Name: _____ Date: _____ Investigation Answer Sheet

Investigation 1.2

Inquiry and Scientific Evidence

How does a scientist conduct investigations?

This investigation is about solving a scientific mystery using the same processes that scientists use to discover new things. The mystery is the identity of the object in the box. You have to determine which clay shape you have in your box without opening the box. Your teacher will give your group a box with an unknown clay shape (one of the four) sealed inside.

1 Setting up

1. Your teacher will give you a small box that has a clay shape sealed inside.
2. The clay shapes started as ping-pong-ball sized pieces. Your teacher (or a student helper) created four different clay shapes: a sphere, cube, cone, and cylinder. Your box has one of these shapes inside.

2 Stop and think

a. Write down at least one thing you know about each clay object. How would the shapes roll? How would they sound when you shake the box?

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b. Write down at least three different observations you could make that might help you figure out which shape is inside a closed box. Assume you can hold the box and do anything (in your classroom) except open it or damage the box or contents in any way.

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3 Conducting your inquiry

Try doing the things you suggested in part 2b above. Write down the results as carefully as you can.

Table 1: Results of your inquiry

What you did	What you observed (evidence)

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4 Your hypothesis

A hypothesis is a possible explanation. At the start of the inquiry your hypothesis is an educated guess at what shape is in the box. It may be the correct shape, but your hypothesis should fit with at least some of the observations you have made so far. Use the following questions to help write down your first hypothesis.

a. What do you think is in the box (your hypothesis)?

b. What specific things (evidence) did you observe that makes you think this hypothesis may be right?

c. Were there things that you did *not* observe which also cause you to think your hypothesis might be correct? These kinds of observation are evidence, too.

5 Testing your hypothesis

As part of the scientific method, all hypotheses must be testable. That means the hypothesis must make a prediction that can be tested with an experiment. For example, suppose your hypothesis is that the clay shape in your box is a cube. You might predict that when you tip the box, the object will sound like it slides rather than rolls in the box. This is a prediction that can be tested.

a. Assume your hypothesis is right. Write down one additional test you could make to confirm that you do indeed have the right object. This test should be something you have not done before.

b. Do the test and write down what you observe.

c. Try any other ways that you can think of to examine the box.

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6 Stop and think

A correct hypothesis agrees with *all* of the observations. If the hypothesis disagrees with even one observation, it cannot be completely correct.

a. Write down your hypothesis for what is in the box based on all your observations.

b. Write down at least four observations (evidence) that you made.

c. Next to each observation, write down whether it supports or does not support your hypothesis.

d. Open your box. Was your hypothesis right? If not, is there another test you could suggest that might have provided a clue to the correct hypothesis?

7 Exploring on your own

Go home and make your own mystery box using things you find around the house. The box should contain at most three objects but may contain only one. Write down at least four tests that would allow someone to solve your mystery.

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