Sustainability Science Sleuths

Day 3

DiscoveryCube

This guide accompanies *Sustainability Science Sleuths Day 3*

PRIOR TO TEACHING

Subject

Sources of Water

Program Length

45 minutes – 1 hour

Program Objective

California has really tall mountains with lush, agriculturally rich valleys down below. Learn about the Big Bumpy Land we call home and show off these features in your very own 3D relief map as you learn where our water comes from in Southern California.

Next Generation Science Standards

3-PS2-2: Make observations and/or measurements of an object's motion to provide evidence that a pattern can be used to predict future motion.

4-ESS2-2: Analyze and interpret data from maps to describe patterns of Earth's features.

5-LS2-1: Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.

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

5-ESS3-1: Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.

5-PS1-4: Conduct an investigation to determine whether the mixing of two or more substances results in new substances.

5-PS2-1: Support an argument that the gravitational force exerted by Earth on objects is directed down.

What I Need Today

FROM SCIENCE KIT:

Per Student:

- ☐ package of Model Magic
- ☐ template map of CA
- ☐ plastic cling wrap

SUPPLIED BY TEACHER:

- ☐ markers or paint

Vocabulary

Raised Relief Map – a physical model of the Earth that uses bumps and colors to show off the Earth's elevation and land features. Often, green represents low-lying areas; brown, red, or white represent tall mountains, and blue represents water.

Contiguous United States – The 48 states (and Washington, D.C.) that touch one another. This does not include Alaska, Hawaii, or any territories, such as Puerto Rico, or the US Virgin Islands.

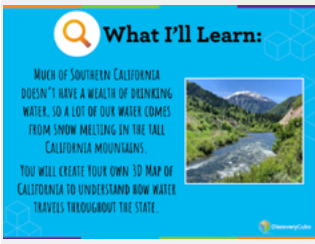
Engineer – A person who uses physics, math, and chemistry to figure out the best way to solve problems by creating new things or improving a product.

Aqueduct – A system that carries water from one place to another. Aqueducts can help water travel underground (through a tunnel or pipe), at ground level (through a canal), or above the ground (over a bridge).

PROCEDURE

What We'll Learn

California has a rich landscape diversity: from a long coast line, a lush central valley, deserts, and lots of tall mountains. Much of Southern California doesn't have a wealth of drinking water, so a lot of our water comes from snow melting in the tall California mountains.



What Will Happen?

Scientists ask questions and make predictions before they start investigating. Have your students hypothesize: how many mountain ranges are in California?

- ○ 3
- ○ 12
- ○ 352
- ○ 4,421

What to Do

REVIEW - DAY 2: SALT WATER

Have your students examine and show off the results of their desalination experiments. What did they learn from this experiment?

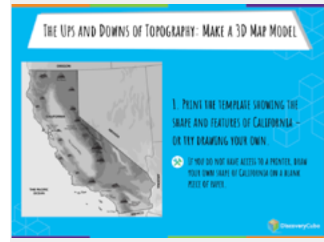
VIDEO - BIG BUMPY LAND

To start learning about the geography of our land, first watch *Big Bumpy Land*: https://vimeo.com/482433180/e006a1ce87

Reflect on the video: what did your students learn?

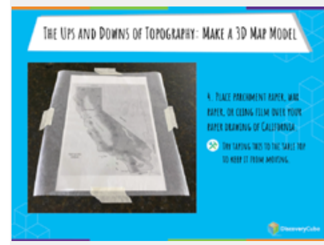
ACTIVITY - THE UPS AND DOWNS OF TOPOGRAPHY: MAKE A 3D MAP MODEL

1) Pass out a package of Model Magic to each student and instruct them to locate the template map of California in their journals.

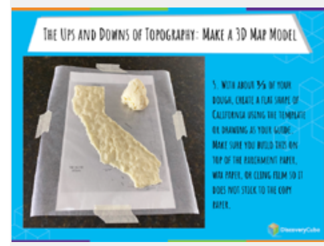


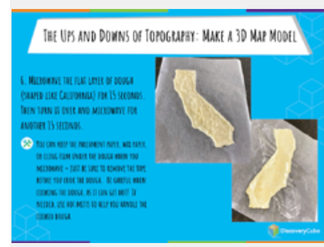
2) To make their raised relief maps showing off the mountains and valleys of California, have each student place plastic cling wrap over their templates of California.

Fun Facts: A raised-relief map is a three-dimensional (3D) map that usually exaggerates the height of mountains so it's easier to see the difference in geographic features.



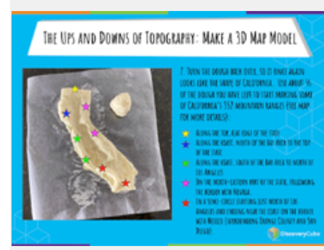
3) With about 1/3 of their Model Magic, have each student create a flat shape of California using the template as their guide. Make sure they build on top of the plastic cling wrap so it does not stick to the paper.



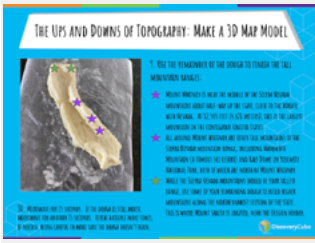


4) Using about ½ of their remaining Model Magic, start making some of California's 352 mountain ranges (see map for more details).

- ☐ Along the top, flat edge of the state
- ☐ Along the coast, north of the Bay Area to the top of the state
- ☐ Along the coast, south of the Bay Area to north of Los Angeles
- ☐ On the north-eastern part of the state, following the border with Nevada
- ☐ In a semi-circle starting just north of Los Angeles and ending near the coast on the border with Mexico (surrounding Orange County and San Diego)

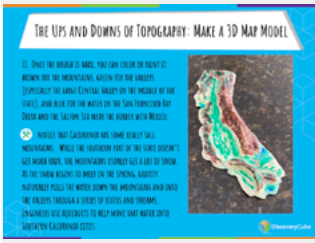


5) Use the remainder of the Model Magic to finish the tall mountain ranges.



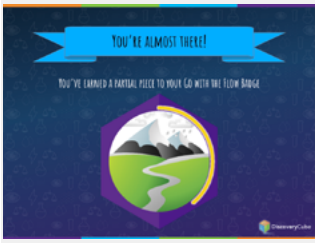
- ☐ Mount Whitney is near the middle of the Sierra Nevada mountains about half-way up the state, close to the border with Nevada. At 12,505 feet (4,421 meters), this is the largest mountain in the contiguous United States.
- ☐ All around Mount Whitney are other tall mountains of the Sierra Nevada mountain range, including Mammoth Mountain (a famous ski resort) and Half Dome in Yosemite National Park, both of which are north of Mount Whitney.
- ☐ While the Sierra Nevada mountains should be your tallest range, use some of your remaining dough to build higher mountains along the northern-most section of the state. This is where Mount Shasta is located, near the Oregon border.

6) Each student can now color or paint their map: brown for the mountains, green for the valleys (especially the large Central Valley in the middle of the state), and blue for the water in the San Francisco Bay Delta and the Salton Sea near the border with Mexico.



Fun Fact: You may notice that California has some really tall mountains. While the southern part of the state doesn't get much rain, the mountains usually get a lot of snow. As the snow begins to melt in the Spring, gravity naturally pulls the water down the mountains and into the valleys through a series of rivers and streams. Engineers use aqueducts to help move that water into Southern California cities.

CONCLUSION



What I Discovered

To earn a portion of the Go With The Flow badge, have your students use their journals to help them reflect on what they discovered. We would love to see pictures of their 3D maps. Please email pictures to *educationemail@discoverycube.org*.

Supplies for Next Time

FROM SCIENCE KIT:

Per Group of 3-4 Students:

- [ ] colored construction paper (not black)
- [ ] marbles

SUPPLIED BY TEACHER:

- [ ] scissors
- [ ] empty toilet paper tubes, paper towel tubes, or wrapping paper tubes
- [ ] cardboard
- [ ] toy train or car tracks (optional)

- [ ] **encourage your students to bring their cardboard and empty toilet paper tubes, paper towel tubes, and/or wrapping paper tubes (as many as possible). Also, if they have any toy train or car tracks, these can be a great addition for the next lesson. These will all be needed for next time.