

Death to the Textbook

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Why Ditch the Textbook?

- Part 1. You do not want to attack a big problem without plenty of ammunition. In the first step, we give you the ammunition to attack the elephant in the room...the fact that the content textbooks provide is incredibly boring, as well as academically unsound.



Part 1

How Do You Promote Reading In and Out of the Classroom?





Interactive Elements of the Reading Process



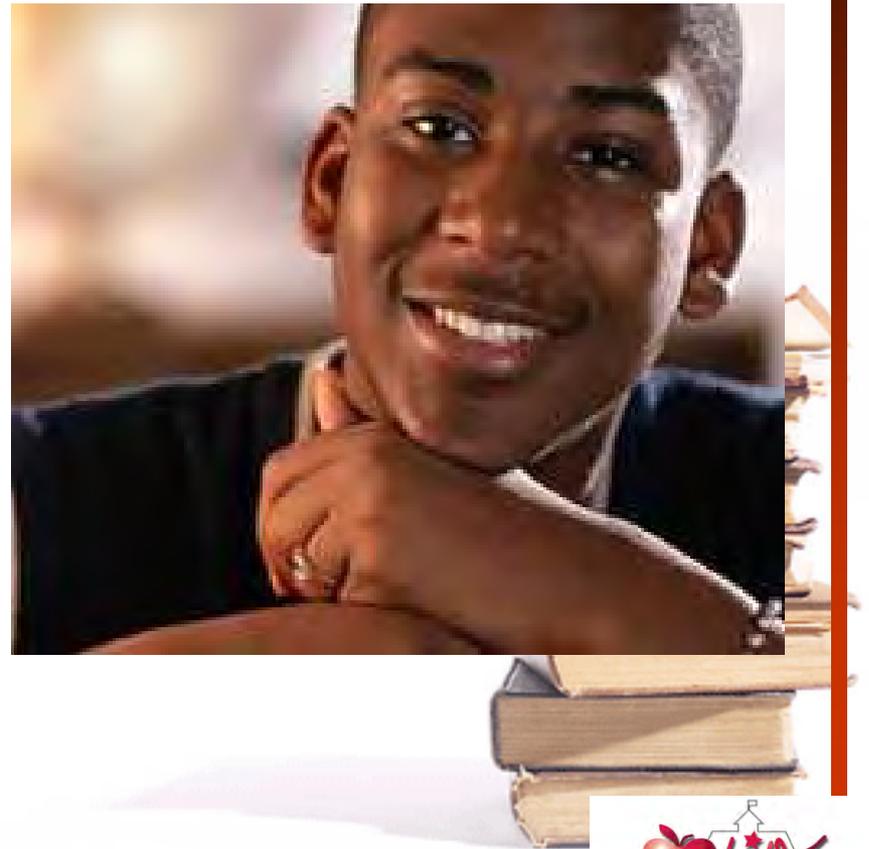
Reader



Text



Learning
Environment



Strategies of Proficient Readers

Visualize

- to make mental pictures or sensory images

Connect

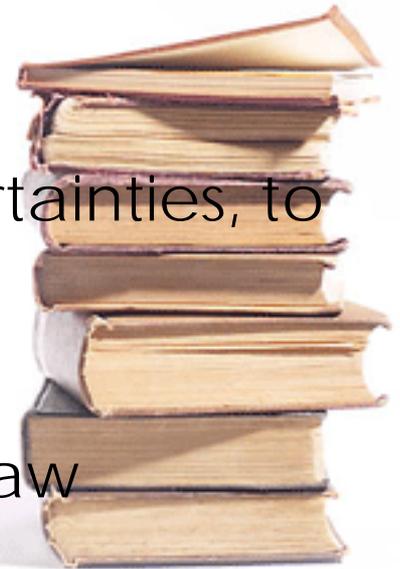
- to link to own experiences, to events in the world, to other readings

Question

- to actively wonder, to surface uncertainties, to interrogate the text

Infer

- to predict, hypothesize, interpret, draw conclusions



Strategies of Proficient Readers (cont'd)

Evaluate

- to determine importance, make judgments

Analyze

- to notice text structures, author's craft, vocabulary, purpose, theme, point of view

Recall

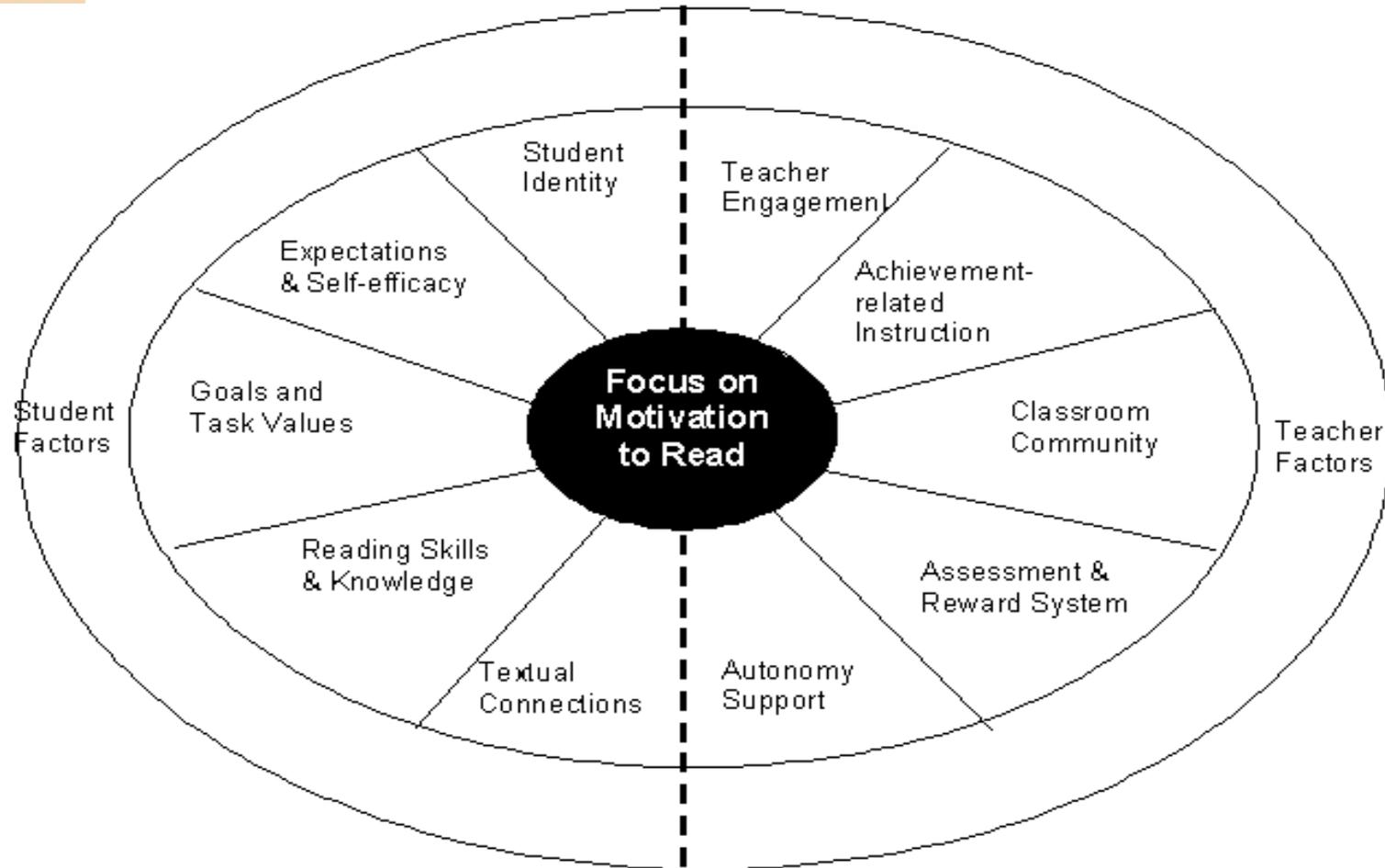
- to retell, summarize, remember information

Self-Monitor

- to recognize and act on confusion, uncertainty, attention problems



Focus on Motivation to Read



Struggling Readers

Struggling readers often need help with:

Comprehension

- Ability to understand what is being read while reading;

Fluency

- Ability to read smoothly and easily at good pace with good phrasing and expression;

Vocabulary

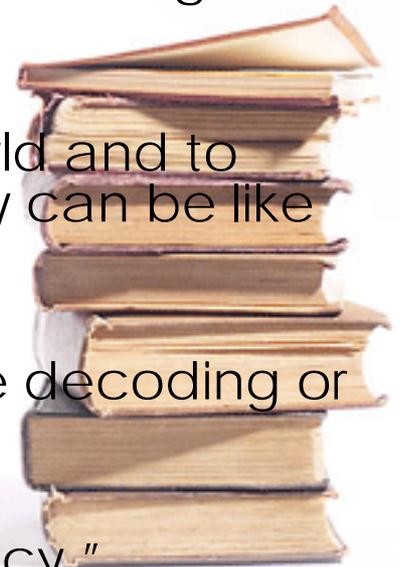
- Repertoire of words used to understand the world and to express perceptions of it; Academic vocabulary can be like a foreign language;

Word Recognition

- Many ways students can access print to include decoding or sounding out, knowing words by sight, etc.;

Motivation

- Desire to read; associated with this is "self-efficacy."



Comprehension

Issues

- The goal of reading is comprehension.
- Comprehension is a complex, abstract activity.
- It is not merely enough to explain what something means: Students need to be taught strategies that will help them understand texts.



Comprehension (cont'd)

What teachers can do...

Teach multiple strategies to include

- Clarifying
- Comparing and contrasting
- Connecting to prior experiences
- Inferencing (generalizing and drawing conclusions)
- Predicting
- Questioning the text
- Recognizing the author's purpose
- Seeing causal relationships
- Summarizing
- Visualizing



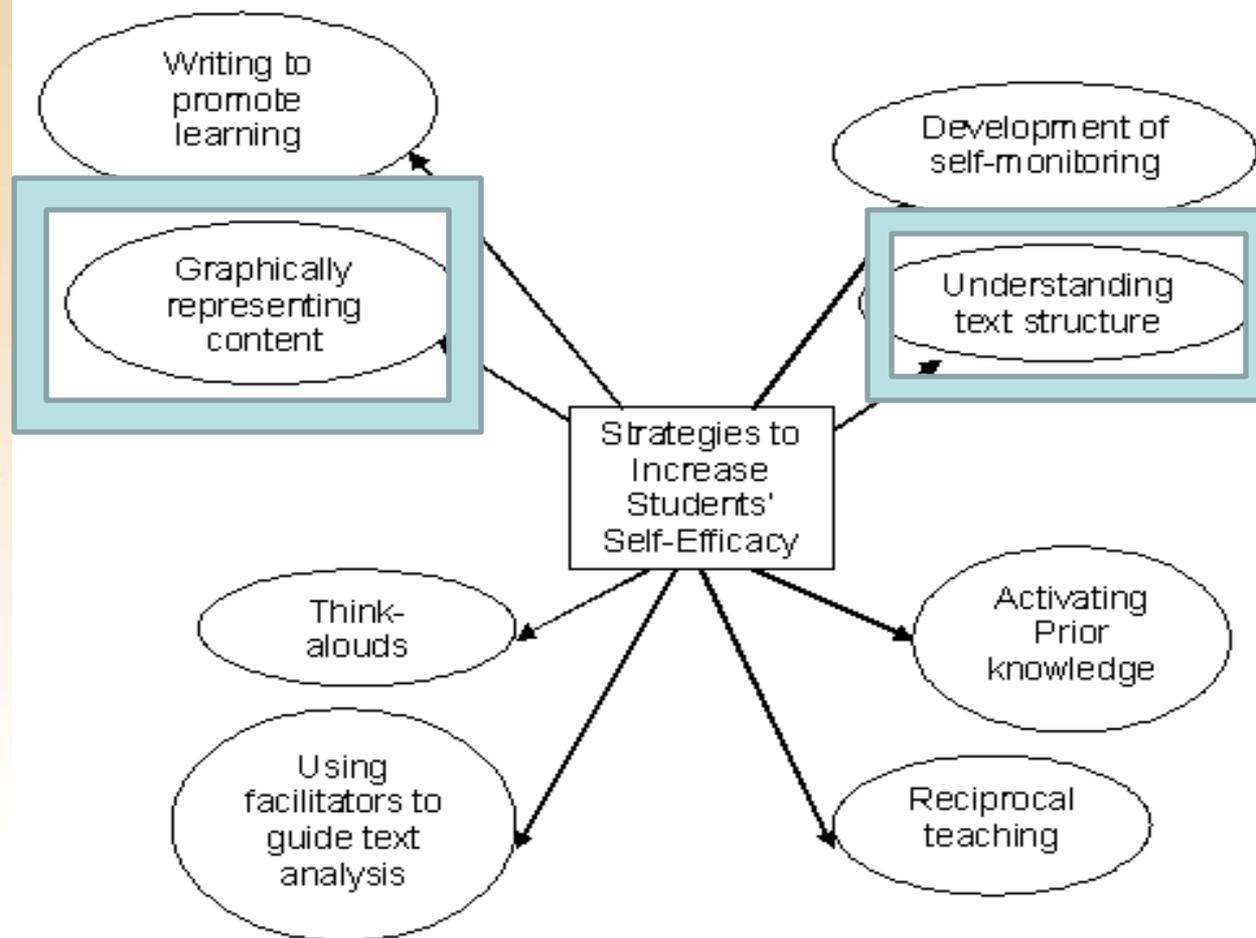
Motivation

What teachers can do...

- Provide students with opportunities to read a **wide range** of materials (e.g., fiction and nonfiction, articles, books, paper and electronic information) in a wide range of genres.
- Provide students with plenty of opportunities to read at a comfort level not frustration level.
- Give students choice of reading materials based on interest and curiosity.
- Engage students in the social process of reading (read, talk and write together).



Developing Self-Efficacious Readers



Reading for Learning in All Subjects

To strengthen reading as a tool for learning in all subjects, classrooms need:

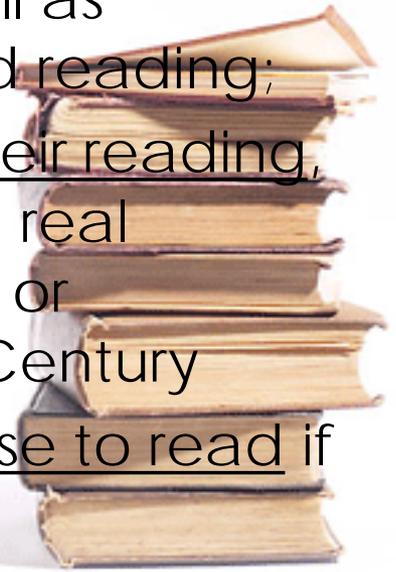
| MORE | LESS |
|---|-----------------------------------|
| “Real texts” (trade books, articles, reports, etc.) | Textbooks |
| Teaching of reading | Assigned reading |
| Student choice of reading | Reading only the “classics” |
| In-class reading | Take-home assignments |
| Workshop and book clubs | Whole-class discussion |
| Reading as a community activity | Reading as an individual activity |
| Reading lots of books (multiple genres) | Many weeks on a single book |
| Reading for enjoyment | Struggling through hard books |
| Reading for as a life activity | Reading as a school activity |



(Daniels & Zemelman, 2004)

Self-Selected Reading and Writing

- access to **multiple genres**, which is important to maintaining students' motivation for and interest in reading;
- opportunities for reading with partners to help them co-construct meaning while reading texts as well as providing them with motivation for continued reading;
- a variety of writing activities in response to their reading, which can be motivating and can provide a real audience for their writing (e.g., book reviews or critiques); 21 Digital Assessments for the 21st Century
- time to read and respond to texts they choose to read if teachers build this into classroom activities.



Reluctant/Struggling Readers: Nonfiction

These readers are looking for:

- Visual features (photos, illustrations, charts, diagrams);
- Two-page spreads (lots of information in a confined amount of space);
- Magazines, computer guides, web sites, newspapers, instruction manuals, graphic novels told in comic book form, puzzles, etc.;
- Index, T.O.C., headings, boldfaced items (being able to read book out of order, turning to the single page they need);
- Think books;
- High-interest topics;
- Vocabulary defined at point of use (rather than in a back page glossary);
- “Wander-around” books where they can start reading it anywhere and stop anywhere (e.g., David McCauley’s *The Way Things Work*);
- Biographies (true-life stories)^{7.4}



Reluctant and Struggling Readers: Fiction

These readers are looking for...

- **Thin books**, short chapters;
- White space – wide margins and an open font;
- Some illustrations to help them visualize the text;
- Well-defined characters that don't require them to "fill in the holes as they read;"
- **Plots with action that begin right away;**
- Mysteries;
- **Humor that lightens the moment;**
- **Characters their age or slightly older;**
- **Characters who face tough choices;**
- **Realistic language (fragments, run-ons, short sentences, slang);**
- **Easily defined conflicts.**





Part 1a: *How Do I Provide Support for Diverse Readers?*

Topics:

-  **Scaffolding strategies** to help all learners
-  **Texts beyond the textbook** to help students develop **fluency** and academic content knowledge
-  **Flexible groupings** and other differentiated strategies
-  **Self-directed reading and writing experiences** that allow for differentiation and motivate students to read, write and discover relevance
-  **Home-community-school collaborations**





What Do English Language Learners (ELL) Need?

 Access to a variety of texts and genres written at multiple reading levels

 Need to hear words pronounced and used

 Need participation in small group discussions



Guided Reading

Purpose: to develop independent readers who can summarize and question meanings they construct, who can form opinions based on reading of a text and support those opinions with reference to the text

- Can be used to help struggling readers apply comprehension strategies to move them toward independent reading
- Can be used to focus on model ways to make connections with texts on multiple levels
- Can be used to focus on reading as a process
- Can be used to generate questions rooted in students' responses, while students are reading rather than using predetermined questions

Key to Success: Texts used should be interesting, informative, short



Differentiated Instruction

Varying Questions

- Teachers vary the sorts of questions posted to students based on their readiness, interests and learning styles.

Multiple Texts

- A variety of texts to read are offered to students, sometimes assigned and sometimes by student choice.





Key Ingredients: Classroom Library

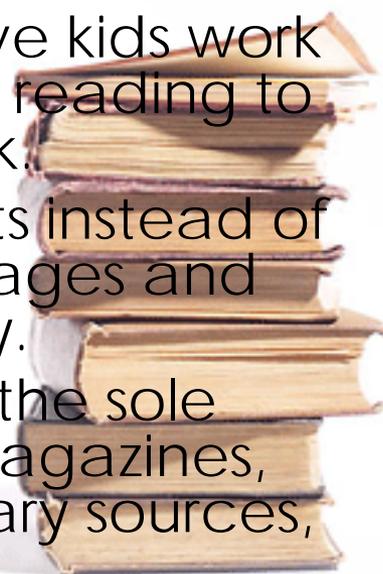
1. Interesting **trade books**, histories and biographies
2. **Current articles** from magazines and newspapers
3. **General interest magazines**
4. **Educational magazines** on school topics
5. **Web sites** (lists or bookmarks)

Daniels & Zemelman (2004)



Six Ways to Use Textbooks More Effectively

- Have empathy. The material may seem easy to you, but it probably isn't to your students.
- Help students get started. Give students support before and during reading – not just handing out quizzes afterwards.
- Don't leave kids alone with textbooks. Have kids work in pairs, groups, and teams at all stages of reading to discuss, debate, and sort ideas in the book.
- Choose wisely. Make selective assignments instead of plowing through the book. Assign fewer pages and help students to study them more carefully.
- Supplement richly. They don't have to be the sole source but one important resource. Use magazines, newspapers, trade books, Web sites, primary sources, etc.



(Daniels & Zemelman, 2004)

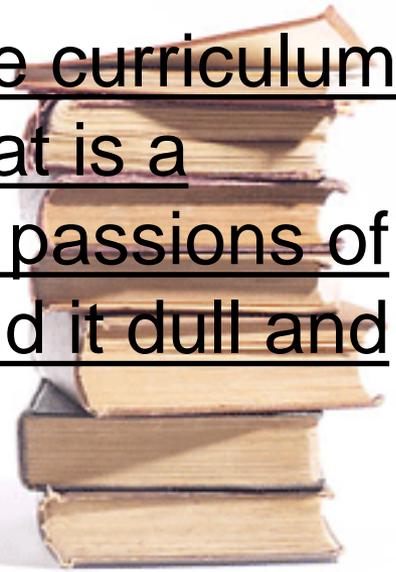
Simplify the IERG

- The goal of this presentation is to support the goal of the IERG, to make education engaging and meaningful, while suggesting a simpler process for implementation.
- [Webquests](#) with well defined adversarial roles, and McKenzie's [Module Maker 2](#) from [Questioning.org](#) may also work well



Because engaging students' imaginations in learning, and teachers' imaginations in teaching, is crucial to making knowledge in the curriculum vivid and meaningful, we call this new approach Imaginative Education (IE). The work of The Imaginative Education Research Group is dedicated to showing how this can be done routinely in everyday classrooms and at home.

Unfortunately so much of the content of the curriculum is routinely taught as though its natural habitat is a textbook rather than the fears, hopes, and passions of real people that students too commonly find it dull and lifeless, and un-engaging.



IERG History

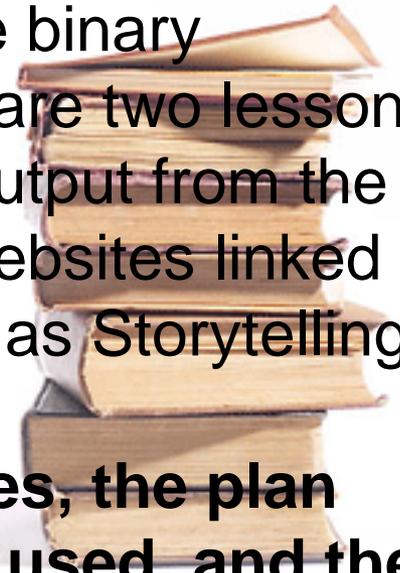
- Egan Published Teaching as Storytelling in 1988
- Established the IERG at Simon Fraser U in Vancouver
- Lots of awards



Objective: Students will pick a topic or story to develop into a topic using the Imaginative Education Research Group templates and Guides. They will then build a lesson plan based on one of the IERG guides. [Planning Framework](#)

Students will select some aspect of their elementary curriculum to develop using a story based on the [Binary Opposites](#) lesson plan. The plan should tell us what book is being used, how it relates to the lesson, and what the emotional hook/binary opposite is, ie what is the dynamic tension. Be sure to watch the binary opposites [video](#) for review. Attached under files are two lesson plans from Spring that can let you see what the output from the assignment should look like. Please review the websites linked carefully, as they explain Kieran Egan's Teaching as Storytelling concepts in detail.

Assessment: In addition to following the guides, the plan document gives the Story or Storybook being used, and the subject area being taught. [Planning Frameworks Guides](#)



THE STORY FORM MODEL

IDENTIFYING IMPORTANCE:

What is most important about this topic?

Why should it matter to children?

What is affectively engaging about it?

FINDING BINARY OPPOSITES:

What powerful binary opposites best catch the importance of the topic?

ORGANIZING CONTENT INTO STORY FORM:

What content most dramatically embodies the binary opposites, in order to provide access to the topic?

What content best articulates the topic into a developing story form?

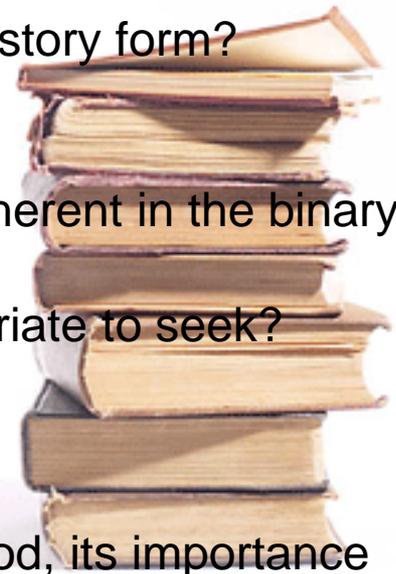
CONCLUSION:

What is the best way of resolving the dramatic conflict inherent in the binary opposites?

What degree of mediation of those opposites is it appropriate to seek?

EVALUATION:

How can one know whether the topic has been understood, its importance grasped, and the content learned?

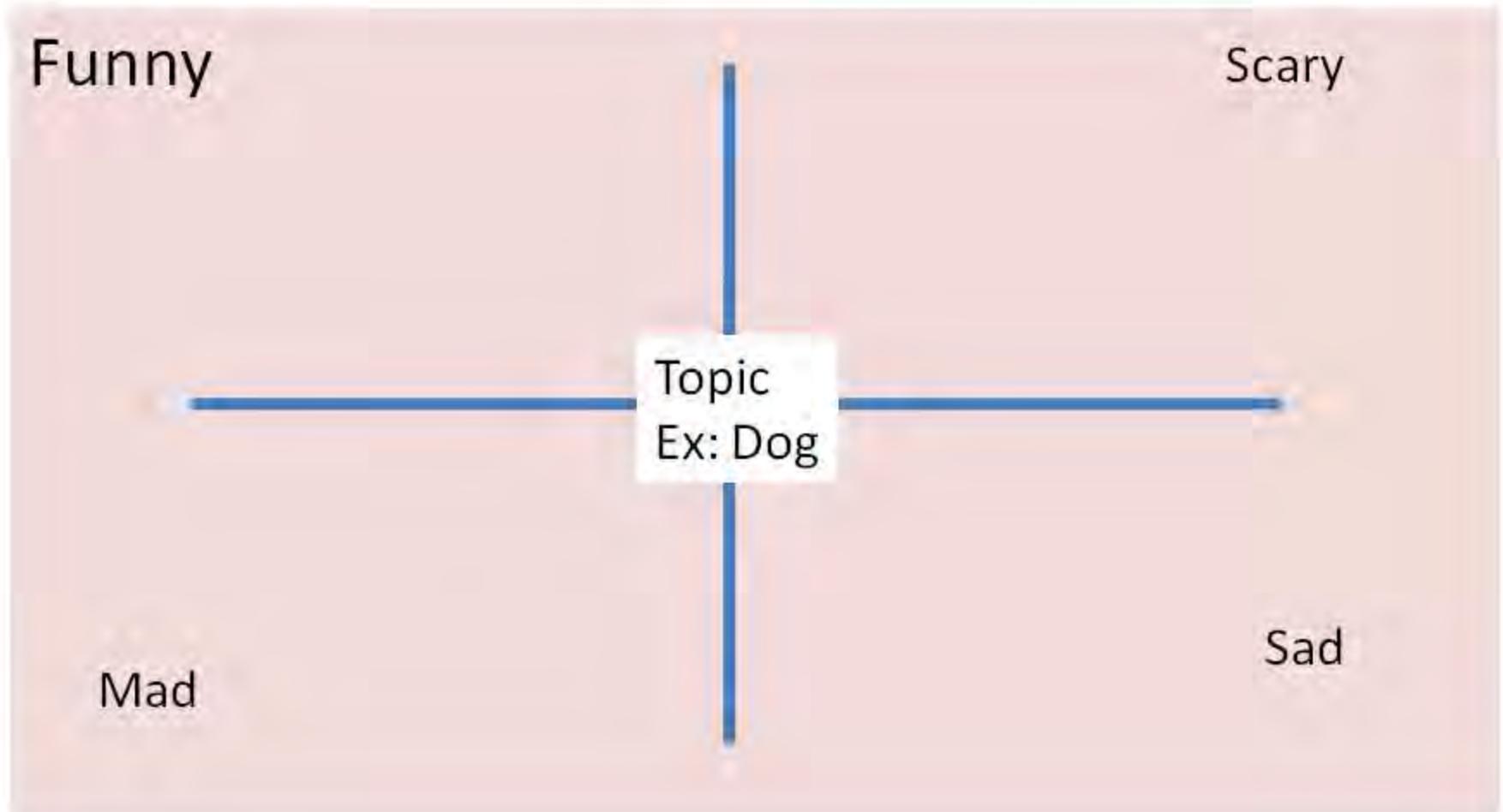


Three Basic Frameworks

- [Mythic](#)
- [Romantic](#)
- [Philosophic](#) (do not use, at least initially)



Story Builder – Emotional Hook

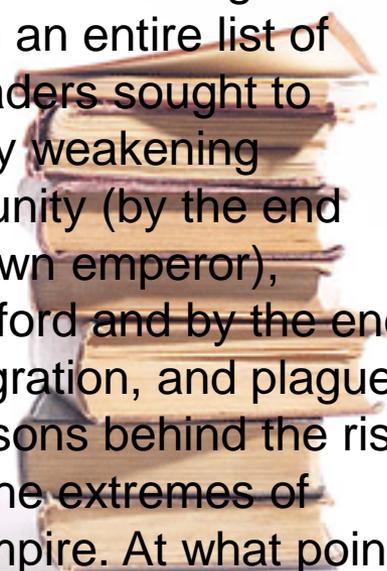


Topic: Ancient Civilizations (The Roman Empire)

Subject Area: Social Studies

Cognitive Tool: Narrative Structuring

What's the story on the small Roman state that, at one point, dominated vast areas of the world? A narrative on the rise and fall of the Roman Empire can be one focused largely on human ambition. Deceit and murder were no strangers to the drama of Roman leadership. One part of the narrative, then, would focus on the nature of the ambition demonstrated by emperors of Rome. One might also look at the army. The Roman army was also a major contributor to the building of the empire. How is military might an example of ambition? Of course, ambition can have positive and negative effects. It is generally noted, for example, that Rome suffered from an entire list of problems. These included: a series of emperors whose military leaders sought to overthrow them (some emperors had military leaders killed thereby weakening leadership in their armies), endless infighting, weakening Roman unity (by the end Rome had two capitals, Rome and Constantinople, each with its own emperor), economic problems (Rome was spending far more than it could afford and by the end didn't have enough gold or silver to make its own coins), mass migration, and plagues (illness decimated the Roman population). By addressing the reasons behind the rise and fall of Rome in terms of ambition our students will encounter the extremes of ambition, its pros and cons, and the human source of this great empire. At what point did the desire for power of Rome as a whole, not to mention individual Romans, lead to its demise? Such questions can be resolved in vivid narratives.



The comics medium can be a powerful educational tool. I discovered this personally while teaching an Algebra class several years ago.

A teacher with glasses stands at a blackboard. On the board, the number 84 is written at the top. Below it, there are two math problems: $\begin{matrix} 12 \\ 22 \end{matrix} 3$ and $\begin{matrix} 2 \\ 2 \end{matrix} 3$. The teacher is pointing at the board with his right hand. In the foreground, the backs of several students' heads are visible as they look towards the board.

My duties as the school's educational technologist required that I miss a couple days of class every two or three weeks. To make up for it, I drew "comics lectures" and asked my sub to pass them out to the students.

A close-up of a hand holding a pencil, drawing a diagram on a whiteboard. The diagram shows the number 84 at the top, with lines connecting it to the numbers 2, 2, and 3 below. To the right, there are more numbers: 2, 2, 1. The drawing is being done in a simple, illustrative style.

It was a hit.

I really like those comics, Mr. Yang! Better than when you're here in person, even!

Uh... thanks?

So why were the comics lectures so effective?

A female student with a backpack is talking to a male teacher sitting at a desk. The teacher has a thoughtful expression. On the desk, there is a small apple and a pencil holder. The background is a simple classroom setting.

When I questioned my students about this, two strengths of the comics medium as an educational tool emerged. First, graphic novels are *visual*, and our students *love* visual media. After all, they're immersed in it.

Two students, a boy and a girl, are looking at a large graphic novel. The cover of the book has the word 'NEW' and 'ATCH' visible. In the background, there are other books and a sign that says 'LOOK'.

By combining image and text, graphic novels bridge the gap between

media we watch and media we read.

A television set is shown on the left, and an open book is shown on the right. The book is open to a page with text and a small illustration. The background is dark, making the TV and book stand out.

Image and text share narrative responsibility. Because of this, many teachers have found great success using graphic novels with ELL students and struggling readers.*

I never thought of that...

That sounds wonderful!

Two women are standing and talking. The woman on the left has her hand to her chin in a thoughtful pose. The woman on the right has her hands clasped in front of her. They appear to be in a professional or educational setting.

*Stephen Cary's *Going Graphic: Comics at Work in the Multilingual Classroom* is a great resource for this!



IERG (Imaginative Education Research Group) Teaching

- DSU students created engaging resources for a sixth grade classroom by re-writing the content of a chapter of a textbook into a narrative format, using the frameworks provided by IERG.



The Thing About Rocks Is.....



MEANWHILE ON EARTH, THE THING IS HELPING CHILDREN WITH VOLUNTEER SOCCER WORK...





UGH, WHERE AM I?

I HAVE BROUGHT YOU HERE TO MARS!



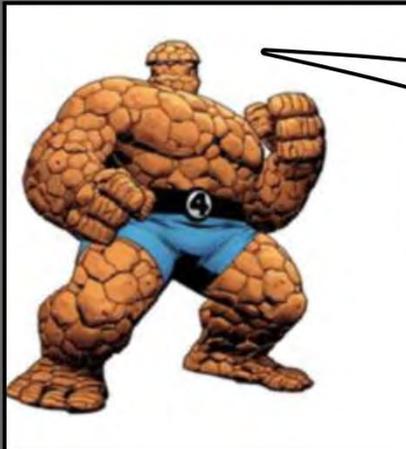
NICE TO SEE YOU AGAIN THING...



ITS YOU!....DOCTOR DESTROYER, I AM FINALLY GOING TO STOP YOU FOR GOOD!



I DON'T THINK SO THING. YOU SEE, WITH THE HELP OF SCIENCE, I HAVE DEVELOPED A NEW WEAPON THAT WILL FINALLY DESTROY EVEN YOU!



HA, DONT MAKE ME LAUGH! YOU KNOW I AM MADE FROM 100% METAMORPHIC ROCK. I AM MADE FROM LAYERS OF CRYSTAL, AND OVER TIME HEAT AND PRESSIRE MADE ME SUPER HARD AND STRONG.



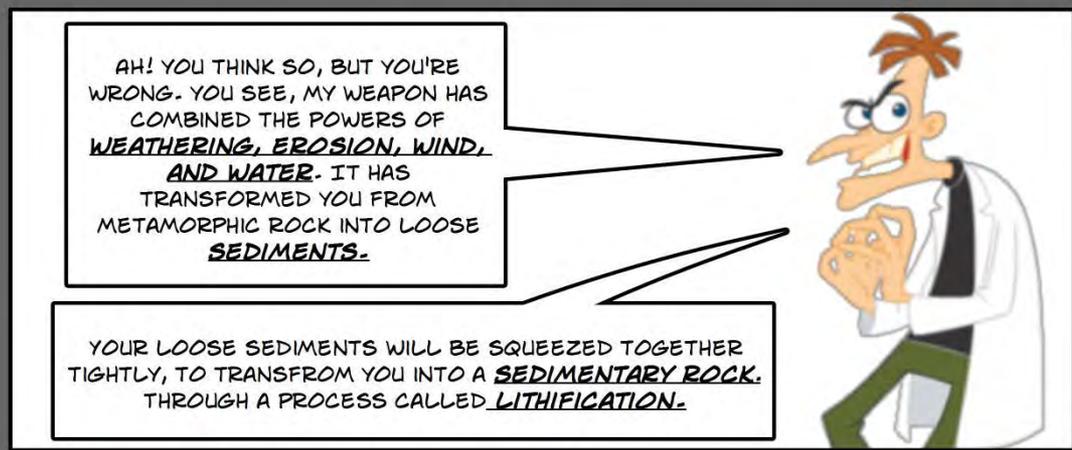


OH YOU FOOLISH HERO...

ZAAAA AAP!



YOU SEE, NOT EVEN YOUR SILLY TOY COULD DO ANYTHING. I AM UNHARMED.



AH! YOU THINK SO, BUT YOU'RE WRONG. YOU SEE, MY WEAPON HAS COMBINED THE POWERS OF WEATHERING, EROSION, WIND, AND WATER. IT HAS TRANSFORMED YOU FROM METAMORPHIC ROCK INTO LOOSE SEDIMENTS.

YOUR LOOSE SEDIMENTS WILL BE SQUEEZED TOGETHER TIGHTLY, TO TRANSFORM YOU INTO A SEDIMENTARY ROCK. THROUGH A PROCESS CALLED LITHIFICATION.

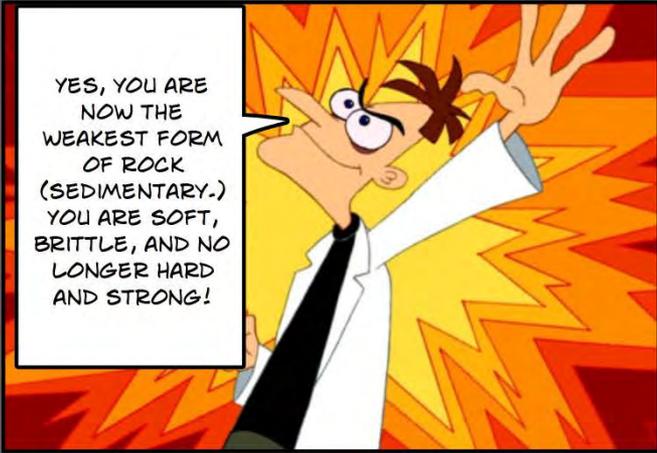


HMMMMM...

DID YOU KNOW?

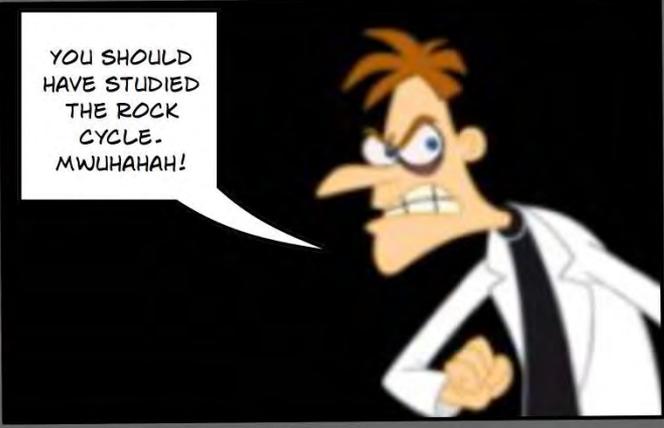
THERE ARE TWO DIFFERENT TYPES OF WEATHERING: MECHANICAL AND CHEMICAL. MECHANICAL PHYSICALLY BREAKS DOWN ROCKS, WHILE CHEMICAL INVOLVES SOME SORT OF REACTION THAT BREAKS OR DECAYS ROCK INTO SMALLER PEICES; ALSO KNOWN AS DECOMPOSITION.





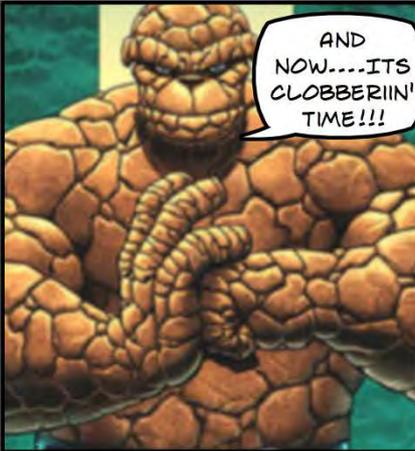
CRUNCH! POW! SMASH!

DR. DESTROYER KICKS THING INTO POOL OF STEAMING HOT LAVA.





LUCKY FOR ME, I DID. THE LAVA MELTED ME FROM SEDIMENTARY FORM. I THEN COOLED AND BECAME A HARD, GLOSSY IGNEOUS ROCK. I ROSE TO THE EARTH'S SURFACE THROUGH A PROCESS CALLED UPLIFT!



AND NOW....ITS CLOBBERIN' TIME!!!



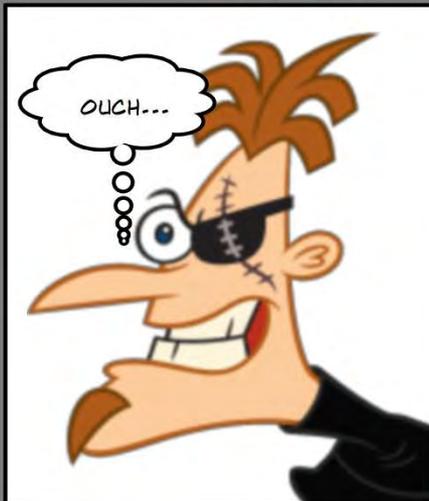
DID YOU KNOW?

MELTED ROCK MATERIAL IS PRESENT BOTH ON AND BELOW EARTH'S SURFACE. WHEN LAVA COOLS AND CRYSTALLIZES ON EARTH'S SURFACE, THE IGNEOUS ROCK THAT FORMS IS CALLED EXTRUSIVE. WHEN MAGMA COOLS AND CRYSTALLIZES INSIDE EARTH, AN INTRUSIVE ROCK IS FORMED.



AN EASY WAY TO REMEMBER IS INTRUSIVE IS INSIDE



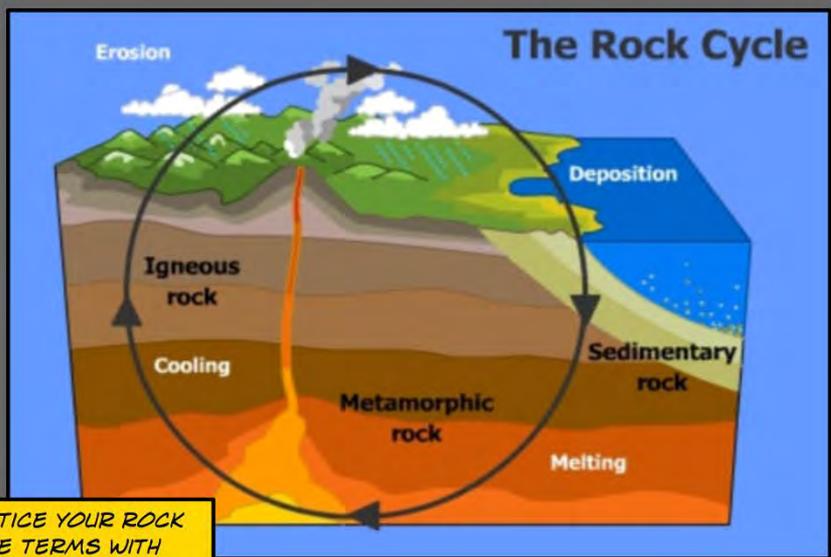
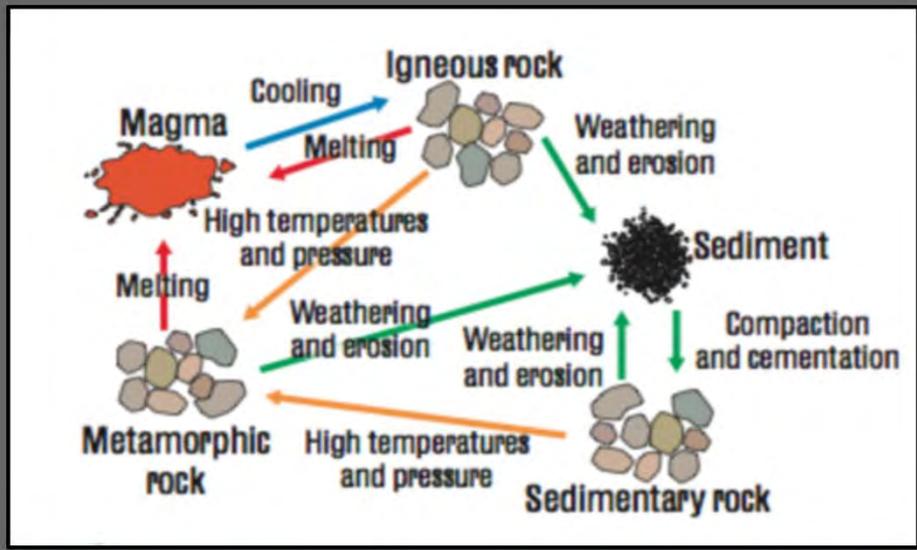


WELL HE WON'T BE A PROBLEM ANYMORE, GOOD THING THE ROCK CYCLE IS A NEVER ENDING PROCESS.



BETTER GET BACK TO SOCCER WITH THE KIDS!





PRACTICE YOUR ROCK CYCLE TERMS WITH THE ONLINE GAMES:-

- FLING THE TEACHER
- SPELLING CITY
- CLASSTOOLS-NET
- WHO WANTS TO BE A MILLIONAIRE



THE END.

**CREATED BY:
CODY LINNEWEBER
STEPHANIE KRUGGEL
SARAH CHAPMAN
CASSEY PENNEY**

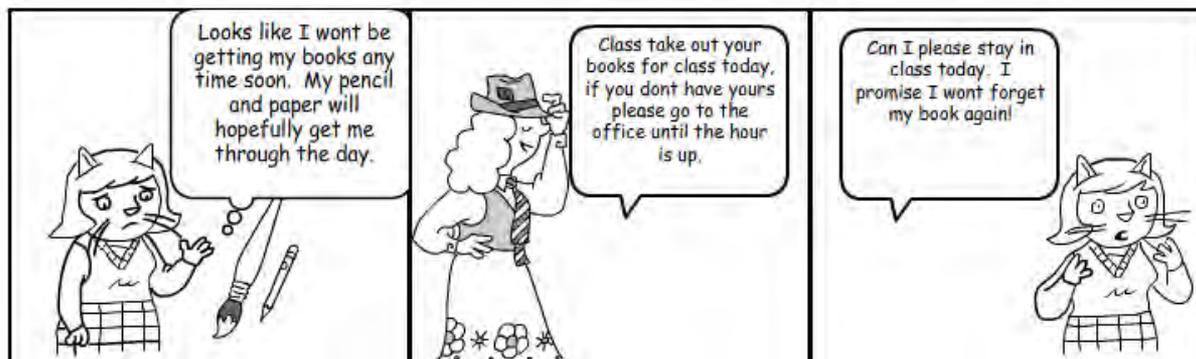


WHO KNEW ROCKS COULD BE SO EXCITING?

[MakeBeliefscomix.com](http://MakeBeliefsComix.com)



Makebelief and Pixton offer additional avenues for creating sequential art

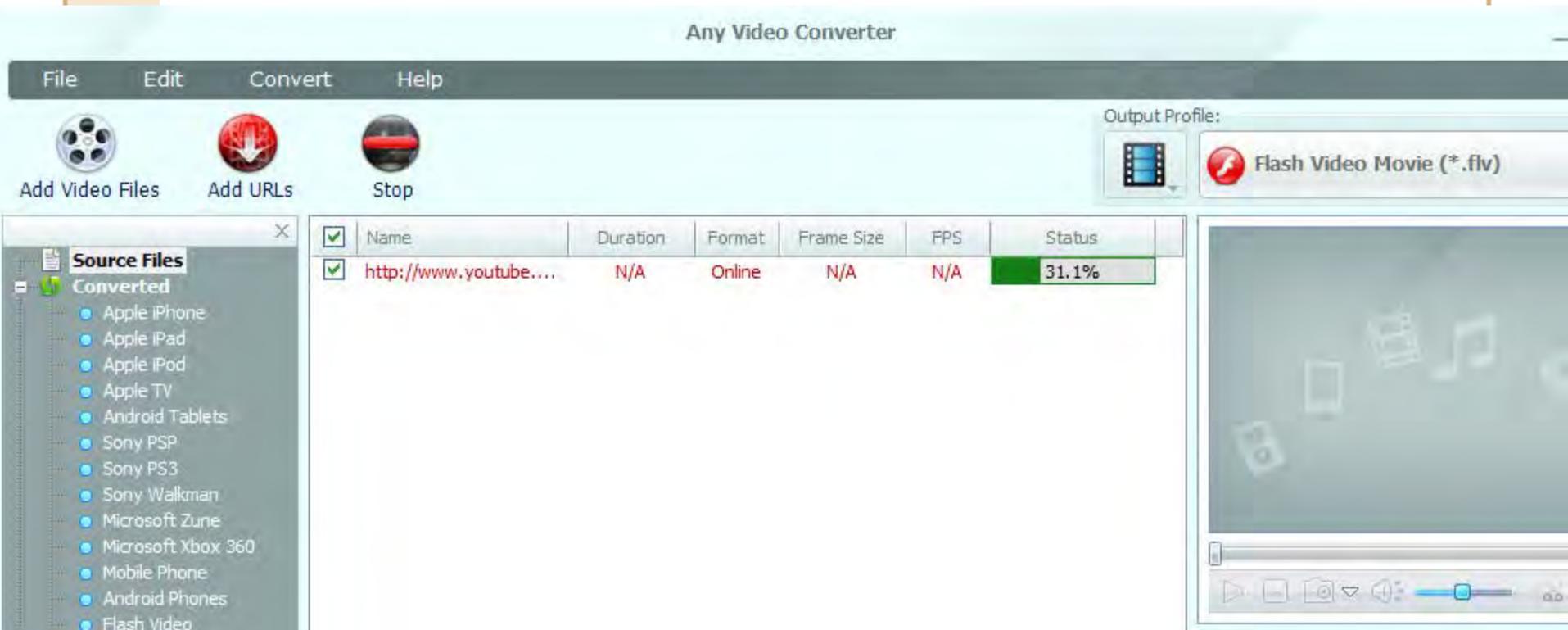


Reverse Storyboarding
Another way of establishing
the relationship between
Video and text is through a
process I call “Reverse
Storyboarding”.

This is where you take a
movie clip, and make it a
story.



Select a clip from YouTube, then download using Any Video Converter, or similar tool



Once downloaded, the movie will need to be converted into a format Adobe Premiere Elements can read

A screenshot of the 'Any Video Converter' application window. The window title is 'Any Video Converter'. It features a menu bar with 'File', 'Edit', 'Convert', and 'Help'. Below the menu bar are three main buttons: 'Add Video Files' (with a film reel icon), 'Add URLs' (with a red download icon), and 'Convert Now!' (with a blue refresh icon). On the right side, there is an 'Output Profile:' dropdown menu currently set to 'Customized WMV Movie (*.wmv)'. The main area contains a table with columns for Name, Duration, Format, Frame Size, FPS, and Status. Two rows are visible, both for 'Student+Value.flv' with a duration of 00:03:26, format of FLV1, frame size of 320x240, and FPS of 30. The second row is checked and highlighted in blue, with a status of 'Completed'. To the right of the table is a preview window showing a blurred image of a document with icons. At the bottom right, there is a progress bar and a play button icon.

| <input type="checkbox"/> | Name | Duration | Format | Frame Size | FPS | Status |
|-------------------------------------|-------------------|----------|--------|------------|--------|-----------|
| <input type="checkbox"/> | Student+Value.flv | 00:03:26 | FLV1 | 320x240 | 30 fps | Completed |
| <input checked="" type="checkbox"/> | Student+Value.flv | 00:03:26 | FLV1 | 320x240 | 30 fps | Completed |

I use .wmv on my PC

Anderson on Student Value

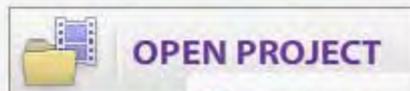
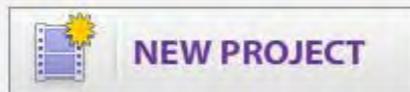
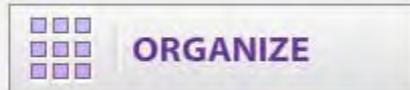


<http://www.youtube.com/watch?v=IN0VnVNcqVU>



Import the movie into Adobe Premiere Elements

WELCOME TO
ADOBE® PREMIERE® ELEMENTS 10

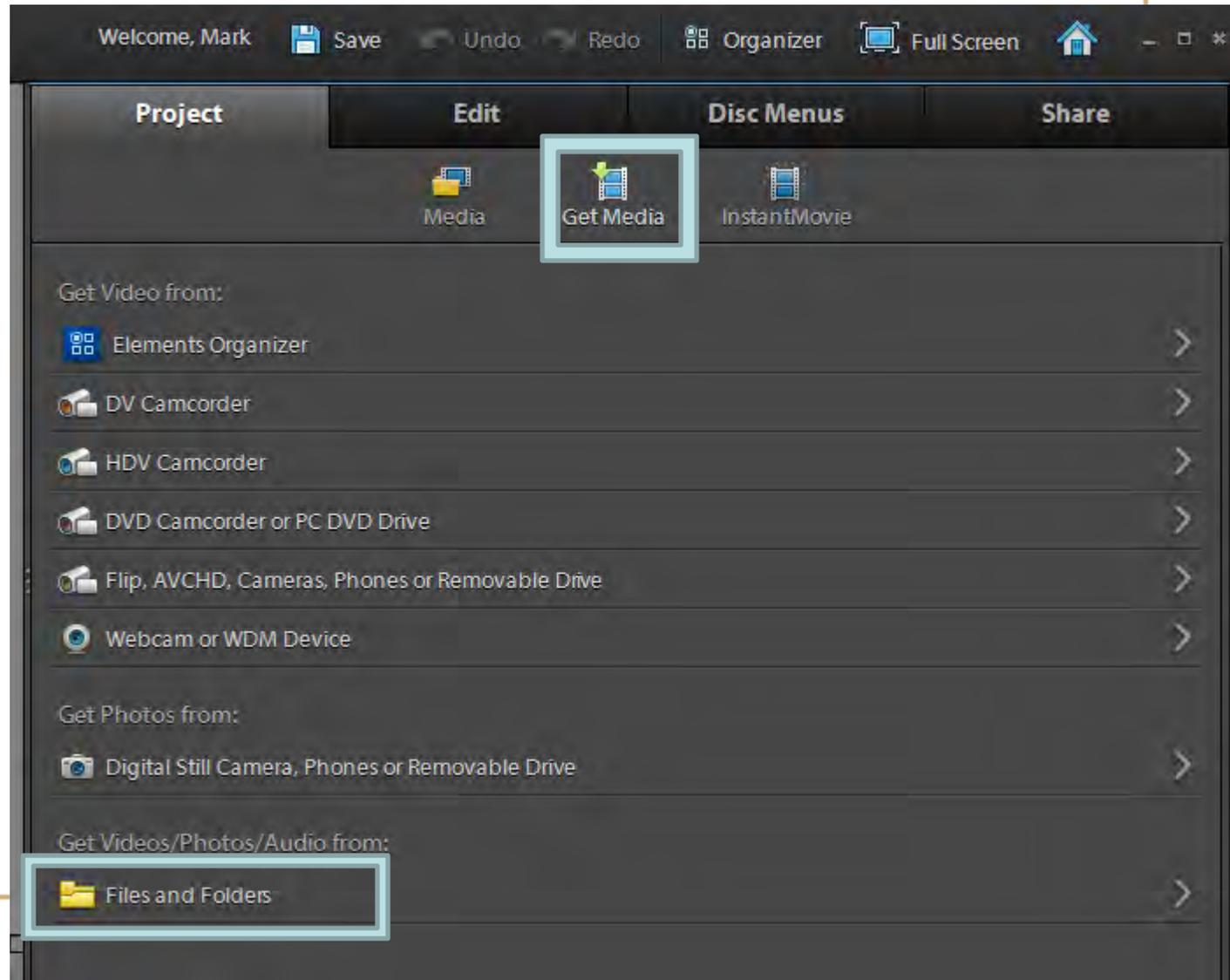


 Reverse-Storyboarding....

 Open...



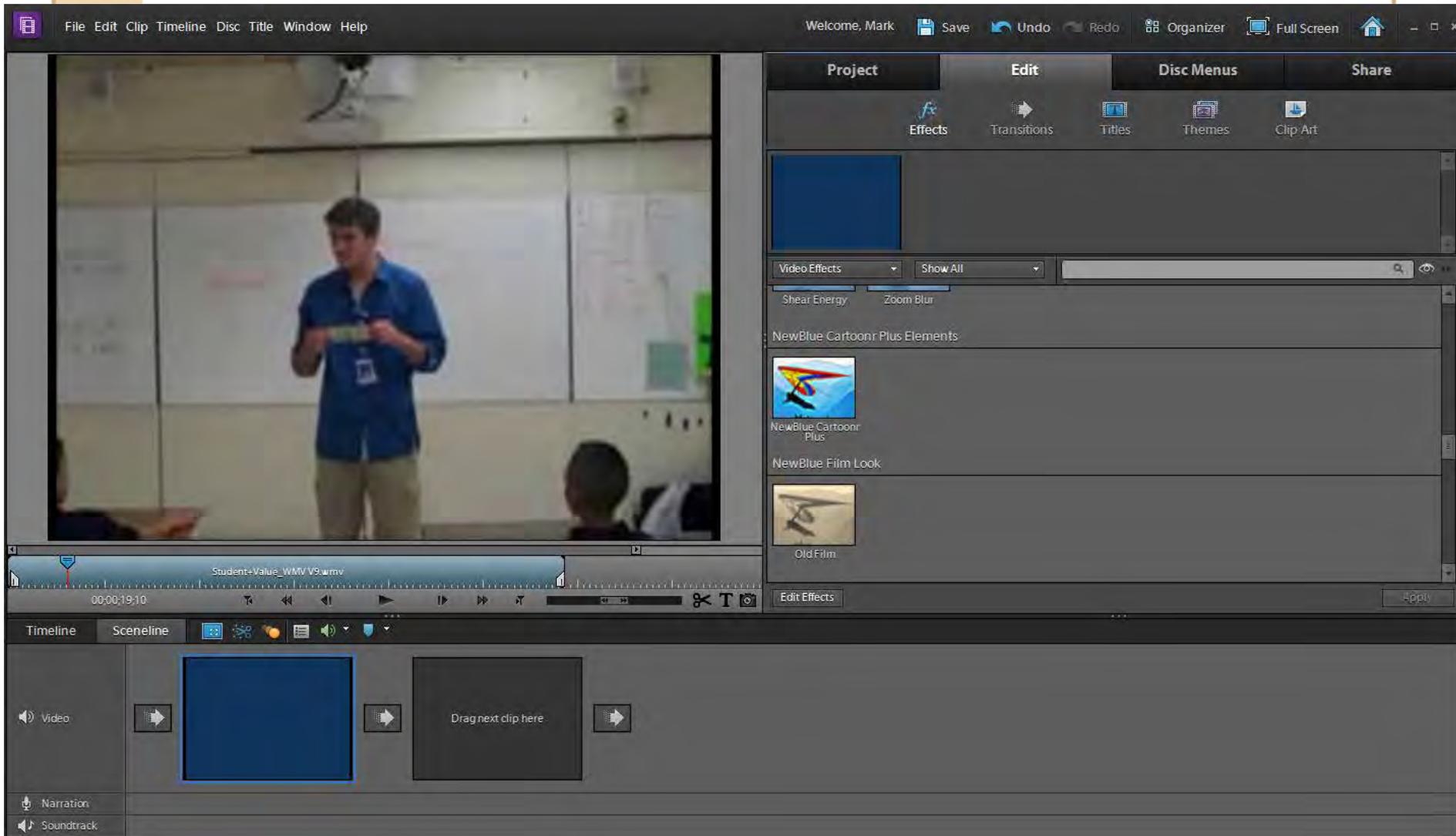
Get your media



Put it in the timeline

The screenshot displays a video editing application interface. At the top, a menu bar includes 'File', 'Edit', 'Clip', 'Timeline', 'Disc', 'Title', 'Window', and 'Help'. The main preview window shows a man in a blue shirt standing in front of a whiteboard. Below the preview is a timeline with a clip named 'Student-Value_WMV V9.wmv' at the 00:00:19:10 mark. On the right, a 'Project' panel contains 'Effects', 'Transitions', 'Titles', 'Themes', and 'Clip Art'. Below this is a 'Video Effects' section with 'Shear Energy' and 'Zoom Blur' tabs, and a list of effects including 'NewBlue Cartoon Plus Elements', 'NewBlue Film Look', and 'Old Film'. At the bottom, a 'Timeline' panel shows a 'Video' track with a blue clip being added, and a 'Narration' and 'Soundtrack' track below it.

Go to effects, and Apply NewBlue Cartoon Plus



To Adobe Premiere and
Comic Life

Making Connections

Text to Text

Text to Self

Text to World



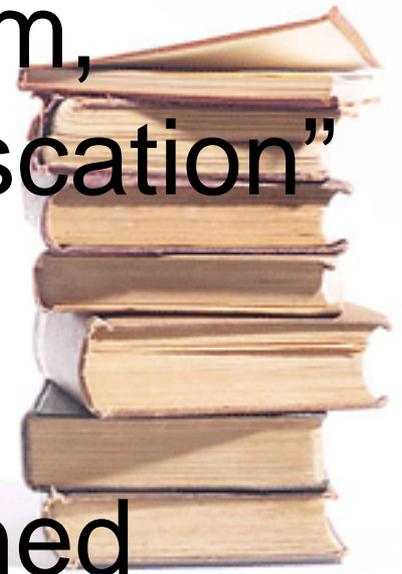
To Adobe Premiere and
Comic Life

Making Connections

Scott McCloud uses the term,
“Identification through obfuscation”

Video is time constrained

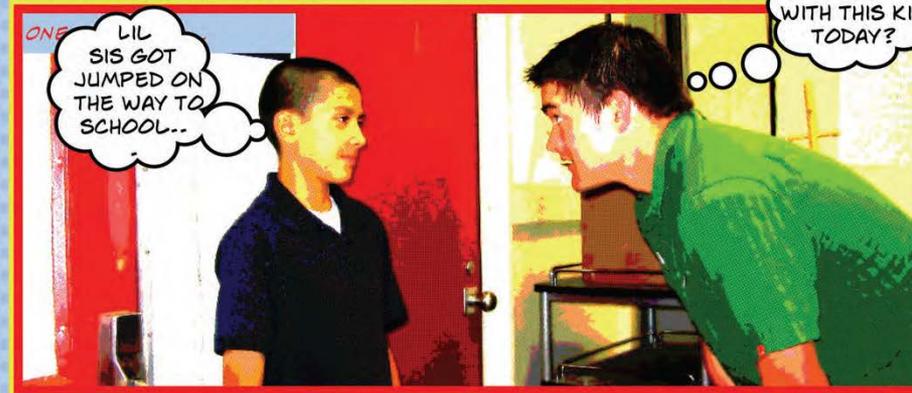
Comics are space constrained



With Effect, the image looks like



BOLD STATEMENTS



STORY:
MICHAEL ANDERSON
MARK GEARY

LETTERING:
COMICLIFE

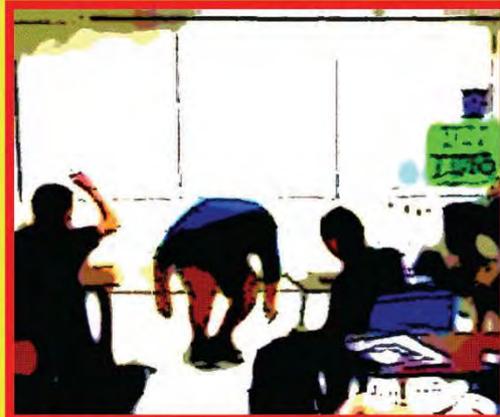
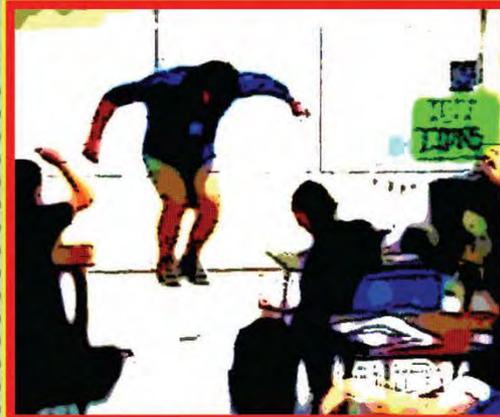
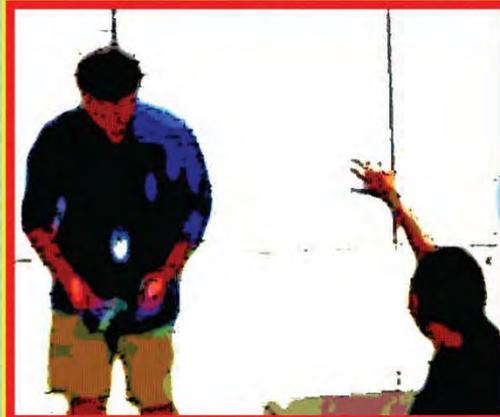
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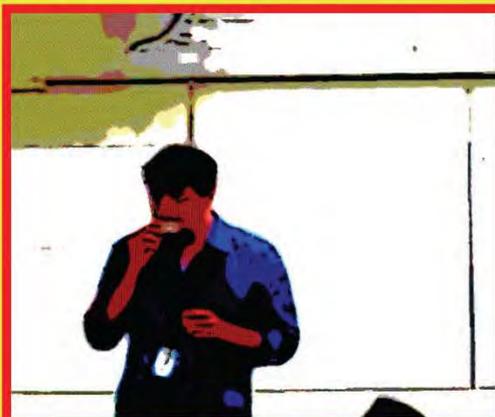
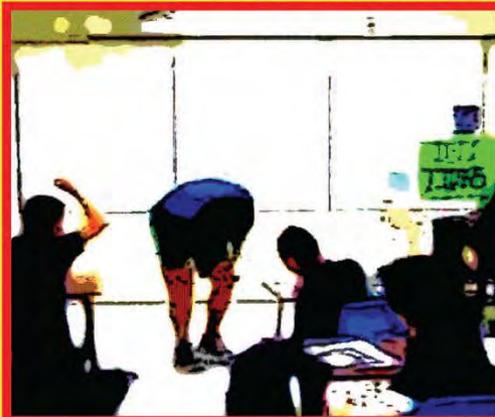
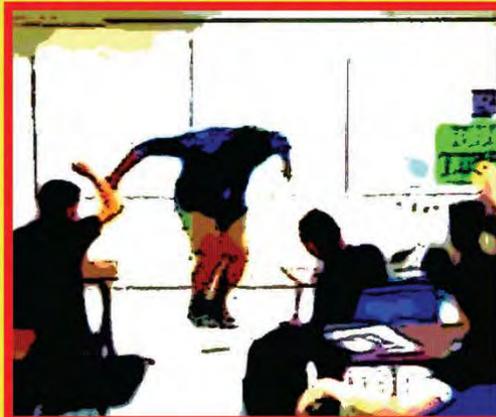
ISSUE:
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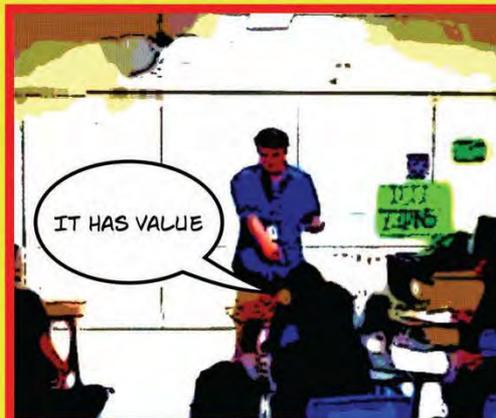


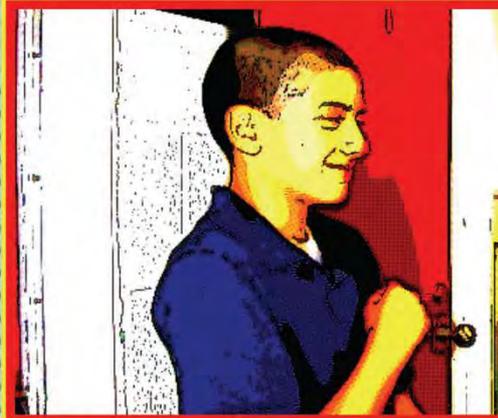
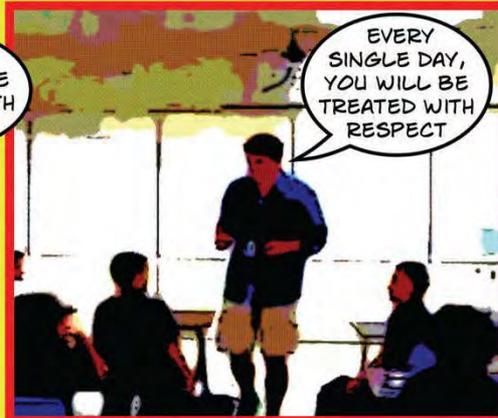












Struggling Medical Students team up with designer and artist Clare Rosean to create Viral Combat

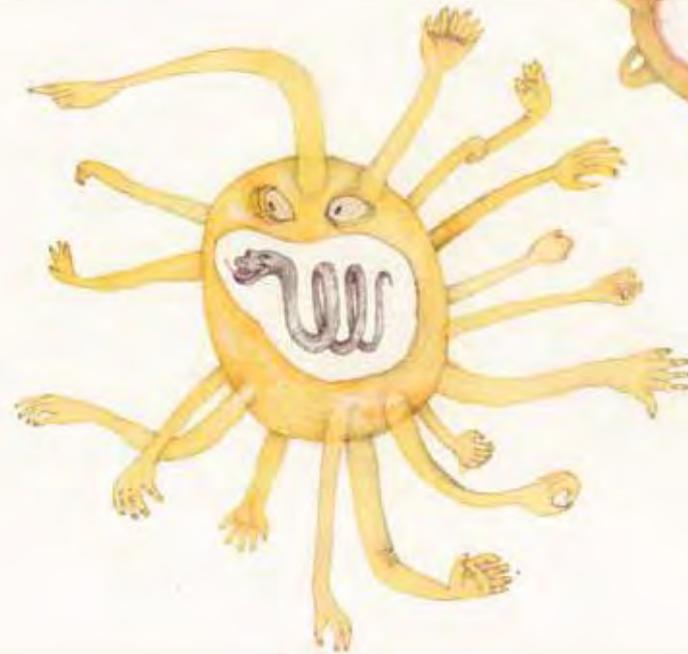
They use this to help commit key terms and concepts to memory

It also happens to be the best book ever written for children about the flu and how it works.



VIRAL COMBAT:

MONICA FIGHTS THE FLU



*Written by Marie Adoohi, Susan Han, Erica MacKenzie,
Bailey Miles, Alex Ruby, and Neha Sathe*

Illustrations by Clare Rosean

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Acknowledgements:

Arte|Science Initiative at the University of Chicago, Julie Marie Lemon, Dr. Elizabeth Kieff, Dr. David Berrier, Laura Letinsky, and the Gary Comer Youth Center.

VIRAL COMBAT:

Monica Fights the Flu

*Dedicated to everybody who has
been sick in bed with the flu...*



The flu **virus** is searching for something. It travels with a gang of others just like it, and they are looking to grow fast.

There's not much time. They cannot live on their own for long; they are puny things. To copy themselves, they need to use a human.

Each virus carries all the **instructions** to copy itself on its inside, coiled like a snake, locked away in its special coat. The human's healthy **cells** can provide the tools the virus needs to carry out those instructions.

The flu virus can rest on all kinds of things as it waits to be picked up by a human...



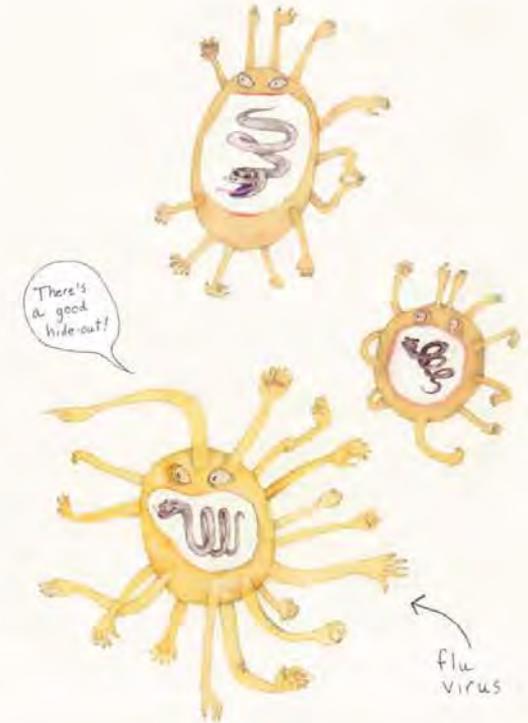
? **So one time I had a stomach ache and was told that it was the "stomach flu." Is that the same thing?**

💡 No, it is not the same thing! The "stomach flu" is still often caused by viruses, but those viruses are totally unrelated to the influenza virus that causes "the flu."

💡 The snake-like set of instructions that the virus uses to copy itself is called **RNA**. Because the virus cannot make copies of itself alone, it is not considered to be "living."

? **So how long can the flu survive on surfaces like the grocery cart?**

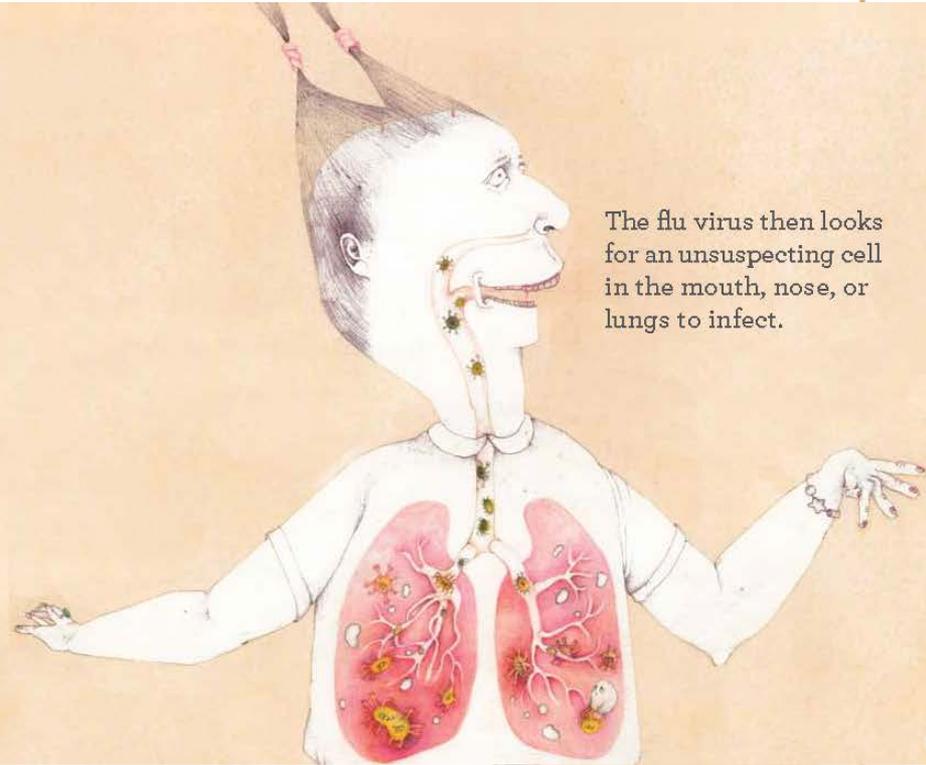
💡 Generally between 2 and 8 hours.





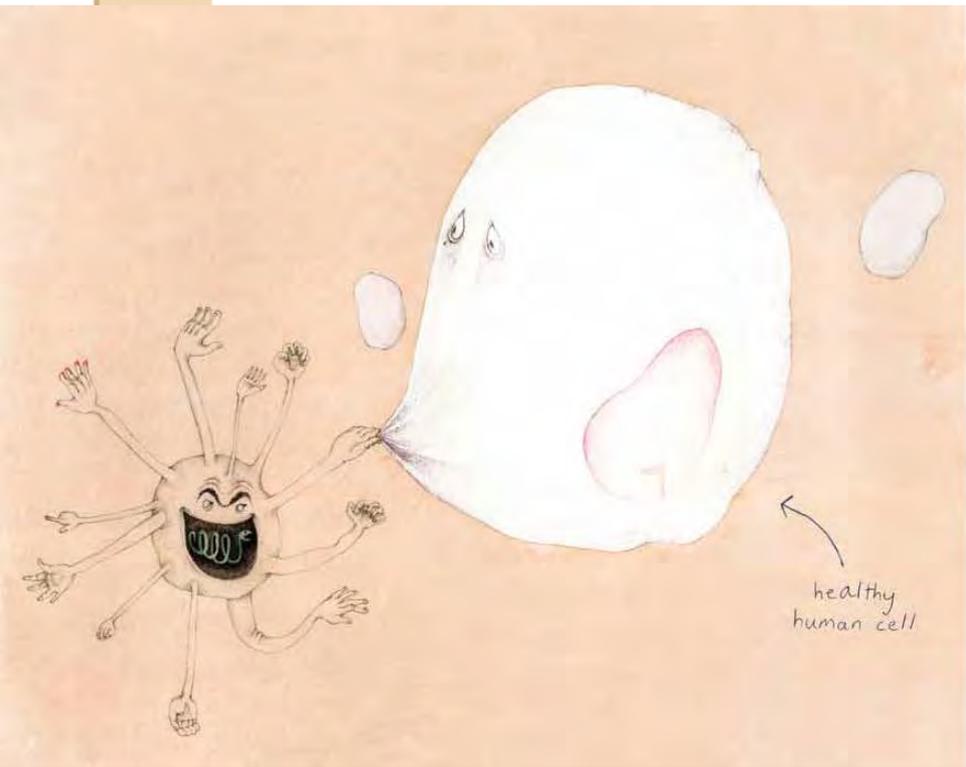
...like Monica.

When Monica grabs onto the handle of the grocery cart, the flu virus, which was lying in wait, hops onto her hand. The next time Monica bites her nails, the virus eagerly enters her body through her mouth.



The flu virus then looks for an unsuspecting cell in the mouth, nose, or lungs to infect.





The virus joyfully grabs a cell with its arm-like extensions. When the two meet, the virus sneaks its instructions into the cell.





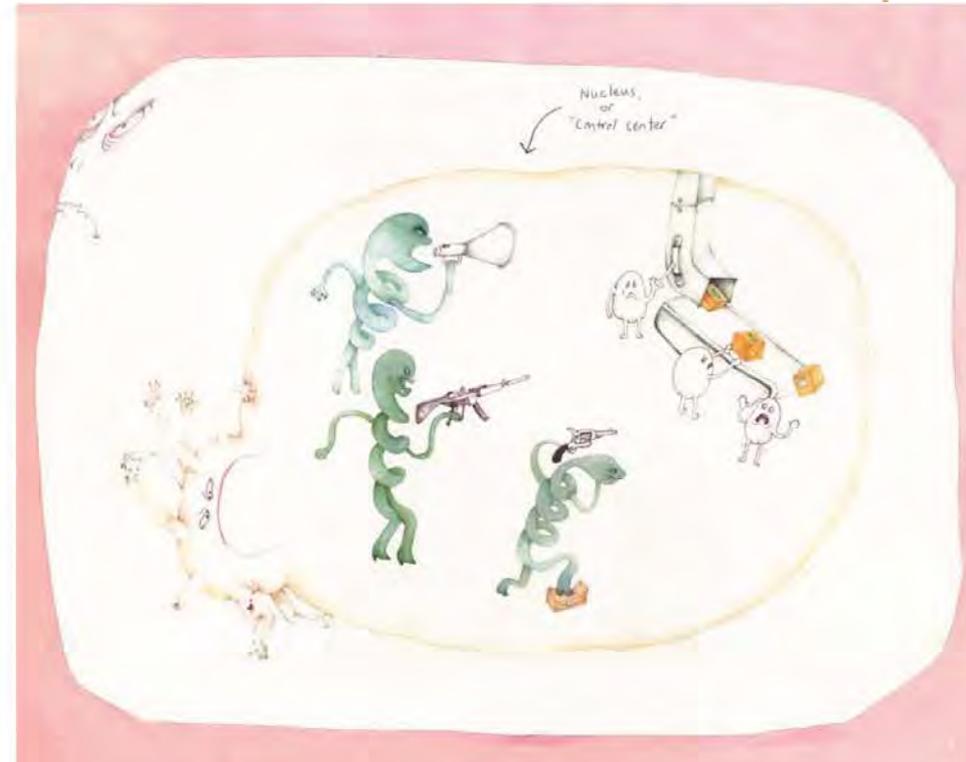
? **Are all flu viruses the same?**



No. Sometimes you might hear various names for different kinds of flu, such as H1N1. The letters H and N refer to different forms of the arm-like extensions that allow the virus to enter the healthy cell. Changes in these extensions can affect how dangerous and **contagious** that strain—or version—of flu will be.

Normally, a healthy cell works like a factory. It has its own set of special instructions, called **DNA**, for making products that the body needs to live.

After the virus inserts its instructions into a healthy cell, the virus can take over the **control center** (inside the **nucleus**) of the factory. The instructions order the cell to make new viruses instead of the products it was making before. The newly made viruses burst out of the cell and go on to hijack other healthy cells.





The newly made viruses hijack more cells, forcing those cells to make even more viruses. Soon, many of the cells of the lungs, nose, and throat are infected by viruses.

Luckily, the cells have a way to fight back. Even though the viruses have taken over the factory control centers, the cells can still send out help signals that alert the body's *immune system*.

The immune system is the body's police force. It can hunt down viruses and destroy them before they have the chance to infect another cell. It does this by making *antibodies*. The antibodies are like *handcuffs* that only work against a certain type of virus. Every time a new type of virus invades, the body needs to make a new type of handcuffs.

These antibodies are very powerful and help the immune police find and destroy the viruses, but it takes time to make them.

The immune police remember what the virus looks like so that they can respond more quickly if the virus tries to invade again.



The fight between the immune system and the viruses isn't easy. While the police are busy making antibody handcuffs, the viruses have time to spread to more and more cells, making the *infection* worse.

Sadly, there's nothing the immune system can do to save the cells that are already infected. The immune system has to kill these cells so that the virus factories inside cannot produce more new viruses. This destruction of infected cells is why the flu makes Monica feel so horrible. She has a fever, a headache, and a cough and feels really, really tired.



Some other symptoms of the flu may be a sore throat, a runny nose, body aches, and chills. Not everyone with the flu will have a fever.



What should I do if I get the flu?



If you think you have the flu, it is a good idea to consult your doctor to figure out what is going on. If you do have the flu, it is important to drink lots of water and to stay home and get rest. If you need to, you can use cough and fever medicines from the drugstore to help with the symptoms. Wash your hands often and try to avoid contact with people around you.





With the immune system police cracking down on the viruses, some of the viruses try to escape and find someone else to infect. Every time Monica coughs or sneezes, viruses are released into the air, hoping to land on another person and start a new infection.

Some of these viruses will do just that. Others will have the bad luck of landing on a person who has gotten a flu shot...



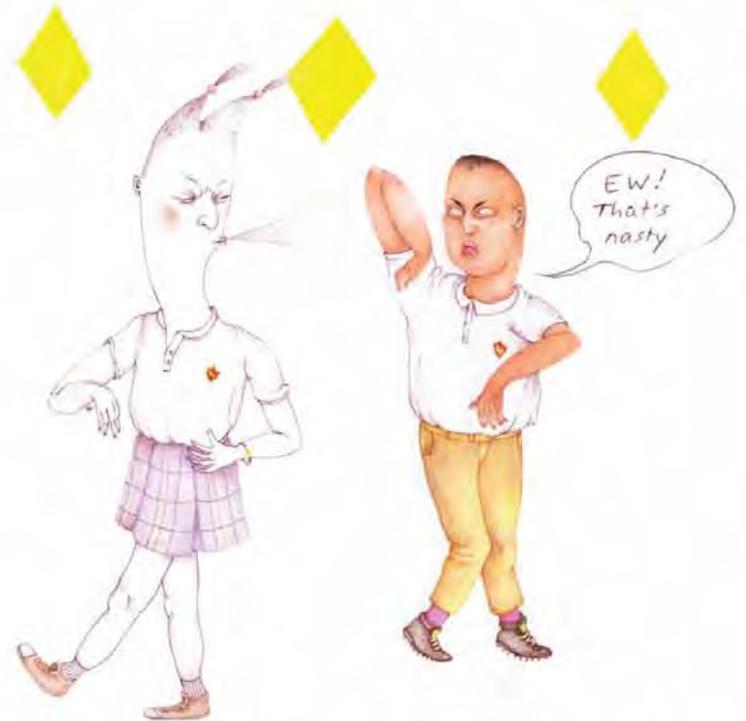
A sneeze can travel up to 6 feet away! Coughing or sneezing can spread the flu to others very quickly.



If I don't want to get my friends sick, how long do I need to stay home?



It is usually recommended that you should stay home for at least 24 hours after your fever has gone away. Taking medicine can lower your fever, but you could still be contagious. You should wait until you are fever-free for 24 hours without medicine.



The flu shot is made of dead viruses whose snake-like instructions have been destroyed. Without working instructions, the viruses can't take over any of the cell's factories, so they can't make a person sick. Instead the dead viruses wait harmlessly in the body until a patrolling immune police officer comes along.

The immune police can tell that the dead viruses are foreign invaders. So even though the dead viruses don't make the person sick, the police force will create antibodies to destroy the dead viruses and remember what the viruses look like.



? ***I don't like shots. Do I have to get one to be vaccinated?***

There are actually two main forms of the flu **vaccine**: the flu shot and a nasal spray. The flu shot injects a dead form of the virus. The body recognizes the dead virus and builds antibodies against it. The nasal spray vaccine is a mist of very weak flu virus. The body recognizes it in the same way and builds antibodies against it. This form of the virus is too weak to cause any infection in healthy people, but it should not be given to people with weak immune systems.

? ***Why do some people not get the flu vaccine?***

Everyone 6 months or older should get a flu vaccine. The flu can be more dangerous for some people, so it is especially important for them to get the vaccine. These groups include: pregnant women, children younger than 5 years old, adults over 50 years old, and people with any chronic medical conditions. Some people, especially if they are healthy, don't get the flu shot because they think getting the flu is not a big deal. However, it's still important for them to get vaccinated so they don't pass the flu on to friends or neighbors at higher risk.

Some people believe that the flu vaccine may be dangerous or might give you the flu. The flu shot cannot give you the flu because it is made with a dead form of the virus. The nasal spray might cause infection in certain people, so it's not for everyone.





The boy Monica sneezed on had already gotten his flu shot earlier in the year. When the flu virus entered the boy's body, it didn't find the friendly environment it had hoped for. Instead, the immune police recognized the virus right away and immediately began producing antibodies against it. Because he had gotten the flu shot, his body was able to kill the virus way faster than Monica's body could.

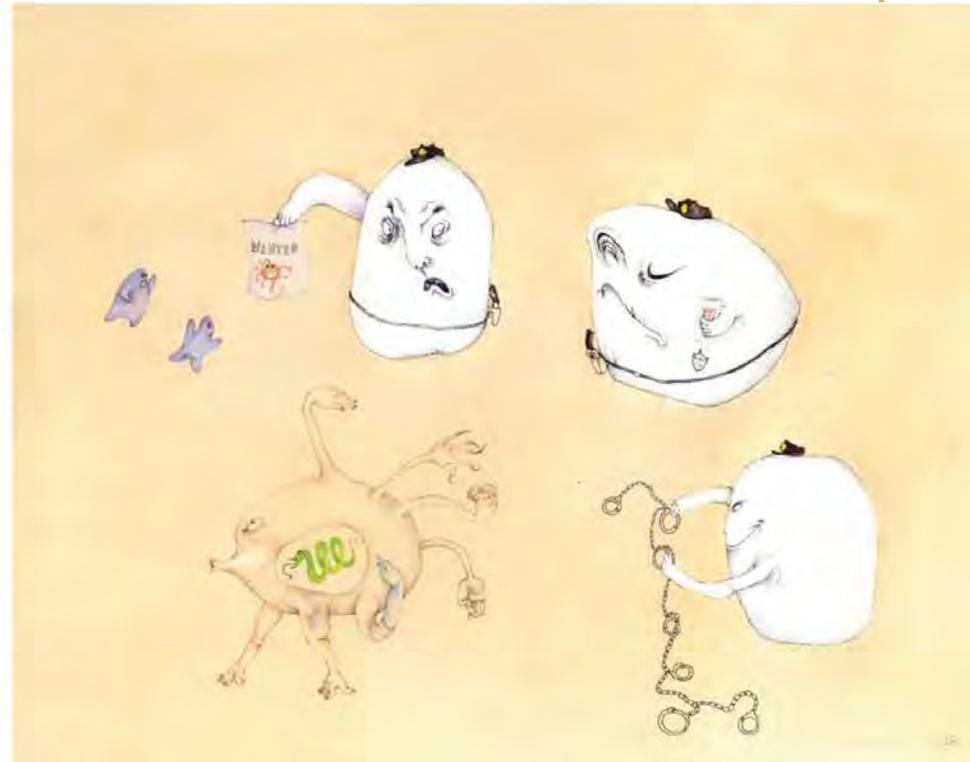
In fact, his immune response was so fast that the boy never even knew it happened and never felt sick.

? My mom says that sometimes when she gets the flu shot she feels sick afterward. Why would she feel sick?

? It is true that some people have mild symptoms for a very short time after getting the flu shot. This is because the immune system is responding to the vaccine and making antibodies to remember the real flu later on. Some of that immune system activity can make you feel sick!

? Does the flu shot work immediately?

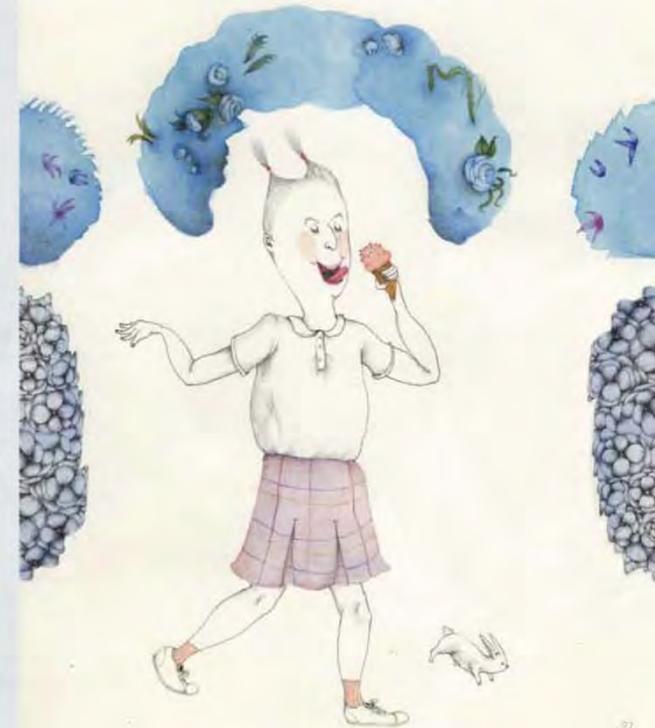
? No, the flu vaccine may take up to 2 weeks to become fully effective, so it is a good idea to get it early! Also, children getting the vaccine for the first time may need 2 doses to build full immunity.



Monica didn't want to get the flu again next year. She asked her parents if she could get a flu shot and they agreed. Even though it hurt a little, it was totally worth it to have fun instead of lying sick in bed.

? *Why do I have to get a new flu shot every single year?*

It is important to get the flu shot every year because the flu virus changes every year! Each year, scientists around the world study different types of the flu virus and decide which 3 types are most likely to spread. They then make a vaccine for those 3 types.





Because getting the flu
is definitely NOT fun.



glossary

Antibody or "handcuffs"

It is a small structure that binds to foreign invaders in the body and marks them for destruction. It is produced by a special type of immune cell called a B cell.

Cell

It is the smallest unit of life. It has the ability to reproduce itself and pass along its genetic information on its own. Nothing simpler (such as a virus) can do this. There are many types of cells within a single person. Your immune cells look different from your skin cells, which look different from lung cells, and so on!

Contagious

When a person with the flu is contagious, he or she can spread the virus to others. Others can get the flu by direct contact like kissing, inhaling stuff that is sneezed or coughed up, or by touching contaminated objects with virus on them, such as the shopping cart that Monica touched.

DNA (DeoxyriboNucleic Acid)

It is the genetic information used by cells and viruses to store important instructions. These instructions are used to make the products they need to live and reproduce. Some viruses, like the flu virus, use RNA to store this information.

Immune system

It includes all of the molecules, cells, organs, and other machinery in your body that helps protect against foreign invaders.

Infection

It is the establishment of a foreign invader, such as a virus, inside your body. All living things, even plants, can get infections.

Nucleus or the "control center"

It is a structure inside human cells that holds DNA.

RNA (RiboNucleic Acid) or the "instructions"

See definition for DNA.

Vaccine

It is a shot or spray that gives you immunity, or protection, against a particular foreign invader. It contains a harmless version of the invader, so that your body learns how to fight off the real thing without actually getting sick.

Virus

It is a tiny infectious particle with a core of DNA or RNA (its instructions) surrounded by a protective protein coat. It can infect living things, and sometimes causes disease, like the flu. A virus is technically not considered living, because it needs to hijack cells and use their machinery to live and reproduce.

About the Authors:

Marie, Susan, Erica, Bailey, Alex, and Neha are a group of medical students at the University of Chicago who believe that science and medicine can be fun, useful, and easily accessible. Their aim is to disseminate important health information in a way that is both artistic and informative.

About the Artist:

Clara is an MFA student at the University of Chicago who loves to make art that is good, clean fun.

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Fortunately, I am a Rock:

Tantalizing Tales of the Rock Cycle.



By

Sarah J. Miller



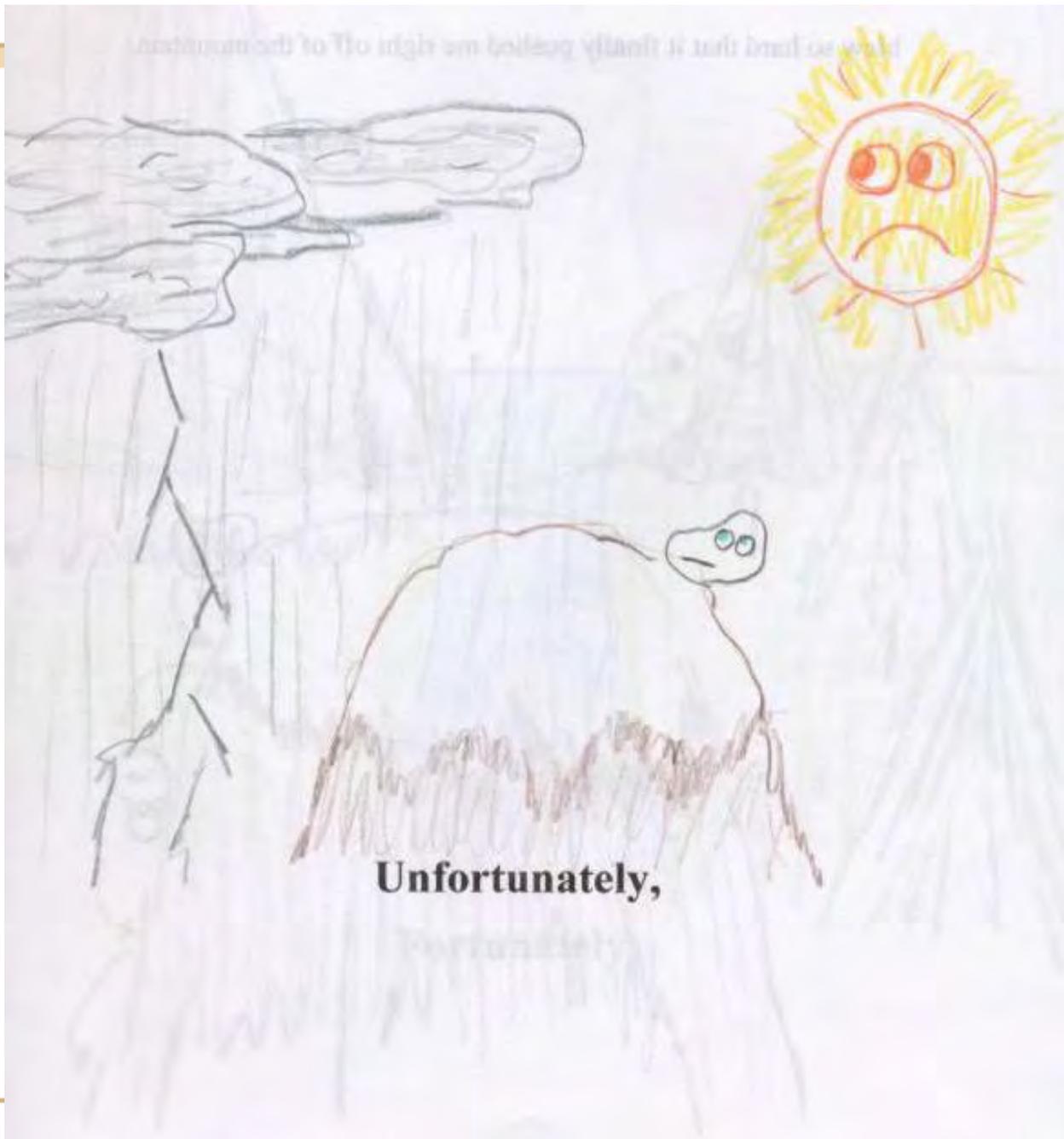


For my pet rock Sharon

Your strength and resilience are an inspiration.

I am a Rock. I have been many places and seen many things. I am constantly changing through a process called the Rock Cycle. I used to live on top of a tall mountain. Every day I was able to look out and gaze upon the beautiful Earth. I was the luckiest Rock in the entire world!



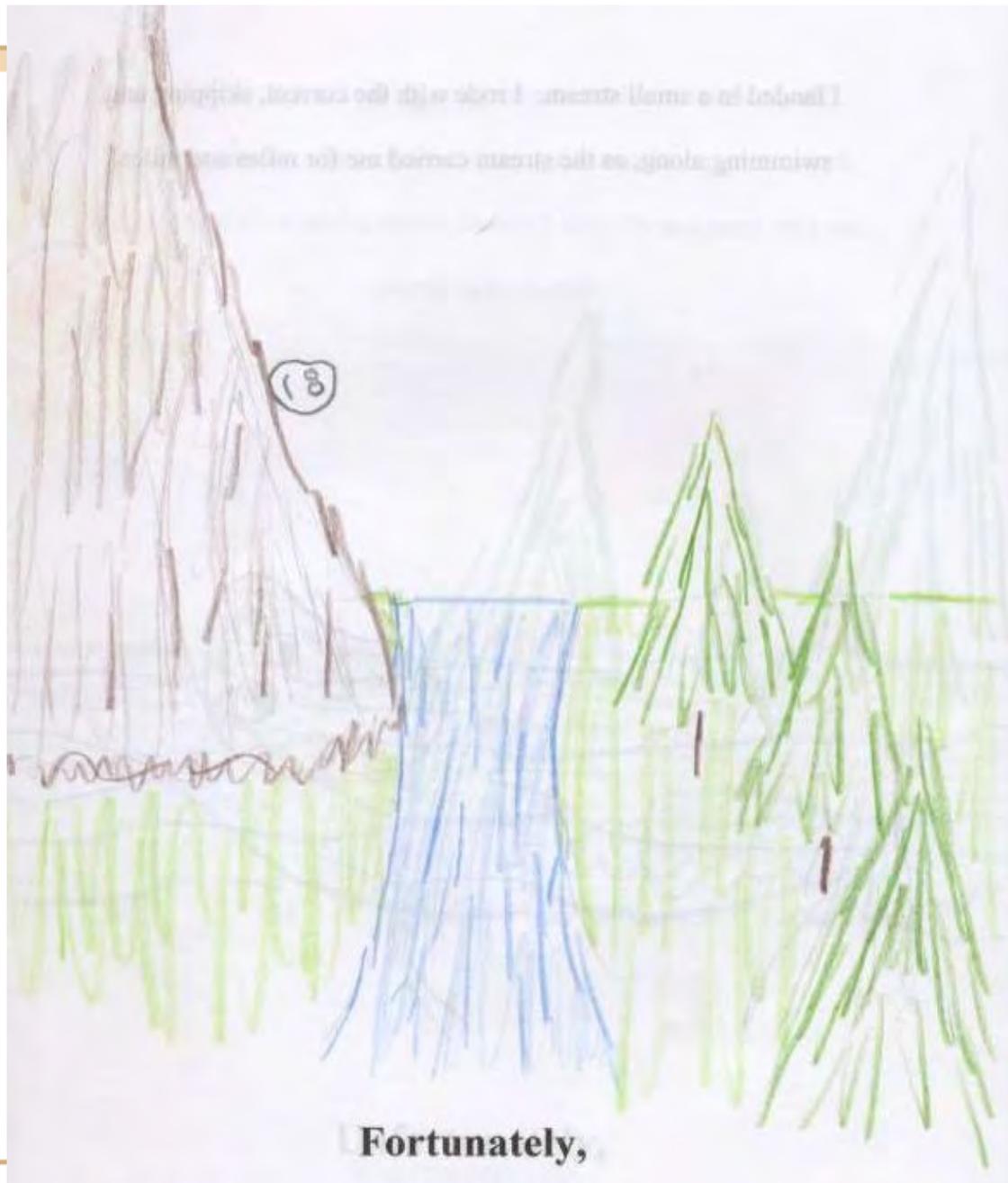


Unfortunately,



It was really windy, cold and wet on top of the mountain. For years and years I was weathered. Raindrops pelted me, ice tried to crack me and the wind kept whipping at me. One day, the wind blew so hard that it finally pushed me right off of the mountain.



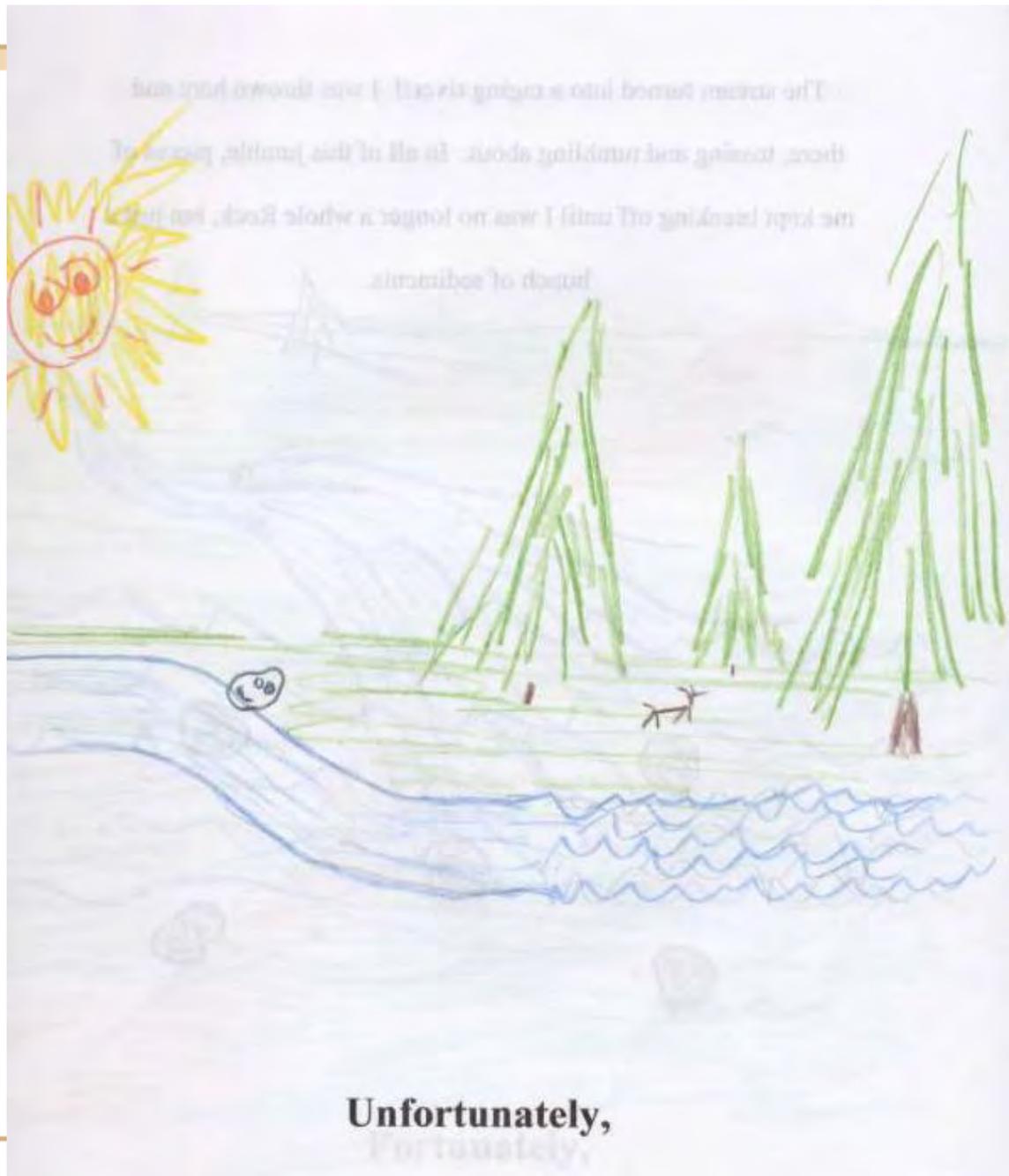


Fortunately,

I landed in a small stream. I rode with the current, skipping and swimming along, as the stream carried me for miles and miles.

Once the wind kept whipping at me. One day the wind blew so hard that it finally pushed me right off of the stream.



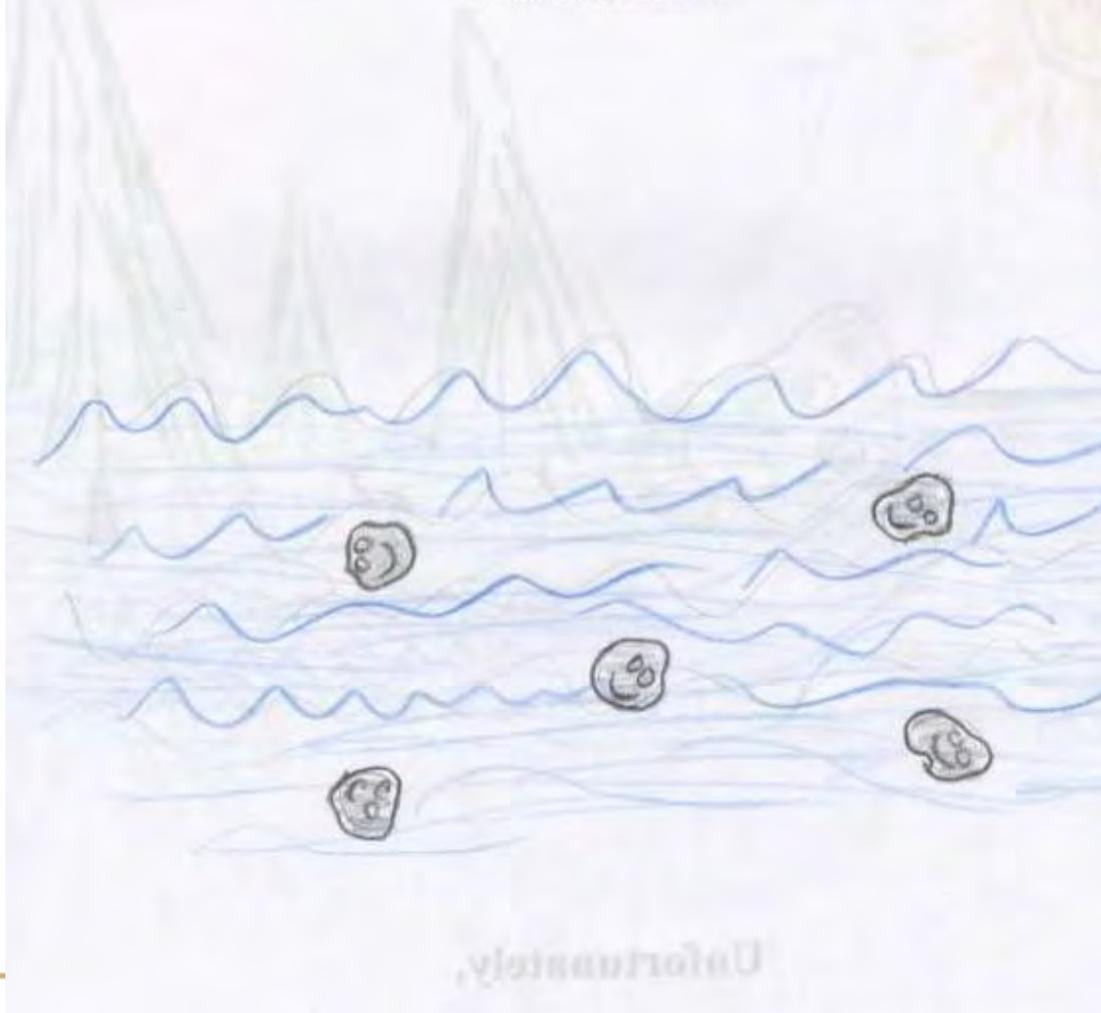


Unfortunately,

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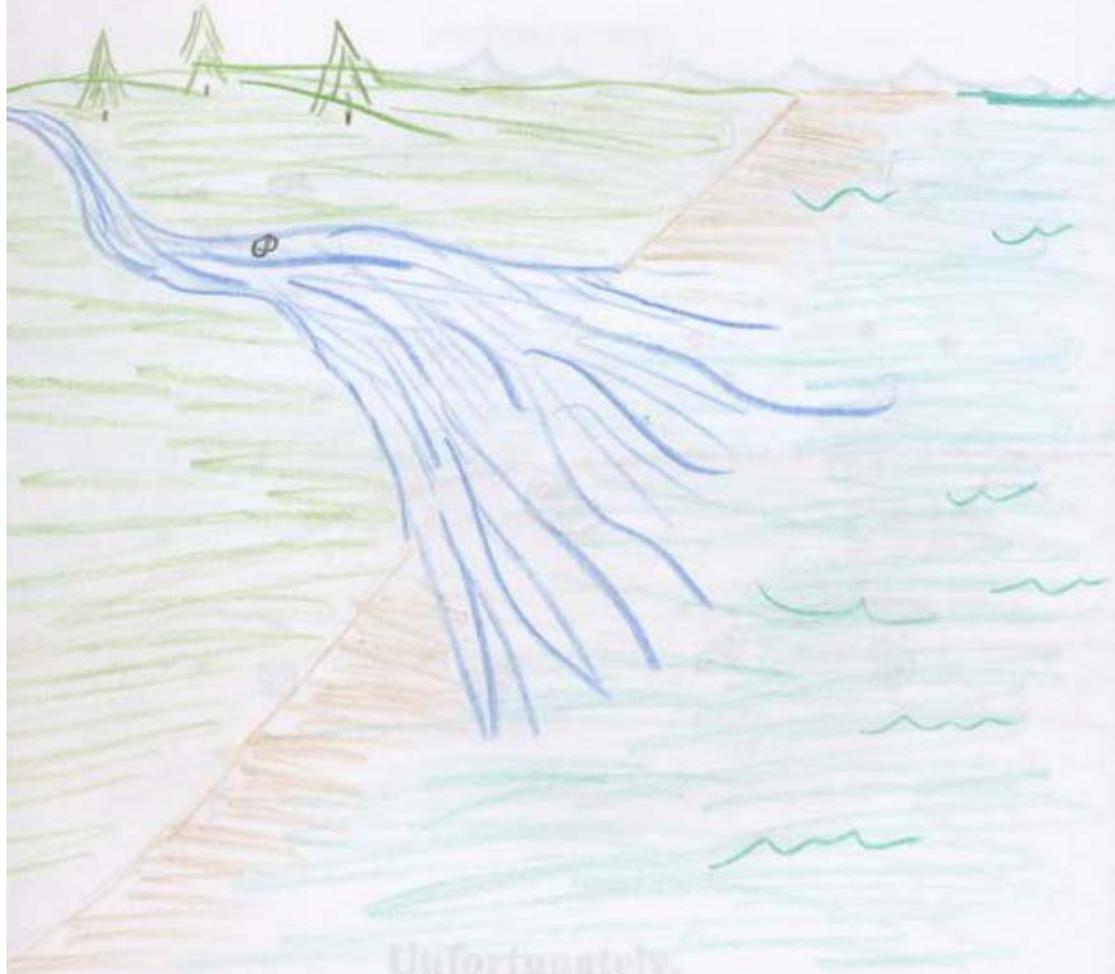
The stream turned into a raging river!! I was thrown here and there, tossing and tumbling about. In all of this jumble, pieces of me kept breaking off until I was no longer a whole Rock, but just a bunch of sediments.



Unfortunatly,

The river flew into the ocean. I was finally able to settle down and

take a rest on the ocean floor.



Unfortunately,
Fortunately,



The river flew into the ocean. I was finally able to settle down and

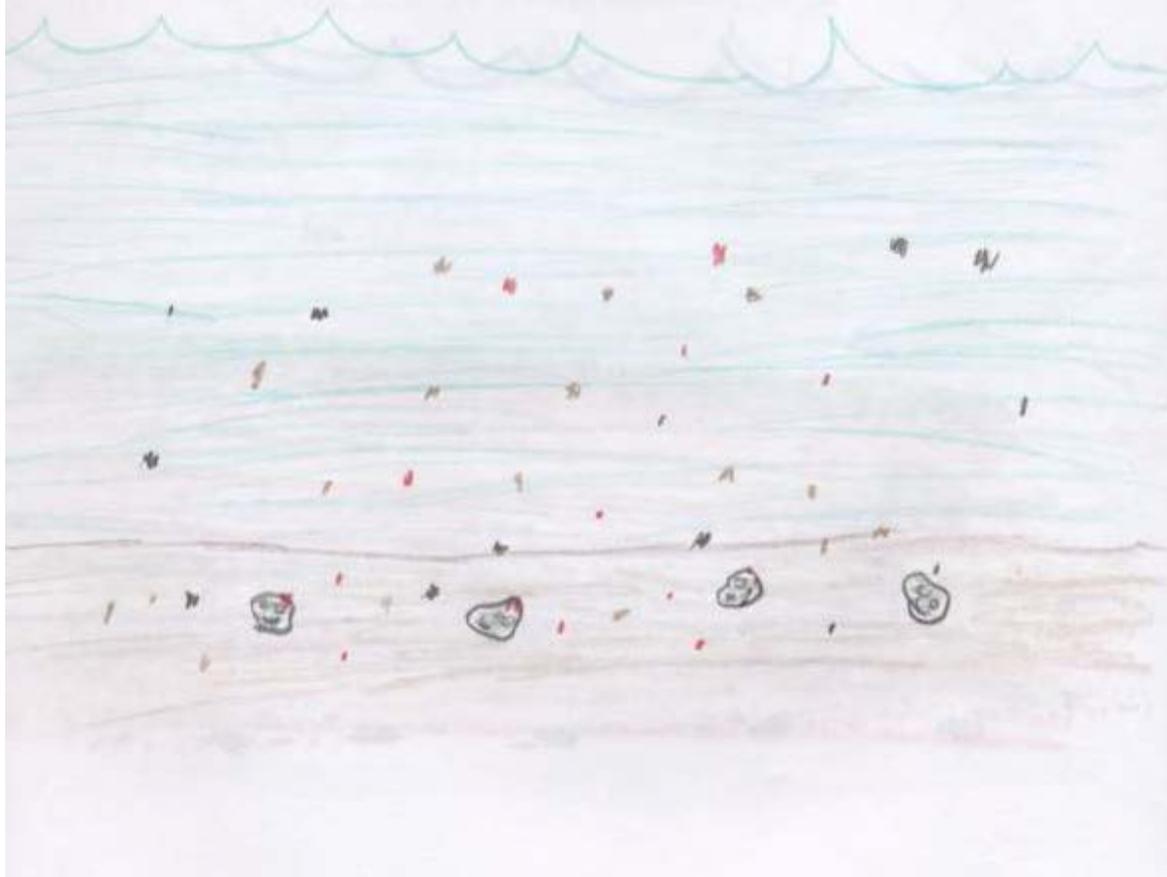
take a rest on the ocean floor.

me kept breaking off until I was no longer a whole block, but just a

fraction of an ounce.



The river continued to push more and more sediment on top of
me, so things started to get pretty crowded. After a while, I could
no longer see the ocean and all of the sediment upon the river
was getting very heavy.



Unfortunately,

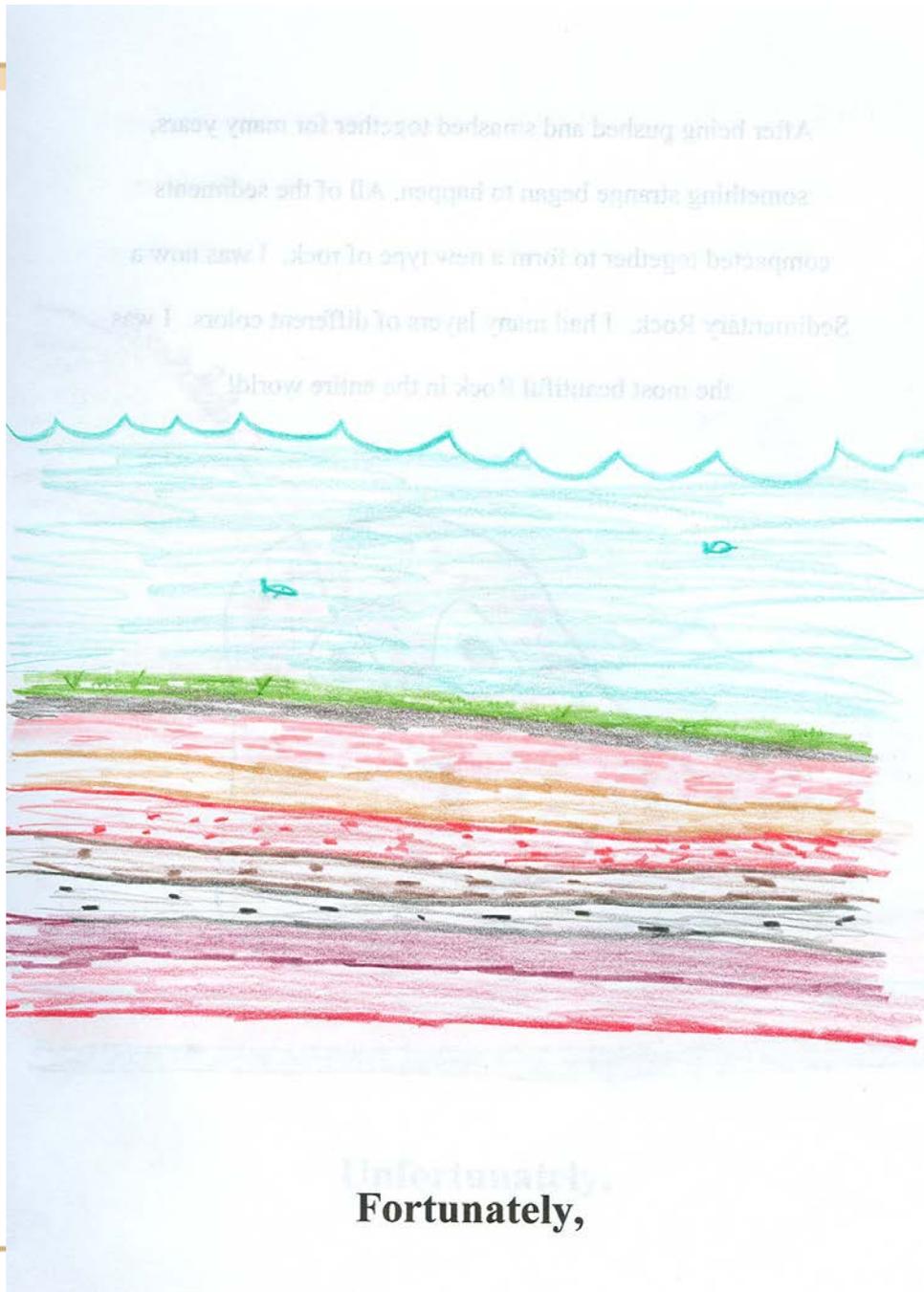
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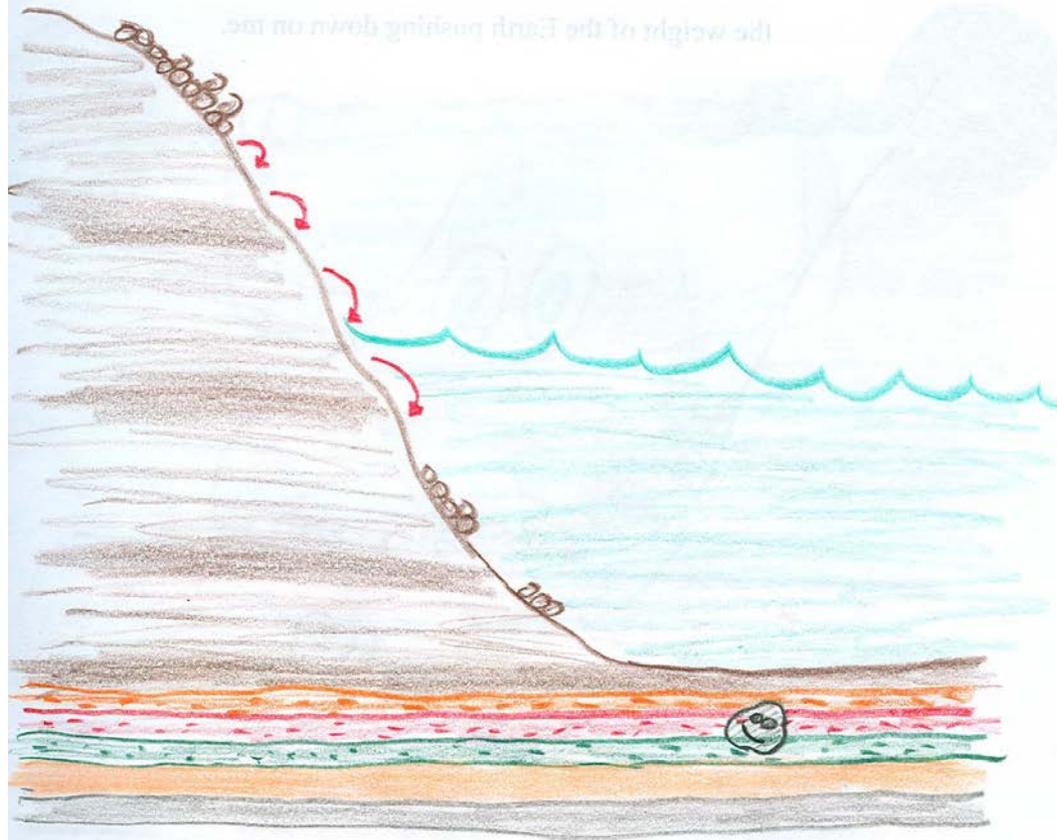
Unfortunately,



After being pushed and smashed together for many years,
something strange began to happen. All of the sediments
compacted together to form a new type of rock. I was now a
Sedimentary Rock. I had many layers of different colors. I was
the most beautiful Rock in the entire world!



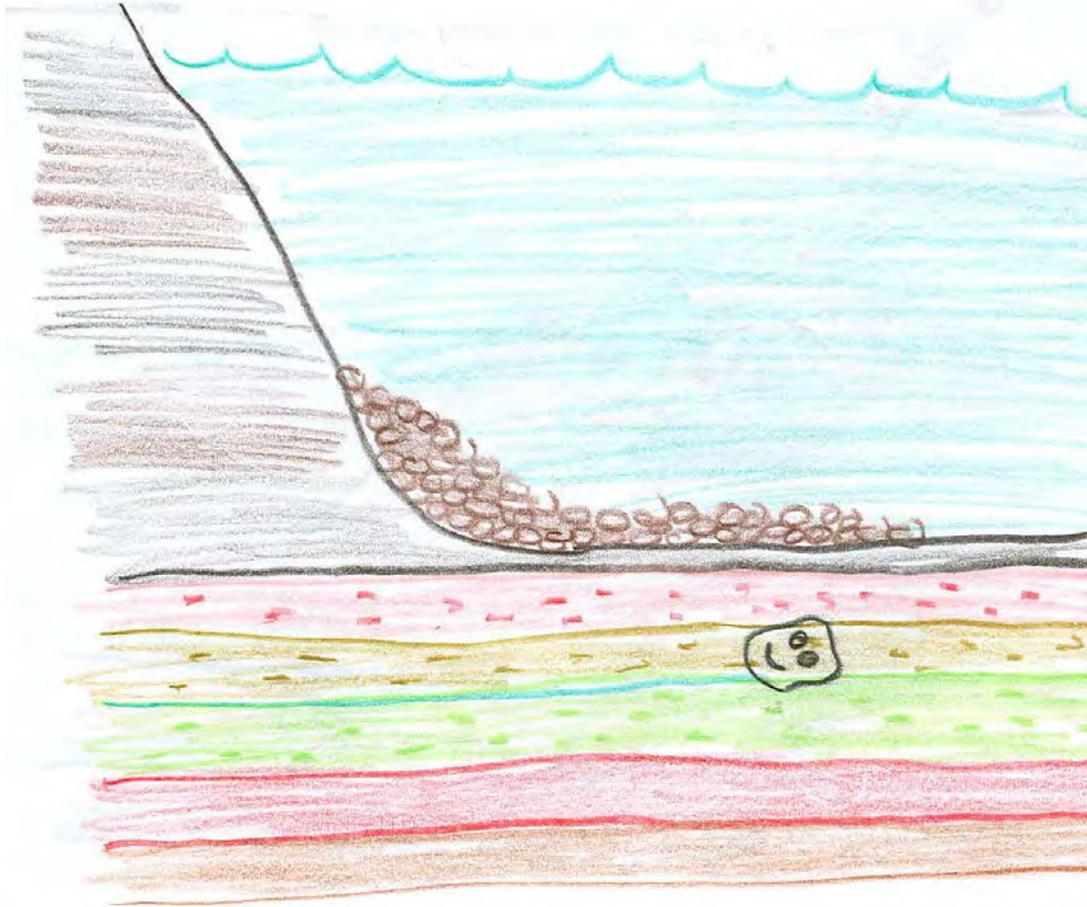
There was a terrible landslide so even more rocks and sediments
were piled on top of me. I was now deep inside the Earth. It
started to become very hot and there was so much pressure from
the weight of the Earth pushing down on me.



Unfortunately,



There was a terrible landslide so even more rocks and sediments were piled on top of me. I was now deep inside the Earth. It started to become very hot and there was so much pressure from the weight of the Earth pushing down on me.

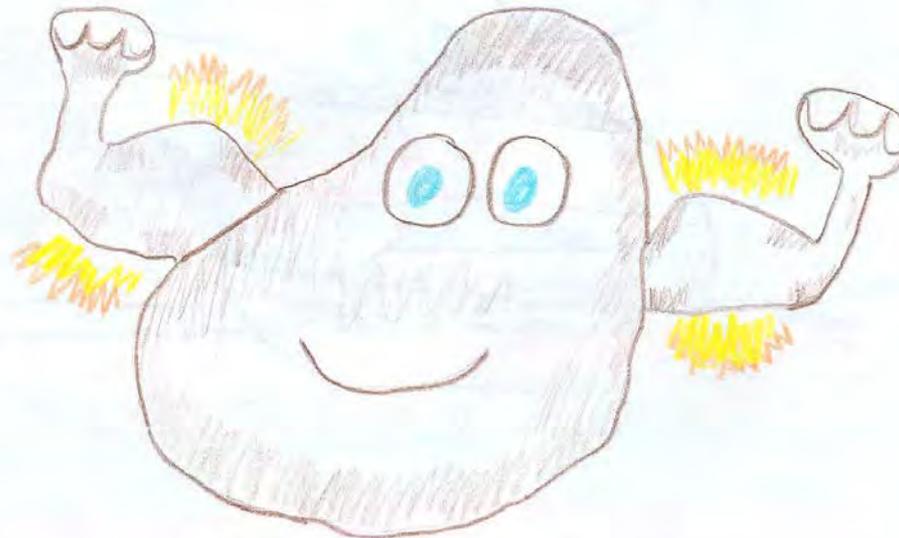




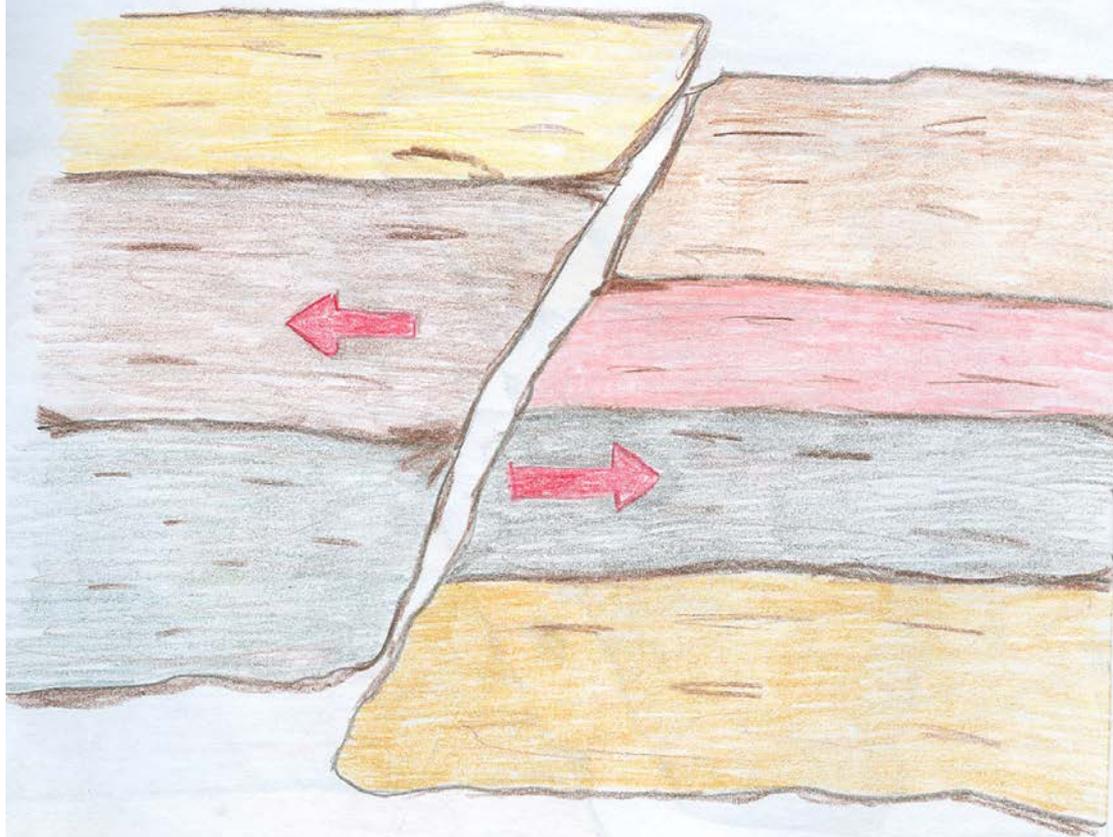
Fortunately,



The heat and pressure began to change me. Like a butterfly, I went through a metamorphosis. I emerged as a Metamorphic Rock. I was a tough Rock with a solid crystal structure. I was deep within the Earth where no wind or water could weather me. I was the strongest Rock in the entire world!



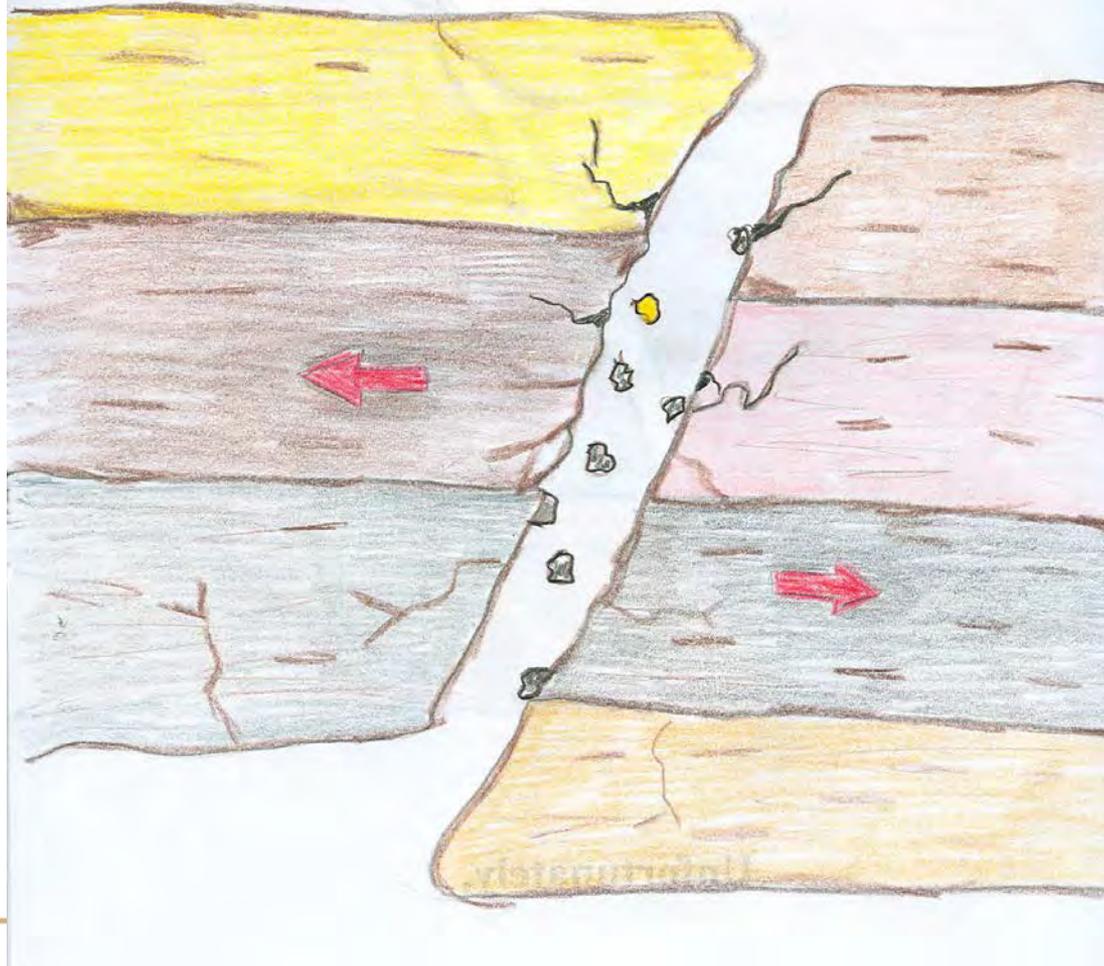
The Earth began to tremble and shake. EARTHQUAKE!!! Pieces
of me started to break and crumble as I was pushed even further
into the depths of the Earth.



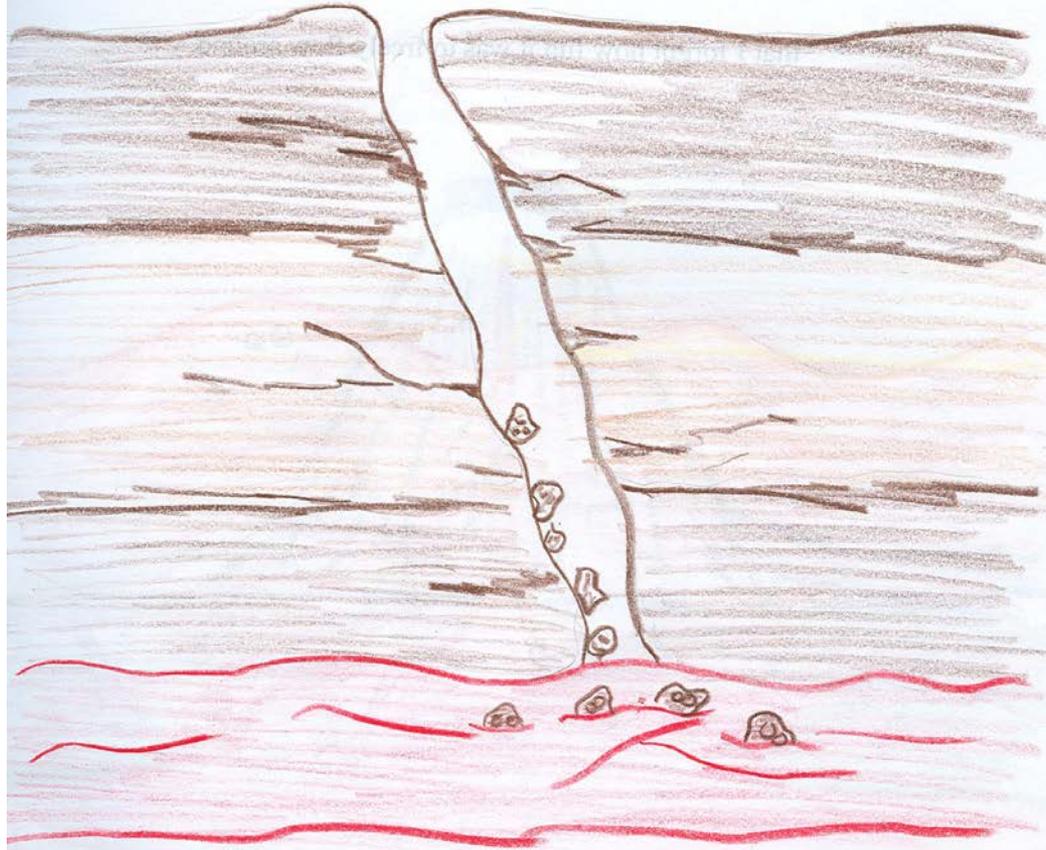
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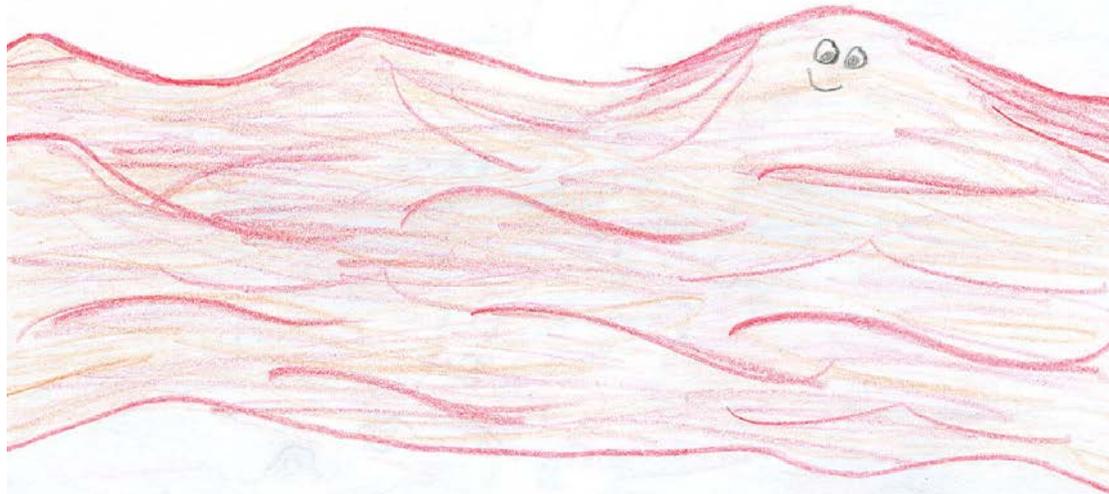
It was extremely hot this deep inside the Earth. In fact, it was so hot that I melted into magma. I had been a solid rock for so long



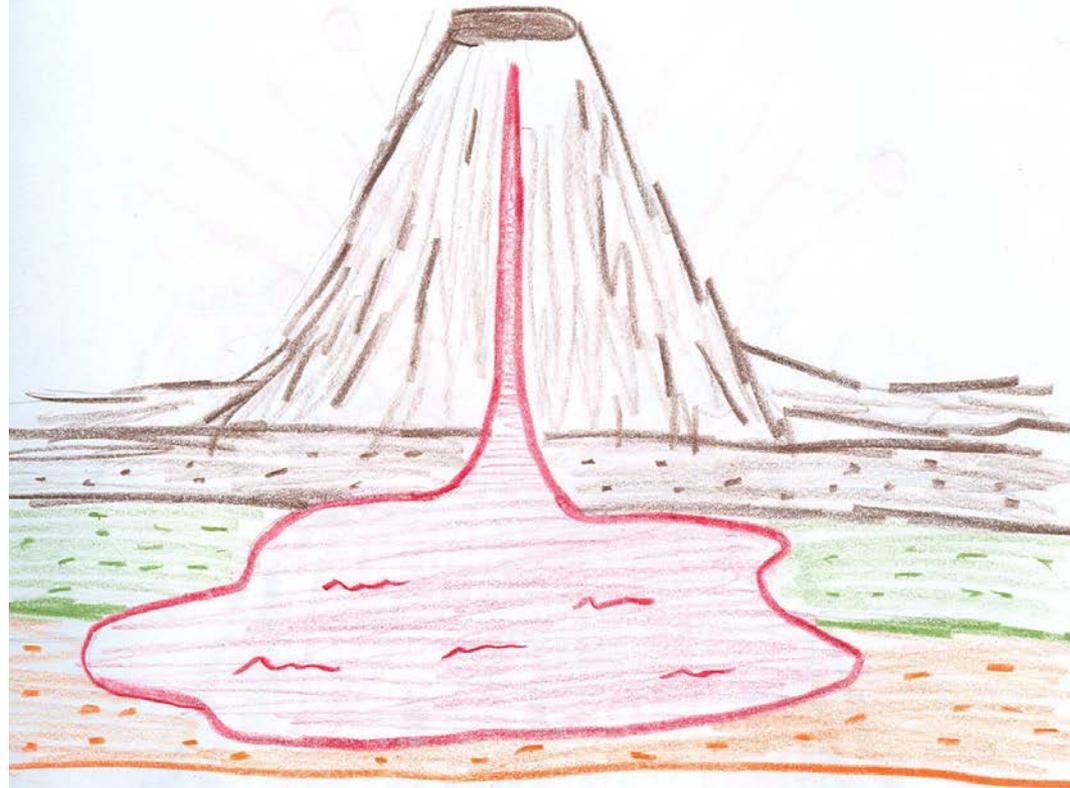
Unfortunately,
Fortunately,



It was extremely hot this deep inside the Earth. In fact, it was so hot that I melted into magma. I had been a solid Rock for so long that I forgot how fun it was to freely flow around.



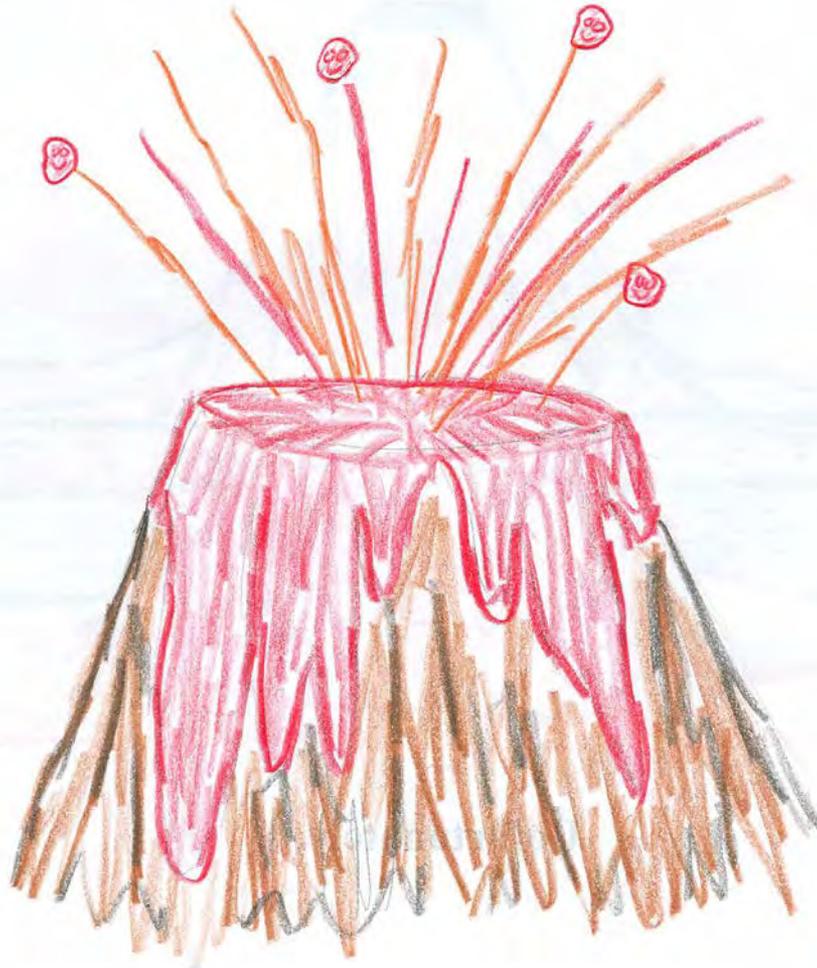
I began to be thrust upwards against my will. I was pushed and
shoved until the next thing I knew, I burst right out of a volcano
and into the sky. I flew for hundreds of feet until I started hurtling
toward the ground.



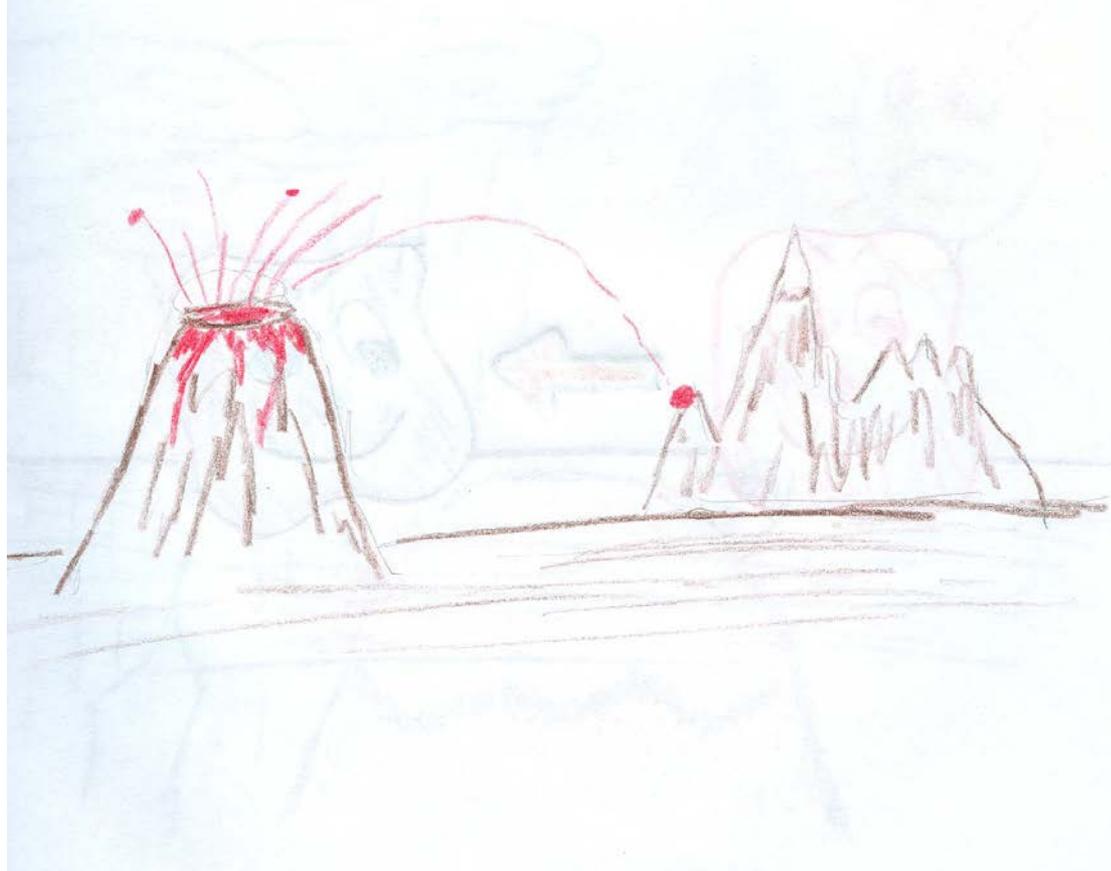
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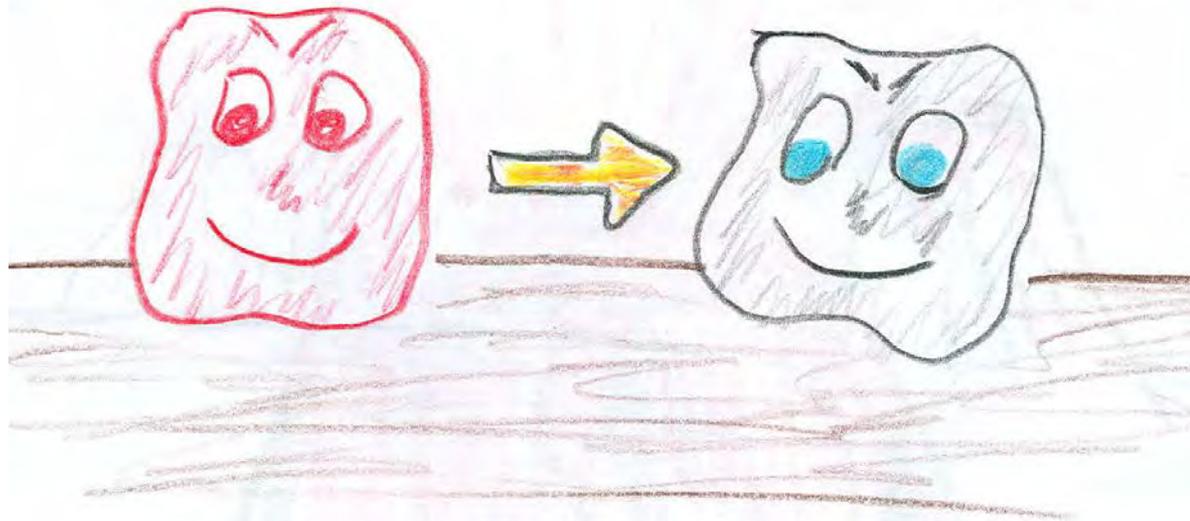
I finally landed in a cozy spot on the top of a mountain. It was
much cooler out here on the Earth and I quickly began to harden. I
am now an igneous rock. I am black and very glassy. I am the
shiniest rock in the entire world!



Unfortunately,
Fortunately,



I finally landed in a cozy spot on the top of a mountain. It was much cooler out here on the Earth and I quickly began to harden. I am now an Igneous Rock. I am black and very glossy. I am the shiniest Rock in the entire world!



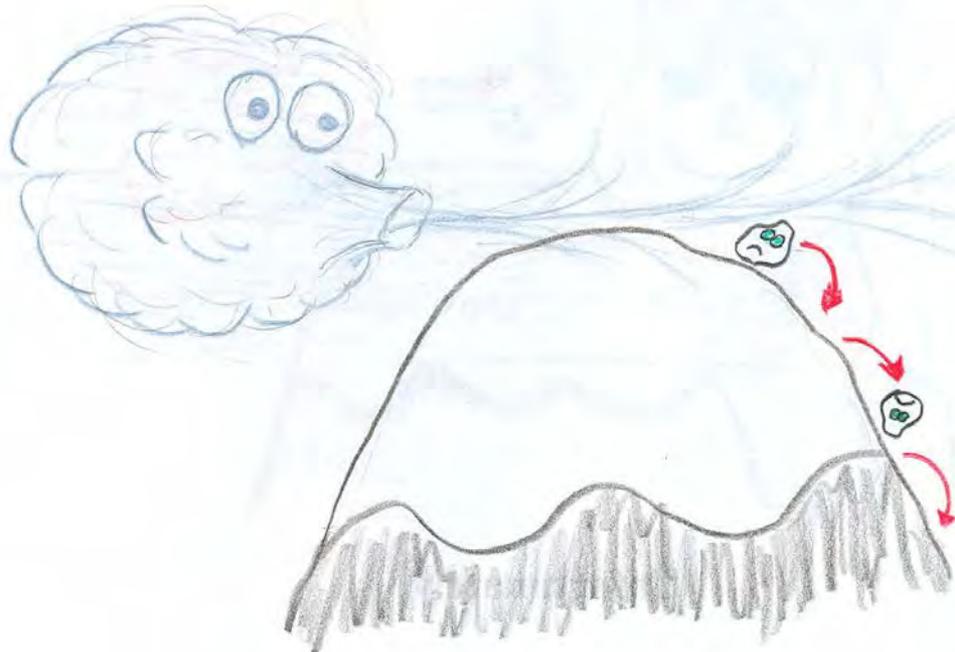
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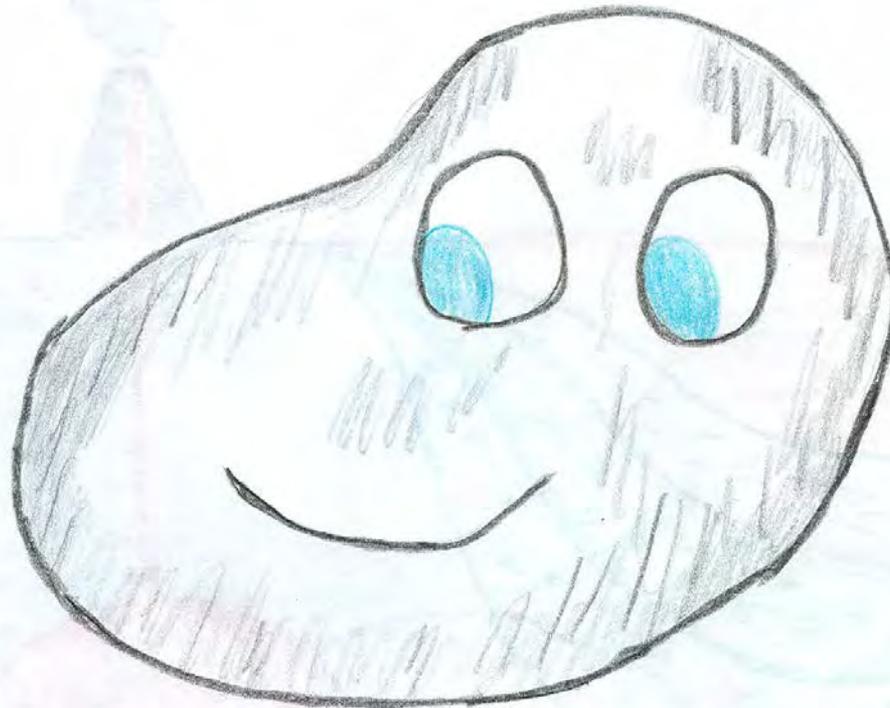
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I am a Rock. I have been many places and seen many things. I am constantly changing through a process called the Rock Cycle. I wonder where my next journey will take me. Do you?



Not

The End

Fortunately, I am a Rock:

Tantalizing Tales of the Rock Cycle.



By

Sarah J. Miller



Recommendations

- Ditch the textbook for experienced teachers
- Pay them to develop their own materials
- Look for the emotional engagement of the new content
- Refer them to the IERG website for planning frameworks
- Use graphic novels as a resource for ALL subjects
- Mark.Geary@dsu.edu

