

Student Drivers -

Driving question boards empower students to figure out what they really need to know and how they will get there

I noticed...

Why did...

**How often
does...**

I Wonder...

What if...

You can find more storylines and the storyline tools at:

<http://www.nextgenstorylines.org>

You can find lots of examples of work in our classrooms on Twitter:

Holly Hereau @hhereau

Wayne Wright @wewright1234

Why do dead things disappear over time?



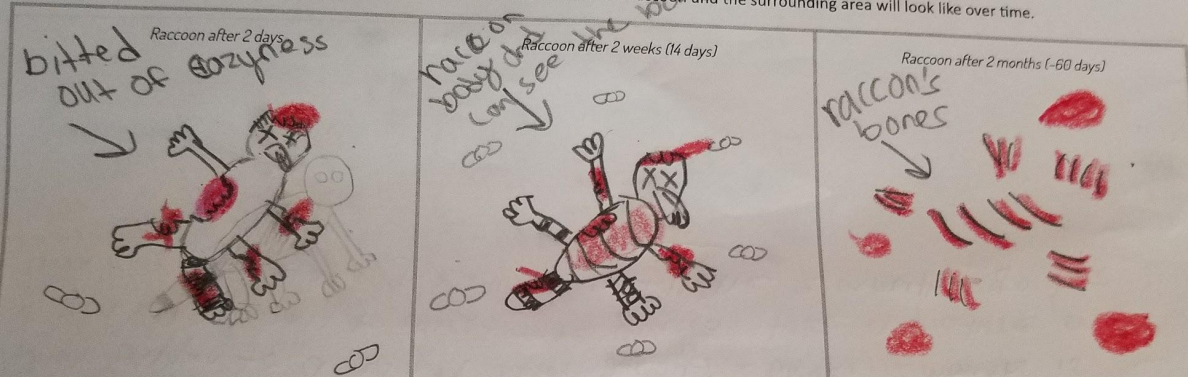
Predictions

- ▶ DRAW
- ▶ What will this look like in 2 weeks?
- ▶ What will this look like in 2 months?

Examples of Student Predictions

Lesson 1 - Student Activity Sheet: What will happen to the raccoon? Name: Rosmee Parrell Date: Jan 30, 19

Q1) Draw and label your predictions of what you think the raccoon and the surrounding area will look like over time.



What will cause it to look this way?

The raccon looks like that because other raccon and animals killed the raccon.

What will cause it to look this way?

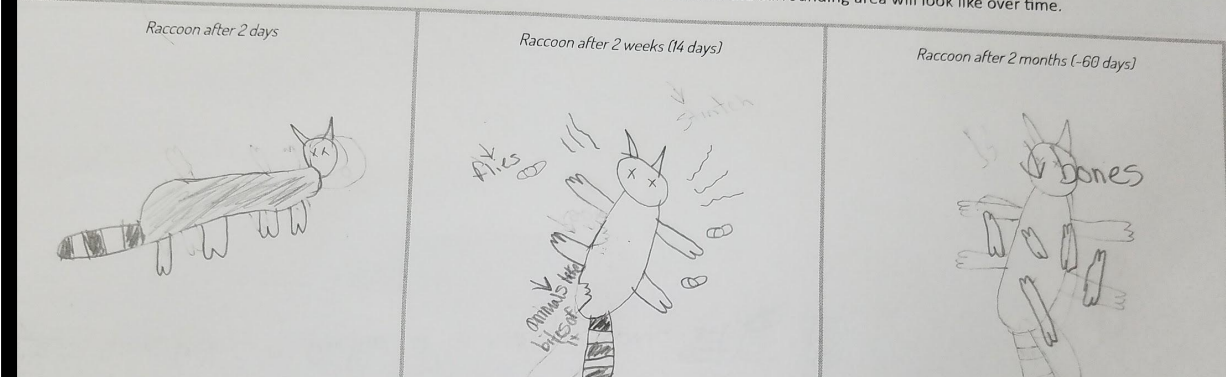
The raccon bones are showing because the other animals were eating the raccon and had open the raccon skin.

What will cause it to look this way?

The raccon is gone and there are nothing but the bones because the skin have decompose.

Lesson 1 - Student Activity Sheet: What will happen to the raccoon? Name: Ariana Strong Date: _____

Q1) Draw and label your predictions of what you think the raccoon and the surrounding area will look like over time.



What will cause it to look this way?

What will cause it to look this way?

What will cause it to look this way?

What do we Notice/ Wonder?



Driving Question Board

Why did this dead thing disappear?



Day 1

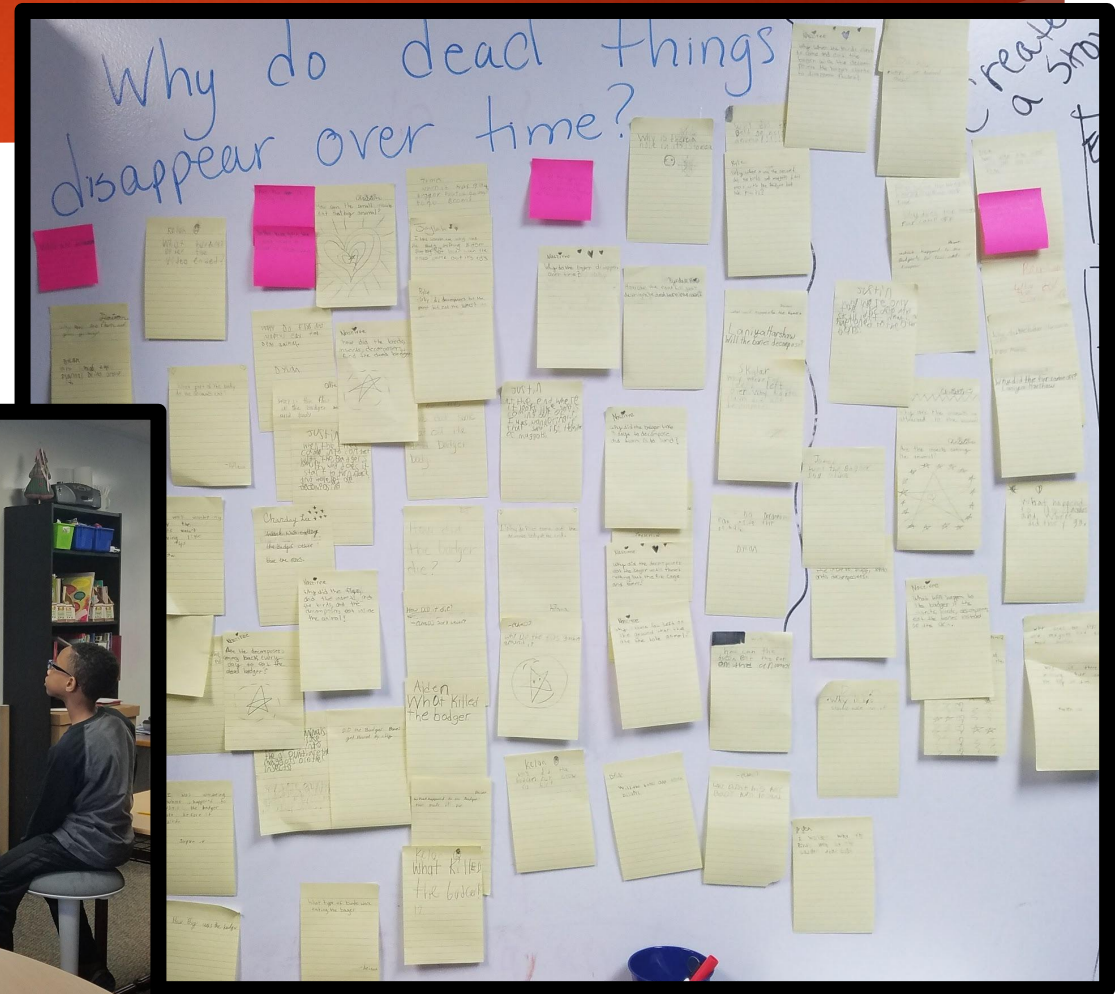
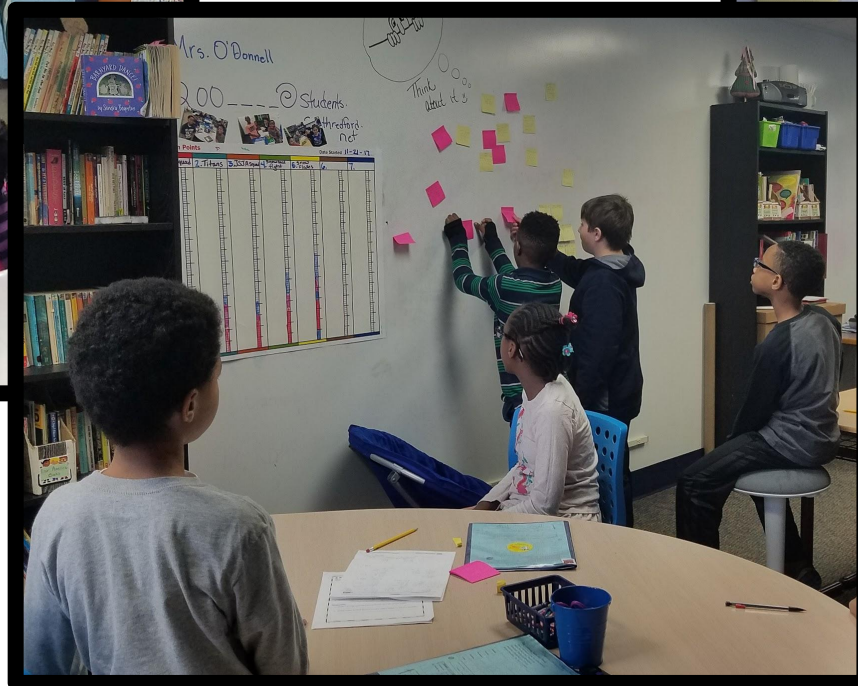
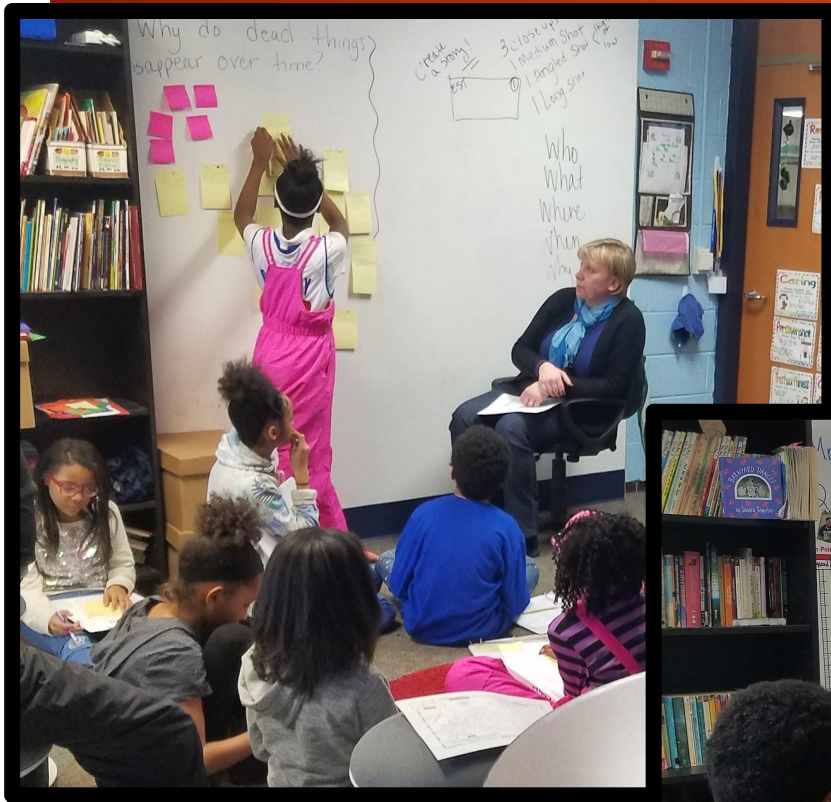


Day 5



Day 9

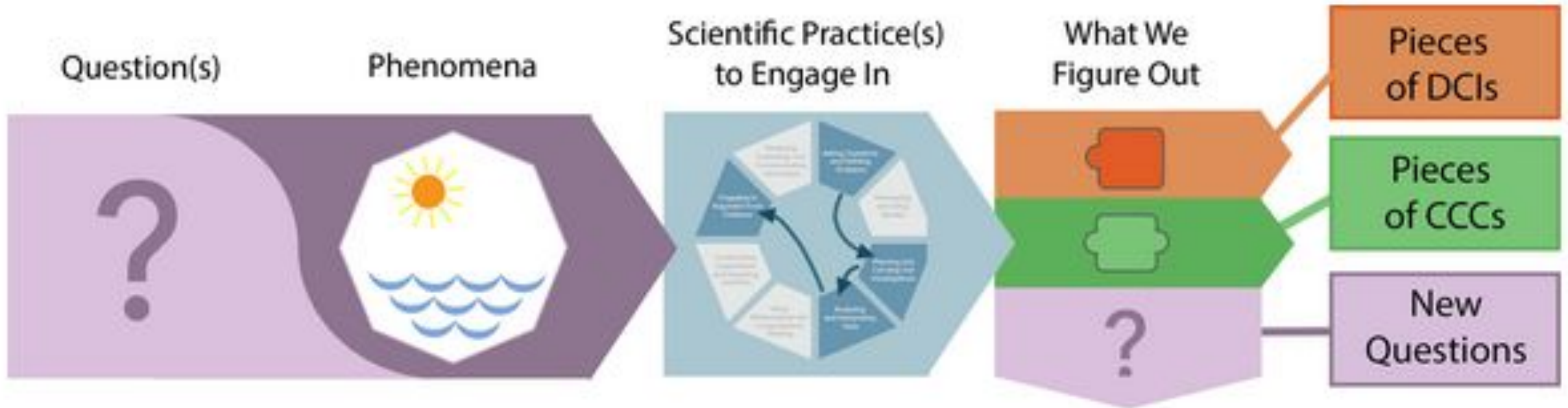
Driving Question Board in Lynda's Class



Examples of Questions

- What are those insects doing on the carcass? Where did they come from?
- What happens to all the parts of the badger like the inside muscles and organs, fur, and bones?
- Do some parts of the badger go into the soil? Does some get washed away? Does it get eaten etc.?
- Is this the same thing that happens to leaves, or fruit or wood when it rots?
- How do new plants grow from parts of plants that seem like they are dead?

Questions paired with phenomena leads to more questions.

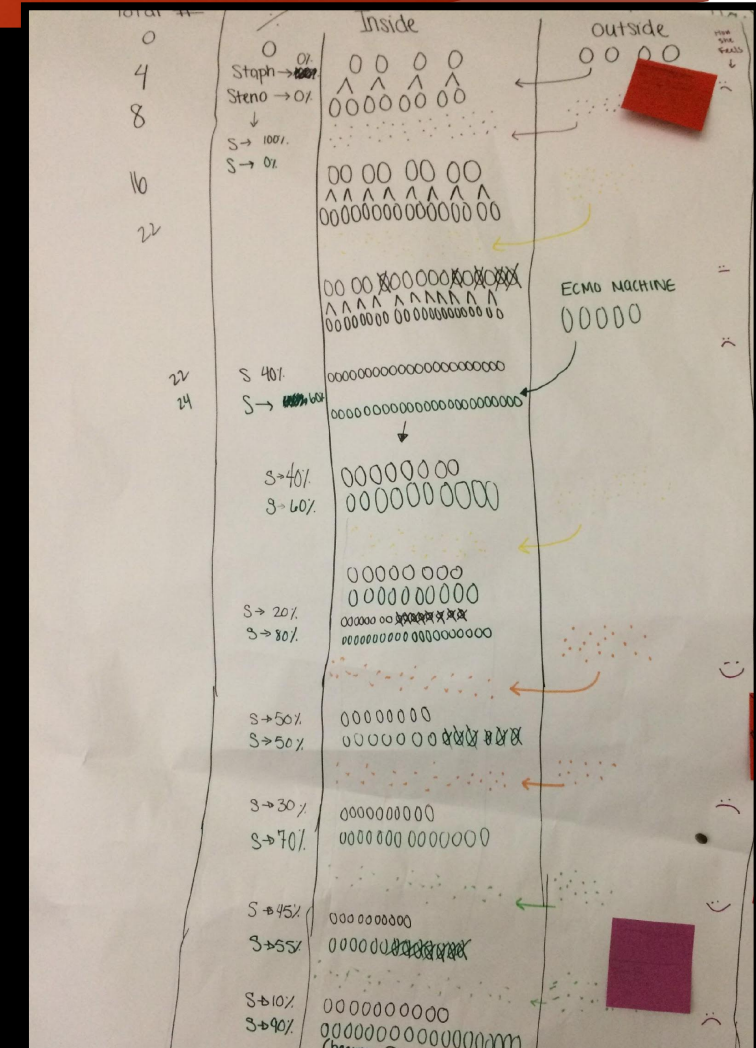
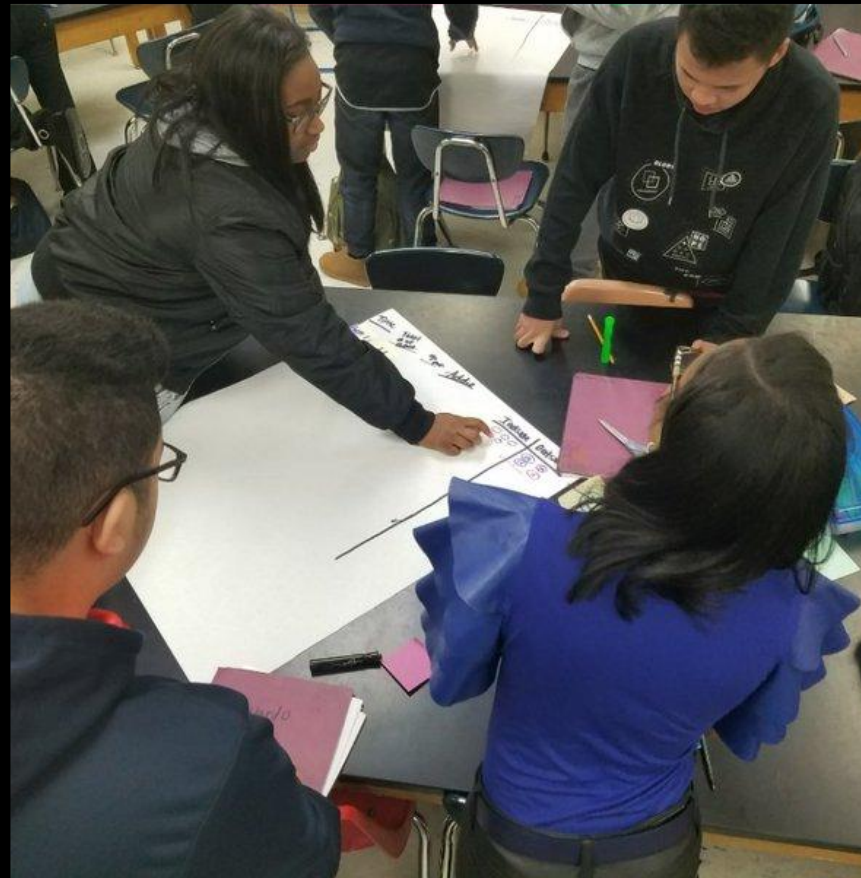
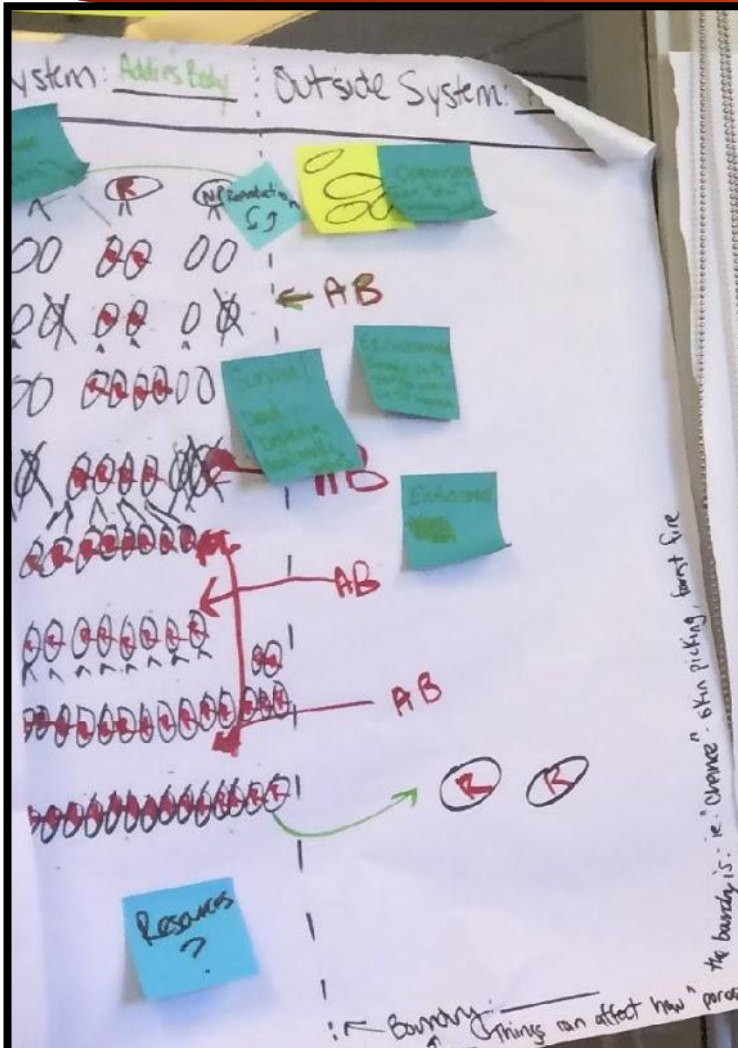


Anchoring Phenomena



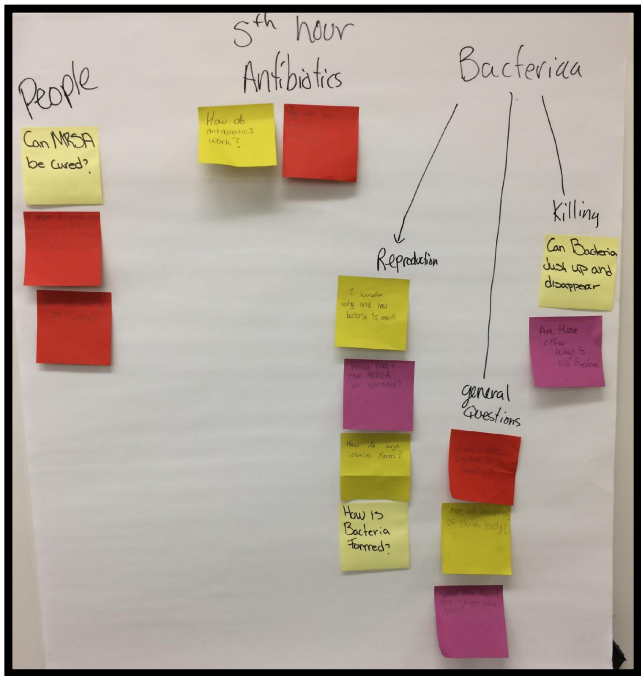
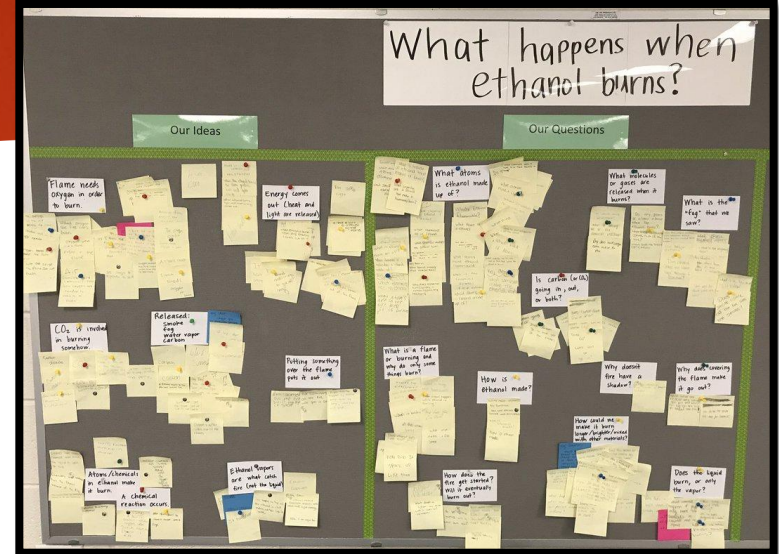
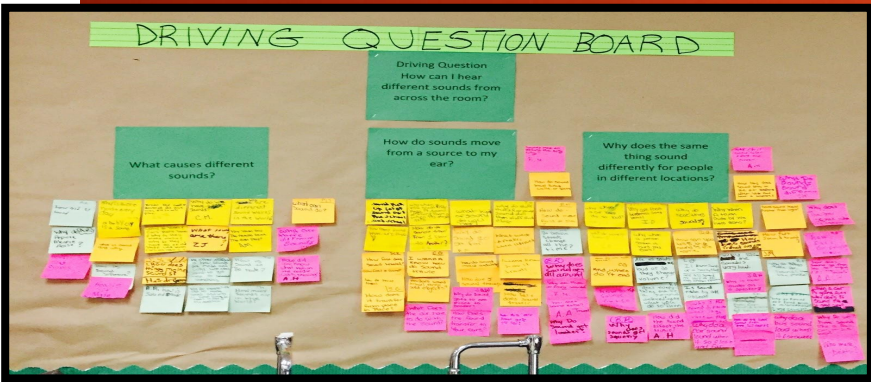
Having the END in Mind!

What do you want students to produce?



The Driving Question Board

Not about how it looks but how it is used!



Initial Questions vs. Driving questions

What about parking lots?



Initial Questions

Driving Questions

Frustration



1) Questions on Bacteria + Antibiotics
Where is this Bacteria found?
Is it found more in some places than others?
How do antibiotics work?
Why not give them all at once?
Are there other ways to kill Bacteria?
Why not give the strongest Antibiotics first?
Once infected how long before you feel sick?
How many people are affected by antibiotics?
Is there a cure yet?
How long has this been going on?
What type of Antibiotics...

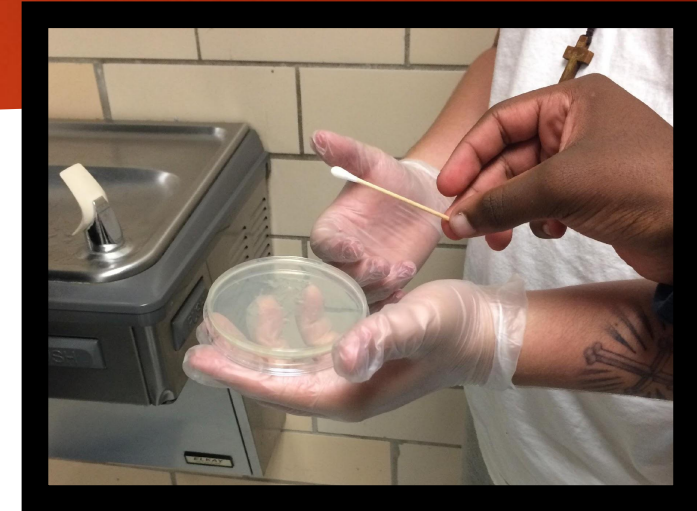
2) Questions on Bacteria + Antibiotics
Where is this Bacteria found?
Is it found more in some places than others?
How do antibiotics work?
Why not give them all at once?
Are there other ways to kill Bacteria?
Why not give the strongest Antibiotics first?
Once infected how long before you feel sick?
How many people are affected by antibiotics?
Is there a cure yet?
How long has this been going on?
What type of Antibiotics did they give her?

3) Bacteria
Other
Places?

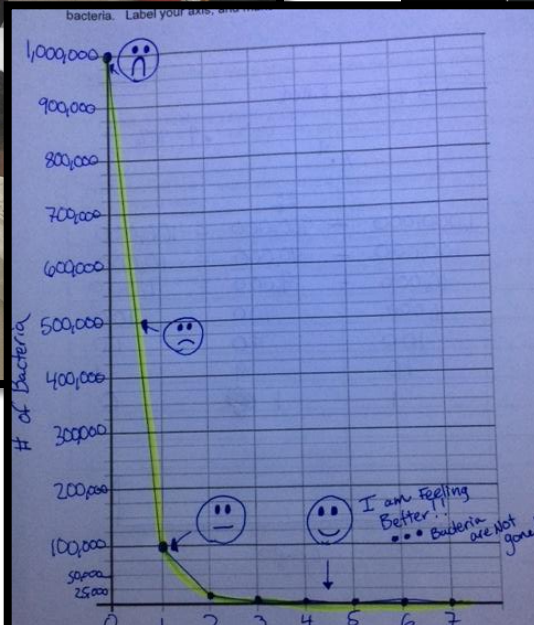
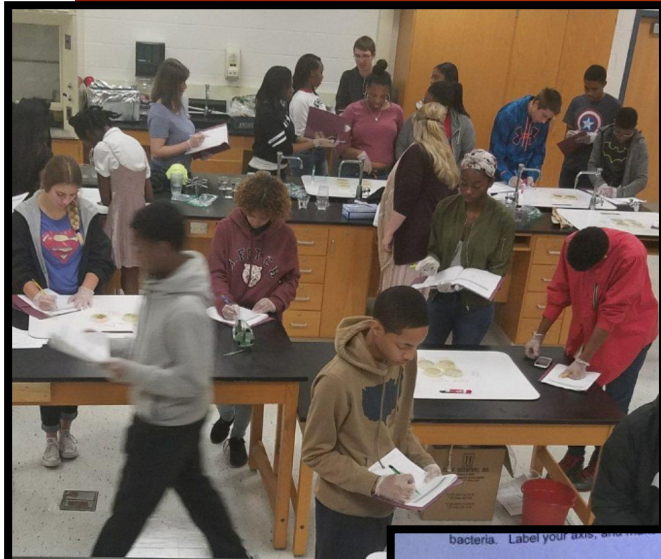
4) Antibiotics
Bacteria
Other
Places

Driving Question Boards

Determining how to answer the questions



Students Figure it out



NATIONAL SUMMARY DATA

Estimated minimum number of illnesses and deaths caused by antibiotic resistance*:

At least **2,049,442** illnesses,
23,000 deaths

*bacteria and fungus included in this report.

Estimated minimum number of illnesses and death due to *Clostridium difficile* (*C. difficile*), a unique bacterial infection that, although not significantly resistant to the drugs used to treat it, is directly related to antibiotic use and resistance:

At least **250,000** illnesses,
14,000 deaths

WHERE DO INFECTIONS HAPPEN?

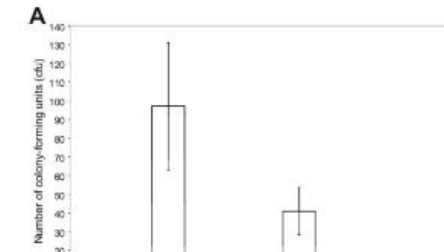
Antibiotic-resistant infections can happen anywhere.

Objectives

Our goal was to determine the diversity and abundance of *Staphylococcus* bacteria on different components of a public transportation system in a mid-sized US city (Portland, Oregon) and to examine the level of drug resistance in these bacteria.

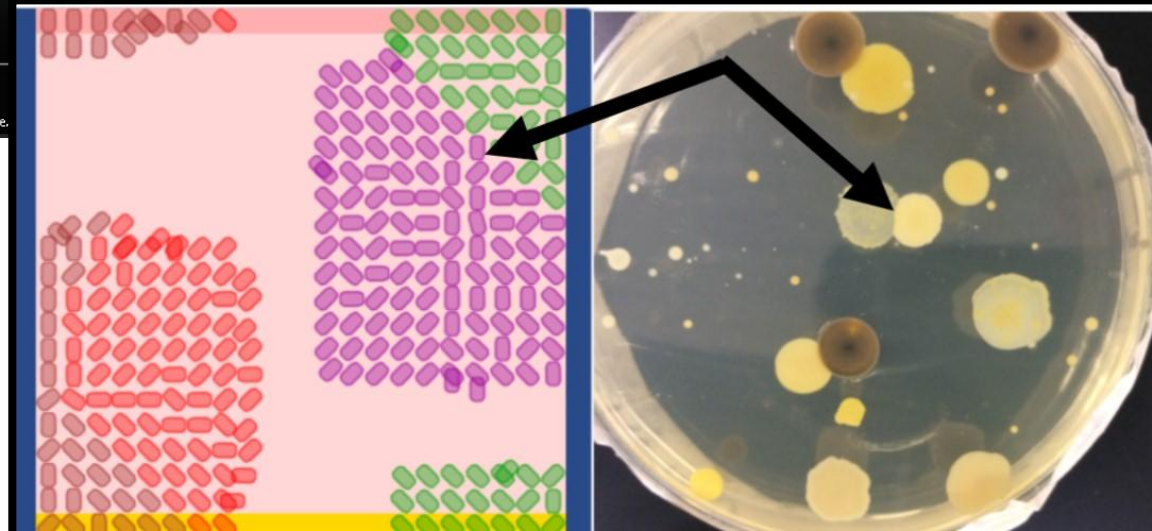
Methods

We collected 70 samples from 2 cm x 4 cm sections from seven different areas on buses and trains in Portland, USA, taking 10 samples from each area. We isolated a subset of 14 suspected *Staphylococcus* spp. colonies based on phenotype, and constructed a phylogeny from 16S rRNA sequences to assist in identification. We used the Kirby-Bauer disk diffusion method to determine resistance levels to six common antibiotics.

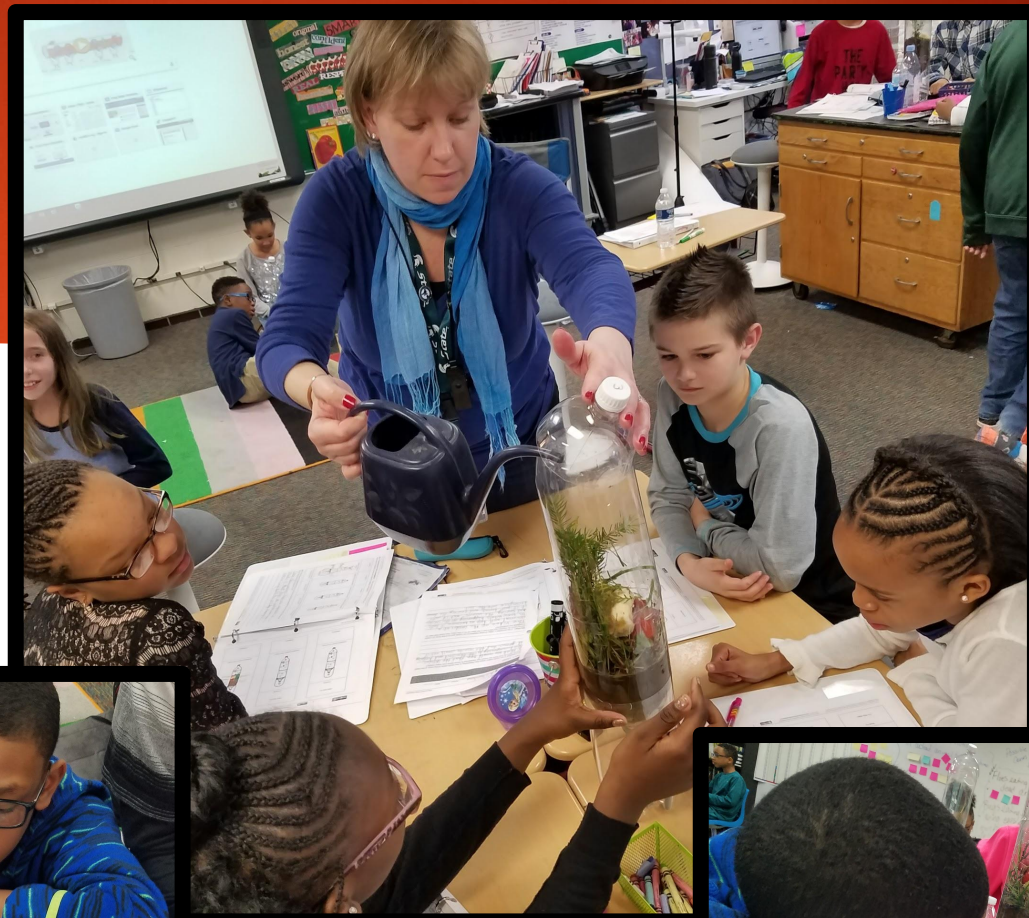


Results

We found a range of pathogenic *Staphylococcus* species. The mean bacterial colony counts were 97.1 on bus and train floors, 80.1 in cloth seats, 9.5 on handrails, 8.6 on seats and armrests at bus stops, 3.8 on the underside of seats, 2.2 on windows, and 1.8 on vinyl seats per 8 cm² sample area. These differences were significant ($p < 0.001$). Of the 14 isolates sequenced, 11 were



Lynda's Class



Students Figure it out and keep track of it.

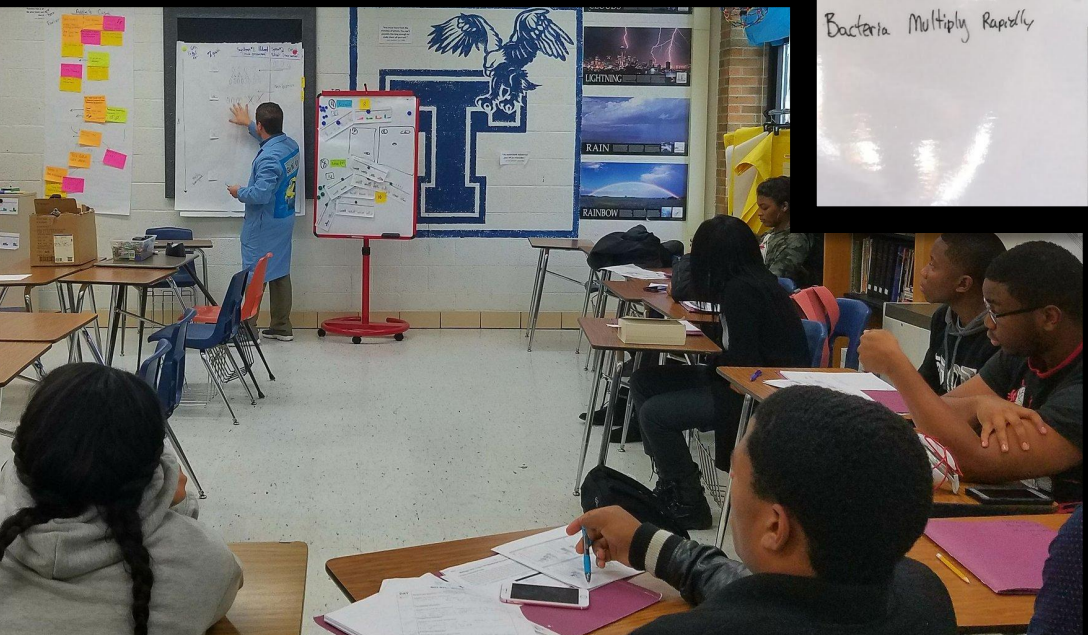
Why Don't Antibiotics Work Like They Used To?

What do we think we KNOW?	What are we LEARNING? (Claims)	What is our EVIDENCE?	How does it speak? What are we WONDERING? How would I know I have it?	What SCIENCE words and principles help us explain?
<p>She had pneumonia then gave antibiotics.</p> <p>She had many symptoms</p> <p>Staph is Common.</p> <p>Staph is Spread through skin to skin contact</p> <p>Bacteria Multiply Rapidly</p>	<ul style="list-style-type: none"> - Staph is found everywhere - even on our skin - Noticed Antibiotic resistance in the 1940's - 1 in the 1940's and 4 in 2002 - 1/2 people carry Staph on skin 	<p>Engaging in Argument from Evidence</p>	<ul style="list-style-type: none"> - Why did the antibiotics work then stopped working? - What infections does it cause? - Are Bacteria getting stronger every year? - What does the bacteria target? - how do antibiotics work? - Could this happen to me? - How did she get this? * Where do we find this bacteria? * is it found in the same amounts? - Can we make a better antibiotic - How do you avoid MRSA? - How do they spread so fast? 	<ul style="list-style-type: none"> - Antibiotics - Pan resistant Bacteria - STAPH

Whole Group Consensus Discussion: As your classmates share out, record what your class agrees on

Systems Comparison Chart

Question	Student 1	Student 2	Student 3	Student 4
1. Are there similarities of bacteria within the same kind? What's your evidence?	yes, resistant & non resistant species	no, same kinds of bacteria	no, same kinds of bacteria	no, same kinds of bacteria
2. Are there different kinds of bacteria? What's your evidence?	yes, CA and HA good and bad bacteria	yes, we picked up different kinds of our samples b/c environment isn't controlled	yes, there were diff colored bacteria and they didn't combine	yes, there were diff colored bacteria and they didn't combine
3. Did the bacteria cause harm or not of the system? What's your evidence?	into, they got in through a cut in her knee to get her sick	into, we placed it inside of the swab	reproduced w/in the system - didn't move in or out	reproduced w/in the system - didn't move in or out
4. (Etc) were collaborative added to the				
5. How are bacteria reproducing? What factors do we have of resistance (even at hand or open) affecting the population of bacteria? What's your evidence?	AB through pills + 10, introduced by killing bacteria or bacteria being resistant	by soaked paper attracted by killing bacteria around AB paper	steady growth we can see their growth over time	bacteria split in the simulation until they ran out of space, we can control rate of growth
6. Were some of the bacteria dying? What's your evidence?	yes, when she started feeling better	yes, there were bacteria by the AB	No more were no AB and were went away	No more were no AB and were went away



Call To Action

