Baking powder

Baking powder is often used in cooking to make cakes rise. Do you know how it does this? You are going to explore the reaction that occurs when baking powder gets hot.

**Part 1**
1. What is a chemical reaction?

2. How can you tell that a chemical reaction has taken place?

3. Write down three chemical reactions that happen in the kitchen.

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**You will need**
- 2 test-tubes
- Test-tube holders
- Bunsen burner and mat
- Limewater
- Cobalt chloride paper (*Toxic*)
- Pipette
- Baking powder
- Eye protection.

**Diagram**
Health and safety
Wear eye protection.

What to do
Set up the equipment shown in the diagram. Heat the baking powder gently.

4. What can you see on the side of the test-tube and what happens to the cobalt chloride paper when you heat the baking powder?

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5. What does the test indicate is present?

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Take a pipette and squeeze all the air out of it. Put it into the test-tube and suck up some of the gas inside. Squirt the gas into the test-tube of limewater.

6. What do you see?

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7. What does this tell you about the gas that has been produced?

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The chemical name for baking powder is sodium hydrogencarbonate. You may see it called bicarbonate of soda in the supermarket. This is the old name for the same stuff. It has the chemical formula NaHCO₃.

The equation for the reaction that takes place when you heat baking powder starts:

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2 \text{NaHCO}_3 \rightarrow \text{Na}_2\text{CO}_3 + \text{ + + }
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8. You have found out what two of the products of this reaction are. Put them into the right hand side of the equation.

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9. The other product of this reaction has been put into the equation for you. What do you think it is called? Write the names of all the substances underneath their symbols.
Part 2

Here are the ingredients of a sponge cake:

- 175 g self-raising flour
- Rounded teaspoon baking powder
- 3 eggs
- 175 g sugar
- 175 g butter
- Half teaspoon vanilla extract.

Look at the cake.

10. What has happened to the baking powder during cooking?

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11. What effect does this have on the cake and why is baking powder included in the recipe?

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Part 3

You are going to make some ‘hokey-pokey’ or honeycomb (the stuff in the centre of Crunchie® bars) using baking powder.

You will need

- Sugar
- Golden syrup
- Baking powder
- Baking paper or aluminium foil
- Saucepan
- Wooden spoon
- Cooker or Bunsen burner, tripod, mat and gauze.
**What to do**

Put 5 tablespoons of sugar and 2 tablespoons of golden syrup into a saucepan. Measure out 1 teaspoon of baking powder and put it on a piece of baking paper or aluminium foil. Keep this separate.

Heat the sugar and syrup gently over a low heat until the sugar dissolves. Keep heating for a further 4 minutes. Keep the heat very low and stir all the time. If you are doing this on a Bunsen burner, you will need to use a tripod and gauze. If the mixture boils vigorously, lift the whole pan off the heat and keep stirring so that the mixture does not burn.

After 4 minutes, remove the pan from the heat, add the baking powder and stir.

Pour the mixture onto a piece of baking paper or aluminium foil.

12. What effect does the baking powder have on the syrup mixture?

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13. Why does this happen?

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14. Write a word and a symbol equation for the reaction that takes place when the baking powder gets hot.

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