# How Water Moves

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**Name:**

**DO NOW:** Examine the picture below and answer the following questions.



1. Where was the photo taken?

2. What created the landform shape seen in the photo?

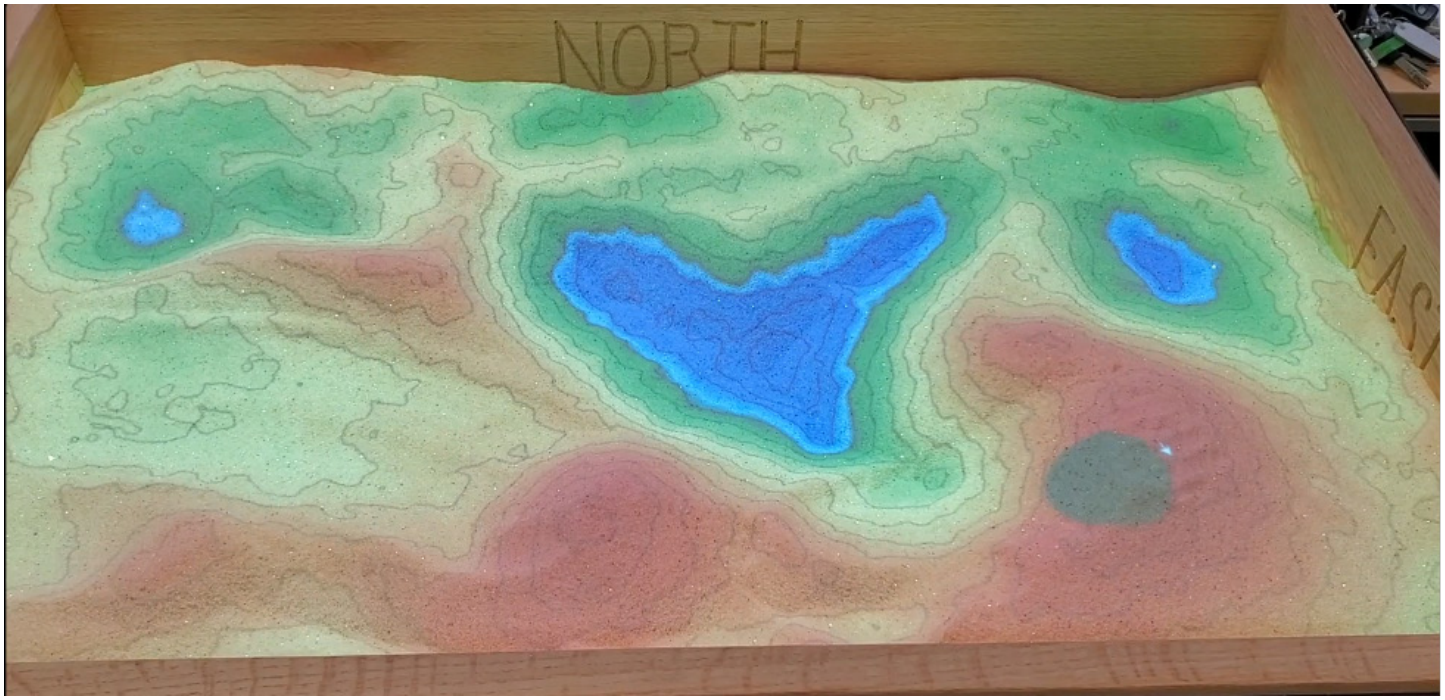
3. Is the water moving and how do we know?

4. What is the name of the river? *Hint: It's famous for canyons and whitewater rapids!*

## HOW WATER MOVES | AUGMENTED REALITY (AR) SANDBOX

The Grand Canyon is one of our nation's most recognizable geographical landmarks. Native Americans long inhabited the canyon, with the Havasupai tribe still living there. Geologists believe the Colorado River began cutting into the Grand Canyon somewhere between 5-6 million years ago, but the Colorado River has eventually exposed nearly 2 billion years of Earth's geographical history! So, how can something as simple as flowing water create something so vast? Today, we'll be using an Augmented Reality (AR) Sandbox to get a better understanding of how water moves.

What is an AR Sandbox?




An AR Sandbox is a real sandbox that uses virtual topography (study of landforms and features) and water that is created with the help of a Microsoft Kinect 3D Camera, a projector, and some software from the computer. Using this technology, we can move the sand around in the sandbox and learn about geographic concepts in real time! However, since there are many of you and only one sandbox, we need to go over some rules!

1. Must use gloves.
2. Only the teacher can water the sand to create landforms.
3. Only one group may come up at a time.
4. All sand must stay inside the sandbox at all times.

Now we'll go through a demonstration of the AR Sandbox, so you can see how it works!

## PART I - Using the Scientific Method with a Model

Now that we got to see the AR Sandbox in action, it is your turn to do a mini experiment using the AR Sandbox to explore how water moves! We're going to use the scientific method for our experiments.

What are the steps to the Scientific Method?

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

With the 6 steps of the scientific method under our belt, we need to do one more thing before we can start our experiments. We need to identify the independent variables. Independent variables are the things we can change in our experiment. So, let's brainstorm as a class to figure out what we will be changing and comparing in our experiment.

- _____
- _____
- _____
- _____

Each group is going to select one of these variables for their experiment. It is okay for multiple groups to have the same variable, but let's make sure we get all the variables covered.

☐ 1. Write the question that you want to explore with your variable. Ex. How does slope affect...? How does the shape of the river affect...? How does more/less rainfall affect...? How do barriers along the river affect...? Make sure to get this checked by your teacher before moving forward!

☐ 2. We have already done our background research for this investigation using the AR Sandbox and class discussion, you will need to now write a hypothesis. Remember, hypotheses are "if...then..." statements. After you write down your hypothesis, draw a model of your hypothesis (What does it look like?). Get your teacher to check before going to the AR Sandbox to test your hypothesis!

☐ 3. Record the results of your test here, you will need to draw the result of the model!

☐ 4. Compare your hypothesis to your result. Did they match? Write a conclusion statement about your results.

☐ 5. Get your teacher to check your conclusion statement and write it on the board!