

Excavation Station

Overview: Do your students enjoy digging up lost treasure? Would they rather spend the day sifting through a bin of sand or rice to find special prizes? How would they feel if you changed their digging material from sand to ice? In this scientific exploration, students will enjoy excavating as they break through a frozen tundra to expose a special prize.

Procedure:

- 1) Prior to beginning this activity, place special prize items into small containers (1 prize item into each container). Fill each container with water and place into the freezer overnight (or until completely frozen).
- 2) To begin this activity, show each student the block of ice they will be working with. Explain that there is a special prize inside each block of ice. Explain to your students that the block of ice is a solid.
- 3) Ask students to think of different ways that will help them get the special prize out of the ice block. Record these ideas on a large piece of paper. Explain that these methods will be different ways to change our ice (a solid) into water (a liquid).
- 4) Discuss with students how they will know that their method has worked and that they now have a liquid.
- 4) After students have brainstormed the variety of ways to “excavate” their special prize, ask each student to choose a method.
- 5) When a student begins “excavating” their ice block, start a timer to see how long it takes for each student to get to their special prize.
- 6) Students may choose different methods throughout their excavating process, but should record the choices they have made so a record is kept to indicate all the different methods used. The time on their timer when they switch to a new method should also be recorded.
- 7) When students have excavated their special prize, record the total time that it took to excavate their special prize.
- 8) Determine with your students which methods helped turn the ice into water the fastest, slowest, easiest, etc.

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;
 - d) appropriate instruments are selected and used to measure elapsed time;
 - e) predictions and inferences are made, and conclusions are drawn based on data from a variety of sources;
 - i) data are collected, recorded, analyzed, and displayed using bar and basic line graphs;
 - k) data are communicated with simple graphs, pictures, written statements, and numbers;
- 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

- c) estimates are made and accurate measurements of elapsed time are made using proper tools;
 - g) data are collected, recorded, analyzed, and communicated using proper graphical representations and metric measurements;
 - h) predictions are made using patterns from data collected, and simple graphical data are generated;
 - i) inferences are made and conclusions are drawn;
- 8S-SI 1** The student will demonstrate an understanding of scientific reasoning, logic, and the nature of science by planning and conducting investigations which
- b) precise and approximate measurements are recorded;
 - h) data are analyzed and communicated through graphical representation;
- 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
- h) data are organized, communicated through graphical representation, interpreted, and used to make predictions;
- 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
- a) chemicals and equipment are used safely;
 - j) valid conclusions are made after analyzing data;
- HSS-SI 1** The student will plan and conduct investigations in which
- a) volume, area, mass, elapsed time, direction, temperature, pressure, distance, density, and changes in elevation/depth are calculated utilizing the most appropriate tools;
 - 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-FME 5** The student will investigate and understand that matter is anything that has mass, and takes up space; and occurs as a solid, liquid, or gas. Key concepts include
- a) distinguishing properties of each phase of matter;
 - b) the effect of temperature on the phases of matter;
- 8S-FME 3** The student will investigate and understand the unique properties and characteristics of water and its roles in the natural and human-made environment. Key concepts include
- b) the properties of water in all three phases.
- 8S-FME 5** The student will investigate and understand the nature of matter. Key concepts include
- c) solids, liquids, and gases;
 - d) physical properties;
 - f) characteristics of types of matter based on physical and chemical properties.

Extension Idea:

As the student goes through the process of excavating their special prize, they will discover the different phases of matter and what characteristics apply.

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 1a: The student will identify and write numerals 0 to 30;

3M-NSCE 2a: The student will solve addition and subtraction problems when result is unknown with number 0-30.

4M-NSCE 1 The student will

b) compare whole numbers ($<$, $>$, $=$);

c) round one-and two-digit whole numbers from 0-50 to the nearest 10.

4M-NSCE 4b: The student will add and subtract double-digit whole numbers.

5M-NSCE 1c: The student will round two-digit whole numbers to the nearest 10 from 0-90.

Extension Idea:

Upon completion of this activity, the times that were recorded for each method can be rounded to the nearest minute. Those rounded times can then be ordered, compared, added/subtracted, etc to analyze the data that was collected.

3M-PSPFA 1 The student will

a) create picture graphs from collected measurement data;

b) use picture or bar graph data to answer questions;

c) insert data into a preconstructed bar graph template;

5M-PSPFA 1 The student will

a) compare two sets of data within a single data display such as a picture graph, line plot, or bar graph;

b) represent and interpret data on a picture, line plot, or bar graph given a model and a graph to complete.

6M-PSPFA 1 The student will

a) display data on a graph or table that shows variability in the data;

c) answer a question related to the collected data from an experiment, given a model of data, or from data collected by the student.

8M-PSPFA 1 The student will

b) describe how a graph represents a relationship between two quantities.

HSM-FS 2 The student will

a) indicate general trends on a graph or chart.

HSM-FS 3 The student will

a) given data, construct a simple graph (table, line, pie, bar, or picture) and answer questions about the data.

Extension Idea:

Upon completion of this activity, students can graph the amount of time elapsed for each method they tried. Graphing results can be compared and analyzed.

Materials Needed:

-small containers (1 for each student)

-water

-special small prizes (small enough to fit into the small containers) (1 for each student)

-timers

-excavating tools; some examples include (but are not limited to)

-salt

-sand

-hot water

-hair dryer

-a variety of liquids

-hammer

-baking soda and vinegar

-large chart paper

-writing utensil

Instructional Setting:

This activity requires that a freezer is accessible to where you are going to complete this activity. It would be best completed on 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 layed out over top of carpeting)

Community Connections and/or Peer Interaction:

Students can work together in small groups to test their different methods of excavation. Students may also benefit from peer assistance in the physical aspect of trying several methods. They can partner with typically developing peers to complete the activity.

Functional Activity/Routine:

-This activity encourages functional skills such as turn-taking, following instructions, and cleaning up afterward.

-This lesson lends itself to discussing the need to keep items cold during the warmer months of the year using a refrigerator and freezer and what happens to items in the freezer if left open.

-During winter month when snow may occur it could be compared with the snow melting and creating a similar time elapsed activity.

Strategies to Collect Evidence:

For collection of evidence, students will create a record sheet of what methods were tried and how long each method was tried in order to excavate their prize. Students can indicate on this record sheet which method was the quickest/slowest. Using pictures or voice output devices programmed with comments and responses could be used with an adult assigned to record responses.

Specific Options for Differentiating this Activity:

- Conduct the experiment on a surface that can be accessed by all students.
- 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 with poor fine motor skills, use assistive technology to complete actions such as pouring materials onto ice.