Make Your Own Exhibit

From the Water Gallery: Build-a-Channel

At Discovery Museum, we explore the properties and power of water in our Water Gallery. Our Build-a-Channel exhibit allows visitors to engineer their own landscape of rivers, pools, and dams. Let's explore how water flows and shapes our world by building some water pathways at home. Please share your experiences with us using the email address found on the last page. We'd love to know what you discover!

Make Your Own Build-a-Channel Exhibit

Supplies for Building Channels

Be sure to ask an adult for help as you gather your supplies to create your exhibit! This exhibit involves water, so be sure any supplies you use are allowed to ***get wet!***

- Lab space for a wet exhibit: patio, driveway, grassy area, bathtub
- Large container or surface that can get wet: plastic container or tub, plywood, cutting board, cookie sheet (see photo)
- Materials for building water channels: blocks, cardboard tubes cut in half (see the "**Get Creative!**" section below for tips for using cardboard with your exhibit), plastic containers—whatever you can think of!
- Something to tilt up one side of your exhibit: plastic block, small box, flat-ish rock, someone else in your home
- Large container of water
- Cup or watering can for pouring water onto exhibit
- 2-3 paper or plastic cups or containers (see photo)
  - cut one large hole in one container
  - poke many small holes in another container
  - save the third container for testing out your own ideas later

*Don't have the suggested supplies? We've got you covered! Check out the "****Get Creative!****" section below.*

Exploration: Building Channels

- Prop up the top of your container so that water will flow downhill. Once you start to build your water channels, you may have to adjust the degree of your tilt so that your materials don't slide downhill, too!
- Test your tilted surface by pouring some water onto the top of it. If water doesn't run all the way down your exhibit, make adjustments until water can freely flow downhill.
- Use some of your materials to build a simple channel for your water (see photos).
- Pour a small amount of water into your water channel.

What do you notice?

Things To Try

- Pour different amounts of water into your channel.

What do you observe?

- Change the design of your channel.

What happens to the stream of water?

- Build a water channel with a different material.

What do you notice?

- Build a place for the water to pool. You may need to reinforce your bottom wall where the water starts to pool (see photo).

What happens to the area below the pooling water?

Get Creative!

Remember, experimenting is about trying new things, observing what happens, and then trying more new things. Not all the supplies you try will work equally well, and that's ok! It's an experiment! Here are some questions to help you get creative and practice your troubleshooting…

- Don't have a wet lab space? That's okay. This experiment can also be done in the kitchen sink—but don't let any of your supplies fall into the drain! You may be able to experiment using your bathroom sink, too, but make sure all of the water makes it into the sink! And have a towel nearby, just in case you spill.
- Don't have a large container that can get wet? A cardboard box or cereal box cut in half will do in a pinch (see photo).

- If your exhibit surface has walls (like a plastic tub), you may need to periodically drain your exhibit of water.
- Using cardboard tubes cut in half for your waterway? Have some extras handy if you can. The water will cause the tubes to flatten, so you may need to replace some parts of your waterway as you play.

- Are your channels floating away with your water? Try:
  - making your exhibit flatter
  - pouring less water
  - pouring water more slowly
  - using your cups with holes in the bottom to drip water onto your exhibit
  - heavier materials for building your channel
  - building higher channel walls
  - building supports for your channel walls (see photo)
  - taping down your channel materials

Supplies for Investigating Erosion

Be sure to ask an adult for help as you gather your supplies to create your exhibit! This exhibit involves water and possibly dirt, so be sure any supplies you use are allowed to ***get wet and muddy!***

- Lab space for a wet and dirty exhibit; outside is probably best for this one
- Your exhibit materials from **Exploration: Building Channels**
- Model soil
  - Sand or dirt for soil; cornmeal and flour can also work, but see the "**Get Creative**" section below for tips
  - Be sure you're allowed to put your model soil on your exhibit surface. If not, you may need to find another surface for this particular Exploration.
- Model trees
  - Small twigs, toothpicks, strips of cardboard, pieces of plastic straws
- Model houses
  - Small squares of cardboard, blocks, Legos
- Model obstacles
  - Small rocks, small squares of cardboard, toys that can get dirty and wet
- Model pipes
  - Cardboard tubes, or pieces of paper rolled into tubes and taped together
- Ruler or other long, flat piece of plastic

Exploration: Investigating Erosion

- Prop up your exhibit so that the water will run downhill.
- Make an initial observation of your landscape by slowly pouring some water onto the top of it.

What do you notice?

- Dig a straight trench into the model soil and pour some water into it (see photo).

What do you notice?

What do you observe about the color of the water at the bottom of the hill?

Things To Try

- Change the path of your trench.
  What do you observe?

- Bring rainstorms to your landscape by using your cups with holes in the bottom.
  How do different amounts of rainfall affect your landscape?

- Change where in your exhibit you add water.
  What do you notice about the landscape?
  About the path the water takes?

- Alter your landscape by adding mountains, valleys, and cliffs.
  How do your features affect the water flow?
  What happens to your features when you rain water onto the landscape?
  What do you notice about the landscape when rain falls in the exact same place over and over again?

- Add trees, houses, obstacles, and tubes in different patterns (see photo).
  What happens to the flow of water?
  What happens to the soil around the objects? Below the objects?

- Place your ruler or flat piece of plastic on the model soil and slowly pour water directly above the plastic (see photo).
  What do you notice about how the water flows?
  What do you notice about the soil below the plastic?

Get Creative!

Remember, experimenting is about trying new things, observing what happens, and then trying more new things. Not all the supplies you try will work equally well, and that's ok! It's an experiment! Here are some questions to help you get creative and practice your troubleshooting…

- Using cornmeal or flour for your model dirt? Here are a few tips:
  - To save food, use a small container with walls so your model soil doesn't flow right out of your exhibit. You may need to drain your exhibit of water periodically.
  - These materials work really well for observing water and soil flow around your trenches. Once you add water to these materials, however, they can start to change consistency quickly, so you'll want to move quickly as you explore your landscape (see photo).

What's Going On?

When you rain and pour water onto your landscape, does the water change the landscape? Can you see your model soil move along with the flowing water?

Moving water can contain a lot of energy, and with this energy it carves its own path through the Earth. As water flows, it picks up materials in its path—rocks, soil, sand—and takes them for a ride. The water deposits these materials in a new location, somewhere along the water's path. The process of water moving natural materials from one place to another is called *erosion*.

Playing with your exhibit, you may notice the water at the bottom of the hill is much cloudier or dirtier than the water you pour onto the top of the hill. You also may notice that as water flows past structures in your exhibit, the landscape around those structures changes. Both of these observations signify that erosion is occurring.

Rivers and streams are not the only habitats that move Earth materials from one place to another. Have you ever walked along the beach and seen something that was washed up onto the shore by the ocean? Ocean waves can certainly move materials around, as can wind and ice.

Erosion is related to another event that helps shape our landscapes, and that is *weathering*. Weathering is the breaking down of Earth materials caused by

water and wind; erosion is the movement of those smaller broken-down pieces. Weathering happens at a location, and erosion happens on the move. Therefore, as weathering takes place, small pieces are created that are then eroded away.

In your exhibit, does erosion always look the same?
What affects the amount of erosion you see?

Some of the factors that change erosion patterns in your exhibit are similar to ones that can impact erosion in the natural world. Erosion is a natural process caused by moving water and moving wind. Erosion can speed up or slow down as the landscape changes. Unfortunately, human activity sometimes unnaturally speeds up erosion and negatively impacts the surrounding environment.

For example, removal of plants and trees increases erosion. Plants slow down soil erosion by slowing down water flow. Slower moving water soaks into the ground rather than flowing by and picking up soil along the way. Therefore, removal of plants by humans can increase soil erosion. Greater amounts of moving water can also increase erosion. Scientists are observing greater water flow due to melting glaciers, increased rainfall, and rising sea levels.

Erosion is an excellent example of a healthy and natural process that can be accelerated in an unhealthy way by human activity. The Discovery Museum Build-a-Channel Challenge explores this concept further.

Discovery Museum Build-a-Channel Challenge

Can you help protect a small town from erosion?

- Place a group of houses in the middle of your exhibit.
- Pour water uphill from the houses and watch what happens.
- Use any materials you have to experiment with different ways to minimize erosion around the town.

How many different solutions can you design?
Do any of your solutions involve building new structures?
Do any of your solutions involve natural methods?
Would your solutions withstand a large storm?
How might your solutions affect fish and animals in the area?
Could any of your solutions be used in a real town built on a hill?
What recommendations would you give to the townspeople if they wanted to build a new town next door?

Share Your Discoveries with Us!

We want to know about your Build-a-Channel exhibit. Share your experience with us in any of the following ways:

- Draw a picture
- Take photos
- Write down which supplies were your favorites to use, why you liked making your own Build-a-Channel exhibit, or any other fun things you discovered

Then email us at myhomediscoveries@discoveryacton.org. We can't wait to hear from you!

And next time you're at the Discovery Museum, check out our Build-a-Channel exhibit in the Water Gallery on the first floor, and show us what you learned from the exhibit you created at home. We'll see you here!

Want even more Build-a-Channel fun?

Check out these resources!

Erosion Lab
https://www.youtube.com/watch?v=ZNJe6hrdL3M

Forming the Grand Canyon
https://www.youtube.com/watch?v=oZZEJMtLOKU

Why Do Rivers Curve?
https://www.youtube.com/watch?v=8a3r-cG8Wic

Time Lapse Photography: Erosion and Weathering of the Earth
https://www.youtube.com/watch?v=ysgZogSBMio