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Teaching science when you don’t know diddly-squat!

• You do not need all the answers to teach science.
• You simply need an inquisitive mind and to be willing to carry out an investigation.
Language of Science

• Draw or paint a picture using words
• Have to use words that you know and understand
• Then build on those words, scaffold learning, spiral your way to more advanced vocabulary
• Science is the language we all speak everyday
Science is NOT....

• Knowing all the answers
Science is NOT….

• Knowing all the answers
Science IS….asking questions

• Where do you think we might find those bugs?
• What time of day would be best to catch them?
• How might poisonous bugs and edible bugs be different?
• How could we test those ideas?
Science is not ... what you find on the internet!
Science is NOT....

• Following a recipe
Recipes are directions
Science is a map
Purpose

• Engage youth in the process of science.

• Encourage youth to ask questions AND discover answers
Science and Engineering Practices

• Asking questions and defining problems
• Developing and using models
• Planning and carrying out investigations
• Analyzing and interpreting data
• Using mathematics and computational thinking
• Constructing explanations and designing solutions
• Engaging in argument from evidence
• Obtaining, evaluating, and communicating information
Science and Engineering Practices

• What are they?
  – Research based best practices for engaging youth in science.

• Where did they come from?
  • Available free on-line
Science and Engineering Practices

• Why do we care?
  – Research based
  – Part of Michigan’s science expectations
How to use Diddly-squat with Youth

• Ignore the Science and Engineering Practices – They are talking points to help support and continue the science work you do.

• Focus on the **QUESTIONS** and on engaging youth in **scientific conversations**

• Conversations that attempt to answer why?
Failure

• Failure is…
  – An unexpected learning opportunity!!
  – Enriched by questions and discussion
Failure

• Adults should provide challenges so youth discover failure can be more rewarding than success.
Exploring a phenomena

• Does the type of paper make a difference in a paper airplane?
What type of paper makes the best paper airplane?

• What does best mean?  
  • Farthest?  
  • Resistance to damage?  
  • Other?

• Does the size or shape of the paper matter?  
  • Why or Why not?

• Does the shape of the paper airplane matter?  
  • Why or why not?
Build your paper airplanes

- Airplanes should only fly in the TESTING AREA
Analyze and interpret your data

• Did the type of paper make a difference?
• Did the style of the plane matter? Why?
• Which paper made the best paper airplane?
  – Why do you think that type of paper worked better than the others?
Using math and computational thinking

• Consider combining data from multiple groups for a larger data set
  – Could this cause problems? Why? Why not?

• Find the
  – Mean (average)
  – Median (middle number)
  – Mode (most common number)
For each paper type – what do you notice?
Constructing Explanations

• Discuss why and how the planes flew, focusing on the types of paper.
Argument for Evidence

• Summing it up
  – Have each youth decide which paper worked the best and justify their answer.
  • Explain why they think as they do
Obtain, evaluating and communicating information

• Discuss as a group
  – The types of paper used
  – The types of paper airplanes used

If different types of airplanes were used the conversation can be richer.
Real World Application

• Can you think of circumstances when different types of materials make a difference in real airplanes?
• What would cause a plane to fly farther?
• Would some designs be better in different weather?
• Can you think of times when the materials used is important?
Questions

• Ask youth why they think something happened is equally important …
  • When they are correct
  • When they are incorrect

• Responding to why is similar to a personal reflection, adds ownership to the learning.
Life Skills Development

• Problem Solving
• Critical Thinking
• Decision Making
• Learning to Learn
• Creative Thinking
• Communication
Are you left- or right handed, and does it matter?

• In your small groups work through another lesson.
Teaching Science When You Don’t Know Diddly-Squat Introduction:
- Introduction: What is the answer? Who cares?

Teaching Science When You Don’t Know Diddly-Squat Activities:
- Can you hear better with paper ears?
- Why does poop splash?
- What if ice didn’t float?
- Why do cows have tails?
- Why is a hammer shaped like a hammer?
- Can you make an animal move without touching it?
- Does texting affect safe driving?
- Do moms really have eyes in the back of their heads?
- How do puddles disappear?
- Do different types of milk taste different?
- Does the type of paper make a difference in paper airplanes?
- Why do some things float and others sink?
- Does technology make our lives easier?
- Does color affect our sense of taste?
- Are you left or right-handed, and does it matter?
Any Questions?

daugustt@msu.edu