SCIENCE

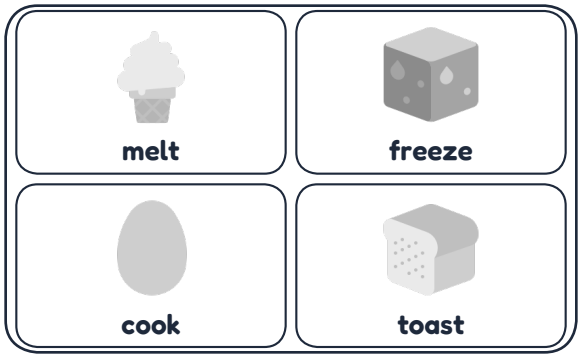
# Heating and cooling

Name _____ Date _____

I can tell how heating and cooling change matter.

## 1 How it works

Heating and cooling can change matter. Heat melts ice into water and melts chocolate and butter. Cooling freezes water into ice. Some changes can be undone: melted chocolate hardens again when it cools. Some changes cannot be undone: once bread is toasted or an egg is cooked, it cannot change back.




## 2 Heat it or cool it? Circle one.

| | | |
|---|---|---|
| To melt ice cream | heat | cool |
| To make juice into ice pops | heat | cool |
| To cook an egg | heat | cool |
| To make toast | heat | cool |
| To make ice cubes | heat | cool |

How did I do? ☆ ☆ ☆

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# Can it change back?

Name _____ Date _____

I can tell which changes can be undone.

## 1 Can you undo it? Circle yes or no.

| | | |
|---|---|---|
| 1. Ice melts into water. | yes | no |
| 2. Bread is toasted. | yes | no |
| 3. Chocolate melts in the sun. | yes | no |
| 4. An egg is cooked. | yes | no |
| 5. Water freezes into ice. | yes | no |

## 2 What happens? Draw a line.

| | |
|---|---|
|  butter in a hot pan | melts into a liquid |
|  juice in the freezer | turns brown and crunchy |
|  a raw egg in a pan | freezes into an ice pop |
|  bread in a toaster | cooks and turns solid |

How did I do? ☆ ☆ ☆

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# Think like a scientist

Name _____ Date _____

I can explain which changes can be undone.

## 1 Think about it

1. Why does ice cream melt in the sun? _____
2. How can you turn water into ice? _____
3. Can you undo toasting bread? Why? _____
4. Name a change you can undo. _____

## 2 True or false? Circle it.

| | | |
|---|---|---|
| 1. Melted chocolate can harden again. | true | false |
| 2. Cooling can turn water into ice. | true | false |
| 3. Heat can melt ice. | true | false |
| 4. A cooked egg can become raw again. | true | false |
| 5. Toast can turn back into bread. | true | false |

## 3 Draw something before and after it is heated.

How did I do? ☆ ☆ ☆

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# Try it: the chocolate melt

Name _____ Date _____

**I can test how heating and cooling change chocolate.**

## 1 You need

- 3 small pieces of chocolate
- 3 paper cups
- a sunny spot
- a shady spot
- a fridge

## 2 What to do

1. Put one piece of chocolate in each cup.
2. Put one cup in the sun, one in the shade and one in the fridge.
3. After 20 minutes, look and gently touch. Which piece melted?
4. Put the melted piece in the fridge. Does it harden again?

## 3 I predict

Which piece will melt the most?

_____

_____

## 4 What I see

| Place | After 20 minutes | Back in the fridge |
|---|---|---|
| sun | | |
| shade | | |
| fridge | | |

**How did I do?** ☆ ☆ ☆

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FOR TEACHERS AND PARENTS

# Answer key: heating and cooling

## 1 Page 1

Heat or cool: 1) heat; 2) cool; 3) heat; 4) heat; 5) cool.

## 2 Page 2

Undo: 1) yes; 2) no; 3) yes; 4) no; 5) yes.

Changes: 1) butter in a hot pan: melts into a liquid; 2) juice in the freezer: freezes into an ice pop; 3) a raw egg in a pan: cooks and turns solid; 4) bread in a toaster: turns brown and crunchy.

## 3 Page 3

Think: 1) The sun heats it; 2) Cool it in a freezer; 3) No, the heat changed it for good; 4) Melting or freezing water or chocolate.

True or false: 1) true; 2) true; 3) true; 4) false; 5) false.

Drawing: answers will vary, for example a raw egg and a fried egg, or an ice cube and a puddle.

## 4 Page 4: Try it!

The chocolate in the sun melts the most, the one in the shade softens a little, and the one in the fridge stays hard. When the melted chocolate cools in the fridge, it hardens again. Melting chocolate is a change that can be undone, but cooking an egg is not.

## 5 Teaching tip

Make a two-column chart called Can we undo it? and add every change the class notices during the week, from melting ice to baked bread.

**Safety: check for food allergies before anyone tastes the chocolate. A grown-up handles anything hot.**



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