

# Chemical and physical change

When food is prepared and cooked, it often causes substances to change. For example, butter melts to a liquid when it is heated. Water changes to **steam** when it boils in a kettle. Bread dough rises and becomes a crusty loaf when it is baked. In some of these changes, new substances are formed or some substances seem to disappear completely. These changes are called **chemical changes**. Other changes to substances are **physical changes**.

## Physical change

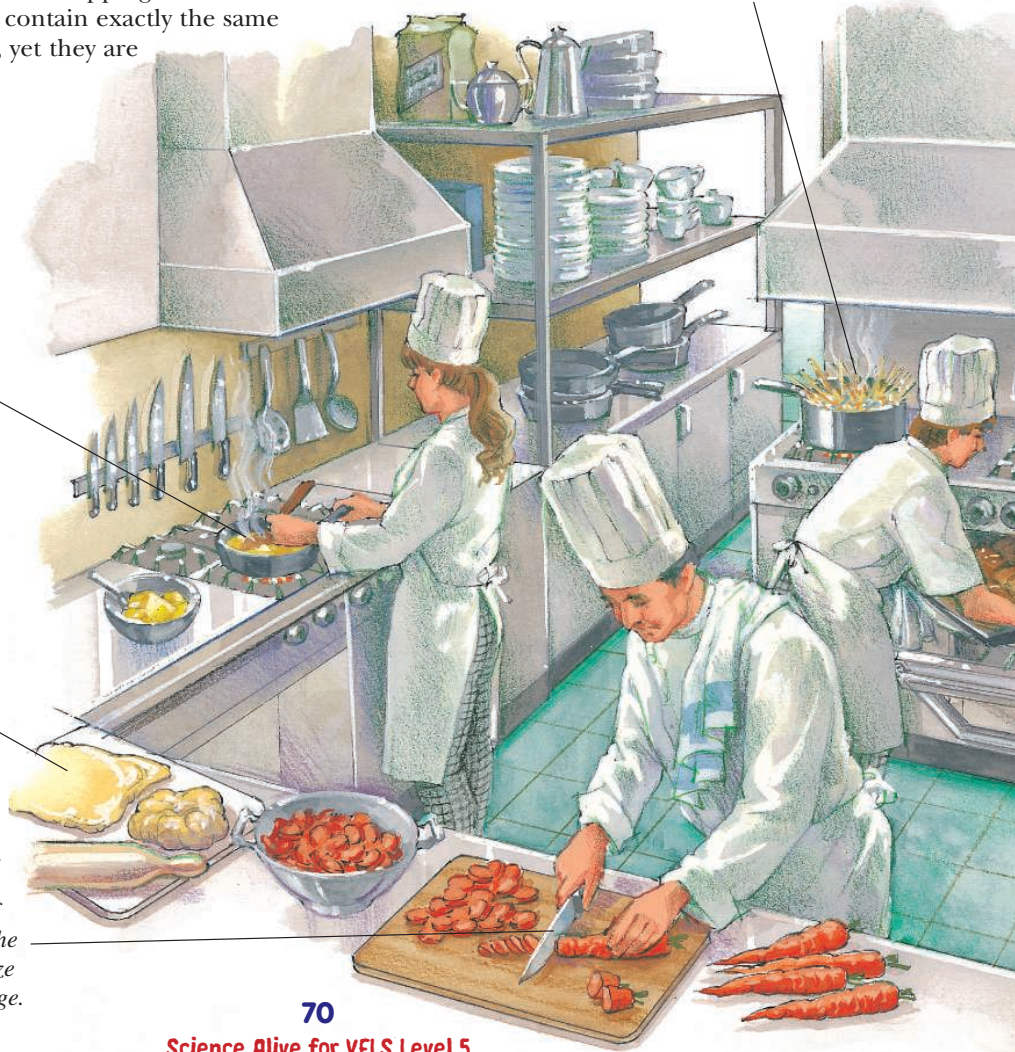
A physical change does not alter the **chemical composition** of the food. Take chopping carrots, for example. Chopped carrots contain exactly the same chemicals as whole carrots, yet they are physically different.

*The change of **state** from solid to liquid is a physical change. When butter is heated, it becomes liquid. When it cools down, it turns back into solid butter. Whether it is solid or liquid, it is still butter. This change, like all changes of state, is a physical change.*

*A large lump of dough can be rolled out flat with a rolling pin. Only its shape has changed. It is the same dough, with the same chemical composition. The change of shape of an object is a physical change.*

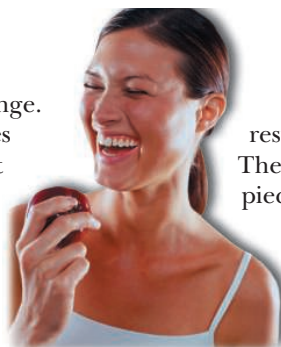
*Chopping is a physical change. The whole carrot and the chopped carrot are made up of the same chemicals. They are the same substances. Change in size is an example of physical change.*

*Pasta is sometimes cooked in salted water. The salt seems to disappear when it dissolves in the water. **Dissolving** is an example of a physical change.*





Any change of state is a physical change. For example, when ice melts it becomes liquid water. Freezing the water turns it back into ice. When liquid water is heated to boiling point, it evaporates and becomes a gas, called steam. When steam is cooled it condenses to become liquid water.



Using your teeth to cut, tear and grind food results in a physical change in the size of the food. The large pieces of food are changed into smaller pieces in your mouth.

Melting chocolate to pour into moulds is a physical change of state. The melted chocolate changes back into a solid as it cools down — another physical change of state.

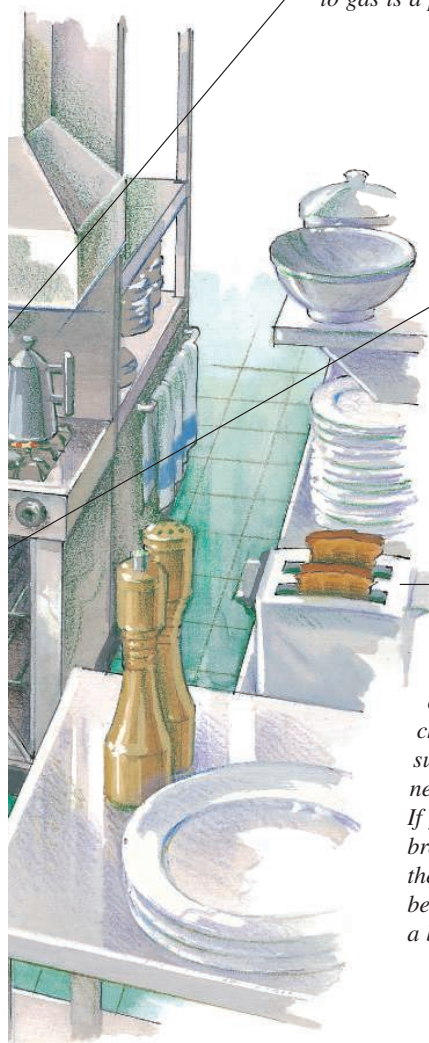
Ice, liquid water and steam all have the same chemical composition. They are the same chemicals, or substances, but in different physical states.

Physical changes can be grouped into three main types. These are:

- change of shape
- change of size
- change of state.

Rolling out a lump of dough and pressing it into a pie dish is an example of a physical change of shape. The dough in the pie dish has exactly the same chemical composition as the lump of dough.

*The change of state from liquid to gas is a physical change.*



*During cooking, chemical changes take place to form new substances. When you bake bread, one of the new substances formed is carbon dioxide — a gas. That's what makes the bread rise.*

*When you toast bread, it changes colour and smells different. That's because toasting bread changes some of the chemicals in it into new substances. One of those new substances is carbon. If you toast the bread for too long, the whole surface becomes coated in a black layer of carbon.*



## Activities



### REMEMBER

1. List three types of physical change. Give an example of each type.
2. How do you know that toasting bread is not a physical change?
3. In your own words, write meanings for the following terms:
  - (a) melting
  - (b) condense.

### THINK

4. Complete this table by listing the type of physical change that occurs during each action.

Action	Type of physical change
Mashing potato	
Melting chocolate	
Freezing ice blocks	
Mincing meat	
Chopping wood	
Boiling water	
Tearing paper into small pieces	
Moulding plasticine	

### CREATE

5. Cut pictures from magazines and newspapers and use them to create a poster about physical change. Organise the examples into the three types of physical change that you listed in question 1.

### INVESTIGATE

6. Research the different types of human tooth. Describe the physical changes that each type of tooth causes to our food when we eat.



### I CAN:

- define a physical change
- explain how a physical change is different from a chemical change
- describe three types of physical change.