

Midnight Dumpers

Summary

Students should gain a greater understanding of how and why chemical dumping occurs. They will also better understand how pollution spreads through underground reservoirs.

Time Frame

1 class periods of 60 minutes each

Group Size

Small Groups

Materials

- [student sheets](#)
(attached)
master-copy of map (found on this [Conserve Water website](#))
- 20 medicine jars or film canisters (amber color or dark but not transparent)
- 600 popcorn seeds
- food coloring
- lid from a cardboard box
- optional: candy bar prizes
- [maps for midnight dumpers](#)
(attached)
- [newspaper articles for midnight dumpers](#)
(attached)

Student Prior Knowledge

Students should understand that water from rain and other sources sinks into the ground and is widely used for by humans for drinking and household use. Contaminants placed on the soil will sink in and pollute the groundwater. The contaminants will also "drift" as the groundwater moves or the contaminant spreads.

Instructional Procedures

Make copies of the student sheets. Make an overhead copy of the city map, 1 per group. Print off the map and teacher map key. This is a sample map. You should make enough map keys for each class you will do the activity with. It is important that in each class the dumping occurs in a different location, because news travels in a school. There are three versions of the activity available. Run off a classroom set of each student map and a teacher map for each version. On the teacher map, fill in the letters of each location going from F to A as the spill dilutes. E, should be close to the site and the letters move towards A as the location gets further from the contamination site. Be sure students do not see the keys during this activity. Label and assemble the medicine jars with seeds in them according to the chart below. The medicine jars should be labeled by writing the letter on the bottom with permanent marker. The seeds should be dyed by soaking them in green food coloring overnight and drying them.

You also may want to drill a hole in the top of the jar for students to shake out a seed. This is not necessary however, as students can also remove the cap and take out a seed. The advantage

to having the hole is that students cannot see the contents of the rest of the jar.

Organize the jars according to letter on the lid of a cardboard box, as shown. Keeping the jars organized throughout the class period will make this activity run much more smoothly. As students return a jar to you, be sure to replace it in its designated area. You might also want to keep this hidden under your desk so your especially perceptive students don't catch on to the method.

Put the city map on the overhead so it is visible as students arrive into the classroom.

7. Hook:

Ask the students to name the town. Tell them that this town has some serious problems with "Midnight Dumping." Expect a few snickers. Illegal dumping occurs often, especially in areas with a lot of messy industries. Ground water monitoring is done around gas stations and other industries to make sure they do not dump contaminants. Sometimes barrels are loaded on trucks, taken to isolated locations and dumped.

Pass out student sheets. Have students read the "Background Information" through the "Prediction."

Discuss the lab (especially the background information) with the students and answer any questions they might have. You may want to offer a prize to the team that correctly identifies the well with the most profit, or in the case of some classes, the least loss. Student may need a reminder on how to do an average. In this case it is to take the number of polluted seeds (green) and divide it by the total number of seeds (around 20) and multiply by 100%.

As students request wells, use your key to know which letter well (jar) they will receive. Don't let students have more than one sample at a time. They must exchange one sample for another.

Discuss the results of this activity with students when everyone has located the site.

Assessment Plan

Sample Scoring Guide:

Sample Answers:

Answers will vary, answers will vary.

Answers will vary, the pollution followed the flow of the water. There was no pollution directly upstream of the contamination site.

Answers will vary.

It is important so that authorities can stop the polluting, find the guilty parties, and clean up the contamination.

Midnight dumping occurs because it is a cheap way to get rid of waste. It is expensive for businesses to comply with all of the EPA and state laws on how to correctly treat and dispose of their waste.

Once pollution is on the ground it seeps through the pore spaces in the soil and into the aquifer or groundwater supply.

The more porous the soil the more quickly the pollution will spread. If the soil is very nonporous like clay, the consequences of dumping would not be as immediate.

As water is pumped out of a well it pulls the surrounding ground water towards it. This draws or attracts the pollution.

It is a good idea to test more than once so you get an accurate perspective of what the water is truly like inside the well. It was luck which seed you pulled out, you may have pulled out the same polluted seed 3 times, giving you a distorted picture of how polluted the water really was.

If you see illegal chemical dumping it is best to contact the local law enforcement.

Answers to Conclusions:

Answers will vary but should be detailed, relevant and in complete sentences.

Bibliography

Lesson Design by Jordan School District Teachers and Staff.

Authors

[Utah LessonPlans](#)