



# LESSON PLAN

## WHAT IS ENGINEERING? GRADES K-2

### SUMMARY

Students will use the engineering design process to design a container that will slow down the melting of an ice cube.  
Duration: 1 hour.



**K-2-ETS1-1.** Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.

**K-2-ETS1-2.** Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.

**K-2-ETS1-3.** Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.

Science & Engineering Practices	Connections to Classroom Activity
<p><b>Asking Questions and Defining Problems</b></p> <p><b>Developing and Using Models</b></p> <p><b>Analyzing and Interpreting Data</b></p>	<ul style="list-style-type: none"> <li>• Students design a solution to help ice stay solid for longer. They then use time data to compare the effectiveness of different solutions.</li> </ul>
Disciplinary Core Ideas	Connections to Classroom Activity
<p><b>ET S1.A: Defining and Delimiting Engineering Problems</b></p> <p>Asking questions, making observations, and gathering information are helpful in thinking about problems. (K-2-ETS1-1)</p>	<ul style="list-style-type: none"> <li>• Students use a variety of materials to make a container to hold ice and keep it from melting for as long as possible.</li> </ul>

### Optimizing the Design Solution

Because there is always more than one possible solution to a problem, it is useful to compare and test designs. (K-2-ETS1-3)

### Crosscutting Concepts

#### Structure and Function

The shape and stability of structures of natural and designed objects are related to their function(s). (K-2-ETS1-2)

### Connections to Classroom Activity

- Students compare the effectiveness of different materials used for keeping ice from melting.



## ENGAGE

Tell students that you have a problem: you want to sell snow cones this weekend, but it's going to be hot outside. You need help designing a container for ice that will slow down the melting of your ice.



## EXPLORE

Show students the materials they can choose from to build their containers. Before building they will need to draw out their plan. Once they have their plan drawn, they can get their materials and start building.

Once students have had 20-30 minutes to build, regain the attention of the class and ask them how you will know who has built the most effective container. Hopefully they will come up with the idea to test the containers by placing ice in them. Follow up by asking, "How can we test to see which design works best?" They should decide to observe and perhaps time how long it takes to melt an equal amount of ice cubes. The container that keeps the ice cube solid for the longest time is the best container.



## EXPLAIN

After determining which one was the best solution to the problem, ask "Why do you think that container was the most effective?" and "What materials did this group use?" Conclude that some materials are better at keeping things cold.

## MATERIALS

- Bag of ice cubes
- A variety of materials; some suggestions:
  - Paper plates
  - Cardboard
  - Felt or other fabric
  - Aluminum foil
  - Popsicle sticks
  - Pipe cleaners
  - Wood pieces
  - Plastic bags
  - Modeling clay
  - Paper bags
  - Plastic cups
  - Styrofoam cups
  - Newspaper

### DIY Activity

- Toothpicks
- Bag of gummy bears
- Hard cover book



## ELABORATE



### WATCH THE GENERATION GENIUS WHAT IS ENGINEERING? VIDEO AS A GROUP

Facilitate a conversation using the Discussion Questions.



## EVALUATE

Students can play the online Kahoot! quiz game located below the video which provides downloadable scores at the end of the quiz game. Alternatively, you can use the paper quiz or the exit ticket questions. All these resources are located below the video in the Assessment section.



## EXTENSION

After the activity discuss different containers that they have seen or used to keep things cold. (coolers, insulated bags, Styrofoam etc.) Talk about the materials that these types of things are made of. Let them re-do their containers after the video, making changes from what they have learned.

