

ENGINEERING TASK 1046-B

Teaching Guidelines

Subject: Science

Topics: The Nature of Science (experimentation), Physics

Grades: 6 - 12

Concepts:

- Understands the concept "center of mass"
- Understands the concept "torque"

Knowledge and Skills:

- Can present experimental results clearly in written form
- Can create a chart for the collection of experimental results

Materials: Straws, straight pins, cardboard for box construction or wood blocks, clay, scale

Procedure: This project should be done by students in teams of two or three.

Each team will need a supply of clay, a ruler, a few straight pins, several plastic straws, wooden blocks or other similar supports as shown in the diagram, and access to a scale for weighing the masses.

Distribute the handout and discuss it with the class.

Tell students they will need to work out how to organize the information that they collect.

Circulate as students work on the activity and give guidance as needed.

International Space Agency

Engineering Task

Space Station Design Center of Gravity

One idea for a space station is to connect two structures with a tube or cables, and set them revolving around each other, creating centripetal force in each to simulate gravity. The structures could be of equal mass, in which case they would each orbit at the same speed around a point halfway between them, producing the same amount of “artificial gravity” in each. But what if they do not have the same mass?

Use a straw, a straight pin and some clay as shown in the diagram to find out how varying the masses on the ends of such a structure would affect the position of the “center of gravity” point around which they would each revolve.

You are to measure the two masses and their distances from the straight pin when it is in a position that balances the structure (the center of gravity).

Begin by hypothesizing the effect of changing the masses on the position of the center of gravity. Then make several measurements for various masses and record your data carefully.

Look for any patterns in the data, and report on your conclusions.

