Fun with Formations Activity Series- Teacher Notes

Setting the Stage:
This Activity Series is designed to give students a hands-on, engaging way to explore the concept of landform formation, and how changes to the Earth's surface over time by wind, water, and ice can create landforms like canyons, sand dunes, and deltas.

The Activity content builds off of the following narrative, where Col. Jo sets the stage for what students will be building in this Activity Series in a fun way. Students will explore a different type of landform in each Activity, describing how it was formed based on their knowledge of changes to the Earth's surface. This narrative is provided as an example, and can be changed to best meet the needs and interests of your students. Add your school's information to the address to personalize it for your students.

Before your students begin working on the Activities, share the postcard from Col. Jo with them.

Greetings from the Grand Canyon!
I just took a helicopter ride around this incredible place, and now I'm writing to you from the base of the canyon. I'm amazed at how all of this happened naturally over so many years! It's inspired me to look at what weathering can do to landforms in other ways too. Did you know that wind, water, and ice can create unique places totally naturally? It can take a LOT of time, but the formations that occur can shape a civilization or natural habitat. I've even been trying to build models of the things I'm seeing with my GO Kit to help me figure out more about how they came to be. Maybe we can build some landforms together? Check out some of my builds for inspiration!
From, Col. Jo

My VEX GO Building Friends

Setting up the Activities:
In each Activity, students will create a model of a landform using their VEX GO Kit, and will photograph and write a description of how that landform was created by changes to the Earth's surface. **Colossal Canyons** focuses on canyons, **Drifting Dunes** focuses on sand dunes, and **Dynamic Deltas** focuses on deltas. In **Formation Creation** students will apply what they've learned to recreate a real life landform from anywhere in the world.

Making the Activities Your Own:
These Activities are editable Google docs, so you can easily change them to fit the needs of your classroom. Choose a famous landmark or geographic feature as a basis for students to build their landforms. To incorporate language arts into these activities have students expand their descriptions into non-fiction narratives, or first person narratives from the perspective of a scientist. See the following articles for more information about editing Google docs for your own classroom use with Google drive or with Microsoft Office.

Setting up the Activities:
Prior to beginning the Activities, make sure students have the following materials ready:

Materials Needed:

- VEX GO Kit
- Blueprint Worksheets or blank paper for sketching their builds and writing the descriptions
- Pencils
- Camera (to photograph their builds)
- Printer (optional - to print photos of builds for student descriptions)

Teacher Tips:

- **For help with the free building component of this Activity Series** - Build an example for students to work from, and construct the model as a whole group synchronized build. Begin with the base, and go step by step to break down the example build to help students see how the pieces are connected in order to create the final product.
- **If students get done building at different times,** there are a number of meaningful learning activities early finishers can participate in as the rest of the group finishes building. View this article for several suggestions about how to plan for engaging students who finish building earlier than others.
- **For extra engagement -** Connect what students have done in this Activity Series to topographic maps. You can create the Topo Map Build and use the Island Expedition Activity Series to extend students learning about landforms, and connect it to other curricular areas.
- **For class collaboration -** Have students share their builds and descriptions with others in the class. Engage students in discussions of the similarities and differences between their builds, and how and why they chose to represent each of the landforms the way they did.
    - Use the following prompts to **focus on the build**:
        - How did your group choose which pieces to use for your build?
        - What kinds of connectors did you use to make your build look as you intended?
        - What was something you had to try a few times to build? How did you improve your build each time?
    - Use the following prompts to **focus on the landforms**:
        - Was your landform created by weathering, erosion, or deposition?
        - Which direction was the water or wind moving to create the shape of this landform?
        - With continued weathering, how would your landform change over time?

Standards that Can Be Reached with this Activity Series:

Showcase Standard:
Next Generation Science Standards (NGSS)
- 5-ESS2-1: Develop a model using an example to describe ways in which the geosphere, biosphere, hydrosphere, and/or atmosphere interact.

Additional Standards:
Texas Essential Knowledge & Skills (TEKS)
- 5.7C – Recognize how landforms such as deltas, canyons, and sand dunes are the result of changes to Earth's surface by wind, water, or ice.

International Society for Technology in Education (ISTE)
- ISTE (4) Innovative Designer 4d: Students exhibit a tolerance for ambiguity, perseverance and the capacity to work with open-ended problems.

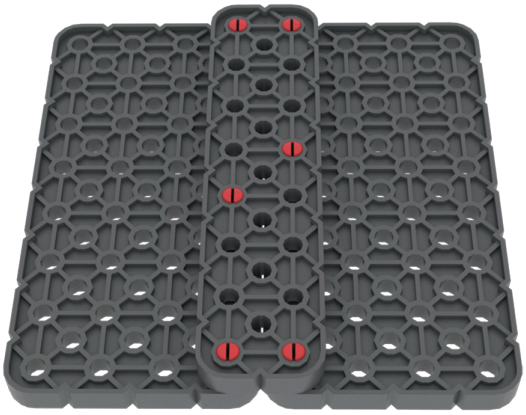
VEX GO Activity

Colossal Canyons

Create your own model of a canyon!

Make a sketch of a canyon, then build your canyon using pieces from your Kit.

Step by Step



1. Sketch the shape of a canyon on paper. Pay attention to how the walls of the canyon rise on either side of the basin. Look at images of places like the Grand Canyon for inspiration if needed.
2. Begin by building the base for your model with 2 Large Gray Plates connected by a Large Gray Beam and 6 Red Pins, as shown in the image to the right.
3. Use the pieces of your Kit to construct the walls of your canyon on either side of the center Gray Beam, as shown in the example above. This is just one example of a canyon model, yours does not have to be the same.
4. Take a photograph of your canyon model, and write a description of how your canyon was formed by changes to the Earth's surface over time.

'LEVEL UP'

- **What type of canyon is it? –** Different types of canyons can be formed by water and ice over time, like a river canyon or a slot canyon. Use classroom resources to learn about different types of canyons, and figure out which type you built. Add details to your description in line with your findings.
- **Where is your canyon? –** Where in the world could your canyon be? Add details to your description like a name and location, or canyon age based on what you've learned.

Pro Tips

Weathering

Weathering is the breaking down and wearing away of rock over time. Sometimes weathering can cause the walls of a canyon to grow wider at the top than the bottom.

How has weathering affected your canyon model?

Standard: 5-ESS2-1: Develop a model using an example to describe ways in which the geosphere, biosphere, hydrosphere, and/or atmosphere interact.

VEX GO Activity

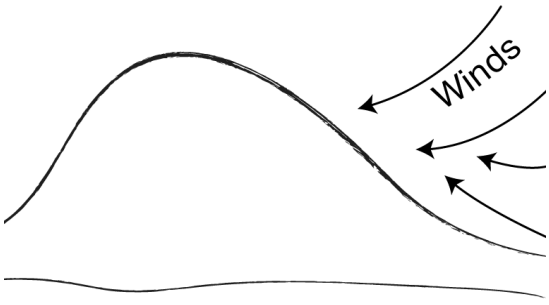
Drifting Dunes

Create your own model of a sand dune!

Make a sketch of sand dunes, then build your dunes using pieces from your Kit.

Step by Step

1. Sketch the shape of a sand dune (or multiple sand dunes) on paper, like the image to the right. Pay attention to how the wind blows sand into raised forms. Look at images of real sand dunes around the world for inspiration if needed.
2. Begin with a Large Gray Plate as your base.
3. Use the pieces of your Kit to construct your sand dunes, as shown in the image above. This is just one example of a model of sand dunes, yours does not have to be the same.



4. Take a photograph of your sand dune model, and write a description of how your dunes were formed by changes to the Earth's surface over time.

'LEVEL UP'

- **What shape of dune is it? –** Sand dunes can be classified by shape. Use classroom materials to research the five major dune shapes, and to determine which shape of dune you built. Add details to your description based on your findings.
- **Dune Field –** Use another Large Gray Plate and use more pieces to build additional sand dunes. Connect the plates together to create a dune field.

Pro Tips

Deposition

Deposition occurs when sediment, like grains of sand, is moved to a new location. Wind causes deposition of sand to create sand dunes. Depending on the strength and direction of the wind, the dune will change size and shape.

How has the direction of the wind affected the deposition to create your sand dunes?

Standard: 5-ESS2-1: Develop a model using an example to describe ways in which the geosphere, biosphere, hydrosphere, and/or atmosphere interact.

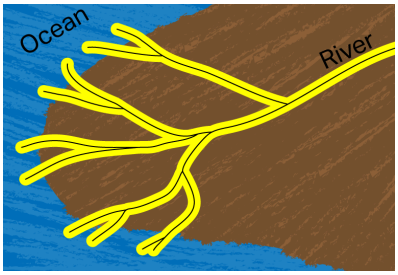
VEX GO Activity

Dynamic Deltas

Create your own model of a delta!

Make a sketch of a delta, then build your delta using pieces from your Kit.

Step by Step



1. Sketch the shape of a delta on paper, as shown here. Pay attention to how the delta is shaped by the tributaries of the river near its mouth. Look at images of river deltas around the world for inspiration if needed.
2. Begin by building the base for your model with 3 Large Gray Plates connected by a Large Gray Beam and 6 Red Pins, as shown in the image to the right.
3. Use the pieces of your Kit to construct your delta, as shown in the image above. This is just one example of a model of a delta, yours does not have to be the same.
4. Take a photograph of your delta model, and write a description of how your delta was formed by changes to the Earth's surface over time.

'LEVEL UP'

- **Delta dwellers –** Deltas are diverse ecosystems. Think about where in the world your delta is located, and use classroom resources to find out what kinds of plants or animals would live there. Use paper and pencil to draw and add these to your model.
- **Where is your delta? –** Where in the world could your delta be? Add details to your description like a name and location, or the people who live around the delta based on what you've learned.

Pro Tips

Erosion

Erosion is the movement of weathered rock and other sediment to other places, and is often caused by moving water. The water around a delta, like the river and the ocean, can cause the land of the delta to erode over time.

How would erosion change your delta?

Standard: 5-ESS2-1: Develop a model using an example to describe ways in which the geosphere, biosphere, hydrosphere, and/or atmosphere interact.

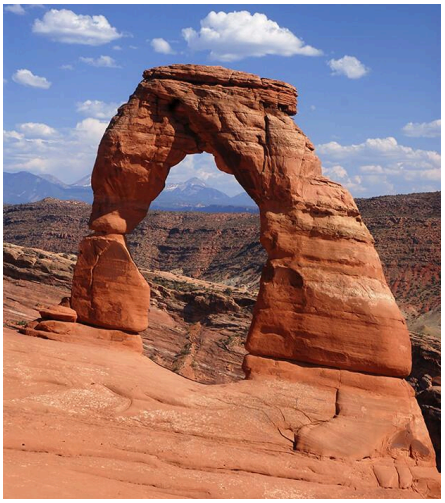
VEX GO Activity

Formation Creation

Recreate a real world landform as a VEX GO model!

Find a landform interesting to you, and rebuild it using pieces in your Kit.

Step by Step



1. Choose a real life landform from anywhere in the world. Pay attention to how the formation took shape from weathering, erosion, or deposition over time. Look at images of the landform you chose if needed, like the example shown here.
2. Begin with a Large Gray Plate as your base. If your landform is large, connect multiple Gray Plates as shown in the previous Activities.
3. Use the pieces of your Kit to construct your landform, as shown in the image above. This is just one example of a landform model, yours does not have to be the same.
4. Take a photograph of your model, and write a descriptive paragraph about it. Include information about the real landform (like its name and location) and how it was formed by changes to the Earth's surface over time.

'LEVEL UP'

- **Landform Habitat –** What plants, animals, or people live in or around the landform you chose? Use classroom resources to learn about your landform habitat. Add details to your description, or draw and add these elements to your model.
- **Make Build Instructions –** Create your own set of build instructions so someone else could build your landform model. Use drawings and/or words to describe each step. Test your build instructions by giving them to a friend to use.

Pro Tips

Think creatively about the pieces in your Kit

Pins are a useful tool to connect pieces, but shafts, standoffs, and connector pieces can also be useful.

Before you start to build, think about the structure of your landform and how you will connect pieces together to create the shapes you need.

Standard: 5-ESS2-1: Develop a model using an example to describe ways in which the geosphere, biosphere, hydrosphere, and/or atmosphere interact.