Overview

This FOSS module provides students with new experiences to:

Develop the concept of a scientific model and engage them in the processes of design and construction.

Investigation 1 - Black Boxes

Students make multisensory observations of sealed black boxes to determine what is inside. They develop conceptual models and construct physical models that they compare to the black boxes. The models help students explain what is in the black box.

Investigation 2 - Hum Dingers

Students are presented with a device that hums when its string is pulled and dings when the string is released. They design and build a physical model of a hum dinger, comparing the performance of the real device to their models.

Investigation 3 - Go-Carts

Students work in pairs to design and build a self-propelled cart. They relate structures to functions as they design, test, and improve their rolling carts.

Investigation 4 - Cart Tricks

Students work in pairs to modify their self-propelled carts to perform interesting maneuvers such as turn corners, bob up and down, and wobble from side to side. Students gain experience with design and engineering tasks as they investigate the relationships among go-cart variables.

FOSS expects students to:

- manipulate objects and materials.
- design and construct conceptual and physical models.
- look for relationships between structure and function of materials and systems.
- apply mathematics in the context of science.
- acquire vocabulary associated with engineering and technology.
- gain confidence in their ability to solve problems.
- learn that there is more than one solution to a problem.
- communicate ideas to peers and work in a collaborative scientific manner.
- use scientific thinking processes to conduct investigations and build explanations, observing, communicating, comparing, organizing, and relating.

Curriculum Integration

Language Extensions

- Research models of the solar system.
- Write directions for construction.
- Look up "switch".
- Share other words for "device".
- Find out about engineers.
- Write a letter to a manufacturer.
- Research automotive engineering advances.
- Sell go-carts.
• Compare features of cars.

Mathematics

• Draw blueprints for a house.
• Play model building games.
• Math Problems of the Week

Art and Science

• Draw pictures of models
• Create hum-dinger ads.
• Design effective presentation posters.
• Investigate cart mass and cart performance.
• Investigate rollers and creepers.

Social Studies and Science

• Compare carts in other lands.
• Improve a household device.
• Design a rubber band boat.
• Use air power; spring power.
• Propel a wagon.

Assessments

FOSS assessment is organized into three categories:

• **Content knowledge:** the facts and scientific concepts of the module
• **Conducting Investigations:** the skills needed for successful inquiry
• **Building Explanations:** the communication of ideas and evidence to support student learning

*Formative* and *summative* assessment strategies help the teacher understand what the students have learned and can do. Throughout the investigations, teachers use formative assessment strategies to inform their instruction, and the end-of-module and portfolio summative assessments provide evaluate information.

The Models and Designs Module is a Full Options Science System (FOSS) module created by the Lawrence Hall of Science at the University of California at Berkeley. It is published and distributed by Delta Education, Inc.