

## What's in the Bag? (The Scientific Method) – Lesson 7

### Description of Setting:

This lesson is intended for a 50-minute 9<sup>th</sup> Grade World History class. It can accommodate as few as 2 students to as many as 30, regardless of cultural background. The classroom must have a computer and projector/large monitor to display a PowerPoint presentation.

### Description of the Learners:

The learners are comprised of 15-17 year-olds. Five of the 30 learners have IEP's for emotional disturbances. Their cultural background is varied, including African American, Bosnian, Vietnamese, and Caucasian. Learners may have some prior knowledge about the Scientific Method from previous science classes.

### Goals and Outcomes:

Students will understand the process of the Scientific Method and the appropriate steps involved. After the lesson they will be able to describe the steps of the Scientific Method and how it is an important tool to discovery.

### Show-Me Standards and/or Grade Level Expectations:

1. Show-Me Standard SS 7: *The use of tools of social science inquiry (such as surveys, statistics, maps, documents).*

### Instructional Process:

#### **5 minutes:**

- The teacher will begin by splitting students into groups of four and handing each group four numbered and sealed paper bags that contain unknown items to the students.
- On the board will be rules for the whole class on what not to do with their paper bags:
  - You cannot open the bag.
  - You cannot tear the bag.
  - You cannot throw the bag.
  - You cannot drop the bag.
  - You cannot smash the bag.
  - You cannot do anything that would harm the bag.
- The teacher will tell students that they must draw on a piece of paper what they believe are in each bag, as well as write out their answers, while following the rules on the board.

**15 minutes:**

- As students are working in their groups trying to figure out what is in each bag, the teacher will walk around the room and ensure no one is breaking the rules.
- The teacher must not tell students what they *can* do with the paper bags.

**15 minutes**

- After the groups have had time to come up with their hypothesis of the contents of each bag, the teacher will ask each group to send one representative to the board.
- Once all groups' representatives are at the board, the teacher will tell them to start at the same time drawing exactly what they believe is in the first bag. The students must also label their drawing with an exact description.
- After the representatives are finished, the teacher will open the first bag and show the class what was inside, as well as award a point to the teams that were correct. This process will continue until all bags' contents are revealed.

**8 minutes**

- Following the activity, the teacher will then ask each group to correctly write down in order the six steps of the Scientific Method:
  1. State the problem
  2. Gather information
  3. Form a hypothesis
  4. Experiment
  5. Analyze data
  6. Form conclusion
- Each team with the correct answer will be given two points.
- The team with the most points wins.

**7 minutes**

- The teacher will then explain to the entire class the steps and order of the Scientific Method, as well as illustrate with real examples how teams used these steps when trying to determine what was inside each bag.

### Assessment Procedures:

The teacher will informally assess through observation of student performance, and should answer “Yes” to the following questions:

1. Did the students work as a group and follow the directions?
2. Did students use proper tools of inquiry, while obeying the rules, to determine the contents of each bag? (i.e. feeling or smelling the bag).
3. Were students successful in identifying the steps of the Scientific Method?

### Materials:

- A chalk/white board.
- Notebook paper and pencils for students who have not come prepared.
- 28 brown paper lunch bags
- 7 of each of the below items:
  - Banana
  - USB cable
  - Rubber band ball
  - Crayons

### Management Procedures:

The teacher will ensure that:

1. Students are adhering to the rules of the activity.
2. Group discussions maintain respect of other groups’ abilities to communicate by maintaining minimal volumes.
3. Students are attentive and not talking while receiving instruction.
4. Students respect others may have different opinions.