Bus Out of This World

Grades: 3–5

Overview
Children use everyday materials such as salt, flour and cinnamon to experiment with the patterns formed when a collision forms a crater on an object in space.

Field Trip Notes
According to Dorothy Ann’s research, an asteroid is going to collide with Walkerville Elementary! To save the school, the class rockets into space to try and follow the asteroids path. There, the kids see comets, meteors, and other space objects. When the moons gravity pulls them off course, the kids discover that the bigger the object, the greater its gravitational pull. DA comes up with an out-of-this-world plan: They’ll find the asteroid, change its course, and fling it into the sun! Can the kids boldly go where no class has gone before? Or will school be out...forever?

Going Hands-On
Time: 30 minutes
Group Size: Four
If the asteroid Ms. Frizzle’s class followed crashed to Earth, it would create a huge crater. Your kids can explore the craters that objects of different sizes and weights - marbles, Ping-Pong balls, and aluminum-foil balls - create.

**What You Need**
- Small jar of cinnamon
- Marbles, small and large
- Aluminum-foil balls
- Ping-Pong balls
- Spoon
- Copies of CRATERS

For each group:
- 4 cups of salt and 4 cups of flour
- Shoe box

**Ahead of time:** Mix flour and salt together in shoe boxes. Smooth the surface flat and cover with a light layer of cinnamon.

**Talk About It**
Hold up the balls. Ask: What might we see if we dropped these into the shoe boxes?

**What To Do**
1) From crouching positions, kids drop the balls into the shoe boxes and then carefully remove balls. Ask: What do you see? (craters of different size and depth; some bigger then objects; they may see “spokes” of cinnamon or small mounds of flour/salt mixture around craters) Have students draw their craters.
2) Ask: What might happen if we dropped the balls from higher up? (They would fall harder.)
3) Have kids drop balls into the box from shoulder height. Ask: What do you see? (bigger, deeper craters) Why did that happen? (Balls had more time to pick up speed; faster balls make bigger holes.) Have kids draw these craters and compare with their first craters.

Next Stop
Ask: What might happen if we dropped objects that aren’t round into the shoe boxes? Try it!

Subjects:

Astronomy and Space, Sun, Force and Motion, Gravity
Friction Action

Find out what happens when you pull the box.

Fill box with stones. Put box on table.

PREDICTIONS
Think about what will happen when you pull the box by the rubber band. Write how long you think the rubber band will stretch before the box moves.

INCHES

INCHES

OBSERVATIONS
Pull the box. Measure how long the rubber band stretches before the box begins to move. Write the distance here.

INCHES

INCHES

Place rollers under box. Then record your predictions and observations.

INCHES

INCHES

Use this handy rule to measure the distance.