

Grade Level: 2 - 3

Curriculum: Explorations, ADST, Science

Title of Lesson: Experimenting with Physical Changes

Learning Goals/Objectives:

- Materials can be changed through physical and chemical processes
- Designs grow out of natural curiosity

Materials Needed:

- Pencil and paper
- Ice cubes
- Various found or recycled materials such as:
 - Newspaper
 - Cardboard
 - Styrofoam
 - Tin/aluminum cans
 - Aluminum foil
 - Used plastic bottles, etc.
- Glue/tape or other adhesive

Activity Instructions: (Step by Step)

- Last week we learned about physical and chemical changes by experimenting with water
 - This week we will look at how we can influence these changes to speed them up or slow them down
- Different materials can speed up or slow down the way objects are heated or cooled
 - Think about this like how we dress ourselves- when it starts to get colder out, we put on warm, puffy coats that are filled with materials that *insulate* us, or, that keep us warm. When it gets hot outside, we can wear clothes that are made from light fabrics that do not insulate us as well
- Our challenge is to slow down the physical change that happens when ice turns into water (melting!) by making a device. This means we need to make sure our ice cube stays insulated!
- Before we make anything, we need to gather any materials that you think may be useful in building your insulating device!
- Once you have some materials ready, we need to start thinking!
 - Have you ever seen another device that keeps things cold? What do they look like, and what are they made from? (eg. A cooler you might take camping or on a picnic, an insulated bottle, etc.)
 - If our device is going to hold just one ice cube, how large should it be? Big or small?

- We also want to run tests more than once, so our device needs to survive the first test!
 - When the ice cube eventually melts it will turn into water! Our device should be waterproof on the inside!
- Now that we have some guidelines for our device, we can start to make some plans!
 - Try to draw 2 ideas for your device, making them totally different from one another! More ideas usually means more success!
 - Compare your ideas; can you think of a way to combine the best parts of the ideas to make one really good one?
- Using your plans, make your device! Remember, this doesn't need to be huge, and it is made from your recycled materials. Get creative, try new things and if it doesn't work as you planned, the worst thing that happens is an ice cube melts!
 - Once you have finished making your device, it is time to test it!
 - Place an ice cube into your device, and write down what time it is.
 - Every 30 minutes, check in on your ice cube
 - Make some observations about the ice cube each time you check on it. Has it melted completely, a little, or not at all? Is it sitting in water, or is it dry? Is the inside of your device warm, or cold?
 - When your cube has melted, write down the time. How long did your cube last? Is this longer or shorter than you thought?
 - Test your design again with another ice cube. Did it last approximately the same amount of time? If it didn't, what do you think may have made the difference?
- If you have extra materials, try to think of a new design for your device to improve it. Before you start, think about your current design a bit. What worked well? What did not?
 - Test it!