Modeling and making predictions about watersheds Lesson 3

Objectives
The student will be able to do the following:

- Demonstrate their understanding of a watershed
- Understand the scientific process
- Make and test hypotheses and predictions

Materials
For each group:

- Play-Doh (enough to build two watersheds)
- Spray bottles
- "Dirt" (glitter, crumbs, etc.)

Background
This unit builds on the previous unit on watersheds. Students should understand that watersheds are bounded by ridges and that a river or stream is a central feature of most watersheds. This unit allows students to implement their knowledge through a hands-on activity.

Students should already have been introduced to the scientific method, but if not, this lesson can serve to do so. For this lesson, students should focus on making and testing predictions through controlled experimental methods. One feature of this activity is that it will require that students record their experiments and later report on them. This activity provides practice in devising and recording methods and identifying differences in results.

Advance Preparation
Materials should be purchased and if necessary, divided for the appropriate number of groups.

Procedure

1. Begin by reminding students that this is a lesson about watersheds. Have students define watersheds and make sure that they understand that it is a feature of land, bounded by ridgelines and featuring a river or stream.
2. Discuss the scientific procedure:
    a. Observation
    b. Hyptheses (for higher level elementary grades, it is time to introduce them to a hypothesis as a prediction, rather than just a guess)
    c. Methods (and recording)
    d. Implementation (data recording)
    e. Results
    f. Analysis
    g. Discussion

3. Explain that in today's activity, each group will be given the tools to make two watersheds. They should build the watersheds and then make predictions about the behavior of water in those watersheds. Directions for the activity can be written on the board.
4. Students should record all observations, hypotheses, methods, and results.
5. For homework, students should write a short "lab" report with their findings.

Activities

1. Build and test watersheds
    a. Each team should use clay, paper, and any other materials they can think of to build two watersheds (e.g., they may build two mountains, or two "half-bowl" structures. They should be allowed to be creative. Watersheds should clearly exhibit ridgelines and streams (both in logical places. Testing may be necessary).
    b. Students should sprinkle dirt (glitter) on the ground of each watershed.
    c. In one watershed, students should build a forest. The other should be "cleared"
    d. Students should then devise an experimental method to test the movement and quality of water in the "forested" and "cleared" watersheds. They should use their scientific notebooks to note any observations or thoughts (from outside of class), make a prediction, and devise an experimental method.
    e. They can then carry out the method (ensuring that the treatment on both the forested and cleared watershed is the same), using spray bottles to simulate rain. (For instance, they may hypothesize that there is more "sedimentation" in the cleared watershed than the forested one. They should devise methods to test for the differences (more glitter in the runoff?). They may want to time how long it takes for runoff to occur. This is where creativity should also be allowed).
    f. Students should record all data and analyze the data to understand the results, determining if they supported their hypothesis.

2. As homework, students should write a lab report presenting their hypothesis, methods, results, and conclusions.

A note on activity kits

Activity kits were purchased at Walmart, Honolulu, HI in February, 2008. At that time, the cost per group was Play-doh ($1.82 for a packet of 4 5-oz tubs), Spray bottle ($0.97), and glitter (1/6 of a packet of 6 purchased for $3.42 (whole packet) ($0.57) = $3.36 + tax per group.

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