



Snippets of Science from Fermilab

PS 1 A (3-5) Explore

AN ATOMIC MYSTERY MODEL

Challenge: Can you “see” inside something to guess what might be hidden?

Goal: Use indirect evidence by probing inside an “atomic mystery model” of a clay ball. What are the characteristics of the hidden object/s?

Fermilab Connection: Millions of invisible particles go through you and our planet every second yet leave no trace. Fermilab scientists use problems to learn about invisible subatomic particles! You can probe a simulated particle to discover what is hidden inside.

Preparation

Prepare atomic mystery model by inserting objects such as pennies, marbles, small ball bearings or a brass nut inside a clay ball.

Procedure

1. Open one end of the paper clip so that it can be used to pierce the clay ball. This will serve as your probe into the unknown space of the clay.
2. Plan how you will probe into the space of your clay ball to discover what is inside and where something may be located. Determine where your probe will be placed.

3. You may only probe in eight locations.
4. On paper, log your activity by drawing a model of your hypothesis (guess) as to the location and size of the object inside the clay ball. You might also be able to determine what kind of material the object is made of. Can you determine anything else?
5. Use the plastic knife to cut open the ball.
6. How does your model/sketch compare to the interior of the clay ball?

GRADE LEVEL

Grades K-8 with modifications

MATERIALS

- Large paper clip
- Plastic knife
- Paper and pencil
- One clay ball with an object hidden inside

Discussion Questions:

1. Could you have made your hypothesis before your experimentation? Why or Why not?
2. Do you think you would be able to do accurate measurements to more precisely create your model?
3. What additional tools might you have used to gain more information about the contents?
4. How might you redesign this investigation/experiment?

You may have individual students try this first; then have groups of students with several balls containing different contents work collaboratively. They can then present their findings as a group to the other researching groups. They should be able to present their method of research, their hypothesis and their results. Would they modify their experiment? You may have one group of students prepare an experiment of the clay balls with contents for other groups.