Icy Science

Background Information:
- **Freezing point**: the temperature at which a liquid turns into a solid when cooled. The freezing point of water is 32 degrees Fahrenheit or 0 degrees Celsius.
- Salt lowers the freezing point and melting point of water.
- Ice has a thin layer of moisture on it. When salt (NaCl) touches this water, it separates into sodium (Na⁺) and chloride (Cl⁻) ions.
- These Na⁺ and Cl⁻ ions squeeze between the water molecules, spread them out further, and turn the ice into liquid.
- This happens because the polar water molecules are attracted to the loose ions. The negative Oxygen ends bond to the positive Sodium ions and the positive Hydrogen ends bond to the negative Chlorine ends. This keeps the hydrogen bonds from forming between the Oxygen and two Hydrogen atoms.
- Because of the salt’s small particle size, no residue is left after the initial melting. This allows the freezing point of the water to return to normal, and it refreezes after the initial melting since it is touching ice.
- This is related to how ice skating works. Although ice is solid, as long as temperatures are above −20°C (−4°F) there is always a very thin layer of water on the surface that makes it slippery. Extra melted water from the rubbing between the blade and the ice vastly reduces the friction allowing the skater to glide across the ice with little effort.

Materials:
- Ice cubes
- Salt
- String

Activity:
1. Start by asking, why do things freeze? As the temperature decreases, molecules slow down enough that their attractions cause them to arrange into a more
stable state. At what temperature does water freeze? This activity will allow children to explore the melting and freezing points are different for different substances.

2. First, make sure each child has an ice cube in front of them.
3. Second, sprinkle salt on the ice cube and place a string on the salted surface.
4. Have the students watch the melting and then the refreezing.
5. The string will freeze onto or in the cube when it refreezes after the salt is gone.
6. Finally, have the students pick up their ice cubes by the strings and ask them what they observed and what they think happened? At the end, explain what happened using the background information.