

Lesson Plan: Mapping Landforms and Bodies of Water

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Target Grade: 2nd

Teacher Prep Time: 20 minutes (1 hour if you need to print picture and property cards)

Lesson Time: 3 hours 40 minutes (We recommend doing this lesson over four days.)

- Day 1:
 - 25 minutes - Landforms and Bodies of Water at/Near School
 - 20 minutes - Landforms and Bodies of Water Vocabulary
- Day 2:
 - 45 minutes - Exploring Google Earth
- Day 3
 - 20 minutes - Location of Landforms and Bodies of Water in Santa Barbara
 - 45 minutes - Paper Landform
- Day 4:
 - 20 minutes - Structure and Function
 - 45 minutes - Making Maps

Lesson Overview: In this lesson students will practice developing and using models through the exploration and identification of landforms and bodies of water in Santa Barbara County.

Learning Objectives: Students will be able to name and describe the properties and functions of landforms and bodies of water as well as describe how they interact to form a system. Students will be able to identify a map as a type of model as well as create a map using symbols.

NGSS: 2-ESS2-2. Develop a model to represent the shapes and kinds of land and bodies of water in an area.

- **Science and Engineering Practice**
 - #2 Developing and Using Models
 - Modeling in K–2 builds on prior experiences and progresses to include using and developing models (i.e., diagram, drawing, physical replica, diorama, dramatization, or storyboard) that represent concrete events or design solutions.
- **Disciplinary Core Idea**
 - ESS2.A Earth Materials and Systems
 - Wind and water can change the shape of the land.
- **Crosscutting Concept**
 - # 6 Structure and Function
 - The way an object is shaped or structured determines many of its properties.

Where this Lesson Fits in: This lesson should be done at the start of your unit on Earth's Systems: Processes That Shape the Earth to introduce students to the different landforms and bodies of water in your area.

Materials Needed: (It is recommended that you have students work in pairs. At some points of the activity they will work in table groups, which is two pairs.)

- Projection system and access to Google Earth
- Document camera
- Large map of Santa Barbara County (tape or magnets to affix to whiteboard or wall)
- Photos of local landforms and bodies of water
- String or yarn (enough for matching photos to map) or magnets
- Plastic covering if working inside (plastic tablecloth or trash bags work)
- Cup (example for structure and function)

For each student:

- *Landforms and Bodies of Water* packet
- Blue colored pencil
- Thick, water-soluble blue markers (example: Crayola marker)

For each pair of students:

- *Model Landforms* handout
- 2 piece of white paper
- 4 pieces of tape or stickers
- Spray bottle filled with water

For each table group:

- Picture and properties cards of landforms and bodies of water

Teacher Prep:

- Day 1: Print out and cut pictures and properties cards.
Make copies of student worksheet.
- Day 2: Set-up projection system and preview Google Earth.
Print out photos of landforms and bodies of water as well as names and symbols.
Post a map of Santa Barbara with the pictures of the landforms and bodies of water around it.
Have string/yarn attached to each picture with the other end dangling (unless using magnets). During the activity students will decide where each picture is on the map.
- Day 3: Cover tables with plastic (optional) for Model Landforms activity.
- Day 4: Write landforms and bodies of water on board for students to use as a word bank.

Lesson Sequence:

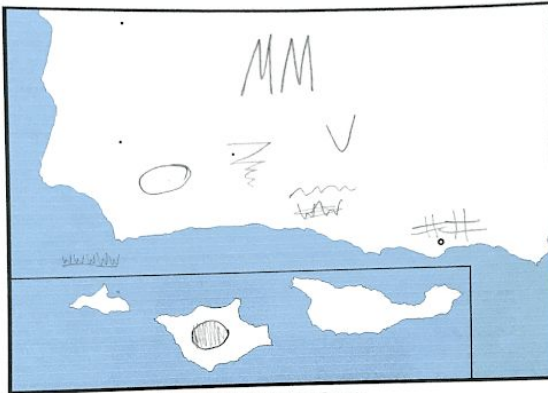
Day 1: 25 minutes	<p>Landforms and Bodies of Water at/Near School</p> <ol style="list-style-type: none"> 1. Announce that the class is going to go on a field trip but at school. What might they see? <ul style="list-style-type: none"> ○ ESR (expected student response) <ul style="list-style-type: none"> ▪ The playground, classrooms, other students, etc. 2. Tell students while they will see these things, we are going to pay close attention to any landforms and bodies of water that we observe. Ask, “What do you think we mean by the term “landforms” and “bodies of water”?” <ul style="list-style-type: none"> ○ ESR <ul style="list-style-type: none"> ▪ Landforms might be mountains, hills, fields ▪ Bodies of water might be puddles, streams, creeks, rivers, oceans 3. As a class, go outside and walk around the campus. Periodically stop and have students look around and ask them if they notice any landforms or bodies of water.
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	<ol style="list-style-type: none"> 4. Return to classroom. 5. Ask students to share with the class what landforms and bodies of water they observed and write these on the board. 6. Pass out <i>Landforms and Bodies of Water</i> packet. Have students use the words on the board to complete question 1, “I observed” <ul style="list-style-type: none"> ○ ESR: <ul style="list-style-type: none"> ▪ “I observed mountains and a creek.”
<p>Day 1: 20 minutes</p>	<p>Landforms and Bodies of Water Vocabulary</p> <ol style="list-style-type: none"> 1. Tell students that we are now going to learn about other landforms and bodies of water. Some we might have seen on our walk, and others we might not have seen. 2. Pass out the picture and property cards. 3. Have students match a property card to a picture. 4. Have students share which cards match together. 5. For each match, read the definition to the students, then ask if they have seen or visited the landform or body of water before. Ask one student to describe their experience. <ul style="list-style-type: none"> ○ ESR <ul style="list-style-type: none"> ▪ “I have been to a creek before. There is one near my house. When it rains water flows in it, but if it has not rained for awhile it is dry.”
<p>Day 2: 45 minutes</p>	<p>Exploring Google Earth</p> <ol style="list-style-type: none"> 1. Tell students they are going to get a bird’s eye view of their school and the area around it using Google Earth. On Google Chrome, you can access Google Earth at https://www.google.com/earth/. If using a different browser, you will need to download Google Earth. <ul style="list-style-type: none"> ○ Note: Only the teacher should have Google Earth open. The students should not have devices. ○ Note: Students are very interested in locating things they are familiar with (their homes, their school, etc.) You may want to introduce Google Earth on another day and show them these places so they are able to focus in this lesson on finding landforms and bodies of water. You could also add another 15 minutes to this portion of the lesson and explore those places before moving onto the lesson objective. 2. Zoom out to show students the area around their school. Ask, “What do you notice? What can you identify?” Write a list of their responses on the board. <ul style="list-style-type: none"> ○ ESR <ul style="list-style-type: none"> ▪ “I can see our school.” (Write “school” on the board.) ▪ “I see the ocean.” (Write “ocean” on the board.) ▪ “I see the mountains.” (Write “mountains” on the board.) 3. Have students look at the list and tell you if the things on the list are landforms or bodies of water. Next to each landform write the letter L, and write the letter W next to each body of water. <ul style="list-style-type: none"> ○ Note: Other places that are not landforms or bodies of water, like “school” will not have any notations. 4. Ask students if there is anything that is not on the list that is on the top of page 1 of the worksheet. If so, add these to the list.

	<ol style="list-style-type: none"> 5. Make sure that students have identified where everything is on the list on Google Earth. <ul style="list-style-type: none"> ○ The best place to show students the slough is next to UCSB and Goleta beach. ○ The only river that you will see is the Santa Ynez River. It goes from west to east across Cachuma lake. On Google Earth the river looks dry, but you can see where it is. You can also follow it from Cachuma Lake to the west to see that it ends at the Pacific Ocean. ○ Creeks are hard to see on Google Earth. Discuss with students the fact that they are hard to see because they are small and many of them are seasonal. 6. Ask students what patterns they notice about where the landforms and bodies of water appear on Google Earth. <ul style="list-style-type: none"> ○ ESR <ul style="list-style-type: none"> ▪ “The mountains seem to get higher as we go away from the ocean.” ▪ “The slough seems to be close to the ocean and is flat.” 7. Have students fill out question 2: “What is one pattern you see about a landform or body of water?”
<p>Day 3: 20 minutes</p>	<p>Location of Landforms and Bodies of Water in Santa Barbara</p> <ol style="list-style-type: none"> 1. Have students look at the map of Santa Barbara with the pictures of the landforms and bodies of water around them. (See set-up section.) 2. Explain that a map is a model. 3. Ask students to help you match up landforms and bodies of water with their labels and symbols (or if the map is posted on a whiteboard, you can use a whiteboard marker to write the name and symbol directly on the whiteboard). 4. With help from student volunteers, use the strings to show where the landforms and bodies of water are on the map (or simply place these on top of the map with magnets). <ul style="list-style-type: none"> ○ Note: You will only be able to show the location of one occurrence of each the landform and body of water but multiple locations can be drawn on question 3. 5. Working as a class, fill in question 3 on page 2 showing symbols for the locations of landforms and bodies of water on the map. 6. Show some students samples under the document camera.



3. Draw the landforms and bodies of water on the map using symbols.



Map of Santa Barbara County

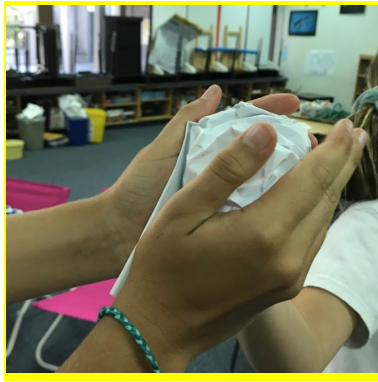
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island ●	creek ~~~~~	slough ###	river Z Z Z

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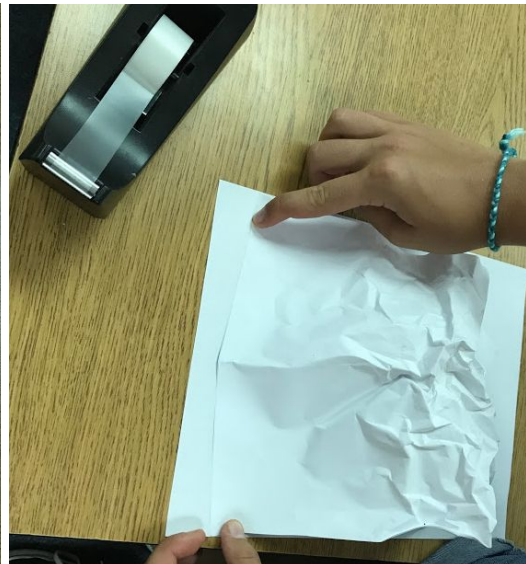
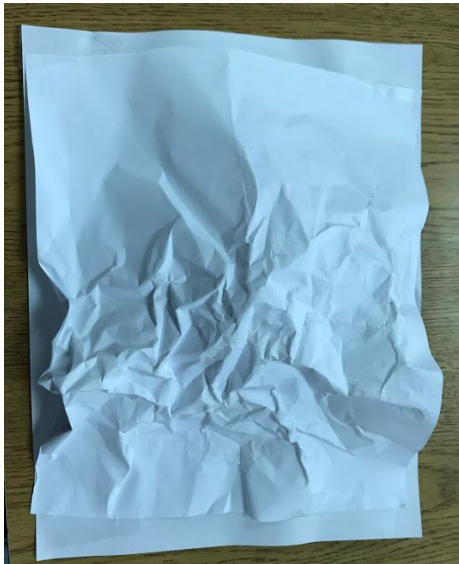
Day 3:
45
minutes

Paper Landforms (Adapted from Mystery Science)

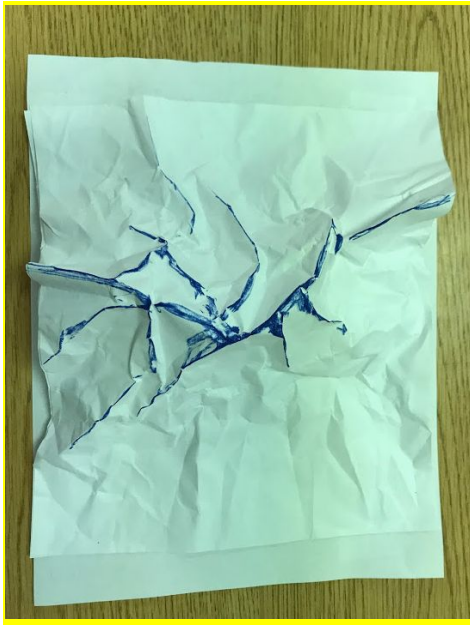
1. Tell students they are going to make a paper landform. Their paper landform will show land that has high places like mountains, and low places like canyons, just like Earth's surface. Tell them that if you look at a picture from above, they'll notice that mountains look a little like a crumpled piece of paper, and that's what they are going to use to make their landform. Then they're going to look at their landform and think about what would happen if rain fell on that landform. They will then watch "rain" interact with their landform to see if they are correct.
2. Pair students up.
3. Direct them to get their supplies: 1 *Paper Landforms* handout, 2 thick blue markers, 4 stickers, 2 blank pieces of paper. Tell students to write their names on the bottom of the *Paper Landforms* handout.
4. Tell students to decide with their partner who will be the "fist" and who will be the "crumpler." Give them ten seconds to decide who does which job.
5. Tell the fist partner to make a fist.
6. Have the crumpler take two sheet of paper (one on top of the other) and crumple it over the fist of the other partner. The paper can then be carefully removed from the other partner's fist (still keeping it crumpled.)
 - Note: Two pieces of paper are used because if you only use one it becomes too soggy.



7. The crumpler should line up the edge of the crumpled paper with one of the blank lines on the *Model Landforms* handout. Then the fist partner should stick the just-crumpled paper down with two stickers or pieces of tape, and then do the same to the other side.



8. Tell students, "Imagine you're high above the Earth looking down. Your crumpled paper is the land below you. Talk with your partner about what your land is like. Can you see any mountains? Can you see any canyons? How about flat places?"
9. Tell students, "You're going to make it rain on your landform. But before you do, where do you think the rainwater will go? Talk to your partner about what you think will happen."
10. Have students decide where the highest places on their models are. Then have both partners carefully mark these places with thick lines using the water-soluble blue pen. The ink in these lines will color their "rainwater" so they can see where the water flows. Make sure they color all the high points.

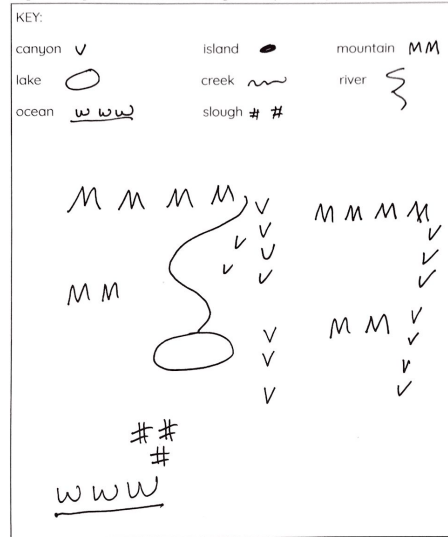


11. Have students put their models in one area (table or outside on the ground) so they can all spray them in the same place.
 - Note: You might want to put a tablecloth under the models so blue ink does not get on the surface.
12. Tell students, “It’s time to make it rain!” Have students give their landform five sprays from above. Teacher can use spray bottles, if necessary.
13. You need to let the models sit at least one minute. During this time have student share out observations.
 - ESR
 - “The water is soaking into the paper. The blue ink is starting to run.”
14. Direct the students to spray their models five more times. Repeat the process if necessary until the water flows to the desired amount, downward in “streams” and through the “canyons” on the paper.
15. Ask students the following questions:
 - What happened when it rained on your paper landform?
 - Why do you think the water went where it did?
 - Did it make anything that looks like a river?
 - If we put more detail on the map, what do you think you’d find at the start at every river?
 - Where do rivers start?
16. Lead a discussion with students about how water flows from high places to low places. Tell them this is because of gravity. It is the same reason that if you throw a ball up it will come back down. Remind the students that on their maps, they noticed a pattern. Several creeks flow into one river and rivers flow into oceans or lakes. But is there any pattern to where creeks start? Just like in the landforms they made, rivers and creeks start in high places, like mountains and hills. They flow downhill to low places. The low places on Earth are the oceans and lakes.

	<p>17. Read question 4 aloud and give students time to talk with their table group about the answers. Come back as a group and discuss their answers. Then have students fill in answer.</p> <ul style="list-style-type: none"> ○ ESR <ul style="list-style-type: none"> ▪ “Water flowed from high places to low places in the mountains.” <p>18. Have students look back at question 3 (the map of Santa Barbara) and have them look at where the bodies of water are. Ask the locations of the bodies of water make sense.</p>
<p>Day 4: 20 minutes</p>	<p>Structure and Function</p> <ol style="list-style-type: none"> 1. Show students a cup. Ask students to describe the properties of the cup. If they are having trouble, tell students to pretend they were describing the cup to someone who could not see the cup without saying It is a cup.” On the board write a list of the ideas student generate. <ul style="list-style-type: none"> ○ ESR <ul style="list-style-type: none"> ▪ “white” ▪ “cylinder shaped” ▪ “top open” 2. Tell students that what they just came up with are structures or properties of the cup. Write “structure/property” on top of the list 3. Ask students to explain what function the cup has. Write “function” on the board and record their ideas. <ul style="list-style-type: none"> ○ ESR <ul style="list-style-type: none"> ▪ “The cup’s function is to hold liquids.” 4. Pass out worksheets and read the top of page 4 aloud. Have students individually pick one of the landforms or bodies of water and fill in question 5a. <ul style="list-style-type: none"> ○ ESR <ul style="list-style-type: none"> ▪ “My structure is the slough.” 5. Have table groups discuss the properties of their structures, then fill in question 5b. <ul style="list-style-type: none"> ○ ESR <ul style="list-style-type: none"> ▪ “The properties of my structure are that it is flat and has both fresh and saltwater.” 6. Have students share their structures and properties as a class until you have reviewed all the landforms and bodies of water. If there is a structure that is not shared, do that one as a class. 7. Tell students that structures often work together. Some of the ways that they work together are by moving, separating, carving, guiding, storing, and collecting. 8. As a class, discuss what each of these words means and find an example. <ul style="list-style-type: none"> ○ ESR <ul style="list-style-type: none"> ▪ Moving: “Taking stuff from one area to another, like when a river moves water.” ▪ Separating: “Having space between like when islands are separated from each other.” ▪ Carving: “Making a cut in something, like when water makes a cut in a mountain.”

	<ul style="list-style-type: none"> • Guiding: “Showing something where to go, like when a canyon guides the water.” • Storing: “Putting something in something to be used later, like when a slough stores fresh or saltwater.” • Collecting: “Holding something, like when a lake collects water from a stream.” <p>9. Have students pick a landform or body of water that works best together with the landform or body of water that they picked for question 5a. They should then draw a picture of the two landforms or bodies of water interacting as well as include the symbols for them.</p> <p>10. They will then fill in the sentence frame that states how their landform or body of water works together using one of the words from question 5C.</p> <ul style="list-style-type: none"> ○ ESR <ul style="list-style-type: none"> • <i>“The slough and the ocean work together because the slough collects water from the ocean.”</i> <p>11. Tell students a structure’s function is the job that it does and landforms and bodies of water work together to move water, store water, and shape the Earth.</p> <p>12. Ask students, “What is a landform’s function or job?” If they are having problems have them think back to the paper landform that they made. Once they have given you the answer write it onto the worksheet for students to copy.</p> <ul style="list-style-type: none"> ○ ESR <ul style="list-style-type: none"> • <i>“To move and store water.”</i> <p>13. Ask students, “What is the function or job of a map?” Once they have given you the answer write it onto the worksheet for students to copy.</p> <ul style="list-style-type: none"> ○ ESR <ul style="list-style-type: none"> • <i>“To show where landforms and bodies of water are.”</i> <p>14. Have students fill in the blank (“a map is a ___ of the system of landforms and bodies of water”) with the word “model.”</p> <p>15. Discuss different functions as a group.</p>
<p>Day 4: 45 minutes</p>	<p>Making Maps</p> <ol style="list-style-type: none"> 1. Tell students that it’s their turn to make a map of an imaginary place.. 2. Tell students that first they will only put in the landforms on their map. 3. Have students look at the list and identify the landforms (canyon, island, and mountain). As students identify the landforms have them tell you the symbol and write it next to the word in question 7. 4. To make it easier, instead of drawing the landforms we will use only the symbols. Refer back to symbols they drew on SB map to help them with using only symbols. It is important that they have all of the landforms on their map. 5. Give students ~10 minutes to draw the landforms on their maps. 6. Tell students they are going to add bodies of water to their maps. 7. Have students look at the list and identify the bodies of water (lake, ocean, creek, and river). As students identify the bodies of water have them tell you the symbol and write it next to the word in question 7. 8. Tell students instead of doing this on their own map they will trade with a partner and fill out the bodies of water on their partner’s map using a blue colored pencil. It is important that they have all bodies of water on their maps.

7. Now imagine your own place and make a map showing the landforms we are learning about. Make sure to add the symbols to your key. When you are finished, trade your map with a partner.



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9. Give students ~10 minutes to draw on the bodies of water on their partner's map.
10. Tell students they are going to return the maps they marked up to their partners so that each student has their own worksheet.
11. Students will look at where their partner put the bodies of water and decide if they agree or disagree with the placements.
12. They will then fill in question 8.
 - ESR
 - "I agree with where my partner drew the bodies of water because he drew the water as a creek going from the top of a mountain down a canyon to the ocean."
13. If your students are proficient with the Seesaw app, this would be a great opportunity for them to post a picture of their model(s) and record themselves explaining how landforms and bodies of water function as a system.