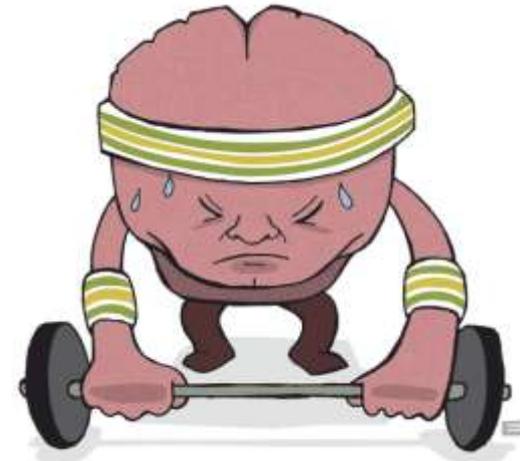


Study #2 on Students Making a Transition to 7th Grade, from:

**Blackwell, L., Trzesniewski, K., & Dweck, C.S. (2007).
Implicit Theories of Intelligence Predict Achievement Across an
Adolescent
Transition: A Longitudinal Study and an Intervention.
Child Development, 78. 246-263.**

Changing Mindsets

The Brainology® concept was initially piloted as an instructor-delivered intervention



Experimental Procedure	Control Group	Growth Mindset Group
Study Skills Training	8	6
Growth Mindset Training	-	2
Total	8	8

Growth Mindset Material Used

- the growth mindset training used a 4-page article developed for the study
 - you can read this article at:
<http://www.brainology.us/websitemedia/youcangrowyourintelligence.pdf>

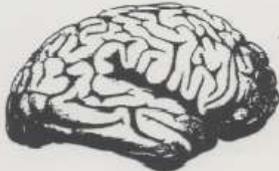
You Can Grow Your Intelligence
New Research Shows the Brain Can Be Developed Like a Muscle

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!"

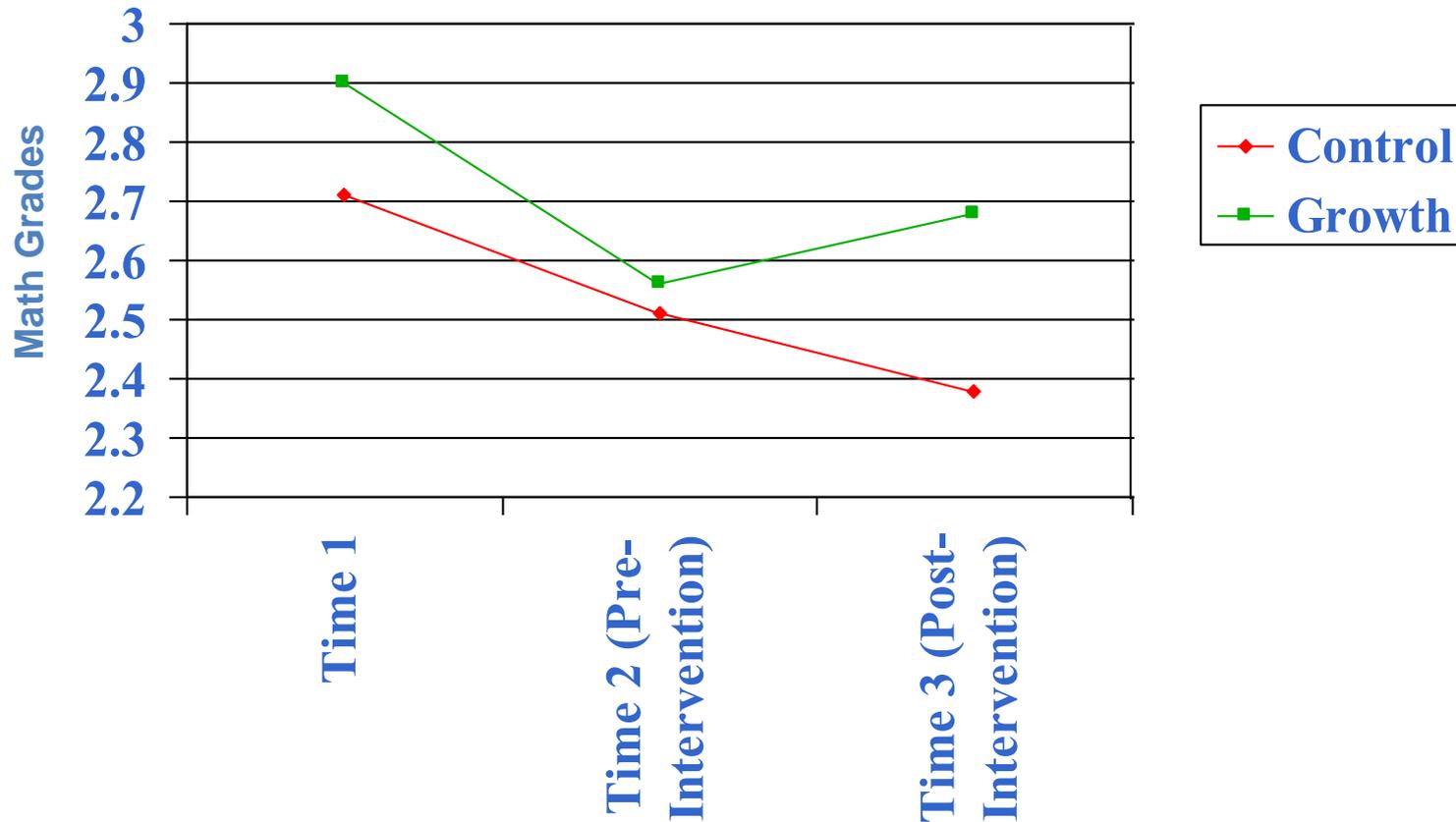
But most people don't know that when they practice and learn new things, parts of their brain change and get larger a lot like muscles do when they exercise.



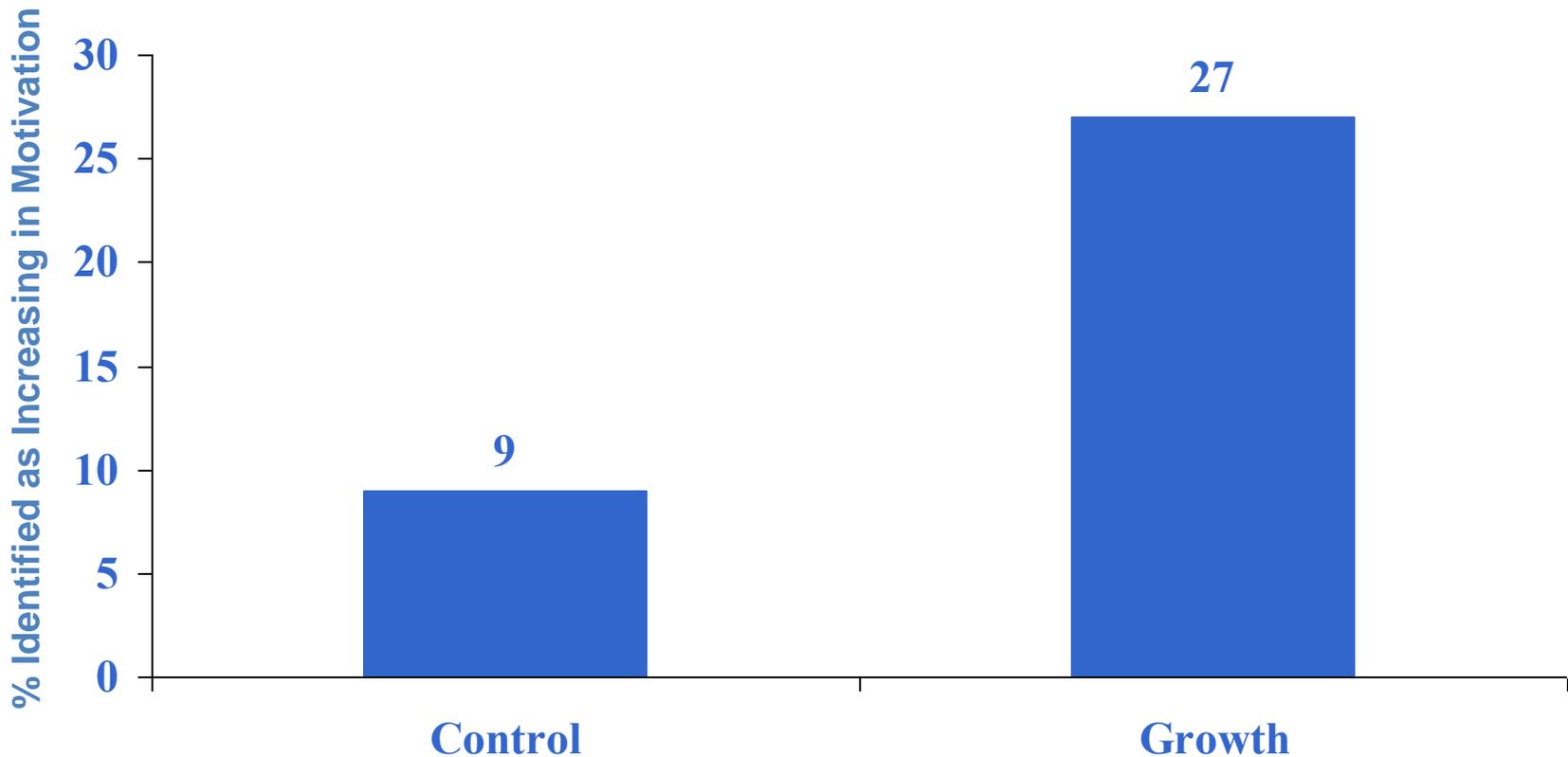
Inside the cortex of the brain are billions of tiny nerve cells, called neurons. The nerve cells have branches connecting them to other cells in a complicated network. Communication between these brain cells is what allows us to think and solve problems.

HEALTH & SCIENCE News You Can Use. 6

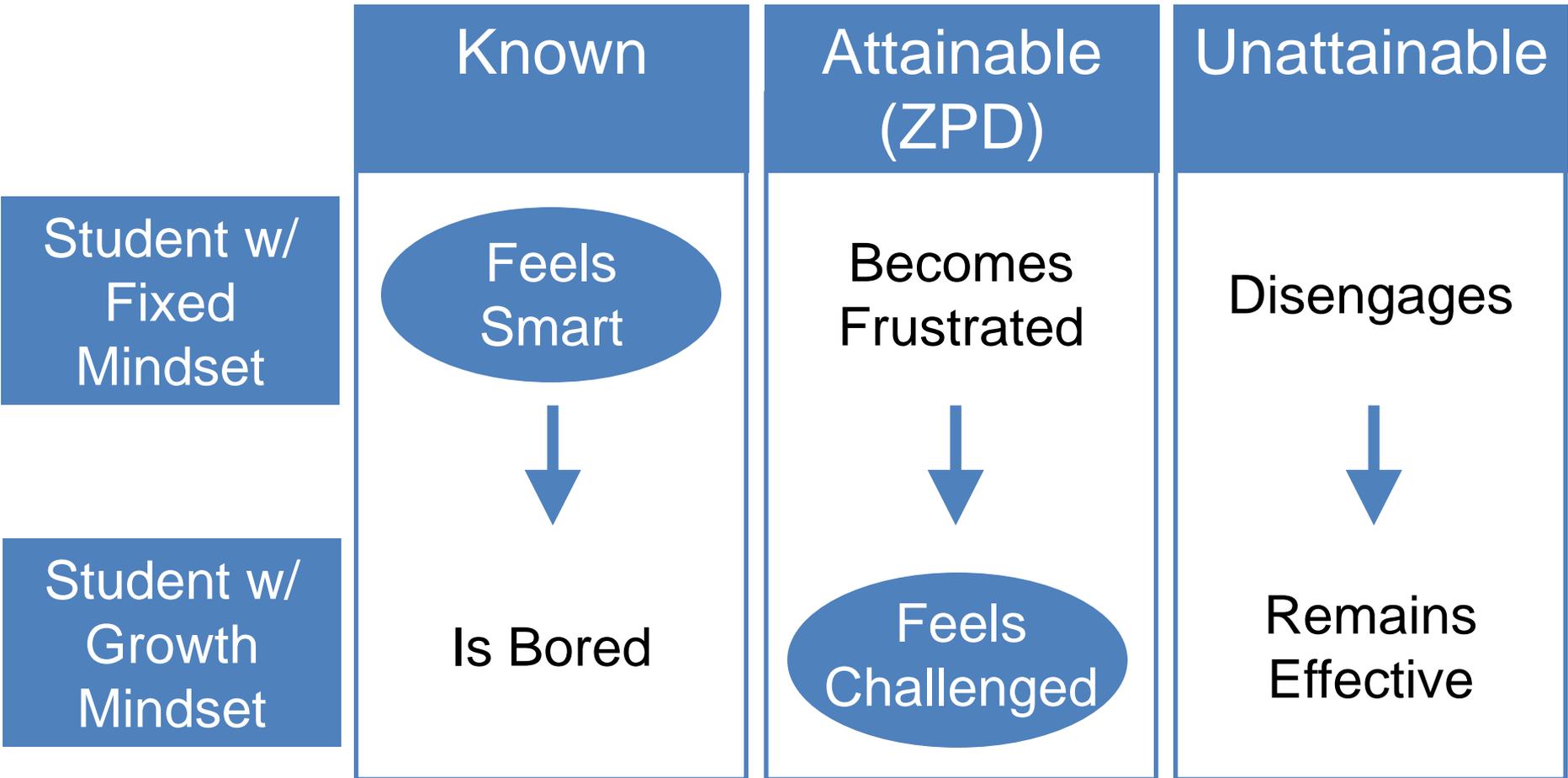
Change in Math Grades



% Identified as Increasing in Motivation



Zone of Prox. Dev. View of Mindsets



Adapted From: Murphy, L., & Thomas, L. (2008). Dangers of a Fixed Mindset: Implications of Self-theories Research for Computer Science Education. ITiCSE '08 June 30–July 2, 2008.

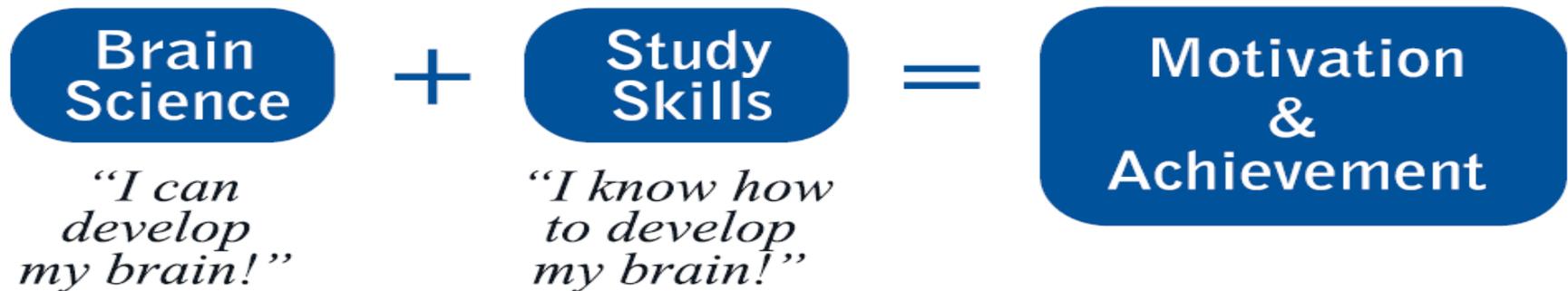
The Brainology® Program





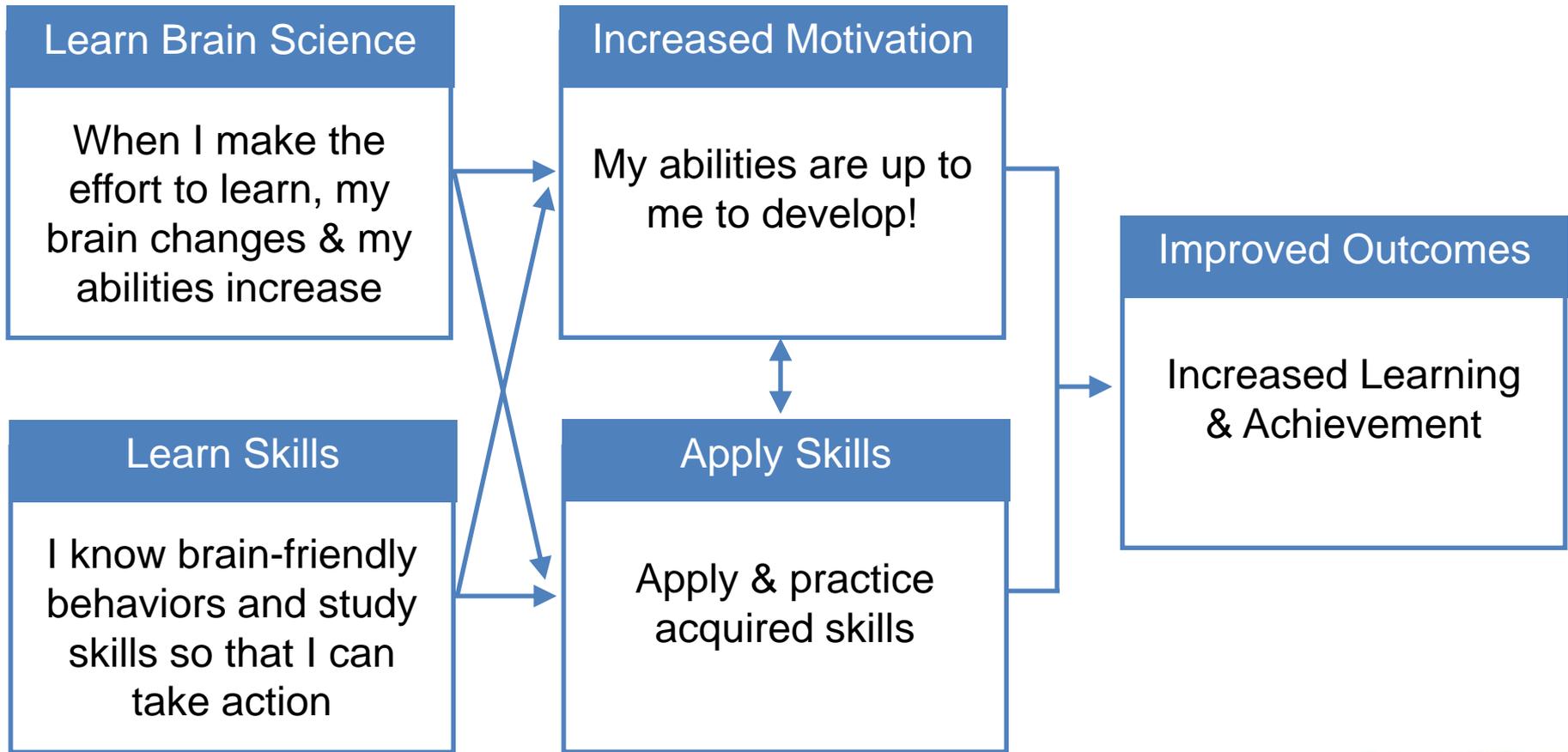
The Brainology® Program

- Interactive, online program to cultivate a growth mindset.
- Students follow animated characters as they tackle issues in their most difficult subjects.
- Brainology® Growth Process:



From Brainology® to Outcomes

Brainology® Use → Behavior → Outcomes



Brainology® Structure

- **students follow animated characters as they tackle issues in their most difficult subjects**
- **brief introduction + 4 units**
- **content made relevant and placed in context of school and student challenges**
- **relevant content + interactivity + humor = high level of engagement**
- **summary handouts, assessments, teacher's guide, teacher tools to view usage data**

Intro & Unit 1: Brain Basics

- **Intro:** an introduction to the characters, purpose of the program, structure and tools available
- **Unit 1:** basics of brain structure & function, particularly what is required to maintain readiness to learn
- **Sample takeaways:**
 - the brain needs certain things in order to function well (e.g. sleep & certain foods)
 - the brain is the body's control center: it gets information from all your senses, and is in charge of all of the body's voluntary and involuntary movement
 - different areas of the brain do different things
 - your senses serve as different “pathways” to the brain: using more than one sense to learn about something lets you use more of your brain and aids learning and memory
 - using different complementary modes of learning helps focus attention and increase learning
 - in contrast, competing pathways can interfere with learning
 - active learning approaches are best

Unit 2: Brain Behavior

- **brain behavior, how it functions, effect of emotions and strategies to manage emotions**
- **Sample takeaways:**
 - the brain is made up of nerve cells, called neurons, in a network of many connections
 - neurons communicate with each other through these connections
 - the branching parts, called dendrites, receive messages, and the long part, called the axon, transmits a signal through the neuron
 - thinking is influenced by the emotions, especially anxiety
 - when facing any type of threat, the brain sets off a fight-or-flight response that causes physical signs of anxiety and interferes with thinking
 - many students have performance anxiety—stress related to taking tests, giving presentations, or other performance-oriented situations—that can interfere with performance even when they know the material
 - you can lower your anxiety level by being prepared, thinking positively, and calming your breathing

Unit 3: Brain Building

- **how learning changes the brain and what sort of activities promote learning**
- **Sample takeaways:**
 - the brain and intelligence are not fixed—they both change when you learn
 - the brain grows more new cells and connections when you learn
 - you get smarter by exercising your brain, much the same way that you get stronger by exercising your muscles
 - how can you exercise the brain?
 - by exploring new information, learning new concepts, and practicing skills.
 - practice is the key to learning—only by practicing can you grow new connections in that area of your brain responsible for learning that thing
 - the more connections you make, the easier it gets to make new ones
 - different environments can influence brain growth--active learning is the key
 - you are never too old to learn and develop your brain!

Unit 4: Brain Boosters

- **how memory works and study strategies to apply the Brainology® lessons in real life.**
- **Sample takeaways:**
 - **memory is stored in the new connections your brain makes between neurons when you have a new experience**
 - **there are different stages in memory, each lasting different amount of time: sensory memory, working memory, and long-term memory**
 - **memory is a process, and if you skip one stage, the memory will not last**
 - **all information enters through sensory memory**
 - **things you pay attention to go on to working memory, which can only hold 5-7 separate pieces of information at once**
 - **information moves from working memory to long-term memory through a process called encoding. In order for encoding to happen, you must pay attention, attach new information to existing information that supports it and repeat the information**
 - **other mnemonics (memory strategies) include connecting information together by chunking, visual images and acronyms**
 - **most good study strategies are those that reinforce this memory process, helping your brain to make many strong connections between neurons and build a strong network of knowledge**

Brainology® Tools

- **e-Journal: students are prompted for reflections throughout the program, and have access to the e-journal at any time**
- **Brain Book: reference guide about the brain. Summary of key lessons learned**
- **Formative challenges at the end of each unit to review material**
- **Map: navigate to any section of the program**

Why is Brainology® the Most Effective Way to Motivate Students?

- **research-based program fully focused on the growth mindset, which leads to motivation & self-efficacy**
- **motivation & self-efficacy are the most powerful levers to catalyze student learning**
- **engages students in a fun, interactive way, in relevant context, so that they're receptive to it**
- **ensures, consistent, comprehensive, high quality delivery across the district**

Student testimonials

"The brainology program was very useful because it taught me a lot about my brain and how it works so that i now can apply that knowledge to my academic education."

– Sarah, 6th grade

"If you want to remember things for tests, make everything easier and more fun and interesting, go to Brainology! You will learn all you ever wanted to know – and didn't even know you wanted to know – about the brain!"

– Meira, 7th grade

"It will totally help me out, especially the part about working long term and short term memory."

– Dillard, 7th grade

"This program helped me a whole lot. its really good because it breaks down the information in an acurate way that i can i understand it"

– Radwa, 9th grade

"Every student in the United States should learn about this."

– Greg, 9th grade

Student testimonials (cont'd)

"It was very fun and educational. I learned alot about my brian and how to help it learn things, thus leading to a succesfull education"

– Yasmeen, 8th grade

"i really enjoyed this program it has helped me in so in so many ways because i have used these skills i learned from this program and now i have A's and B's in all my classes and befor i had all F's with a very low gpa now i have a 3.14 gpa passing all of my classes"

– Markeec, 9th grade

"i had a great time doing brianology and i think it will help me in the future"

– Leshwin, 8th grade

"I think that brainology was amazing. It helped me learn so much about the brain. But it still made it fun and easy to learn"

– Blair, 8th grade

Teacher testimonials

"YES I truly believe that this has helped. The students are self reporting that their grades have raised and that the strategies that Brainology teaches them are helping. They report that they imagine their dendrites growing :-). They talk about needing to never give up. The relationships I have with these students are stronger than any I have ever had (not including coaching) and I attribute it to my work with them in this realm."

– Emily, High School Teacher, California, USA

"I find students using the content/process vocabulary of Brainology in their academic and social interactions. They have also generalized the lessons to help with dealing with stress and sustain problem solving during high-stakes test. Brainology does a wonderful job with addressing both the cognitive and emotional components of brain structure and function... The interactive format combined with pre-teaching and post-review, with boosters dramatically increases not only attention but also retrieval. As a consequence I have found students to be more willing to take risks and support others. The change in attitude is contagious for teachers as well."

– Manuel, High School Psychologist, California, USA

Teacher testimonials (cont'd)

"The best word I can think of to describe its effects is empowering. It allows students to know that they are in control of their brains and learning -- and it's not based on the "cards they are dealt." ... For the past several years, we have been teaching our students about the brain at the beginning of the year for the purpose of empowerment. However, the delivery of similar (yet more in-depth) information through Brainology is straight-forward, informative, and appealing to kids. I think the plan to have them go through each level and then discuss it as a class is a good one. That way the lessons are reinforced through another channel."

– Sue, 8th & 9th Grade Teacher, Minnesota, USA

"Brainology definitely helped my students. They all enjoyed it very much and came away with more self-confidence and belief that they could improve their "brain power"."

– Louise, Educational Aide, Idaho, USA

Teacher testimonials (cont'd)

"I really do think that it made them consider their own roles in their success, as well as how to improve their success. It allowed students to be proactive about their learning. They could point to what they did try and what they didn't as they sorted through how they learned, and what worked for them. They tried new study skills and explained why the skills worked or didn't in terms of the vocabulary introduced... It really helped us grow in our understanding of the students' challenges as well as our own development."

– Suzanne, High School Math Teacher, California, USA

"Yes, because kids truly believe that Mary sitting across the room is smarter than them because she gets A's all the time. When I show them why and how Mary gets A's, they understand that it is the "effort" factor that makes a difference, and perseverance is important."

– Rose, Social Studies Teacher, Connecticut, USA

Screenshots



Screenshots

The screenshot displays the Brainology software interface. On the left is a dark blue sidebar with the 'TOOLS' section containing icons for: e-Journal, Notepad (e-J Reflex.), Map, Brain book, Help, Feedback, and Save & Exit. The main area features a green mountain map with a winding path. A speech bubble from a sun icon says: "Go to Level 4: Brain Boosters continue where you left off restart the unit". The path is divided into four levels: Level 1: Brain Basics, Level 2: Brain Behavior, Level 3: Brain Building, and Level 4: Brain Booster. Each level includes a Classroom, Brain Lab, and Challenge. The path ends at a castle labeled "Brain Master Challenge". A compass rose is visible on the left side of the map.

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Screenshots



Screenshots

The screenshot displays the Brainology™ e-Journal interface. On the left is a blue sidebar with 'TOOLS' including: e-Journal (e-J Reflex.), Notepad, Map, Brain book, Help, Feedback, and Save & Exit. The main area shows 'Chris' e-Journal' with a 'My e-J' icon and tabs for 'My Reflections' and 'My Challenges'. A 'Save & Close' button is in the top right. The journal entry text reads: 'my brain. Good thing my brain just gets denser instead of bigger! I'd hate to grow a bigger head and be off balance for basketball because of all this learning I'm doing!' Below this is a bolded title 'Brain connections like basketball passes!' followed by 'entered by Chris while in Unit 2: Brain Behavior' and a paragraph: 'WOW I'm an Apprentice! Who would have thought that the brain is made up of a network of so many nerve cells all passing signals around--like how a good basketball team passes the ball from one player to the next down the court, until they get to the basket for a slam-dunk. Now scoring is something I can relate too! I have to start thinking of what I'm going to do and how I'm going to do it-cause you need strategy and a game plan in math just like in b-ball. That square breathing thing sounds weird but I'm going to try it'.

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Screenshots

TOOLS

- e-Journal (e-J Reflex.)
- Notepad
- Map
- Brain book
- Help
- Feedback
- Save & Exit

My e-Journal

My Reflections | My Challenges | Save & Close

My Challenges

Other Challenges:

- I have trouble concentrating on school work
- I get really nervous when I take a test
- I forget things that I read or hear in class
- Some subjects are very hard for me to learn
- I'm too far behind in my class
- I'm just not a good student
- I don't know how to take notes in class
- I don't have enough time to do everything
- I lose papers, notes or assignments
- I don't like school
- There's nobody to help me
- I don't know how to study for a test
- I don't have a good place to study or do homework
- Personal problems get in the way

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Screenshots

The screenshot shows the Brainology application interface. On the left is a dark blue sidebar with the 'TOOLS' section containing icons for 'e-Journal', 'Notepad (e-J Reflex.)', 'Map', 'Brain book', 'Help', 'Feedback', and 'Save & Exit'. The main content area is white and titled 'Brain Book' with a 'CLOSE' button in the top right. Below the title is 'Brain Book Contents'. It lists four units:

- UNIT 1: BRAIN BASICS** - What does the brain do? (Icon: brain with globe)
- UNIT 2: BRAIN BEHAVIOR** - How does the brain work? (Icon: gears)
- UNIT 3: BRAIN BUILDING** - How does the brain learn? (Icon: brain with number 123)
- UNIT 4: BRAIN BOOSTERS** - How does memory work, and how can you make yours work better? (Icon: brain with lightning bolt)

 At the bottom of the interface, there is a copyright notice: 'Copyright © 2008 Brainology, LLC. All rights reserved.' and the website address 'www.brainology.us'.

Thank you!

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