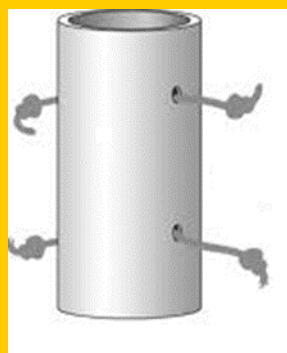




Mystery Tubes

Key Concepts Addressed in this lesson:

- ⇒ The processes of science
- ⇒ Testing hypotheses
- ⇒ Making observations
- ⇒ Developing models
- ⇒ Problem solving
- ⇒ Critical thinking



Purpose:

Upon the completion of this investigation, your team will:

- Construct a model to represent ideas about the arrangement of strings through a Mystery Tube to test a Hypothesis
- Collaborate with a team to solve a problem
- Develop stronger insight into NOS

Materials:

You will need:

- Mystery Tubes
- Pringles
- String
- Paper clips
- Washers

Engagement:

Michael's father brought a tube home from work. The tube was capped at both ends and there were two parallel holes drilled through the tube approximately 3 cm from the top of the cap at each end of the tube. There were four strings, each tied to a small washer, one string extending from each hole. Michael's father asked Michael and his friends Albert and Buffy to study the tube and then draw how they thought the strings were arranged within the tube. Buffy scratched her head and asked "How can we solve this problem if we cannot see what is inside the tube?" "Well, we could pull the strings and see what happens," suggested Albert. "Yes, and if we pull the strings slowly and over and over again, we should be able to guess how the strings are arranged," Michael exclaimed. "I know, we could make a model of our own to see if we are correct," Buffy noted. The three friends began to study the tube and decided to call it the Mystery Tube because they felt as though they were solving a mystery as they studied the tube.

Challenge:

- 1) Study the mystery tube by pulling the strings and making observations
- 2) Begin with the two strings at the top of the tube
- 3) Diagram your ideas about how the strings are related to one another inside the mystery tube

- 4) Continue to study the tube until the team develops a working hypothesis focused on the arrangement of strings within the tube.
- 5) Use the empty Pringles tube to test the hypothesis
- 6) Each team will then create the model to test their hypothesis
 - ⇒ The models will be constructed from: Pringles tube, string, washers, and paper clips
- 7) Each team will share their hypothesis, observations, and conclusions about their model and the hypothesis with the class.
 - ⇒ Teams will demonstrate their model to the class and explain the logic which led to their conclusions
 - ⇒ All explanations will be evidence based

Evaluation Questions:

- ⇒ Why do scientists use models?
- ⇒ Think of an example of a model that could help you learn about something that is difficult or possibly too small to see.
- ⇒ Think of an example of a model of a very large object or system that could help you to understand the object or system.
- ⇒ What other disciplines rely upon models to understand systems or objects?
- ⇒ How did searching for patterns contribute to your understanding of the Mystery Tube?
- ⇒ Did ideas offered by teammates help you to think about the model from a different perspective and, as a result, better understand the model?



Name: _____

Question: Question you are attempting to answer through this investigation:

Hypothesis:

'If, then' statement to show cause and effect:

Predictions:

1. What do you think will happen when you pull one of the strings?

2. What do you think the evidence you gather will consist of?

Diagram of Mystery Tube:

Observations:

Data Analysis:

How will you analyze your data?

Patterns: Did you observe patterns or relationships within the data from this investigation?

What does your data tell you about the way in which the strings interact within the Mystery Tube?

Was your prediction about the response of the strings when only one is pulled?

Based upon your observations, how do you think the strings are arranged within the Mystery Tube?

Conclusion/Explanation:

Look back to your observations and your data, collaborate with your partner and develop an explanation supported by your data for this investigation. Use that explanation and collaborate with your team to construct a new *Mystery Tube*.

Include a diagram of your model to explain your solution.