

Grade Level: 2 - 3

Curriculum: Explorations, Science, ADST

Title of Lesson: Chemical and Physical Changes

Learning Goals/Objectives:

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

Materials Needed:

- Pencil & Paper
- Clear, freezer safe container (old plastic bottle, a glass, milk jug, etc)
- Water

Activity Instructions: (Step by Step)

- Matter makes up everything we see and eat and touch each day
 - There are two main ways that we can cause matter (or materials) to change
 - A **physical change** changes how something looks without turning the original material into something new
 - For example, if our material is the hair on your head, when we cut it, it changes how the hair looks, but it does not turn the hair into something new! If we crumple a piece of paper up into a ball, it is still paper, even if it looks different!
 - A **chemical change** creates a new substance as a result of the change
 - This kind of change leaves clues behind for us to see it was a chemical or physical change:
 - If we see flames or burning
 - If we see temperature change without us heating or cooling the substance
 - An explosion is a very fast chemical change
 - A change in colour is a chemical change
 - A change in smell or odour is a chemical change
- This activity will let us experiment with a very common change and decide whether it is a physical change, or a chemical change
 - You will observe the change of water into ice!
 - First, let's make a list of what we know about water:
 - Some questions to guide you
 - Is water a solid, a liquid, or a gas?
 - Is it heavy? Is it light?
 - What colour is it?
 - What smell does it have?
 - What temperature is it? Warm, cool, hot, cold?

- Create a similar list about what you know about ice using the same questions
 - Look at your two lists. Do you notice any similarities? Any differences?
- We know water turns into ice when it gets very cold, but what else happens to the water during this change?
 - First, we need to fill a clear container with water. Don't fill it right up to the top, or else we might spill when we move it to the freezer!
 - Put a mark on the container right at the water line. This could be a piece of tape, a line drawn with a marker, etc.
 - Before we put the container into the freezer, write any other observations you may have about the water.
 - We also want to make some predictions about what you think will happen to the water:
 - Do you think the water level will go up, down or stay the same? Why?
 - Do you think there will be any change to the smell of the water? The colour? The clarity? Why?
 - How long do you think it will take the water to freeze completely?
- Place your container into your freezer. Try to make sure it is in a spot where it won't get knocked over! Remember to check on it every 30 minutes or so! Each time you check, write down what you notice about the water!
- Once the water is completely turned to ice, take it out of the freezer.
 - Write some observations about the container:
 - Is there anything you notice right away?
 - Check in with your predictions
 - Were they close, correct, or not quite right?
 - What is the water level now?
- Now, let's reverse our change. Leave the container out someplace warm and safe. You may want to leave it on a napkin or cloth in case it drips!
 - Do you think the water level will return to the original mark you made? Why?
 - Do you think it will melt at the same speed that it froze? Why?
 - What do you think will happen to the colour, clarity and smell of the ice?
- When the water is totally thawed, compare what happened to your latest predictions.
 - Based on all of your observations and predictions, do you think this was a physical change or a chemical change?

Extensions (Optional):

- If we add salt to water, we can change how the water behaves. Try putting 2 tablespoons of salt into one cup of water. Repeat the experiment and record what

happens. Can you think of anywhere we might see lots of cold, salty water? Does it freeze there?

- If you have an outdoor space at your home, try conducting the experiment out there. As the weather starts getting colder you can see if the water behaves differently outside than it does in the freezer