

DISSOLVING GOBSTOPPERS®

Background:

The scientific method is a critical topic for any student learning science to be familiar with. By having students design their own experiments they get first-hand experience with the scientific method, while also allowing them to learn by inquiry.

Objectives:

1. Students will understand what a testable question is and be able to distinguish between questions that are testable and those that are not.
2. Students will understand and be able to identify variables, make and understand hypotheses, and record and report observations.
3. Students will design and conduct their own experiments using knowledge learned from this lesson.

Materials:

- Gobstoppers® (enough for each group of 2 or 3 students to have 4)
- Clear plastic cups or other containers (one for each group)
- Water
- Student experiment materials (as identified by students in their experiment outlines)

Time:

Approximately 8 classroom hours divided into 3 days

Grade level:

Grades 5-7

Procedure:

Day 1

- Explain to the students that they are going to do an experiment with Gobstoppers® that will allow them to practice making a hypothesis and making scientific observations. Have the class think of different ways that scientists might record their observations (E.g. drawings, tables, graphs, etc.).
- Show the class what they will be doing to make sure they understand. Hold up a clear plastic cup. Tell them that theirs will be filled halfway with water. Tell them to *gently* place 4 different colored Gobstoppers® into the water, placing them around the edges, as far away from the others as possible. Re-iterate the importance of not disturbing the container of water.
- Tell the students that as soon as they place the Gobstoppers® into the water they are to begin making observations. Have them write down everything they see, and to make at least 2 drawings as the reaction takes place.
- Divide the class into groups of 2 or 3.
- Give each group 1 clear cup and 4 different colored Gobstoppers®.
- Once students begin their experiments, make sure that they are making observations and drawing pictures as the reaction happens.
- After students have completed their observations (approximately 20 minutes) have each student write any questions they had about the reaction (at least 2). Have them tear a piece of paper in half, and write a question on each half. Example: would this happen if a different liquid were used?
- When students have finished writing them, collect all their questions.

- Discuss with class what an experiment is. Ask what they think one needs to do to perform an experiment. Explain that a variable is something in the experiment that you can change to get a different outcome. Ask for examples from the activity (Examples: water, size of container, number of Gobstoppers®, type of liquid, etc.)
- Explain that a testable question is one that you can create an experiment about, and change only one variable, in order to find the answer. A testable question cannot be answered by looking up the topic in an encyclopedia! To reinforce the idea of testable questions, explain that we are going to read through the questions they wrote, and decide as a class whether or not each question is testable. It may be helpful to create a chart that you can tape the questions to.
- During class discussion of testable questions, ask students *how* they might test their questions (what experiment would they do?). What results would they expect to see?

Day 2

- Discuss with students what a hypothesis is, and its function. Explain to students that a hypothesis is an attempt to explain an observation, and that it is NOT a prediction. Provide and discuss examples with the students.
- Explain to students that they are going to design and perform their own experiments using the Gobstoppers®. Many students will surely have thought of other experiments they would like to perform while doing the original experiment. Ask them to limit their needed materials to common household items to make it easier for you.
- Pass out the attached proposal worksheet to help them think about and plan their experiment.
- Once the students have finished, you will need to collect the worksheets to make sure the experiments are appropriate. Also, you will need their list of required materials so that you can provide them.
- **WARNING: DO NOT ALLOW THE STUDENTS TO USE BLEACH IN THEIR EXPERIMENTS. GOBSTOPPERS AND BLEACH REACT SOMEWHAT VIOLENTLY AND IT IS NOT SUITABLE FOR THE STUDENTS TO PERFORM SUCH AN EXPERIMENT.**

Day 3

- Inform students that today they will be performing the experiments they designed. Stress the importance of mature behavior and that they need to be careful with the materials they are using because they could be messy.
- Inform students that, as they did with the first Gobstopper® activity, they need to immediately begin recording ALL of their observations.
- Allow students to collect their materials and begin their experiments. Allow at least 30 minutes for observation.
- After all groups have finished their observations, have them work on worksheet 2 (assessment). This can be used as evidence of concept knowledge and for assessment.

Evaluation:

Assessment will be based on student's completed assessment sheets in which students will have to identify the hypothesis they created, explain their experiment, identify the question they were testing, identify the variables, and explain their results.

