

Mystery Boxes

Lesson Concept	Matter has observable physical properties at both a macro and micro level. Everything is made of something smaller, including matter. Matter is made of elements. The ways elements are put together make different types of matter.
Link	Introductory lesson to structure of matter
Time	1 hour 15 minutes
Materials	<p><u>Whole class</u></p> <p>1 demonstration station with mystery box and sample materials (see below)</p> <p>1 image of an atom</p> <p>1 image of the sun</p> <p><u>Per Group (groups of 2)</u></p> <p>Cardboard box with cardboard or sponge shape (rectangle or triangle) taped inside and one marble (taped closed so that students are unable to see inside)</p> <p>Cardboard box (empty and open)</p> <p>Tape (masking tape)</p> <p>One marble</p> <p>Rectangle and triangle cardboard or sponge shapes</p> <p><u>Individual</u></p> <p>pencil</p> <p>Mystery Box Lab (see attached)</p>
Advance Preparation	<ol style="list-style-type: none">1. Gather supplies (cut cardboard or sponge shapes).2. Assemble mystery boxes by taping a rectangle or square shape made of sponge or cardboard inside each box (placement varies); also place a marble inside each box, and tape box closed.3. Reproduce copies of Mystery Box Lab
Procedure:	
Engage	<i>(10 minutes) Observe physical properties on a macro and micro level.</i>

1. Display a picture of the atom and the sun.
2. Ask students, “How do scientists know what is inside an atom? How do scientists know what the inside of the sun looks like? How might scientists construct this model?”
3. Discuss how scientists are able to construct a model for something that cannot be seen with the human eye.

Explore ***(30 minutes) Matter has observable physical properties at both a macro and micro level. Everything is made of something smaller, including matter.***

4. Distribute taped mystery boxes, empty mystery boxes, masking tape, marbles, cardboard or sponge shapes, and Mystery Box lab papers.
5. Allow students to observe their taped mystery boxes and construct a drawing of what they think is in the mystery box models.

Explain ***(15 minutes) Matter has observable physical properties at both a macro and micro level. Everything is made of something smaller, including matter.***

6. Discuss/chart student findings. Discuss student methods. Have students describe how they inferred what was in their mystery box.

Extend ***(10 minutes) Observe physical properties on a macro and micro level.***

7. Distribute empty mystery boxes, masking tape, marbles, cardboard or sponge shapes. Have students create their own mystery box for another group to observe and infer what is inside the mystery box.

Evaluate ***(15 minutes) Apply methods for exploring what cannot be seen with the unaided eye to a new situation.***

8. Have students compare and contrast their methods for constructing mystery boxes with a scientist’s method for constructing a model of something that cannot be seen such as the Earth’s layers or the Sun’s layers.

Name: _____



Mystery Box Lab Paper

1. How do scientists know about the Sun's/Earth's layers?

2. Sketch what you think is inside the black box.

Idea #1	Idea #2

3. Test your ideas. Do you think your model is a match with the Mystery Box?

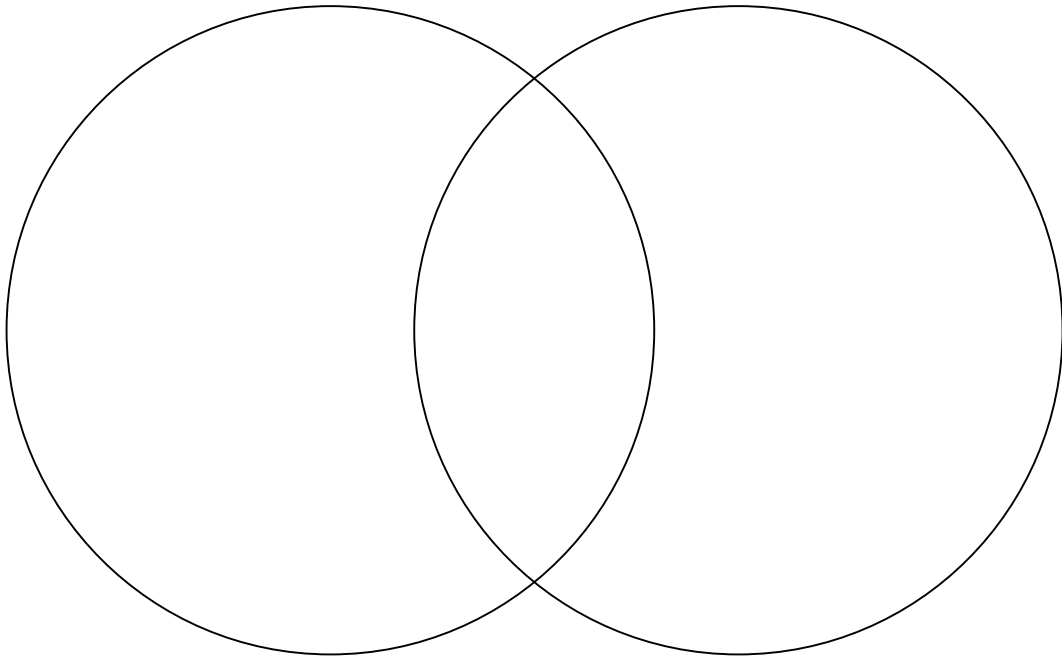
4. How would you alter your model? _____

Post Lab Question:

9. Compare and contrast your methods for constructing your mystery box with a scientist's method for constructing a model of something that cannot be seen such as the Earth's layers or the Sun's layers.

Your Method

Scientist Method



Describe how your method compares with a scientist's method.

