TEACHER'S OUTLINE

Activity 1: Lab Investigation

Getting Ready

1. Mix Oobleck well before class.
2. Mix 4 boxes cornstarch, 6 $^1/_2$ cups water, 15 drops food coloring. Let stand. Stir with hand 15 minutes before class.
3. Cover work areas with newspaper.
4. Establish optional equipment station.

Setting the Scene

1. A space probe has just returned from a newly discovered moon in the Solar System. We'll investigate a sample from the moon's green ocean.
2. We've named the substance "Oobleck."
3. Preliminary studies show Oobleck is safe to handle. Students will find out what it is made from later.
4. Explain the meaning of "properties" by using paper as example.
5. Tell students their job is to identify properties of Oobleck. Use all senses **except taste**.
6. Organize research lab teams. Tell students to record properties on large sheets of paper and number them.
7. Give each team one container of Oobleck. Encourage exploration.
8. After five minutes hand out large sheets of paper and markers. Help teams as needed.
9. Ask lab teams to star properties that are important in determining if Oobleck is solid or liquid.
10. Cleanup.

Activity 2: Scientific Convention

Getting Ready

1. Post lists of properties on wall or board.
2. Keep Oobleck and newspaper on hand in case needed for further testing .

Setting the Scene

1. Professional scientists hold conventions. The goal is to find the truth and state it clearly and completely.
2. Tell students their convention on Oobleck will follow these rules:
   a. One property discussed at a time.
   b. Raise hands to say why you agree or disagree with a property.
   c. Try to re-phrase properties so everyone agrees.
   d. Vote on whether or not class agrees with a property to see if it's a "Law of Oobleck." (Some teachers may prefer other terms.)

Facilitating the Discussion

- Time for discussion will depend on interest level.
- Allow students to resolve disagreements by going back to the lab for a few minutes.
- Challenge students to think of cases where a stated property might not be true.
- Change wording so everyone can agree by adding a phrase or defining terms.
- Allow for further experimentation to resolve disagreements.

Ask questions and probe for student reasoning.

Activity 3: Spacecraft Design

Getting Ready

Write Laws of Oobleck (from previous activity) on board.

Setting the Scene

1. Challenge is to design a spacecraft capable of safely landing on an ocean of Oobleck, explore the moon, and take off again, with all passengers safely on board.
2. Review Laws of Oobleck. Emphasize that spaceship designs must take these into account.
3. Tell students to draw ideas and label parts that allow craft to land safely and take off again without getting stuck.
4. Hand out paper and colors. Students can work in teams or individually.

Designing and Discussing Spacecraft

1. Help as needed. Remind students to label drawings.
2. Allow students to continue for a second session if needed.
3. Encourage students to see each other's drawings.
4. Ask volunteers to explain spacecraft ideas. Give everyone who wants to a chance.
5. Ask which designs are most likely to survive.

Activity 4: What Scientists Do

Getting Ready

1. Write these headings across top of board: "Laboratory," "Convention," and "Spacecraft Design"
2. Prepare overhead transparencies of the Mars Rover mission.
3. Choose quotation(s) on nature of science and make overhead of it.

Setting the Scene

1. Reveal that Oobleck is made of cornstarch, water, and green food coloring.
2. Remind students that the Oobleck activity had three parts: laboratory, convention, and spacecraft design.

Students as Scientists

1. Ask students to describe how they acted as scientists in the laboratory. List their ideas on the board.
2. Do the same for the Convention and Spacecraft Design parts of the activity.
3. Explain that these scientific methods are used by professional scientists too. Briefly discuss their ideas about designing a craft to land on Mars.
4. Point out how Mars mission scientists used these processes. Refer to the overhead images and step-by-step text provided for them.
5. Conclude by discussing the nature of science as an ever-changing process of knowledge based on evidence derived from observation and experiment to seek to explain the natural world. Post the quotation by Albert Einstein and/or others of your choice.

Consider presenting optional activities:

Activity 5: Microscope Eyes

Activity 6: Full Investigations