



Classroom Teacher Preparation

Scientific Practices 3: Mystery Tubes

Please use the following to prepare for the next SfS lesson.

Description:

This lesson gives students experience developing a physical model in order to understand how an unknown system (a mystery tube) works. Students will observe the system, then design, build, and test their own models so that they behave the same way as the unknown system.

Lesson Objectives – SWBAT (“Students Will Be Able To...”):

3rd-8th

- Explain why scientists use models
- Work with a partner to design and build a model to explain a phenomenon

Disciplinary Core Idea (DCI)

- No DCI's apply

Science & Engineering Practice (SEP)

Developing and Using Models

- (3rd-5th) Collaboratively develop and/or revise a model based on evidence that shows the relationships among variables for frequent and regular occurring events.
- (6th-8th) Develop or modify a model—based on evidence – to match what happens if a variable or component of a system is changed

Crosscutting Concept (CCC)

Cause and Effect

- (3rd-5th) Cause and effect relationships are routinely identified, tested, and used to explain change.
- (6th-8th) Cause and effect relationships may be used to predict phenomena in natural or designed systems

Preparation:

Encourage your students to bring in an empty toilet paper or paper towel tube for this activity. Students with their own tube can bring home the model they build and do not have to return building materials they have used at the end of the lesson.

Room Set Up for Activities:

Students will work in pairs or trios at tables or desks. Each student can use their own tube.

Safety:

There are no safety precautions for this lesson.



Related Modules:

This lesson may be taught as part of a sequence or group of related modules on **Scientific Practices** or in developing skills with **models**. Modules include:

Scientific Practices 1: Procedural Thinking – Students learn the importance of creating and following clear and ordered plans. They will try to replicate the creation of a classmate from written directions.

Scientific Practices 4: The Classification Challenge - Students classify objects based on their observations, and learn how different classification schemes influence their view of the objects/world.

Engineering 2: Rover Restraint - This module gives students a hands-on, team-oriented introduction to engineering within the context of space exploration. They learn about NASA's Mars rovers as examples of the challenges engineers face in balancing competing goals, while creating a lander for a mock rover to be tested in an egg drop..

For other module sequences and groups, look here: www.sciencefromscientists.org/sequences

Standards Covered:

Please click the following link to our website to review the standards covered by this lesson, listed by state: www.sciencefromscientists.org/standards/

Lessons are matched to both national NGSS and local state standards.

After Our Visit:

Our Classroom Post can be found on our website at sciencefromscientists.org/cohorts. Use the name of your school/cohort and password to log in.

To help Evaluate, check out our Open Response questions online at sciencefromscientists.org/open-response-questions. They are freely available for all of our lessons for current teachers. Use the password supplied by your instructor to log in.

For an Extension, students can create “mystery cups,” available [here](#).

Additional Resources:

- “The Nature and Structure of Scientific Models” by Cartier, Rudolph, and Stewart: <http://ncisla.wceruw.org/publications/reports/Models.pdf>
- What is a Scientific Model? (3:26) <https://www.youtube.com/watch?v=dkTncoPqo5Y>
- Scientific Models (6:30) <https://www.youtube.com/watch?v=fGCC9vI0dTU>