Use It or Lose It

The BIG Idea

- What happens to skills that I don't practice?

AGENDA

Approx. 45 minutes

I. Warm Up: Do-Now: Something I Need to Improve (5 minutes)

II. Pruning (10 minutes)

III. What am I Using and What am I Losing? (15 minutes)

IV. The Dazzling Students of Garfield High (10 minutes)

V. Wrap Up (5 minutes)

MATERIALS

- ❑ **STUDENT HANDBOOK PAGES:**
  - Student Handbook page 18, Something I Need to Improve
  - Student Handbook page 19, What Skills Am I Building?
  - Student Handbook pages 12-13, You Can Grow Your Intelligence (Out of the Mouths of Babies)
  - Student Handbook pages 20, The Dazzling Students of Garfield High
  - Student Handbook pages 21, Garfield Grads: Where Are They Now?
- ❑ Overhead projector
- ❑ Chart paper and markers
- ❑ Colored pencils

OBJECTIVES

During this lesson, the student(s) will:

- Understand that the process of pruning reduces connections between neurons when skills are not practiced
- Identify skills they're spending most of their time on, and understand the consequences for learning

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OVERVIEW

In this lesson, students consider the importance of practicing skills that they find difficult. They create a bar graph of how they spend their time and discuss the implications for learning and success. They read about the brain pruning that takes place in toddlers and adolescents, and hear the story of the hard work and academic achievements of the students of Garfield High School in East Los Angeles. (The movie "Stand and Deliver" is based on their story.)

PREPARATION

- ❑ List the day's **BIG IDEA** and activities on the board.
- ❑ Write the day's vocabulary word and definition on the board.
- ❑ Think about a skill you've had difficulty with, and be prepared to describe your attempts to improve.
- ❑ The following handouts need to be made into overhead transparencies or copied onto chart paper:
  - **Student Handbook page 19, What Skills Am I Building?**
  - **Student Handbook pages 12-15, You Can Grow Your Intelligence (Children's Brain Growth)**

VOCABULARY

Pruning: process in which weak brain connections are eliminated and connections that get more use are made stronger.

IMPLEMENTATION OPTIONS

In **Activity II, Pruning,** you may choose to read the article as a class to assist struggling readers. On the overhead, underline the key points in the article and have students highlight those points on their handbook pages.

For **Activity III, What am I Using and What am I Losing?,** you may choose to make a sample bar graph charting how you spent your time during middle school.

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ACTIVITY STEPS

I. Warm Up: Do-Now: Something I Need to Improve (5 minutes)

1. **SAY SOMETHING LIKE:** The title of last week's lesson was "You Can Grow Your Intelligence." Who can explain what that means? Who can offer evidence that it's possible to do this? Who can summarize the results of the juggling experiment? What happened when the jugglers stopped practicing?

   This week, we're going to focus on what happens to skills you stop practicing. The title of today's lesson is "Use it or Lose It."

2. [Have students turn to **Student Handbook page 18, Something I Need to Improve**. Model the completion of this page by describing an activity you've had difficulty with, and your attempts (successful or not) to improve. Then have the students complete the page independently.]

3. [When they've finished, have a few students share their own stories.]

4. **SAY SOMETHING LIKE:** It seems like most of us have subjects or activities we feel we're not good at. Some of us may even go out of our way to avoid those activities because they make us feel awkward or stupid. What happens if you stop trying the first, or the second, or the twentieth, time something is difficult? (You stop learning.)

II. Pruning (10 minutes)

1. **SAY SOMETHING LIKE:** There are two times during a person's life when he or she is building brain connections at a tremendous rate. Anyone wants to guess at what age this happens? [Accept guesses, and ask students for supporting evidence.]

   One period of amazing brain growth is in early childhood – from infancy to age three.

2. [Have students turn to **Student Handbook pages 13, You Can Grow Your Intelligence,** to read "Out of the Mouths of Babies." Place the transparency of this page on the overhead projector.]

   SAY SOMETHING LIKE: If I were a student in this class, I'd wonder why babies' brain growth is important to our discussion of <u>your</u> brain growth. Ideas?

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3. [Have students read page 13 to themselves, then discuss what babies can teach us about learning.]

4. **SAY SOMETHING LIKE:** There's one other thing we can learn from babies. They're building lots of dendrites (brain connections). When they reach the age of three, the brain connections that are used less frequently disappear. The strongest and most-used connections survive, which allows the brain to work efficiently. This process is called **pruning**. You may have seen someone prune a tree or hedge. They cut back spindly, unhealthy branches, which helps the remaining branches grow stronger. The same thing happens inside your brain.

5. **SAY SOMETHING LIKE:** Now, let's return to the adolescent brain – yours. In case you haven't guessed, the other period of big brain growth is right before puberty, around age 11 or 12. While you were going about your everyday life in the past few years, your brain was building dendrites. Now, from ages 13 to 18, your brain will go through a pruning process to make sure that the strongest connections survive. So, if you want to be great at sports, or music, or academics, now is the time to exercise those parts of your brain. Your brains are very adaptive at this age. That's why it's easier for young people to learn to speak a new language or operate a new piece of technology than it is for adults. Scientists also think that sleep is necessary for brain pruning and growth – ten hours a night is recommended.

III. What am I Using and What am I Losing? (15 minutes)

1. **SAY SOMETHING LIKE:** In the next activity, you're going to take a look to see how you're spending your time to examine what connections you're strengthening. And what you may be in danger of losing. [Instruct students to turn to **Student Handbook page 19, What Skills Am I Building?** and place its transparency on the overhead. Distribute colored pencils to students.]

   How many of you have ever created a bar graph? [Show of hands.] Who can explain how this is done?

2. **SAY SOMETHING LIKE:** To make this bar graph, you are going to figure out how much time you spend <u>in one day</u> on each of the activities listed at the bottom of the page. Each of the small boxes equals 15 minutes, so four boxes equal one hour. The color of the boxes changes to show where one hour ends and the next begins. Let me show you how this works.

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3. [Model the creation of the bar graph as follows. **Note:** you can adjust the dialogue to describe how you spend your time. (See **Implementation Options**.)]

   What's the first activity listed here? (TV) Let's say I turn on the TV when I get home at 7:00 and watch until 10:00 at night. From 7:00 to 8:00 is one hour, 8:00 to 9:00 is two hours, and 9:00 to 10:00 is three hours. I'm going to find the 3-hour mark and color the bar below it.

   I'm skipping "Video Games" and "Sports" because I don't do either one. I probably read for at least an hour a day, so I'll find the 1-hour mark and color the bar below it. And so on.

   If there are activities you do often, but don't see here, for example, playing a musical instrument or doing arts and crafts projects, write them in one of the columns to the right. You should also feel free to add a column for downtime – daydreaming or talking with friends. Don't worry if there's some overlap between your activities, for example, if you do math homework with the TV on in the background. Just make your best guess as to how much time you're spending on each.

   You can include <u>all</u> of the time you spend in class only if you're paying complete attention. So if you're with your math teacher every step, taking notes and working all the sample problems, give yourself credit for 45 minutes. If you do a half hour of homework, add another 30 minutes, for a total of an hour and 15 minutes. If you don't do either of these things, skip the math column – your total time spent on math is zero – and go on. If you're somewhere in between, give yourself credit for the time you spend paying attention and the amount of homework you do.

   [Let students know how long they have to work on their graphs, and let them know when a minute remains.]

4. [Help students summarize their findings.]

   SAY SOMETHING LIKE: Let's take a look at the skills that lead to success in school. (Reading, Math, Writing, Computer) How much time did you spend on these subjects? Are you seeing any relationship between what you're good at, and how much time you spend on that activity? Why does this happen?

   The question you may want to ask yourselves is "What's important to me, now and for

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my future?" If the things that are important are not the things you're spending time on, what can you do to make a change?

SAY SOMETHING LIKE: It takes less time to make a change than you might imagine. Suppose on the average night you watch 4 hours of TV and spend 30 minutes on math work. If you spent one half hour less on TV each night, and used that time to practice math problems instead, you could double the time you spend on math each day. At the end of a school week, that little bit would add up to two and a half hours. At the end of the month, you'd have spent 10 extra hours on math—all from 30 minutes each night!

[Ask students to share examples of activities where they need to increase their effort in order to grow their intelligence. Then examine what activity(s) they could cut back on.]

IV. The Dazzling Students of Garfield High (10 minutes)

1. **SAY SOMETHING LIKE:** Our last activity today is a case study of a group of high school students who performed far beyond their own expectations. How they managed to do this will probably not surprise you, now that you know what's required to grow your intelligence.

   Please turn to **Student Handbook page 20, The Dazzling Students of Garfield High**. I'd like you to read this page with a partner. Here are the questions I'd like you to consider as you read. [Display the following questions on the board, overhead, or chart paper:
   - What do we know about Garfield High?
   - What was the students' goal?]

V. Wrap Up (5 minutes)

1. **SAY SOMETHING LIKE:** Let's make a list of what we learned about the brain today. [Write students' suggestions on chart paper. These might include the need for practice, that mistakes are okay, use it or lose it.]

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2. Next week, we'll complete our lessons on growing your intelligence. We'll look at the life stories of a few more highly successful people, learn new ways to describe intelligence, and think about advice we might have for younger students who haven't heard about this research. I'll see you then!

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Something I Need to Improve

Name one subject or activity (for example, sports, music, or art) that you struggle with.

_____

Describe why you find it difficult, or give an example of a time you had difficulty.

_____

_____

_____

List two things you've done to get better at this activity.

1) _____

_____

2) _____

_____

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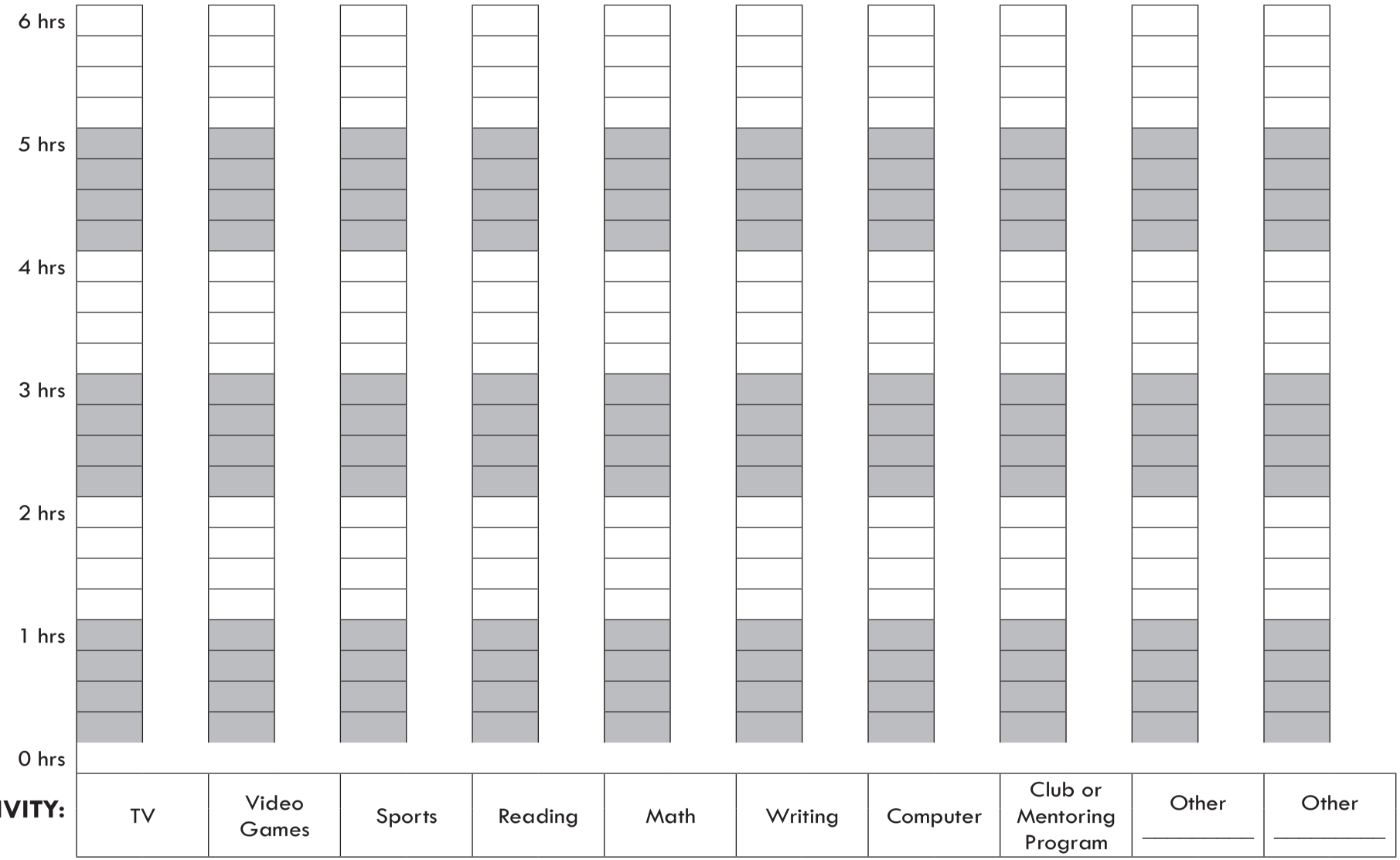
What Skills Am I Building?

Think about how you spend a typical day. Create a bar graph to show how many hours you spend on each of the activities below. Example: If you pay attention in math class (45 minutes) and spend a half hour on homework (30 minutes), you can color in 5 spaces (1 hour, 15 minutes) in the "math" column.



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The Dazzling Students of Garfield High

The students who attend Garfield High School in East Los Angeles are not rich. Nine out of ten students qualify for free lunch. They are not privileged. Many of their parents didn't finish high school. But they are famous.

Years ago, Garfield High School students dazzled people across the country. They became experts at the most difficult math high schools have to offer – calculus.

Their teacher, Mr. Escalante, did not believe in failure. He believed in preparation. He made his students believe, too. Here are the things they did to become top math students.

- They worked hard in math in junior high, no matter how poorly they had done in earlier grades.
- They came to school early and stayed late when they needed extra help.
- They attended special summer school courses to improve their skills.
- They cheered and chanted to get themselves ready for the work ahead.
- They had a goal – passing the Advanced Placement Calculus Test – the hardest standardized math test in the country.

Did their effort pay off? It did. One year, 18 students passed the test – a huge number for a test so difficult. Each year, more students attempted the test. Five years later, 85 students passed. The Garfield students went on to some of the best colleges in the country, and some of the best jobs anywhere.

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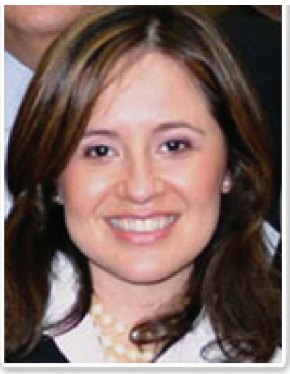
Garfield Grads: Where Are They Now?

Dr. Armando J. Islas
Dentist/Surgeon, Policeman, CEO
Class of 1976

Dr. Islas was the first in his family to go to college. He attended Harvard.

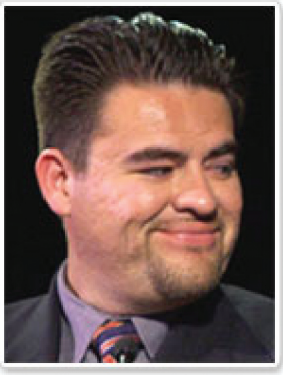
What he learned from Mr. Escalante:
"You can do anything you want to do and nobody can put a ceiling on how high you can go."



Juanita Gutierrez
Director of Public Relations, HSBC
Class of 1988

Ms. Gutierrez attended Wellesley College (Massachusetts) and the London School of Economics.

What she learned from Mr. Escalante:
"He made sure that students . . . came back after their first year of college and told us about their college experience . . . That one student coming to tell us about her experience changed my life forever."



Thomas I. Valdez
Research Engineer, Jet Propulsion Laboratory
Class of 1991

What he learned from Mr. Escalante:
"He gave me the ability to push myself and, yes, I can do whatever I want."

PHOTOS: Micheal Hall Photography (www.michealhallphotography.com)
STORY: The Futures Channel, Inc. (www.thefutureschannel.com)

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