

Model Watershed Lesson

Students build model watershed and use it to learn about how fertilizers, pesticides, and other chemicals can be washed into waterways by rainfall. Students also learn about erosion and the shaping of landforms by the movement of water.

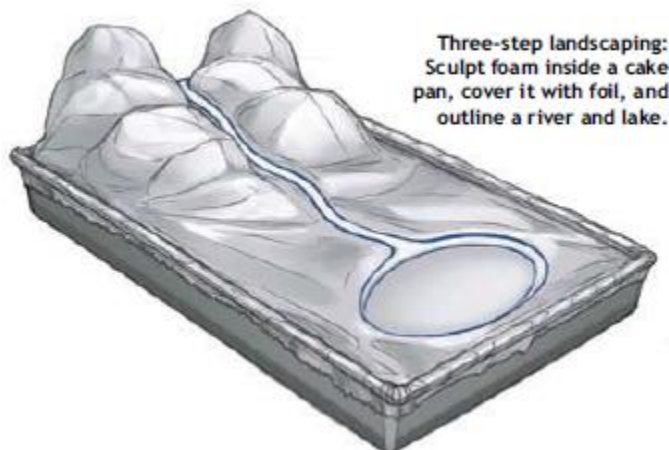
There is a pdf in the shared folder (“How to build a model watershed”) that describes the lesson. I have reproduced the high points here along with a few additional suggestions of my own.

Materials

- Disposable aluminum cake pan or a plastic bin
- Florist foam
- Aluminum foil
- Permanent markers (e.g., a Sharpie®)
- Watering can or spray bottle
- Chocolate pudding/hot chocolate mix
- Colored gelatin mix
- Sponges

Procedure:

1. Divide the students into even groups, each with one tutor. Each group will build a watershed model together. Each group should obtain a set of building materials.
2. Create your landscape inside the cake pan using green florist foam. Arrange the foam to represent two tall mountains on the outer edges of the pan. A river should run between the mountains down to a lake. Make a shallow depression for the lake to hold water. Or do whatever you want, but definitely have a place for water to collect.
3. Cover your landscape with foil, hopefully in such a way that water sprayed or poured on the landscape will run into the lake you created and not find a way to seep below the foil and out of sight. See below for a visual of what you might expect a foil covered landscape to look like.



4. The plan suggests you outline a river where you think water will dominantly flow. Depending on how your landscape was designed this may or may not make sense for you. Maybe at least outline where the water should collect? Make sure the kids know about gravity, I guess?

5. The lesson has you put a bunch of plastic toys on the landscape to designate farms and homes and stuff, but maybe we could just draw them on the foil with sharpie or make buildings out of paper and tape? I don't really think it is worth it for us to buy a bunch of toy houses.
6. Take a spray bottle and make it rain on your landscape. See how the river(s) form (or not, depending) and see that you were able to predict where the water would collect. Pour out the water.
7. Add sediment and pollution to your landscape. Sediment can be represented by hot chocolate powder and pollution by various colors of gelatin or drink mix. Ask them to think about what kinds of chemicals the powders are representing. Possibilities include lawn care chemicals, agricultural products like pesticides and fertilizers, oil, and dirty wastewater / solvents from industrial processing.
8. Make it rain again. This time your lake will be a lot more colorful. Talk about the effects of this on wildlife. Brainstorm ways that we can reduce the amount of pollution that gets into the water. The most obvious one is to use fewer types of chemicals and less of each type we do use or keeping the chemicals we use more contained. Another possibility is to do some filtration of the water before it gets into natural waterways. Talk about erosion by water and how it leads to major geological changes over time. Valleys and canyons. Maybe they've seen pictures of the grand canyon. Pollution runoff should be the emphasis of the lesson, but if it seems like that point has gotten across and you still have time you can discuss erosion.
9. You may not have time for this, but the lesson goes on to suggest that you can make wetlands (which can act as natural filters and purifiers of water) out of cut up pieces of sponge and put them in a position to block some of the chemical runoff from entering the waterway. If you can, model any of the other pollution reduction methods you brainstormed earlier. Add pollutants and make it rain again.

Talking points / background info:

1. A watershed is an area of land that drains water, sediment, and pollutants into a common body of water. For example, the Chesapeake Bay watershed is thousands of square miles of land and waterways that all eventually drain into the Chesapeake Bay. A watershed can also be a very small area that drains into a local pond or stream.
2. Pollution on land in the watershed eventually ends up in the water. Fertilizer, pesticide, and manure runoff from farms and yards can put potentially harmful chemicals and pathogens in rivers and lakes. Incorrect disposal of household and industrial chemicals can lead to deadly chemicals in waterways. Excess sediment from construction sites can wash into streams, smothering fish eggs and the bottom-dwelling bugs fish eat.
3. Healthy watersheds and clean water are important to protect the rivers, streams, and lakes we use for drinking water, recreation, and fishing.
4. Fertilizer runoff from farming in the midwest travels down the Mississippi River into the Gulf of Mexico feeding massive algal blooms. The algae subsequently die and the process by which they decompose consumes a lot of the oxygen dissolved in the water. This results in hypoxic conditions that can kill fish and other ocean wildlife.