

## MODELING THE UNSEEN: A SIMULATION OF DISCOVERING THE ATOM

### Procedure:

1. Divide a blank piece of paper into four equal squares by folding it in half twice. Number each square 1 through 4.
2. **Do not touch the paper bag!** Simply try to figure out what is inside the bag by using senses other than touch. You may smell the bag, listen for movement, and look at the bag. But you may not even move it or pick it up!
  - Draw what you think is in the bag.
  - What evidence do you have for this?
3. **Do not open the paper bag!** You may pick up the bag now. Feel its weight, shake or tip the bag, listen to the objects inside, etc. Just don't open it or squeeze the bag!
  - Draw what you think is in the bag.
  - What evidence do you have for this?
4. **Do not look in the bag!** Without looking into the bag, open the top and put your hand in the bag to feel the contents. But don't look!
  - Draw what you think is in the bag.
  - What evidence do you have for this?
5. **Now, look in the bag!** Do not change the arrangements of the materials inside.
  - Draw the contents of the bag

### Analysis:

1. Did your model (drawing) of the bag change over time?
  - a. What caused it to change?
  - b. With each new investigation did your model get closer to "the real thing"?
  - c. Why do you think this happened?
2. How does this investigation compare with the way in which scientists have learned about the atom? Make two concrete comparisons to specific scientists or discoveries about the atom.
  - a.
  - b.

3. In what ways could you have tested the accuracy of your model of the contents of the bag without opening it? (Think of other tests you could do.)
  - a.
  - b.
4. What kinds of special instruments could also be used to make indirect observations of the inside of the bag?
5. If you used some of these special instruments and found that the results did not agree with what you originally thought to be inside the bag, what would you need to do?