MYSTERY TUBES!!

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Based on the lesson:
http://undsci.berkeley.edu/lessons/mystery_tubes.html

Purpose:

- To understand a little bit about the process of how scientists work to solve problems and answer questions.

What will you be doing?

- You will try to figure out what is going on inside the tubes without looking inside.

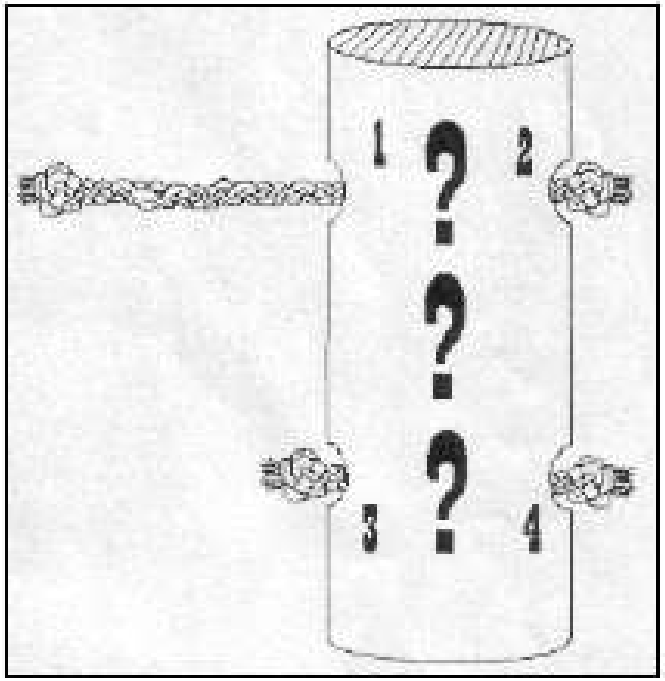

Image from: http://lasp.colorado.edu/home/wp-content/uploads/2011/06/Mystery-Tube.pdf

How should you start?

- Start off by looking carefully at what happens when you pull the strings.
- In your notebook on page #8 write down what you see as you work with the tubes.

What's next?

- Sketch out what you think is happening inside the tube on page 8 in your notebook.
- Label your drawing.

What do you think?

- How confident are you that your sketch really shows what is going on inside the tube?

- How can you increase your confidence that your sketch is accurate?

Next step….

- Each group of 2 people will need one “kit” from the back table to build their model.
- You don’t have to use all of the materials in the kit
- You can use scissors, the hole punch, and tape as needed to modify the materials and make your model.

Post-Activity list & questions (HW)

- On page 9 in your notebook do the following:

  1. Make a list of the steps that you followed during today's activity and also during the Help Harry activity from last week – be as descriptive as possible.

  2. How is what you did like what scientists do?

  3. How is what you did different from what scientists do?

Mystery tubes activity – Day 2

- You will have 10 minutes to continue building and working with your model.
- Make sure that you are checking to see if your model behaves in the same way as the mystery tube when the strings are pulled.
- After 10 minutes we will share our designs with each other.

Sharing designs

- On the paper provided to you write your names at the top, and then sketch out your original design.
- Indicate with a "YES" or "NO" if your original design was accurate. Did it behave in the same way as the Mystery Tube?
- If you had to change your design, make a second sketch of the design you finally ended up with.
- We will put up all of the sketches and we will look at them together.
- You will explain your sketch to the rest of the class.

What steps did we use?

- Look at last night's homework and think of the different steps that we completed in this activity between yesterday and today.
- I will collect all of the responses from the entire team and make one list that includes everything and I will give that to you tomorrow.

Which design is right?

- How do scientists (you) know when an explanation or model is right?
  - Can scientists "open the tube" or "check the answer key" to see if they are correct?
  - Scientists need to look for evidence to support their explanation, the more evidence that is found, the better.
  - If there is evidence that DOES NOT support the explanation, that can lead to the explanation being rejected or changed.
  - There are many times when there is more than one "right" answer.

Source:
http://www.towson.edu/fcsm/centers/stem/loanerlab/documents/mystery-tubes-manual.pdf

Arguing based on evidence

- What do scientists do if there is more than one answer that is supported by the evidence?
  - Scientists look at the evidence and reasoning for each explanation carefully, they evaluate it, and choose the explanation that provides the best argument.

Why use models?

- You made 2 different models during this activity. What were the 2 models that you made?
  - Your original sketch & your toilet paper tube model.
- Scientists use models for several reasons. What do you think they are?
  - To explain or share information
  - To make and test predictions
- Can you think of an example of another scientific model?
  - Ex. heart model, DNA, layers of the Earth model, computer models to predict weather, etc.

Mystery Tubes Activity Exit Ticket

1. How do scientists know when they have the “right” answer?
2. Can scientific ideas ever change? Explain why you think they do or do not?
3. Making models is an important science practice. Explain two ways that scientists use models and give one real world example of a scientific model.