



Scope Phenomenon

Name: _____ Date: _____

Ice Melting

1. Name the state(s) of matter in the video.

2. What causes ice to melt?

3. What do you notice about the size of ice as it melts?

4. Ice is frozen water. Do you think that there is less water when the solid ice melts into liquid water? Why or why not?

5. What would happen if more heat was added to melted ice?



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Changes from Heat

Part I

Prediction

- 1. What do you think will happen to the state of matter of your ice cube as it sits on the grid?

Observations

- 1. Where is your ice located?
- 2. Fill in the following table with your observations.

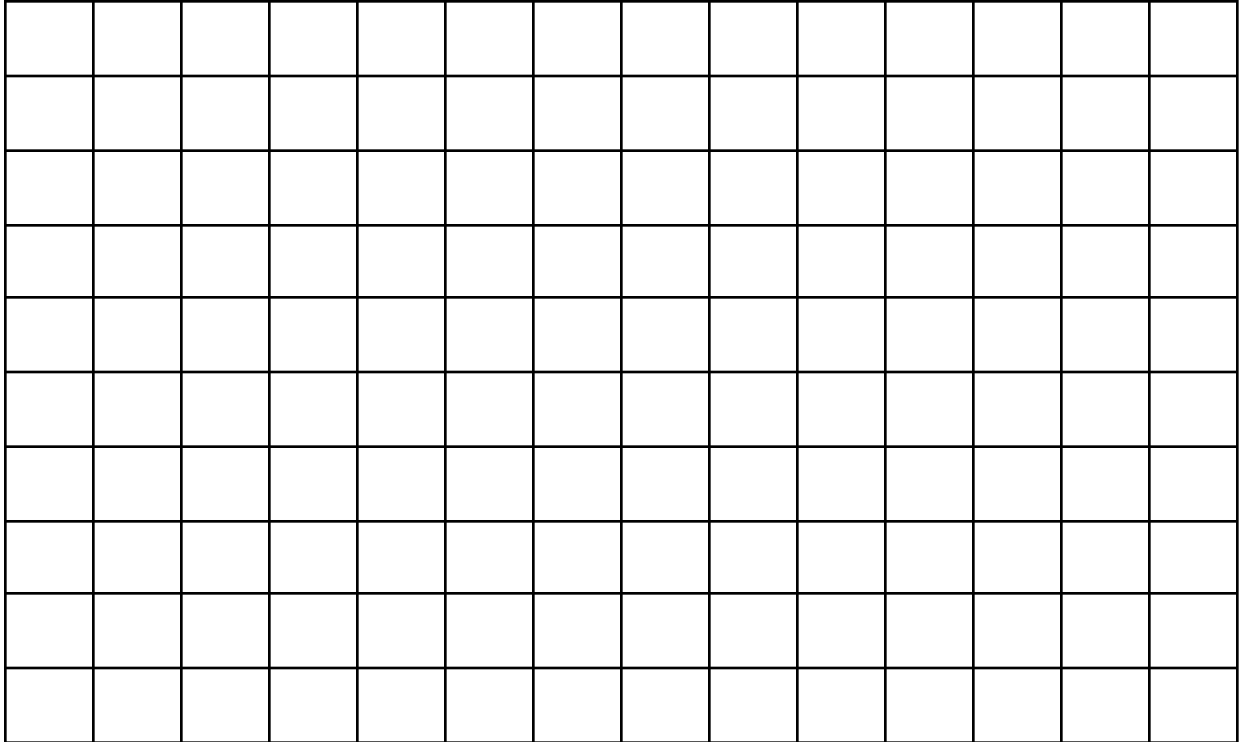
Time (min)	Number of Squares Covered	Time (min)	Number of Squares Covered
2		14	
4		16	
6		18	
8		20	
10		22	
12		24	

- 3. How long did it take for your cube to melt completely?



Explore

4. On the grid below, draw and fill in what your puddle looks like every 2 minutes. Show which squares are completely covered and which are only partially covered. Use colored pencils.



Reflections and Conclusions

1. What change in state did you observe in Part I?
2. How many squares on your grid were covered by colored water?



Explore

3. For how many minutes did you investigate your ice cube? Did it melt completely?
4. Compare your data table with that of someone whose ice cube was at a different location and melted faster. Why did the difference in melting time happen?
5. What could you try next time if you wanted to make the ice cube melt more slowly?



Explore

Part II

Observations

1. Fill in the following table with your observations.

Time (min)	Number of Colored Squares Now Dry
0	
5	
10	
15	
20	

2. On the grid below, draw and fill in what your puddle looks like now. Show which squares are completely covered and which are only partially covered by the liquid water. Use colored pencils. Then, place an X over each square that is now dry or no longer has liquid water on it.



Explore

Reflections and Conclusions

1. What change in state did you observe in Part II?
2. What was necessary for this change to occur?
3. For how many minutes did you investigate your puddle? Did it evaporate completely?
4. What could you try next time if you wanted to make the puddle evaporate faster?
5. What could you do to make the liquid water turn back into solid ice or make the water vapor turn back into liquid water?



Name: _____ Date: _____

Student Guide

Part I

1. Place the grid board in your assigned spot. Be sure that the board is level.
2. When your teacher gives the signal, place your melt-away cube on the gray box in the center of the grid. Be careful not to touch or bump the board while you are timing and counting.
3. Observe your cube for changes from heat every 2 minutes.
4. Every 2 minutes, count the number of squares on your grid board that are covered by colored water.
5. Using colored pencils, draw what your puddle looks like on the grid on the Student Handout.
6. Repeat steps 2–5 until your cube has melted completely.
7. After your ice has melted completely, count the number of squares on your grid board that are covered by colored water.
8. Record how long it took for your cube to melt completely.
9. Answer the Part I Reflections and Conclusions questions on your Student Handout.

Part II

1. None of the squares on your grid board will have had a chance to dry yet, so in the table on your Student Handout, write “0” in the first row of the “Number of Colored Squares Now Dry” column.
2. Every 5 minutes, for a total of 20 minutes, count the number of squares on your grid board that are colored but no longer appear to have puddles of liquid water on them. Record this number in the table each time.
3. Using colored pencils, draw what your puddle looks like on the grid on the Student Handout. Place an X over each square that is dry or no longer has liquid water on it.
4. Answer the remaining Reflections and Conclusions questions on your Student Handout.



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Student Reference Sheet

Location: _____

Place the cube on the gray box to begin.



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State-of-Matter Changes

Procedure

Part I

1. Use the triple beam balance to measure the mass of an aluminum pan by itself. Record this data in grams (g) in column B of the data table.
2. Select a material (saving the ice cube for last), place it on the aluminum pie pan, and measure the mass using a triple beam balance. Subtract the mass of the aluminum pan alone to get the mass of the substance. Record the mass of the substance itself in Column C of the data table.
3. Place the pie pan with the material in it on a hot plate, and let the substance melt.
4. After the material has melted, use oven mitts or the teacher's assistance to transport the pan from the hot plate to the triple beam balance.
5. Measure the material's mass on the triple beam balance again. Record the data in column D of the data table.
6. Repeat steps 2–5 for each of the other materials.
7. Be sure to turn off the hot plate as soon as your group is done heating all of the materials.
8. Answer Reflections and Conclusions questions 1–4.

Part II

1. Place the pie pans with the melted materials aside (off the hot plate), and allow time for the shortening, chocolate bar, and butter to become solids again.
2. Measure the mass of each material and pie pan again, and record these in column E of the data table. (You will not record a mass for the ice cube because it has not yet returned to a solid state.)
3. Answer Reflections and Conclusions questions 5 and 6.
4. Turn on the hot plate again. Place the pie pan with the melted ice in it onto the hot plate.
5. Observe for a few minutes as the liquid water heats to a boil.



Explore

6. As soon as most of the water has evaporated, remove the pie pan from the hot plate and turn off the hot plate. Place the pie pan on the triple beam balance, and record the mass of the pie pan and the liquid water that remains.
7. Answer Reflections and Conclusions questions 7 and 8.
8. Graph your data from columns C, D, and E in the triple bar graph.
 - a. Create a triple bar graph that represents the data from the first three materials in the data table (not the ice cube). Include labels and a title.

Data

Data Table

A Material	B Mass of Aluminum Pan Alone (g)	C Mass of Material and Pie Pan before State Change (g)	D Mass of Melted Material and Pie Pan after State Change (g)	E Mass of Solid Material and Pie Pan after State Change (g)
Shortening				
Chocolate bar				
Butter				
Ice cube				N/A

Mass of pie pan and remaining liquid water after evaporation: _____



Explore

Triple Bar Graph

Graph title: _____

Shortening and Pan before Melting	Shortening and Pan after Melting	Shortening and Pan after Cooling	Chocolate and Pan before Melting	Chocolate and Pan after Melting	Chocolate and Pan after Cooling	Butter and Pan before Melting	Butter and Pan after Melting	Butter and Pan after Cooling



Explore

Reflections and Conclusions

1. What happened when heat was added to each substance?
2. How did the mass before melting the substance compare to the mass after melting the substance?
3. Why do you think the mass was the same after the substance melted?
4. What do you think will happen to the mass once the materials return to their solid states?
5. Why did most of the materials return back to a solid state? Why did the melted ice not become solid again?
6. Is matter conserved when it changes state? Explain your reasoning using conclusions from your data.



Explore

7. Did matter seem to vanish, or disappear, when the melted ice (liquid water) was placed back onto the hot plate? What was actually happening?

8. If matter is conserved when it changes state, why was the mass of the liquid water less at the end of the activity?



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State-of-Matter Changes
Claim-Evidence-Reasoning

Prompt

Write a scientific explanation describing whether a change in the physical state of matter changes the matter’s mass.

Claim:

Evidence:

Reasoning:



Explore

State-of-Matter Changes

Rubric for Writing a Scientific Explanation

Points Awarded	2	1	0
Claim	The student made an accurate claim.	The student made an inaccurate claim.	The student did not make a claim.
Evidence	The student provided at least two accurate pieces of evidence.	The student provided one accurate piece of evidence.	The student did not provide evidence or provided only inappropriate or inaccurate evidence.
Reasoning	The student accurately connected the evidence to scientific thinking.	The student accurately explained scientific thinking but did not connect it back to the evidence.	The student did not connect any evidence to the claim or made only inappropriate or inaccurate connections to the evidence.



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Main Ideas and Details

While you read: Look for details in the text that give more information about the three main ideas listed below. Write four details for every main idea.

Text Topic: Matter can change states.			
Page	Main Idea: Cooling air can cause condensation.	Detail 1:	Detail 2:
		Detail 3:	Detail 4:



Linking Literacy

Page	Main Idea: Matter does not vanish or disappear.	Detail 1:	Detail 2:
		Detail 3:	Detail 4:



Linking Literacy

Page	Main Idea: No matter what changes happen, the total weight of the matter does not change.	Detail 1:	Detail 2:
		Detail 3:	Detail 4:



Linking Literacy

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Anchor Chart

List three main facts you want to include on your anchor chart.

Use the space below to plan how your anchor chart will look before creating the final copy.