Legendary Lessons
How to Enhance your Instruction through Storytelling
"Legendary Lessons": How to Enhance your Instruction through Storytelling

Once upon a time, a teacher wished for a classroom full of happy, engaged students. Alas, our teacher hero was up against many dastardly obstacles/foes!

Uninspiring curriculum, budget concerns, time limits, high-stakes standardized testing...
A little about me...

Elaine is one of those (strange and fortunate) people who’s known from a very early age that she wanted to be a teacher when she grew up. She received her B.S. degree in Psychology from the University of Illinois at Urbana-Champaign with a minor in Chemistry, and her M.A.T. degree in Elementary Education from National-Louis University in Chicago while working concurrently for a Chicago-based school management organization called Academy for Urban School Leadership (AUSL). Over the past 10+ years, Elaine has had the honor & privilege of teaching students of all ages in a diverse array of settings on a wide range of subjects, some of them including teaching English abroad in Taiwan & Malaysia, teaching private music lessons to students ages 3-50+, teaching a semester of high school freshman biology & advanced anatomy, and teaching young children the awesomeness of hands-on STEM in an extracurricular enrichment setting. She currently works as a Curriculum & Professional Development Specialist at the Illinois Mathematics and Science Academy (IMSA) on the Statewide Student Initiatives team and she often describes her job as “being a big kid who gets to devise fun STEM activities to try out and then inviting kids from all over to explore/nerd out with her.”
~*In-Person Program Offerings*~

Summer@IMSA

Saturday STEM

https://outreachatimsa.wordpress.com/
Session Overview

I. Rationale for Storytelling - (Elaine will try her darndest to make you fellow believers in the power of using more stories in the classroom!)

II. Some Storytelling Tips + Tricks for Maximum Engagement with examples...

   (a) (hopefully) Have some Fun along the way... 😊
Why Stories...?

Please share some of your awesome thoughts/opinions in the chat. 😊👇
Heider-Simmel (1944) Psychology Experiment

An Experimental Study of Apparent Behavior by Fritz Heider & Marianne Simmel is a landmark study in the field of interpersonal perception, in particular in relation to the attribution process when making judgments of others.
Ancient Roots... (Why fight our genetics?)

“It took neurology several centuries to validate what the prehistoric cave painters of Indonesia already knew:

Storytelling makes for effective communication. Yet it feels like the more evidence we have that our brains are hardwired for relational and analogical reasoning, the more instructors recite bulleted data points without context, despite the vast amount of resources and technology at our fingertips.”
What the neuroscience shows...

“Not only do stories connect us to the past and express universal beliefs, they can also help us develop a better understanding of the world and those we share it with. This is part of the reason why your brain loves stories.

[...] Yet [The brain] is still a pattern-seeking instrument that looks to put the chaos of the world into some kind of recognisable order. Stories represent our most powerful and meaningful way of doing just that.

Research also shows that all this brain activity can last for several days, explaining why good stories tend to stay with us. Additionally, stories also improve our ability to recall any information embedded in them. One estimate suggests that we can recall facts up to 22 times more effectively when they are part of a story rather than just isolated data.”
Why Tell a Story?

Distinctly human—hard-wired into DNA
Activates the emotional part of brain
Aids memory

Manage the Story, Manage the Change:
How Neuroscience Informs the Management of Change through Storytelling

Your Brain On Story

- Motor Cortex
- Emotions
- Smells
- Amygdala
  - emotional reactions
- Memories
  - our shared experiences
- Visual images

When you are listening to a story you have 7 areas of the brain that light up on fMRI. These additional 5 areas are adding the somatic elements of sight, hearing, motion, and emotions. This is what has been called the neural story net, or NSN.
HOW STORYTELLING AFFECTS THE BRAIN

NEURAL COUPLING
A story activates parts in the brain that allows the listener to turn the story into their own ideas and experience thanks to a process called neural coupling.

DOPAMINE
The brain releases dopamine into the system when it experiences an emotionally charged event, making it easier to remember and with greater accuracy.

MIRRORING
Listeners will not only experience the similar brain activity to each other, but also to the speaker.

CORTEX ACTIVITY
When processing facts, two areas of the brain are activated (Broca’s and Wernicke’s area). A well-told story can engage many additional areas, including the motor cortex, sensory cortex and frontal cortex.

Infographic highlighting the effectiveness of using ‘Whiteboard Animation’ for storytelling @stayingaliveuk - www.stayingaliveuk.com
Inuit Parenting
“And it’s strange—I’ve noticed that many of my former students will come back and ask, “Do you still tell your class that story about ...?”

Of all the knowledge that I attempted to instill in their minds, those goofy stories I told from time to time seemed to leave the longest-lasting impression.”
SITE Intern “Testimonial”...

“A particularly proud moment of success [...] came during this last week of camp classes. The Engineering Explorations lesson I was teaching was very weak, which I quickly realized during the first class. The lesson addressed microbes, viruses, bacteria, and how basic hygiene, vaccines, and medicine work with the immune system to keep people from getting sick. I felt drained as I went to lunch. The lesson was not sticking. As I walked back to my room, my mind was trying to find a way to change it, and I had a revelation about a perfect storyline I could use. The comparison between Rocky Balboa as a fighter against Apollo Creed and the immune system fighting against diseases. I tried it, and the story took off. It was exciting and amazing how much it improved the class’s engagement and success.”
In Summary...

1. Stories can help generate intrigue/interest, which can lead to the all-important **student buy-in & engagement**!
   a. Stories can help make a concept more accessible / “less scary” for students.

2. Humans are genetically wired to respond to stories!
   a. Stories activate major neural networks in the brain, which can greatly help aid with memory formation & retention.

3. Stories can help create a framework and/or context for students so they can better understand the *purpose* behind what they are doing.

4. Stories can help foster better relationships between teachers & students.
   a. Stories can help release powerful hormones such as cortisol & oxytocin, which can help with focusing a person’s attention and helping a person feel a sense of connection & well-being respectively.
So why **NOT** stories...?

*Please feel free to share some more of your thoughts/opinions in the chat... 😊👇*
Some Storytelling **Plot** Tips...

1. Surprise the audience!
2. Provide a twist!
   a. Turn the expected inside out or upside down...
   b. Encourage readers to anticipate what *could* happen, but then give them an event/character response they couldn’t have expected...
3. Give characters multiple problems and setbacks—**pile on the problems**!
4. Pose questions and delay the answers
5. Encourage emotional responses - (joy/laughter is a great emotional response too 😊😉)
6. Draw from personal experiences/interests
7. Encourage audience to think—keep them involved and *curious*
The Expanding Marshmallow

Introduction
Help students explore and understand Boyle's Law with this simple demonstration. See how a change in pressure affects the volume of marshmallow. Students will easily remember the relationship between pressure and volume after participating in this activity.

By simply placing a marshmallow inside a syringe and using the plunger to increase and decrease the pressure, your students can watch the marshmallow expand and shrink to get a clear understanding of Boyle's Law.

Concepts
- Pressure
- Volume
- Boyle's Law
- Gas laws

Materials
- Syringe, without needle, plastic, 35-mL
- Miniature marshmallow, fresh
- Felt-tip pen (optional)
- Syringe tip cap (optional)

Safety Precautions
This laboratory activity is considered nonhazardous. Follow all normal laboratory procedures.

Procedure
1. If desired, use a felt-tip pen to draw a happy face on the end of a miniature marshmallow.
2. Remove the end cap from the tip of a 35-mL plastic syringe.
3. Remove plunger from the syringe and insert the marshmallow into the syringe.
4. Place plunger back in syringe so the volume reading is approximately at the 15-mL mark.
5. Place a syringe tip cap over the tip of the syringe. Pull the plunger out—decreasing the pressure inside the syringe. The marshmallow should expand—it’s volume increases.
6. Now push the syringe in—increasing the pressure inside the syringe. The marshmallow should shrink—it’s volume decreases.

Disposal
Please consult your current Flinn Scientific Catalog/Reference Manual for general guidelines and specific procedures governing the disposal of laboratory waste. The marshmallow should be removed from syringe and put into the trash according to Flinn Suggested Disposal Method #26c. Clean work area and wash hands thoroughly with soap and water before leaving the laboratory.

Tip
- A finger may be used to “seal” the syringe instead of a syringe tip cap, if needed.
The Tale of the Squishy-Looking Aliens...

Our team of astronauts have landed on a new, mysterious planet but it turns out we are not alone! There are squishy-looking aliens seemingly growing & shrinking at will and we need to hurry up and figure out the science behind this strange power and whether these squishy aliens are friend or foe?

(TO BE CONTINUED....)
The Tale of the Squishy-Looking Aliens... (Part Deux!)

We have solved the mystery of the growing & shrinking aliens, and have given them a safe space-suit to wear that will protect them from large fluctuations in air pressure!! BUT, our new friends are not safe yet!! They have informed us of a grave danger they are facing...there are evil campfire aliens running amok on Planet S’mores, trying to capture the marshmallow aliens so they can make endless S’mores! Since we are now all friends, we have offered to create an escape launch device that the marshmallow aliens can use to blast themselves to safety. Using their knowledge of gas behavior (Boyle’s law), our astronaut team will design and test our air-powered “Alien Relocation Devices” (ARDs).
Some Storytelling **Delivery** Tips...

1. Use Movement
2. Use Dramatic Pauses
3. Use Vocal Inflections
4. Use Different Voices for Different Characters
5. Use Props
6. Use Sound Effects / Music!
7. Use Repetition
8. Invite audience participation!
A Picture is Worth 1000 Words
Teaching Science With Comics

The docs never thought this was funny either.

In nursing school, pathogens made sense to me as characters.

And I always explain things to my patients this way.

What the hell is this??

It usually works.

I'm telling you, Harold. She said bugs. In my blood. She said bigger than.
Amoeba Sisters Shout-Out!

Like water to solutes, I will always be drawn to you.

Valentine, I belong with you... like adenine to thymine.

You are the substrate

I'm stuck on you

to my enzyme.

like fatty acids on a glycerol.

Stay Curious!

RNA: If you can't help make proteins, get out of the kitchen.

And when he looked at his strand the next morning...

ONE OF THE BASES WAS GONE!

Sharing mutation stories was a DNA camping tradition.
Harry Potter in the Classroom...

https://www.the74million.org/article/watch-teachers-go-back-to-school-with-harry-potter-and-it-works-magic-on-their-students/
Science should be a story: Tyler DeWitt at TEDxYouth@BeaconStreet
Thank You So Much for Coming!!

YOU'RE AWESOME

THANK YOU!

Please feel free to reach out to me at ewu1@imsa.edu


