



THE BUS PROJECT

TODAY'S EXPLORATION: Unbalanced Forces

Grade Level : 3

Overview: Students will explore the experience of objects at rest and what happens when another force acts upon it. Students can explore a variety of forces, push, pull, and gravity. Then, have students explore how to interfere with the force and keep the objects in place when they shake the table or desk. What solutions worked?

NGSS: 3-PS2-1. Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object. [Clarification Statement: Examples could include an unbalanced force on one side of a ball that can make it start moving; and, balanced forces pushing on a box from both sides will not produce any motion at all.]

Practices

- Planning and Carrying Out Investigations

Crosscutting Concepts

- Cause and Effect

Materials:

- Cups, bottles, bowls, pencil boxes, etc. (anything that students can place on a desk to shake).
- A desk or chair that students can shake.
- Boxes (collected from recycling) and tape
- Pencil and paper
- Video - [Forces and Motion](#)

Investigation:

1. Start by placing an object (cup, bottle, pencil box, etc.) on a desk or chair.
2. After setting it there, ask, "what is the object doing?"
3. Shake the desk or table (not too hard). Now ask, "what is the object doing?"

4. What is different? What did you have to do to cause the object on the desk or chair to move?
5. What is it that makes objects move or stay still?
6. Using a pencil and paper, draw a model of what was happening between you, the desk or chair, and the object on the desk or chair. Use labels and arrows to show the direction of the pushes and pulls and where they were coming from.
7. Is there a way you could make the objects stay still on the desk or chair while shaking it?
8. Make a plan using materials and tape to keep the objects on the desk or chair while it shakes.
9. Implement your plan.
10. Now shake the desk or chair. Did your plan work? What did you do? How did you keep the object at rest (not moving) while shaking (pushing and pulling) on the chair or desk?
11. Watch the video [Forces and Motion](#).
12. Draw a new model of what forces were interacting between you, the desk or chair, and the object on the desk or chair. Draw a second model showing what happened when you tried to keep them still.
13. Share your two models with another person or classmates.

Product or Artifact Possibilities:

- Drawn models of the desk and object experiment

Guiding Questions:

1. What happens to objects on a desk or table when you shake the table?
2. What happened?
3. Why is this happening?
4. What are the different forces that cause motion?
5. What forces are acting on an object that is still?

What Are We Discovering?

All objects have forces acting upon them. Forces interact with objects to cause motion or balance each other to keep objects at rest. For example, we can interact with a force to stop an object's movement.

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