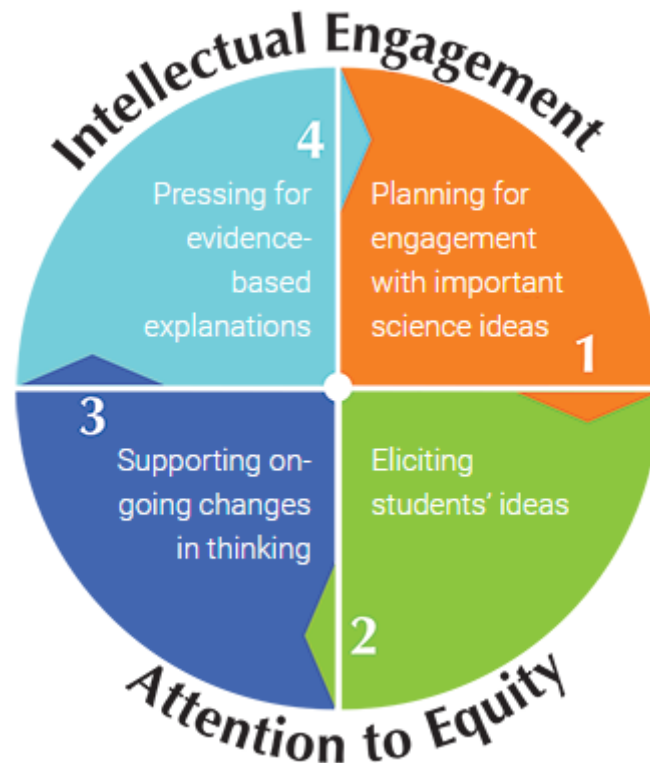


MVHS Science, CASTL, and NGSS



Presentation to MVSD Board of Directors

December 5, 2018



MVHS Science, CASTL and NGSS



Powerful Teaching & Learning

Inspire every student to develop critical thinking and problem solving skills, through high expectations and instruction that is engaging, research-based, and relevant.

Collaboration for
Ambitious
Science
Teaching and
Learning

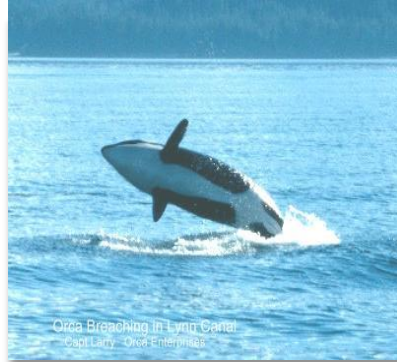
High-quality science education

Students develop an in-depth understanding of content and develop key skills —communication, collaboration, inquiry, problem solving, and flexibility—that will serve them throughout their educational and professional lives.

Puzzling phenomena and NGSS



A puzzling event or process whose full explanation requires a wide range of science ideas to be coordinated with one another and with evidence.

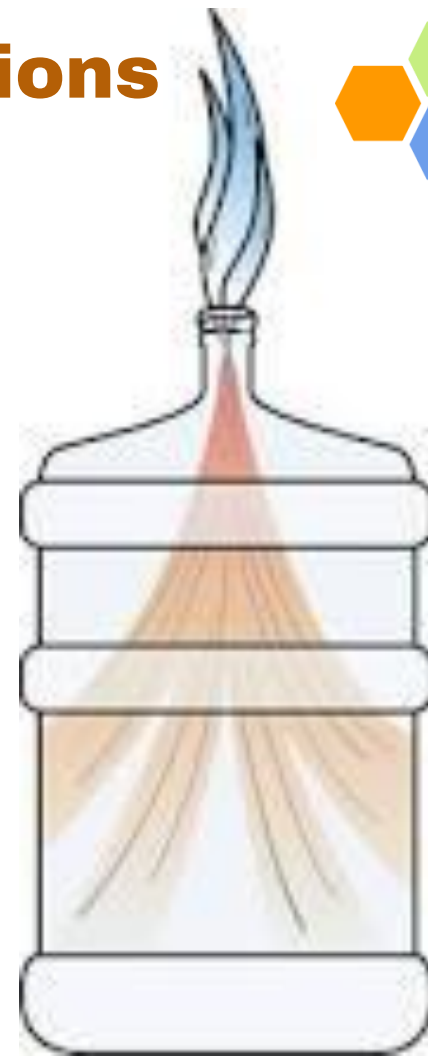


Sustained intellectual work on challenging problem

Whoosh Bottle--Student Questions



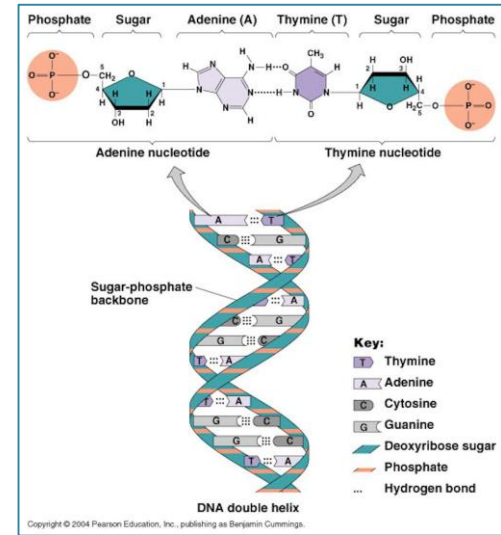
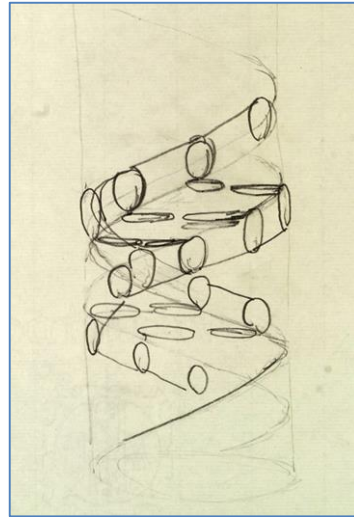
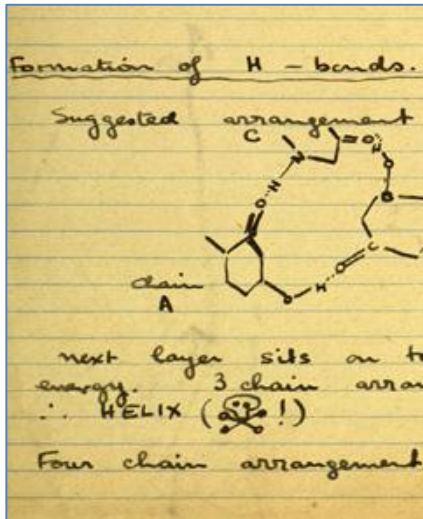
- What is the liquid that's poured out at the end?
- Is the liquid at the end flammable?
- Why didn't the ethanol burn the same the second time?
- What would happen if the demo was done in a smaller container? A larger container?
- What caused the bottle to feel colder at the beginning and warmer at the end?
- What happened to the atoms that made up the ethanol molecules?
- Why is the fire blue at the beginning and orange/red at the end?
- What causes the sound?
- How does the bottle not blow up/explode/melt?
- Can the fire last longer in the bottle?
- What would happen if we added more than 15 mL of ethanol?
- What was the smell at the end from?
- What would need to happen for the fire to burn bigger?
- Was the new liquid at the end melted plastic?



What is modeling?



- A scientific practice, in which representations of **phenomena** are created, tested, and revised over time.



Evolution of DNA double helix model

Starts with images from Rosalind Franklin's notebook

Lyme Disease Model

Phenomenon:

Why are more people getting Lyme disease today than they were 50 years ago?

Cross Cutting Concepts:

Patterns, Cause and Effect, Scale, Modeling, Structure and Function, Stability and Change

Disciplinary Core Ideas:

- Define, evaluate, and refine a solution for reducing impacts of human activities on the environment and biodiversity

AND MORE!

NGSS

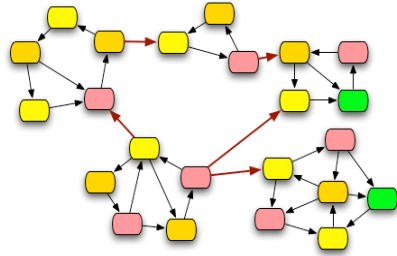
STUDENT ENGAGEMENT



Science & Engineering Practices:

- Asking Questions & Defining Problems
- Developing and Using Models - Planning & Carrying Out Investigations
- Analyzing & Interpreting Data - Constructing Explanations & Designing Solutions
- Engaging in Argument from Evidence
- Obtaining, Evaluating, & Communicating Information

Do this...



Select topic

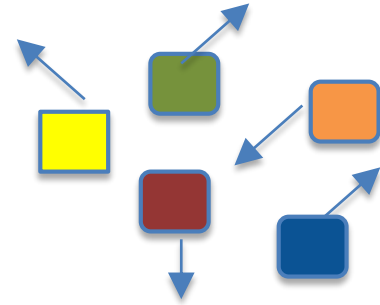
Identify the big ideas in NGSS

Select anchoring event

Develop explanation for event

Connect learning activities with each big idea in explanation

Not this...



Select topic

Choose assortment of fun, topical activities

Do a lab on the first idea

Do a lecture on this other idea

Give a quiz

Goes on for two more weeks >>>

MVHS Science and Ambitious Science Teaching



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Figure 1.1 from *Ambitious Science Teaching* by Mark Windschitl, Jessica Thompson, and Melissa Braaten

MVHS Science Night



Thursday, April 25, 2019

Mount Vernon High School 314 N 9th Mount
Vernon, WA 98273

5:00-8:00pm

Free & Fun for the whole family