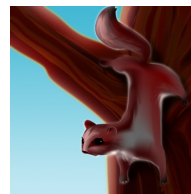




Purpose and Objectives:

- Provide a quick sample STEM PBL Activity.
- Snapshot into Problem-Based Learning.
- Begin to explore what is STEM.
- Begin to explore engineering in the NGSS.
- Text integration ideas: fiction (harder) or nonfiction (a little more self evident).
- Look at possible 4 day format.
- Introduce Makerspace ideas.
- Have at least a little fun... :0)



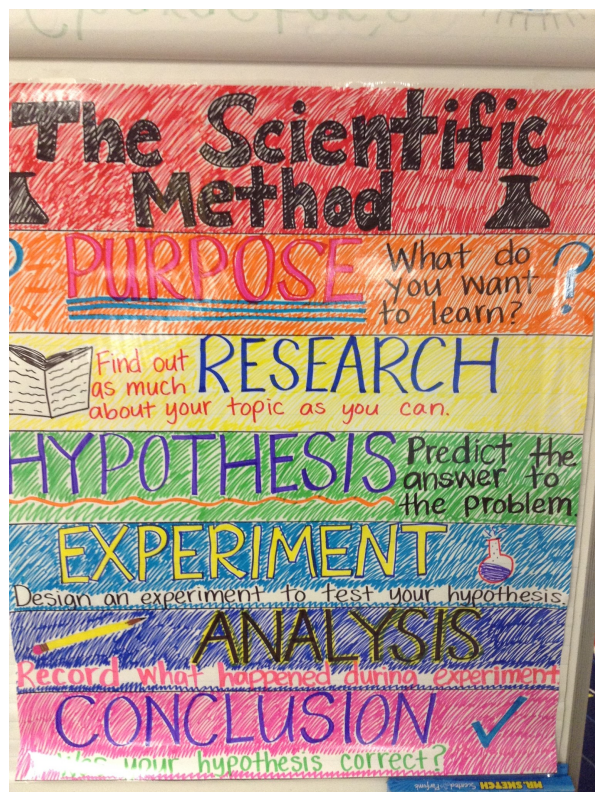
Those Darn Squirrels



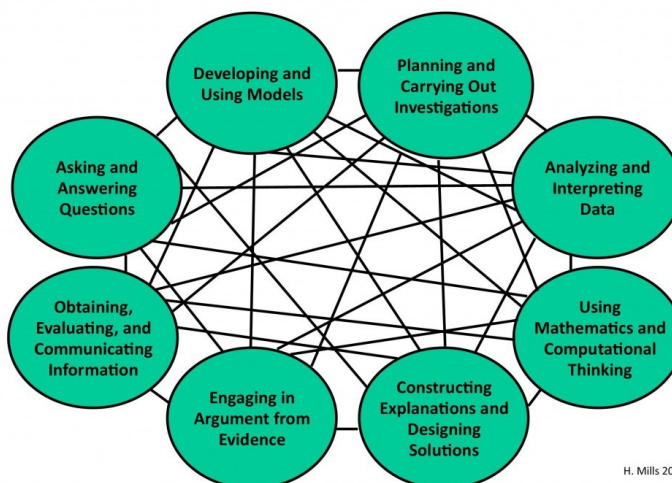
3-5-ETS1-1: Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.

Crosscutting Concept: Cause & Effect.

Science/Engineering Practice: Developing & Using Models



Science and Engineering Practices



H. Mills 2015

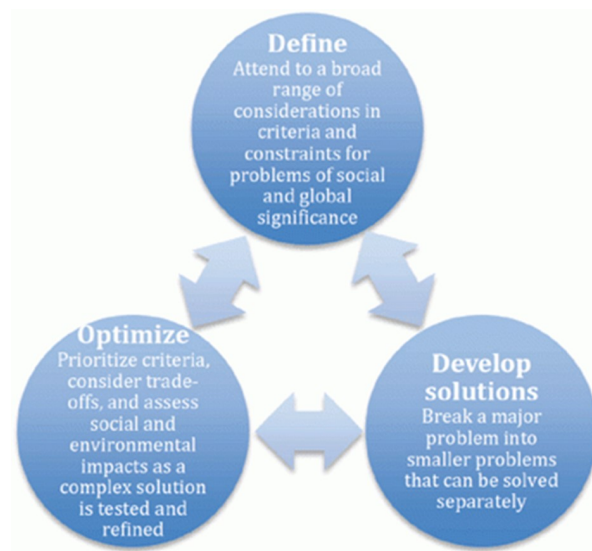
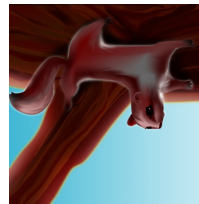
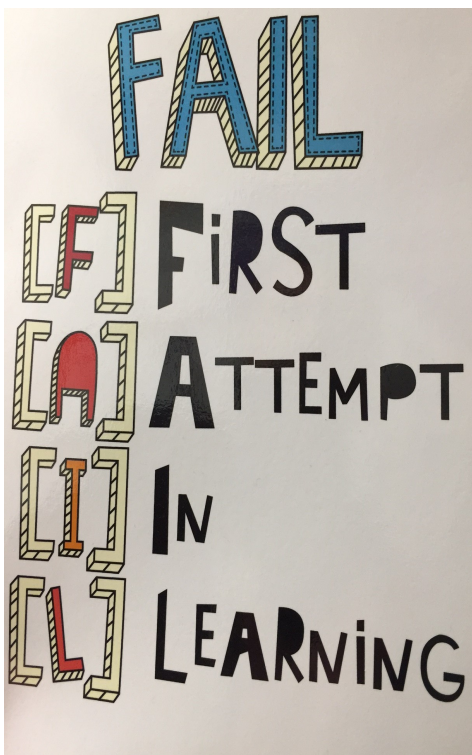
DEFINE THE PROBLEM

Plan Summary:

TEST RESULTS:

OPTIMIZE SOLUTIONS (Redesign)

Engineering, redesign, failure points, and...

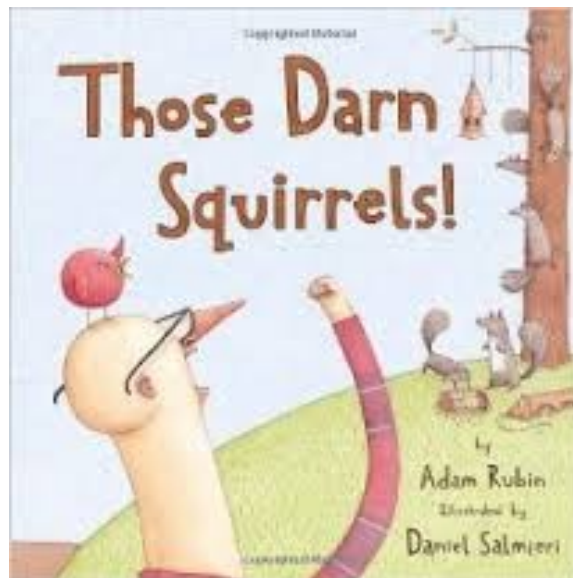


Part 1: "I do": Background Knowledge: Formative Assessment & Research.



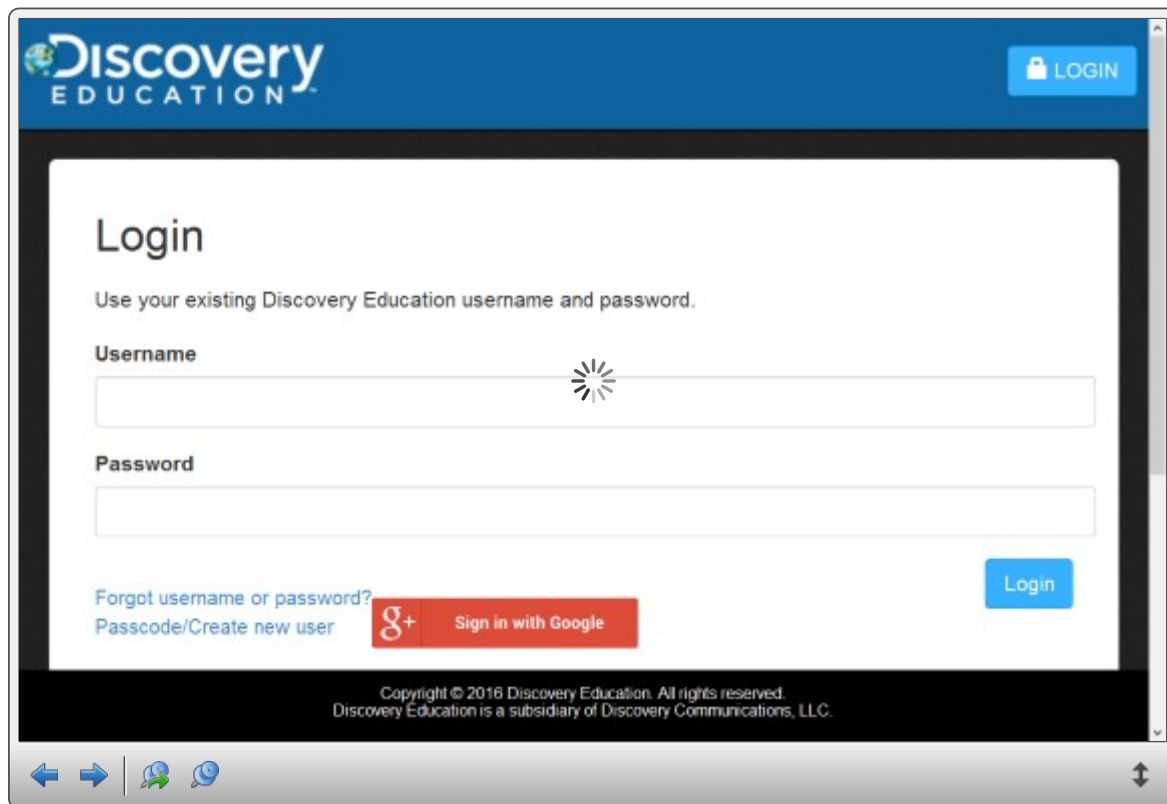
- Establish Purpose.
- Formative Assessment:
 - > Asking Q's
 - > Journal Prompt
 - > Uncovering Student Ideas Activity (Probe)
- Research:
 - > Teacher Instruction
 - > Text-based (Close Reading)
 - > Audio/Video Research (Ed. Video)

"Those Darn Squirrels"



Discovery Streaming (Simple) Machines

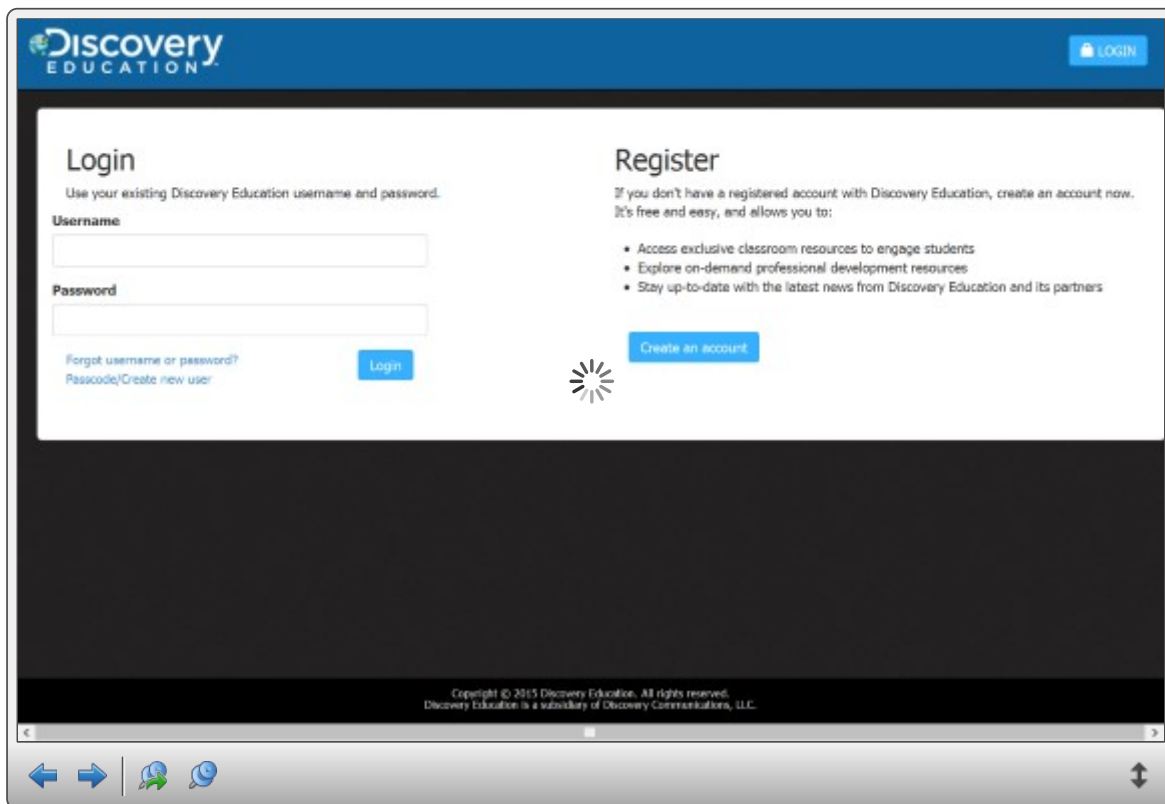
[http://app.discoveryeducation.com/player/view?
assetGuid=D885A693-5048-4FA9-AA01-
BEFBA1A929BF&showBreadcrumbs=true](http://app.discoveryeducation.com/player/view?assetGuid=D885A693-5048-4FA9-AA01-BEFBA1A929BF&showBreadcrumbs=true)



The screenshot shows the Discovery Education login interface. At the top, the Discovery Education logo is on the left, and a blue 'LOGIN' button is on the right. The main heading is 'Login', followed by the instruction 'Use your existing Discovery Education username and password.' Below this are two input fields: 'Username' and 'Password'. The Username field has a loading spinner icon. To the right of the Password field is a blue 'Login' button. At the bottom left, there are links for 'Forgot username or password?' and 'Passcode/Create new user'. In the center bottom, there is a red 'Sign in with Google' button with a Google+ icon. At the very bottom, a copyright notice reads: 'Copyright © 2016 Discovery Education. All rights reserved. Discovery Education is a subsidiary of Discovery Communications, LLC.'

Discovery Streaming Engineering Design Process

<http://app.discoveryeducation.com/player/view/assetGuid/DA761F7B-AEFF-4DF9-937E-8A0D687A7E0B##>



Simple Machines



Simple Machines



Lever



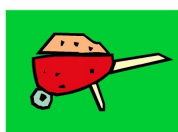
Inclined Plane



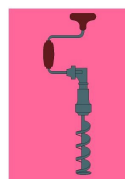
Wedge



Pulley



Wheel and Axle



Screw

Part 2: "We do":

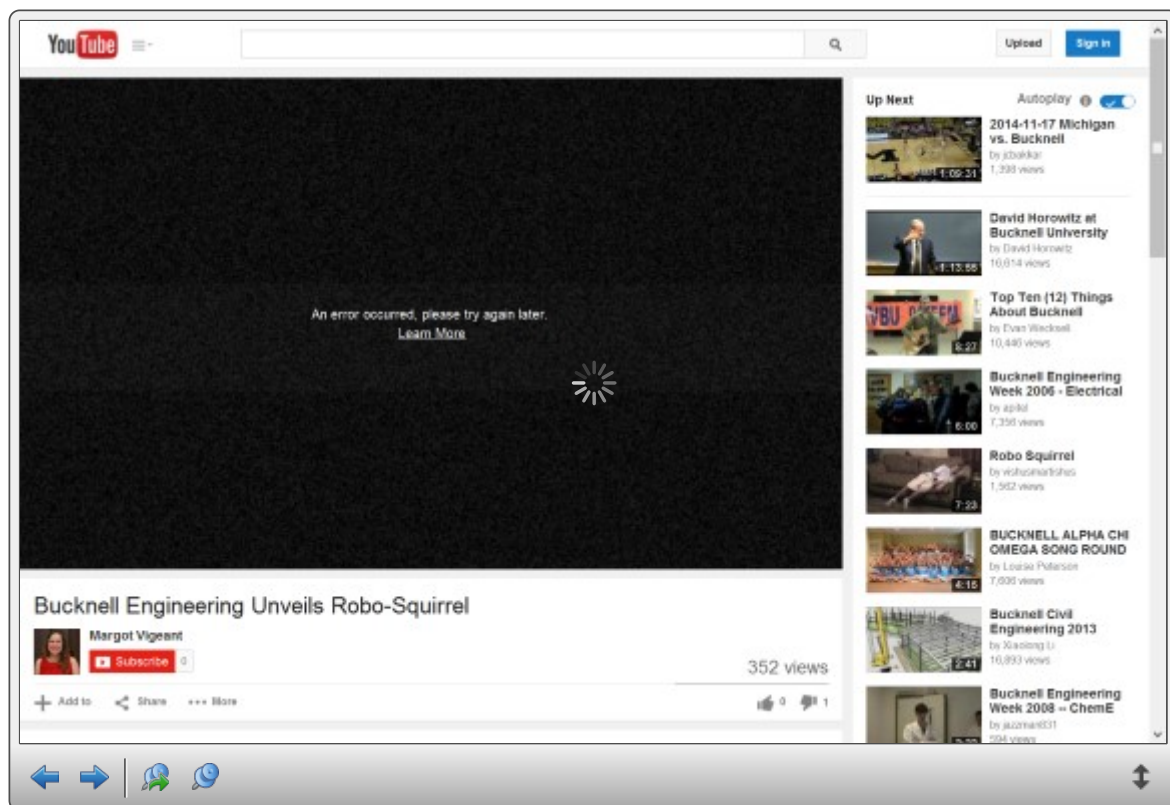
- Follow-up on Formative Probe
- Follow-up on Research if Time
- Quick/short video.
- Quick/short simulation.
- Plan our activity/experiment (procedure).





The future that our students face: jobs & technology we haven't even imagined...

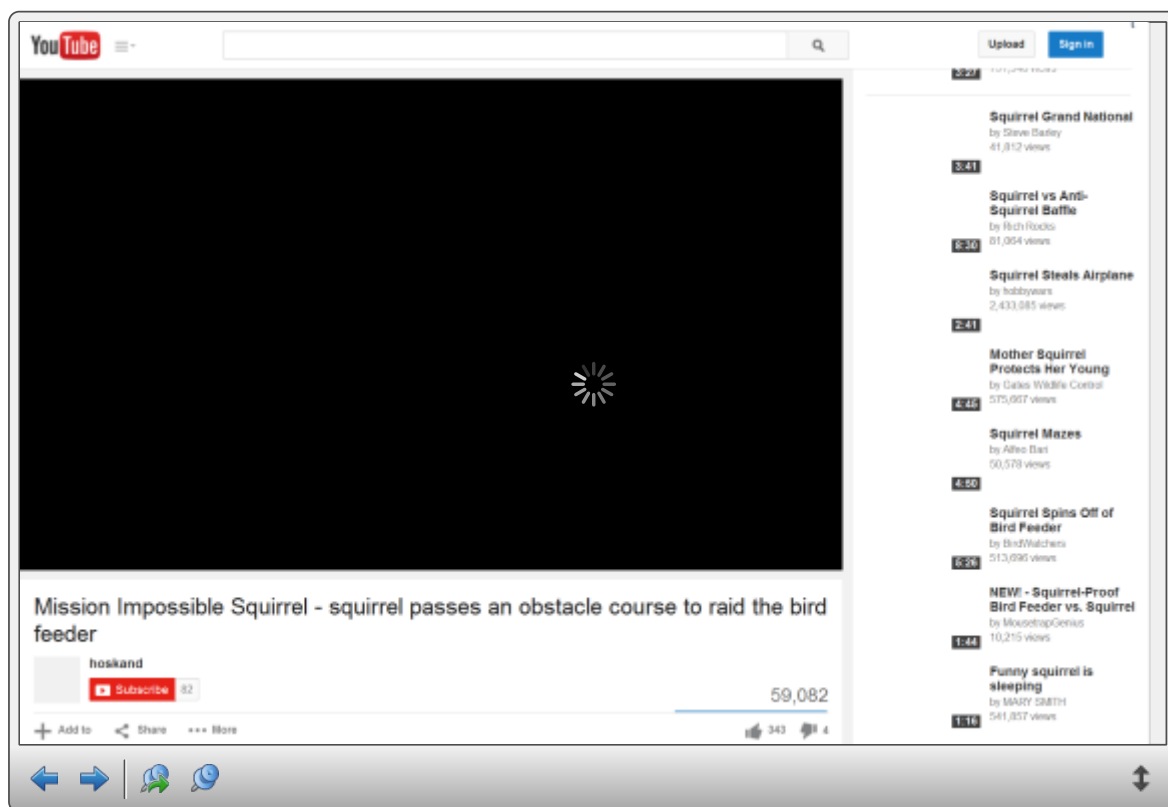
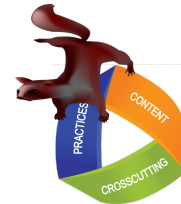
<https://www.youtube.com/watch?v=kwyifgm0o5k>



Mission Squirrel-possible?!?

(Obviously, this squirrel went to the Martin Sortun of squirrel STEM schools)

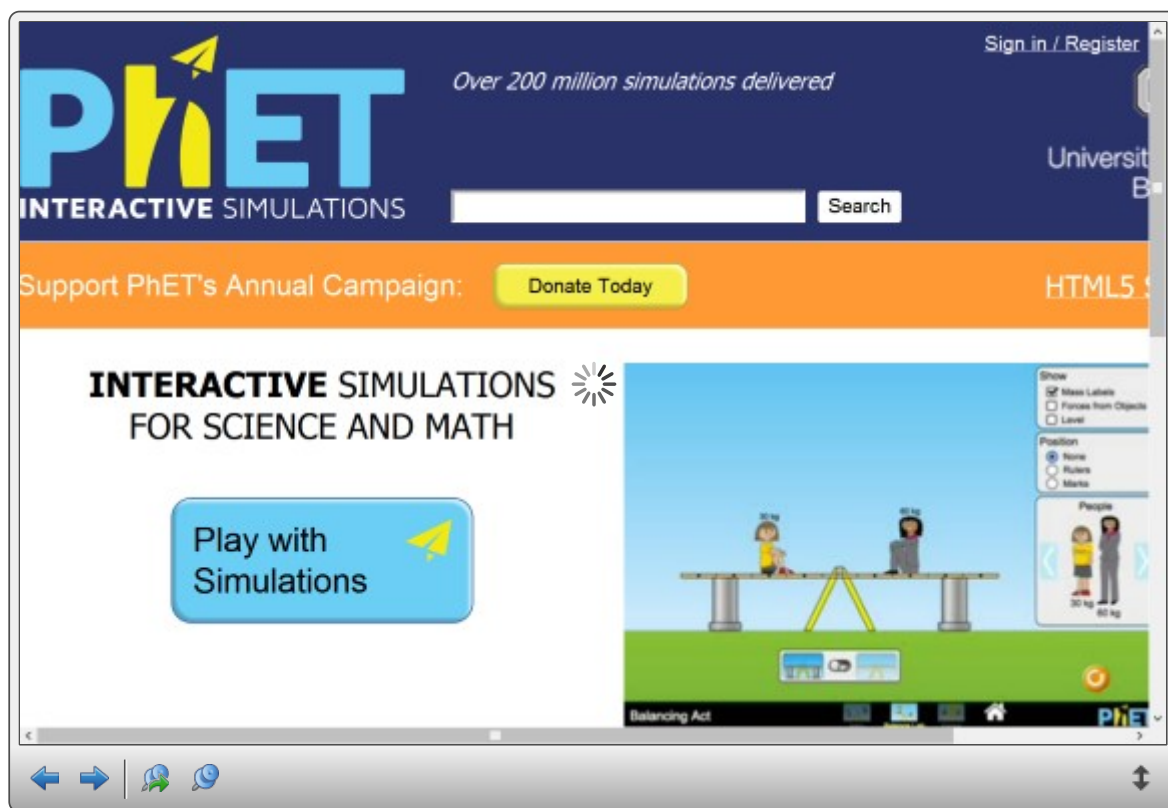
<https://www.youtube.com/watch?v=1EnDwkclDcA>



Gizmo



PhET



Part 3: "You do": Student Activity Ideas:

- Read a fiction or nonfiction text with similar concepts, e.g. compare and contrast, etc.
- Write their own engineering story.
- Create and solve a math problem based around the story.
- Draft or conduct a science experiment based on the story. (real or virtual).
- Design or do an engineering activity based on the story (real or virtual). [for the squirrels or for a better bird feeder/defense or for an obstacle course or etc.]
- \$: could add a cost/math component.



Part 4: "We do" some more & "You do" some more:

- Share our data as colleagues (class).
- Discuss our results.
- Write up our findings/conclusions.
- Write in our science journals about what we're still thinking:
 - > Questions
 - > Ideas
 - > Applications of our learning

