The Meltdown

Objective: The students will explore what happens to the amount of different substances as they change from a solid to a liquid or a liquid to a solid.

Materials: Ziploc baggies, water/ice, chocolate chips, margarine, paper towels and a scale or balance. One observation chart (included) per group or student (teacher preference).

Time: 30 Minutes

MN Standard: **Science**—*Physical Science: Structure of Matter*
The student will know that heating and cooling may cause changes to the properties of a substance
- The student will observe that heating and cooling can causes changes in state.
- The student will describe the changes in the properties of a substance when it is heated or cooled.

Set Up: Set up 3, 6 or 9 lab stations (depending on the class size and desired group size). Each lab station will contain a Ziploc baggie; one of the following: ice, chocolate chips or margarine; and paper towels (the number of these items also depends on the instructor, each student could have a bag or several students could share). Have a central station with a scale or a balance used for the weight measurement. One group will conduct the experiment with ice, another with chocolate chips and the third with margarine. Also, set aside one baggie and ice cube for the prediction demonstration.

Process: Begin the lesson by asking the students the following questions:
- Has anyone ever eaten ice cream on a hot summer day? What happens to it if it is not eaten?
- Have you ever left a glass of ice water out on the table? What happened to the ice?
- Have you ever noticed what happens to frozen objects as they heat up?
- What happens to the amount of a substance if it is changed from a solid to a liquid?

As a large group, show the students a baggie filled with ice. Ask students to predict what will happen to the substance (including the amount of it) over time. Record a list of the students' predictions in an appropriate and visible location.

The students will now report to their lab stations to conduct the experiment. Have students put the ice, chocolate chips or margarine into the baggie and seal it. Record their observations of their substance at this time on the provided observation chart, and then record the weight of the baggie and substance on the same chart. Have students take turns holding the baggie in their hands, wiping the outside of the bag as necessary to get rid of any moisture.
- What do you see?

- What is happening to the ice, chocolate chips or margarine?
- Why is this happening to the ice, chocolate chips or margarine?
- What do you think is happening to the amount of ice, chocolate chips or margarine?

Have students weigh the baggies again. Record this weight and other new observations on the chart.

- What happened to the amount?
- Does the ice, chocolate chips or margarine look the same as it did in the beginning? How is it different?

Allow the solid to completely change to a liquid, and have students wipe the bag and weigh it again. If time allows (and there is a freezer available), put the baggies into the freezer to solidify the liquid. Then wipe the bags and weigh them a final time. Record the final weight and final observation on the chart.

- Does the amount of water, chocolate or margarine change when it changes from a solid to a liquid?
- Does the amount of water, chocolate or margarine change when it changes from a liquid to a solid?
- How would you explain what you observed to someone who did not perform this experiment?

Review: Return to a large group and discuss the results of the experiment. Have a representative of each substance share their findings. Compare the weight change, if any, and discuss the fact that matter is not lost when it changes from state to state.

Extension: Begin a short discussion about snow. Have the students gather snow from outside and build a miniature snowman on a water safe tray inside the classroom. Then use the following questions to get the students thinking about the different states of water.

- What is snow?
- What happened to the snow as the temperature increased?
- Did the amount change as the snow melted and turned to a liquid?
- Why did the snowman appear to get smaller? What was really happening to him? Did the amount of the snowman really change? Why or why not?

Lesson adapted from *Water 3: Melting and Freezing* produced by Science NetLinks www.sciencenetlinks.com

Trial	Observations	Weight

1 Beginning		
2 Middle		
3 End		

Trial	Observations	Weight
1 Beginning		
2 Middle		
3 End		