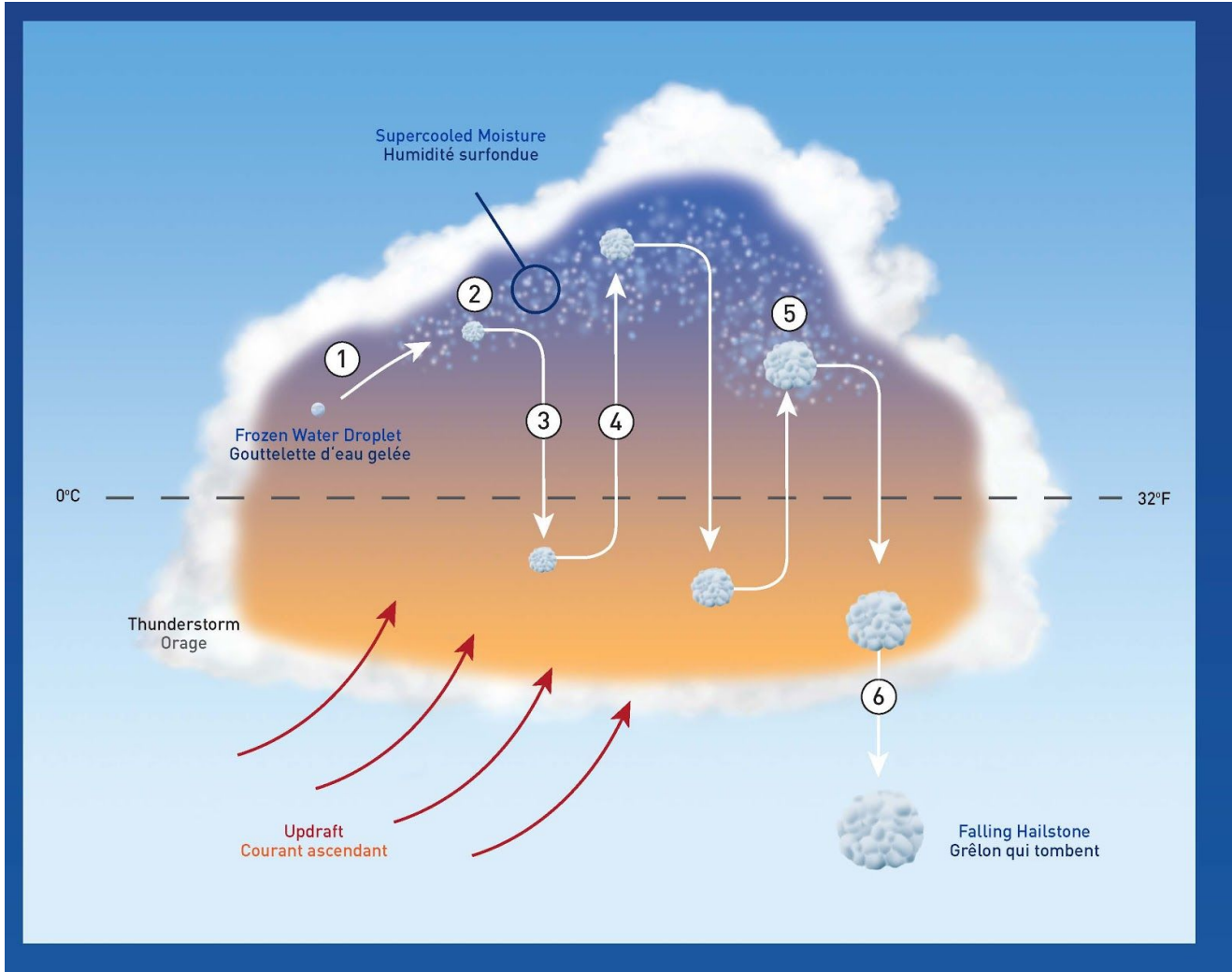


Water in Nature		Grade 2 : Water in the Environment	
<b>Lesson Plan</b>		<b>Safety Notes</b>	Ask an adult for permission to do this experiment. No protective equipment required.
<b>Description</b> Discover water in the weather and create your own piece of weather with a simple experiment.			
<b>Materials</b>  Here are the materials that you will need: <ul style="list-style-type: none"> <li>● One or two large cups</li> <li>● Cold water to fill cups</li> <li>● One or two colours of food colouring (optional)</li> <li>● 1 ice cube or ice cube tray</li> <li>● String (20 cm in length)</li> <li>● Salt (1 tsp)</li> <li>● Refrigerator</li> <li>● Freezer</li> <li>● Parchment paper or wax paper or plastic wrap</li> <li>● Plate or small baking pan</li> <li>● Ruler</li> <li>● Activity Sheet</li> <li>● Pencil</li> </ul>			
<b>Science Background</b>  The weather is largely a result of water in its different states - solids, liquids and gases. Rain is water in its liquid state. Snow is frozen water in its solid state. Liquid water on our planet like that found in oceans, lakes, rivers and puddles can change into a gas, or water vapour, when heated by the sun. This is called <i>evaporation</i> . As the water vapour rises higher and higher into the air, it will begin to cool and change back into small drops of liquid that form clouds. This change from a gas to a liquid is called <i>condensation</i> . If the cloud gets really cold, those liquid water droplets begin to <i>freeze</i> and form solid ice crystals. When the ice crystals are heavy enough, they will fall to the ground. If the air above the ground is warm, the ice crystals <i>melt</i> and fall as rain. If the air above the ground is cold, they fall as snow.  Sometimes, even though the air near the ground is warm, frozen water can still fall from the sky as hail. Hail happens during larger thunderstorms. As ice crystals begin to fall, strong updraft winds can			

push the ice crystal back up into the cloud. Liquid water droplets from the cloud freeze to the ice crystal, making it a larger piece of ice. When the ice is heavy enough to fall and break through the updraft winds, it falls as hail. A hailstone can take several trips up and down in a storm cloud before it falls.



### Activity Procedure

We will be doing a simple experiment that mimics how a hailstone is formed. It is recommended that you do the experiment in the kitchen since it can get a bit messy.

Place all the equipment on a table or counter in the kitchen close to a refrigerator and freezer. Place a small square of parchment paper or wax paper on your plate or baking pan. If you do not have parchment paper or wax paper, you could also use plastic wrap. This will keep your hailstone from sticking to the plate. If you have an ice cube tray at home, fill the tray with water and stick one end of your string inside one ice cube and freeze completely. If you have ice cubes already made, place one

end of your string on top of your ice cube and sprinkle the ice cube and string with a little salt. This will cause your string to stick to your ice cube. Lift it up to test it, and if it sticks, put it into your freezer right away for at least 15 minutes.

In the meantime, prepare your water. You can do this experiment with plain, clear water or if you have some at home, you can use food colouring to colour your water. Place 7-10 drops of food colouring in your water if you are using it. Place your cups of water in the refrigerator so that they are cold.

Once your ice cube is frozen, take it out of the freezer. Use your ruler to measure your ice cube. You are going to measure the longest side of the ice cube in centimetres. Write down the number on your activity sheet in the space that says “0 dips”.

Holding your ice cube by the string, dip your ice cube quickly in your water. Put it back on your plate and place the plate back into the freezer immediately. Wait at least 15 minutes for the ice cube to freeze. Now, dip it a second time. Place the ice cube back on your plate and put it immediately back in the freezer.

Repeat this 5 times. After you’ve dipped it a total of 5 times, measure it again and write down the number on your activity sheet. Repeat 5 more times and write down that number. How big does it get after 15 dips? 20 dips? 25 dips? How big can you make your hailstone?

### What’s going on?

The ice cube is so cold that it immediately freezes the water around it when you dip it in the glass. You’ve created a small layer of new ice. Each time you dip it, you freeze a new layer of ice, making your hailstone bigger and bigger!

### What else could you try?

Try changing colours every 5 dips. Can you see the different layers forming? Ask an adult to take your hailstone outside. Place a towel on top and crack it with a hammer on a hard, safe, surface (like a sidewalk). Can you see the layers you made?

### Debrief

Each time you dipped your hailstone in the water, the liquid water changed from a liquid to a solid. Each layer of new frozen water makes the hailstone bigger and bigger. This is what happens inside of a cloud. As a piece of ice forms in the cloud, it becomes heavy and begins to fall, but strong winds inside of the cloud push the piece of ice back up. Along the way, it gathers liquid water droplets around it that freeze to the piece of ice, creating a new layer. The bigger the hailstone, the stronger the winds were inside of the cloud to keep the piece of ice from falling and allowing it to grow. **Want to learn more?** Take a trip with Walter the Water molecule from the Bluecoats at Science North.

Activity Sheet

Use this sheet to write down the measurements for your hailstone.

0 dips = \_\_\_\_\_ cm

5 dips = \_\_\_\_\_ cm

10 dips = \_\_\_\_\_ cm

15 dips = \_\_\_\_\_ cm

20 dips = \_\_\_\_\_ cm

25 dips = \_\_\_\_\_ cm

You can dip your hailstone as many times as you want to!  
How big did your hailstone get? How many dips did it take to get there?

\_\_\_\_\_ dips = \_\_\_\_\_ cm

## Activity Sheet

Make a bar graph from the measurements of your hailstone.

