

Thursday, September 20th, 2012

Unit: Scientific Inquiry Topic: "Black Box" Experiment: An introduction to inquisitive thinking...	Date: Thursday, 9/20/2012 Class: Biology
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Illinois State Objectives:

11.11.01 Understand and follow procedures relating to scientific investigations, including understanding the design and procedures used to test a hypothesis, organizing and analyzing data accurately and precisely, producing and interpreting data tables and graphs, performing appropriate calculations, applying basic statistical methods to the data, identifying appropriate conclusions, making predictions, and evaluating competing models.

11.11.02 Understanding the design and procedures used to test a hypothesis, organizing and analyzing data accurately and precisely, producing and interpreting data tables and graphs, performing appropriate calculations, applying basic statistical methods to the data, identifying appropriate conclusions, making predictions, and evaluating competing models.

Lesson Objectives:

- Students will understand that science is a process
- Students will develop questioning & inquisitive skills.
- Make and record observations that are not based on sight
- Students will make a hypothesis based on the data they collected.

Activities: (Include minutes)	Materials/Equipment:
Bellringer: What is the difference between qualitative & quantitative data? "Black Box" Experiment	Sealed box filled with: <ul style="list-style-type: none"> • paper-clips • pair of scissors • dixie cup • confetti • 3 glass marbles Worksheet with directions & guiding questions to assist with inquiry activity.

Assessment: (Embedded, Formal)

Embedded: Class Discussion

Each group:

- explained what they thought was in the box
- explained what methods they used to reach those conclusions

This showed me & their peers where they were at in the scientific process. I also wanted to see if they understood that all experiments don't lead to correct, definitive conclusions in science. If anything, experimentation leads to more questions than there were previously.

Formal Assessment: Homework

1. What did your group conclude about the contents of the box?
2. Could you classify your conclusion as a hypothesis or a theory? Why?
3. Did each lab conduct their investigation in the same manner? What differed? What was the same?
4. Did each lab reach precisely the same conclusions as to the contents of the box? Why or why not? What may have influenced each group's characterizations?
5. Keeping in mind that you have not made any direct (visual) observations, how confident are you of your characterization? What implications might this have for the nature of scientific evidence (i.e., what is the legitimacy of inference)?