

Effects of Mountaintop Removal Mining On Stream Runoff

by

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While reading *Saving Wonder* by Mary Knight, my students conducted an experiment to see what the runoff from mountains into streams would look like. We compared a "normal mountain" versus a mountain that had undergone mountaintop removal due to mining.

Materials:

- Two 2L bottles per group
- Box cutter
- Soil
- Nerds (10 small boxes per group)
- Pixy Stix (10 straws per group)
- 2 plastic see-through cups per group
- tape
- string
- trash bags/tablecloths (optional)
- Sharpie markers
- Water
- Pitchers

Before the experiment, lay each 2L on its side and cut an oval out of each (see picture) using a box cutter.



Procedure:

- Divide the class into groups.
- Cover each table with a trash bag or tablecloth (optional)
- Provide two 2L, two cups, 10 boxes of nerds, 10 Pixy Stix, string, and tape per group

1. Discuss what mountaintop removal is. You may want to have students research various websites including:

- a. <http://appvoices.org/end-mountaintop-removal/ecology/>
- b. https://www.washingtonpost.com/opinions/the-dirty-effects-of-mountaintop-removal-mining/2014/10/21/851c4236-58a2-11e4-bd61-346aee66ba29_story.html?utm_term=.4a3922777c16

c. http://e360.yale.edu/features/mountaintop_mining_legacy_destroying_appalachian_streams

2. Using a Sharpie, students will label one 2L “Normal Mountain” and one 2L “Mountaintop Removal.”
3. In the normal mountain 2L, students fill the 2L halfway with soil and then gently press down the soil.
4. In the same 2L students will disperse 5 boxes of Nerds and 5 Pixy Stix. The candy represents the minerals and materials buried in mountains.
5. In the same 2L students add soil to the top of the hole and then compact the soil using their hands.
6. In the mountaintop removal 2L students fill the 2L to about ½ inch from the top of the hole with soil.
7. Do not compact the soil because the mountain has been disturbed.
8. In the same 2L add the remaining Nerds and Pixy Stix (5 boxes and 5 stix) to the top of the soil.
9. Using tape, attach the string to the tops of the cups (see picture.) The 2L should be placed at the side of the table, so that the cups hang below the 2L bottles.
10. Hang one cup from each opening of the 2L bottles.
11. While one student holds onto the cup, another student slowly pours 2 cups of water over the opening of one of the 2L bottles.



12. Repeat process with the other 2L bottle.

13. After 5 minutes, take the cups off the bottles and compare the runoff.

Discussion:

- How are the two runoffs different?
- What could account for the differences?
- How does this experiment reflect mountaintop mining?

During our experiment, we found that the mountaintop removal runoff was greenish/brown due to the candy colors being mixed. It also smelled like candy. The normal mountain runoff contained soil and smelled earthy. This led to many discussions including that sometimes we cannot see chemicals, but we can smell them. (See picture below)

