Michigan Water
Stewardship Program

Augmented Reality Sandbox

My Watershed Student Worksheet

Pollution in Watersheds

This activity introduces watersheds and the impact our actions can have on the watershed and how far our actions can reach

Introduction: This activity is meant for small groups in a lab setting led by an instructor. This may work best with different 'stations' one being the ARS the other stations having other relevant activities to supplement the Lesson. This introduces the concept of watersheds and how our watersheds are affected by our actions.

Objectives: Students will be introduced to the concept of watersheds and pollution. Students will recreate a watershed or come up with their own inside of the Augmented Reality Sandbox (ARS) by moving the sand around and models to simulate infrastructure.

Two Important Rules for Using the Sandbox
Keep the sand in the box
Please don't touch the computer or projector to insure proper settings

Supporting Information for Teachers and Students:

In this lesson we will be learning about watersheds and how our everyday lives and activities can impact a watershed. Watersheds can be impacted greatly by what we put onto the ground be it our yard, driveways, parking lots, etc.

In Michigan we have a total of 86 major watersheds, the largest of these being the Grand River watershed, which is 260 miles long.

- A **watershed** is the land area that drains surface water to a particular river, stream or body of water. Large watersheds include many smaller watersheds.
- After a heavy rain, or a snow/ice melt **Stormwater** will be carried into these watersheds then into main waterways. Storm water is water from a rain or snow melt that is carried over land or other Impermeable surfaces before soaking into the ground water or reaching a waterway.
- An **Impermeable** surface is any surface water cannot easily soak into such as roadways or parking lots. In contrast, a permeable surface that water can easily soak into, such as soil.
- A lot of this stormwater will end up in **Storm Drains** alongside the roads or parking lots. A Storm Drain receives all the water that doesn't or cannot sink into the ground right away.
- A good portion of this water will soak into our groundwater due to a process called Infiltration. During **infiltration** stormwater will move along the surface and begin to soak into the soil.
- **Groundwater** is the water that is below the surface in the zone of saturation. Groundwater is a major source for our drinking water, if the groundwater becomes contaminated our drinking water is then at higher risk of becoming contaminated.

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Complete questions #1-#5 on Stormwater Management worksheet BEFORE working hands-on at the ARS unit. Then in small groups complete the worksheet as you experiment with the ARS unit.

1. Sources of groundwater contamination include:
    a. Oil spills
    b. Misuse of fertilizers and pesticides
    c. Leaking Underground Storage Tanks
    d. All of the above
2. Where does groundwater come from?
    a. Rainfall and Snowmelt
    b. Underground rivers
3. What is a watershed?
    a. Land that collects and channels water from a small body of water to a larger body of water
    b. The shape of the land determined by elevation
    c. Natural stream of water of a considerable volume
    d. A river and all of it tributaries
4. Impermeable surfaces such as sidewalks allow rainwater to be absorbed into the ground.
    a. True
    b. False
5. Why is stormwater pollution a problem?
    a. It can harm wildlife
    b. It makes playing or fishing in the river undesirable
    c. It decrease the quality of our water
    d. All the above

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Group Hands on Experiment with the ARS

- Create a mound of sand that has a gradual slope. Using different props create houses, trees, roadways, roadways, etc. Create ditches to represent storm drains with fingers or with the silver straws.
- After your mini city has been formed, create a small lake nearby to represent your body of water
- Have your group make it rain over your city by holding your hands out flat. Let's talk about what happens when the water falls onto your city

Where does the water flow?

What may get carried with the storm water?

What issues may this cause for your watershed?

What changes would you make to your city after seeing how water flows around it?

When you are all done, flatten your terrain and put all of the props back where they belong so that the box is ready for the next group.

Optional: Take a picture of your watershed and submit it to your teacher with this worksheet. Teachers, if permitted, forward pictures to the Eaton County Conservation District so we can see the ARS unit in use, and we will post it on our website and Facebook page.