

Mystery Boxes

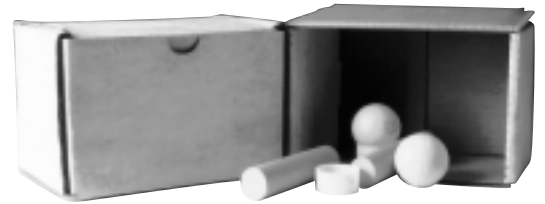
*Students realize the value of using their senses
(in this case, hearing, touch, and possibly smell) in combination.*



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Time Required

Setup	10 minutes
Performance	20 minutes
Cleanup	less than 5 minutes



Mystery boxes and objects

National Science Education Standards

Science as Inquiry Standards:

- Abilities Necessary to Do Scientific Inquiry
Students use their own observations to answer the question "Which sample object matches the object in the mystery box?"
Students conduct a simple investigation in which they use their senses of touch, hearing, and possibly smell to observe the sample items and the items in Mystery Boxes and make systematic observations of each.
They formulate a hypothesis about what is in the box and appeal to the evidence they obtained to support their hypothesis.

Physical Science Standards:

- Properties of Objects and Materials
The objects are made of one or more materials and can be described by the properties of the materials from which they are made. These properties can be used to match each mystery object's identity with a sample object.

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Materials

For Getting Ready

Per group

- duplicate pairs of several mystery objects, such as the following:
 - wooden blocks of different sizes and shapes (for example, cylinder, sphere, rectangular prism, cone, cube)
 - balls
 - marbles
 - corks
 - bottle caps
 - pens or pencils
 - coins
- opaque box with a lid or flap that is easily opened and reclosed, such as a shoebox



For the Procedure

Per group

- Mystery Box prepared in Getting Ready
- 3 objects, 1 of which is identical to the object in the group's Mystery Box

For Variations and Extensions

- ② Per class
 - large box
 - 2 pieces of fabric
 - pair of socks
 - variety of objects

Safety and Disposal

No special safety or disposal procedures are required.

Getting Ready

Prepare a Mystery Box for each group by placing one object in a box with a lid. Be sure you have a duplicate of that object available for examination.

Introducing the Activity

Without revealing its identity, place an object in a box that the students are unable to see into. Ask the students to guess what may be in the box. Do not allow the object to move around or students to handle the box. After several guesses are offered, ask the students why they had so much difficulty guessing the object. *No clues were given about the object.* Ask the students what would help them make better guesses without opening the box. *Shake the box, feel the weight, etc.*

Procedure

1. Give each group a Mystery Box and instruct students to keep the box closed during the exploration steps of the activity.
2. Give each group three objects and explain that one of these objects is identical to the object in the group's Mystery Box.
3. Instruct the group to examine the box without opening or peeking into it. Allow each student in the group to spend several minutes examining the box.
4. Challenge each group to formulate a hypothesis about what is in its box and to provide evidence to support its idea.
5. Allow each group to open its box to reveal the actual identity of the mystery object.
6. Provide the students with pairs of identical objects and allow the groups to make their own Mystery Boxes and trade with other groups. Repeat Steps 3–5.

Variations and Extensions

1. Place two or three objects in a Mystery Box. Have the students try to describe and identify each item separately.
2. On opposite sides of a box, cut holes large enough for students to put hands and forearms in. Cut a piece of fabric to cover each hole and tape it inside the box at the top of the hole to form a flap. Place several objects in the box. Have a student put socks on his or her hands and slide the sock-covered hands through the holes in the sides of the box. Challenge the student to describe and guess the identity of each object in the box.

Explanation



The following explanation is intended for the teacher's information. Modify the explanation for students as required.

Scientists often confront situations in which they cannot directly see what they are investigating. Thus, they must use other experimental evidence to gather information. For example, chemists cannot see atoms, but they infer information about them through methods such as observing the results of chemical reactions. In this activity, students rely on their senses of hearing and touch to observe what happens when the box is tipped gently from one side to another, quickly tipped, slowly tipped, or inverted. They use the different sounds and feelings to gather information about their object which helps them match it with one of the known objects.

Cross-Curricular Integration

Language arts:

- Scientists need to be able to clearly describe results of investigations. An important part of description is effective use of adjectives. Have students make lists of adjectives to describe the objects from the Mystery Boxes. Discuss which sense is used to identify the characteristic each adjective describes. For example, if an object can be described with the adjective "bumpy," the senses of sight, touch, and hearing may have been used.

Contributors

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