

Dig Your Way to China

Overview: Have your students ever wondered how long it would take to dig a tunnel to the other side of the world? Have you tried to explain the impossibility of this feat to them? Explore your way through the layers of the earth with this simple cooking activity!

Procedure:

- 1) Explain to the students that you will be making a model of what makes up the Earth. Explain that there are 4 main layers of the earth; the inner core, the outer core, the mantle, and the crust.
- 2) Give each student a clear plastic cup. Ask them to retrieve one Oreo cookie to place at the bottom of their cup.
- 3) Explain that the Oreo cookie represents the inner core. It is very solid from all of the pressure of the other layers that will eventually be on top of the cookie.
- 4) Follow the recipe to make one box of chocolate pudding. Place several Oreo cookies into a clear plastic bag and use the rolling pin to crush the cookies.
- 5) Once the chocolate pudding is ready divide it by half into two different bowls.
- 6) In one bowl, add the crushed Oreo cookies into the pudding.
- 7) In the other bowl, mix half of the container of whipped cream into the pudding.
- 7) Use the pudding + cookie mixture to spoon into each student's cup, on top of their Oreo cookie.
- 8) Explain that this layer represents the outer core. It is not as solid as the inner core, but still is mostly solid because of the crushed Oreo cookies.
- 9) Next spoon in the pudding + whipped cream mixture into each student's cup, on top of the pudding + cookies mixture.
- 10) Explain that this layer represents the mantle. It is much more pliable and not so solid. It can jiggle a bit and move more freely.
- 11) Use the remaining half container of whipped cream to spoon on top of the pudding + whipped cream layer.
- 12) Use the shredded green-dyed coconut to sprinkle on top of the whipped cream.
- 13) Explain that the whipped cream + shredded coconut layer represents the crust of the Earth. The peaks and valleys of the whipped cream look like mountains and valleys; the shredded coconut represents other varieties of land.
- 14) Finally, students may retrieve several gummy worms to place on top of their "crust" to represent the animals that exist on the crust.

ASOLs Covered in this Activity:

SCIENCE

- 5S-SI 1:** The student will demonstrate an understanding of scientific reasoning, logic, and the nature of science by planning and conducting investigations in which
- a) distinctions are made among observations, conclusions, inferences, and predictions;
 - b) objects or events are classified and arranged according to characteristics or properties;
 - l) models are constructed to clarify explanations, demonstrate relationships, and solve needs.

- 5S-SI 2** The student will demonstrate an understanding of scientific reasoning, logic, and the nature of science by planning and conducting investigations in which
- a) items such as rocks, minerals, and organisms are identified using various classification keys;
 - i) inferences are made and conclusions are drawn;
 - j) models are constructed to clarify explanations, demonstrate relationships, and solve needs.
- 8S-SI 1** The student will demonstrate an understanding of scientific reasoning, logic, and the nature of science by planning and conducting investigations which
- a) observations are made involving fine discrimination between similar objects and organisms;
 - c) scale models are used to estimate distance, volume, and quantity;
 - i) models and simulations are designed and used to illustrate and explain phenomena and systems.
- 8S-SI 2** The student will demonstrate an understanding of scientific reasoning, logic, and the nature of science by planning and conducting investigations in which
- d) models and simulations are constructed and used to illustrate and explain phenomena;
- 8S-SI 3** The student will demonstrate an understanding of scientific reasoning, logic, and the nature of science by planning and conducting investigations in which
- m) models and simulations are constructed and used to illustrate and explain phenomena.
- HSS-SI 1** The student will plan and conduct investigations in which
- c) scales, diagrams, charts, graphs, tables, imagery, models, and profiles are constructed and interpreted;

Extension Idea:

These standards can be addressed through the course of this activity's scientific process.

- 5S-ESS 3** The student will investigate and understand the relationships among Earth, the moon, and the sun. Key concepts include
- d) the relative size, position, age, and makeup of Earth, the moon, and the sun;
- 5S-ESS 6** The student will investigate and understand how Earth's surface is constantly changing. Key concepts include
- d) the basic structure of Earth's interior;
- 8S-ESS 5** The student will investigate and understand the organization of the solar system and the interactions among the various bodies that comprise it. Key concepts include
- f) the unique properties of Earth as a planet;
- HSS-ESS 1** The student will investigate and understand the characteristics of Earth and the solar system. Key concepts include
- c) characteristics of the sun, planets and their moons, comets, meteors, and asteroids;

Extension Idea:

As the student creates their model of the Earth's interior, they will be able to investigate what the Earth is made of and the characteristics of the Earth's interior.

5S-ESS 6 The student will investigate and understand how Earth's surface is constantly changing. Key concepts include

- e) changes in Earth's crust due to plate tectonics;
- f) weathering, erosion, and deposition;
- g) human impact.

HSS-EMP 3 The student will investigate and understand geologic processes including plate tectonics. Key concepts include

- a) geologic processes and their resulting features;
- b) tectonic processes.

Extension Idea:

After completing the model of the Earth's interior, students can experiment with the whipped cream + coconut layer of their model to experience different actions that can be completed as a result of the plate tectonics. (i.e. students can push two sides of the layer together to form a peak showing how mountains are made). Students can also use dark food coloring to represent an oil spill and how it stains and harms the Earth's crust.

READING & WRITING

3E-RW 2a: The student will use newly acquired vocabulary drawn from reading and other content areas.

3E-RW 2b: The student will demonstrate understanding of the meaning of newly acquired vocabulary.

3E-RW 6d: The student will demonstrate understanding of words that signal spatial and temporal relationships (e.g., behind, under, after, soon, next, later).

3E-RW 3g: The student will identify words from other content areas.

3E-CN 1g: The student will sequence at least two steps in a procedure or ideas/incidents in an event.

4E-RW 1c: The student will use newly acquired vocabulary drawn from reading and other content areas.

4E-CN 1d: The student will interpret information presented visually and orally;

5E-RW 1f: The student will demonstrate understanding of content-specific words.

5E-WP 1b: The student will select an event or personal experience and use drawing, writing, or dictating to compose a message about it;

5E-WP 2a: The student will use technology (including assistive technologies) to produce and publish writing;

5E-WP 3c: The student will select an event or personal experience and write one thing about it;

5E-WP 6a: The student will use technology to produce and share writing;

5E-WP 9a: The student will list words that describe an event or personal experience to use when writing about it;

6E-RW 1b: The student will use context clues to determine the meaning of vocabulary words drawn from reading and other content areas

7E-RW 1b: The student will determine the meaning of words and phrases;

- c: The student will use context clues to determine the meaning of vocabulary words drawn from reading and other content areas;

- 8E-RW 1b:** The student will demonstrate knowledge of new vocabulary drawn from reading and other content areas;
- e:** The student will acquire and use content words and phrases.
- 8E-WP 1a:** The student will write to convey ideas and information including facts, details, and other information.
- b:** The students will write about a personal experience by introducing the event or experience, at least one character, and two or more events in sequence.
- d:** The student will use content specific vocabulary when writing about a topic.
- 8E-WP 3b:** The student will write to convey ideas and information including facts, details, and other information as well as graphics and multimedia as needed.
- 8E-WP 5a:** The student will write an argument to support a claim with one clear reason or piece of evidence.
- b:** The student will write to convey ideas and information clearly including facts, details, and other information.
- HSE-RW 2c:** The student will acquire and use content words and phrases.
- HSE-RW 3c:** The student will demonstrate knowledge of the meaning of words and phrases from reading and other content areas by using context;
- HSE-CN 2c:** The student will analyze information presented in different media on related topics to answer questions or solve problems.
- HSE-WP 1b:** The student will write to convey ideas and information using clear organization and including facts, details, and other information as well as graphics and multimedia as needed.
- c:** The student will write about an event or personal experience by introducing the event or experience, at least one character, and describing multiple events in sequence.

Extension Idea:

Upon completion of this experiment, students will write a text that summarizes their experiences and findings. This can be a fun way for the students to demonstrate what they have learned. Particular attention may be given to content words, figurative language, and sequence of events. Encourage students to include illustrations, tables, graphs, and digital photographs. Texts might take the form of a PowerPoint presentation, book, journal entry, newsletter, or blog. These texts might make great additions to self-selected reading libraries.

MATH

- 3M-NSCE 7a:** The student will differentiate between whole, half, and fourth.
- 5M-NSCE 4a:** The student will differentiate between halves, fourths, and eighths;
- 6M-NSCE 3a:** The student will compare the relationships between two unit fractions.
- 7M-NSCE 1a:** The student will add fractions with like denominators (halves, thirds, fourths, and tenths) with sums less than or equal to one.
- 8M-MG 2a:** The student will identify volume of common measures (cups, pints, quarts, gallons, etc.).

Extension Idea:

Students can be told an exact amount of each “layer” to be placed into their cup (i.e. $\frac{1}{2}$ cup of the pudding + cookie layer) for them to measure prior to adding to their model of the Earth. Students can also add together all of their measurements to determine the total amount of ingredients placed into their plastic cup.

- 3M-MG 1a:** The student will identify coins (penny, nickel, dime, quarter) and their values.
- 4M-NSCE 3a:** The student will round money to a nearest dollar;
- 7M-NSCE 2c:** The student will demonstrate the value of various money amounts using decimals.

Extension Idea:

Prior to this activity taking places, take the students to a grocery store to buy the supplies needed. Provide each student with a shopping list and a variety of currency. Allow students to pay for their supplies independently using the currency provided.

Materials Needed:

- plastic clear cups
- spoons
- large bowls for mixing
- chocolate pudding (instant or already prepared)
- whipped cream
- chocolate sandwich cookies (referred to as the commonly known Oreo cookies throughout the procedure)
- shredded coconut
- green food dye
- gummy worms

Instructional Setting:

This activity requires a flat surface such as a table or counter. It should be completed in an area that is easy to clean up (i.e. tile floor or plastic garbage bags lied out over top of carpeting)

Community Connections and/or Peer Interaction:

- Share the recipe with families so that students can try it at home, too.
- Partner with typically developing peers to create models.
- Shop for the supplies on a community training trip incorporating a shopping list.

Functional Activity/Routine:

This activity encourages functional skills such as turn-taking, following instructions, and cleaning up afterward. This activity also encourages students to make their own snack independently and to be able to navigate a kitchen.

Strategies to Collect Evidence:

For collection of evidence, observe each student's creation of their snack. An informal assessment can be completed throughout the activity, asking students which layer of the snack corresponds to which layer of the Earth. Provide pictures or a voice output device to allow students the opportunity to comment and answer questions.

Specific Options for Differentiating this Activity:

- Conduct the experiment on a surface that can be accessed by all students.
- For students with poor fine motor skills, use assistive technology to complete actions such as pouring materials into the cups, stirring the materials, grasping the cookies and gummy worms, etc.
- Allow students to use their preferred “pencil” when writing. This may include a writing utensil, keyboard, alternative pencil, or dictating to a scribe.
- Prepare, as necessary, for each student to make choices and communicate with their preferred method. This may include using augmentative communication.
- For students who cannot eat this snack allow them to smell the ingredients, wear chocolate lip balm, and/or make the snack for a friend or staff member.