Science Worksheet

Investigate Signs of Reactions

In this worksheet, students will answer questions on chemical reactions and what to look for to indicate that a reaction is taking place.

Key Information

Topic	Chemical Reactions
Level (1-3)	●○○
Questions	10
Key Stage	KS 3
Year	7
Curriculum Coverage	Chemistry: Chemical Reactions
Curriculum Skill	Types of Chemical Reactions

Name

Date

Introduction

When a chemical reaction takes place, there are several changes that may occur. These visible changes are called the indicators of a chemical reaction. There are several indicators of reaction:

Colour Change

A change in colour is a sign of a chemical reaction. For example, frying an egg is a chemical reaction with a colour change - colourless to white.

Gas Given Off

During a chemical reaction, a gas can be produced. This can be seen by bubbles forming in the reaction or by a coloured gas being produced (such

as smoke).

Solid Formed

If two solutions are mixed and a solid is formed, this is called a **precipitate**. A precipitate is an insoluble solid formed by reacting two liquids. For example, when milk goes very sour, a solid is formed.

Temperature Change

An energy change involves a change in temperature (either up or down). For example, the burning of a match involves a release of both heat and light.

The indicators of chemical reactions shown here all involve a **chemical change** - for example, the burning of a match.

These are different to **physical changes.**

Physical changes are reversible (such as boiling water) which means we always end up with the same substance we started with (water in this example), but sometimes in a different state (liquid to gas). It's easy to confuse those with a chemical reaction, which always ends up with new substances, so watch out!

Remember that, in a chemical reaction, one or more **new substances** are always produced!

Let's make a start on those questions!

QUESTIONS

Question 1

Using the table below, decide whether each of the following is a chemical change or a physical change.

	Chemical Change	Physical Change
Wood burning	○	○
Water evaporating	○	○
Salt dissolving	○	○
Egg frying	○	○
Ice melting	○	○
Metal rusting	○	○

Question 2

Which of the following is a chemical reaction?

Answer 1 ○ Gas burning on a hob

Answer 2 ○ Chocolate melting

Answer 3 ○ Clothes drying on a washing line

Question 3

Which of the following is **not** a chemical reaction?

Answer 1 ○ Petrol burning in a car engine

Answer 2 ○ Fireworks exploding

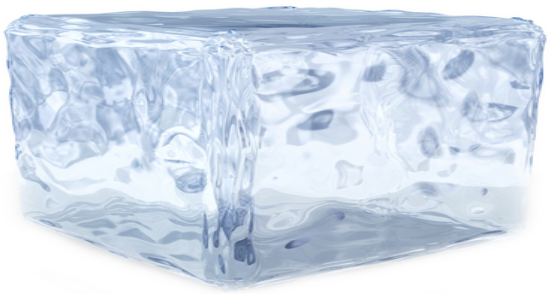
Answer 3 ○ Paint drying

Question 4

Can you complete the sentence below?

Question 5

Can you complete the sentence?



Question 6

Read carefully the description of an experiment performed in a science lab:

Henrik added 5g of green copper carbonate to a colourless solution of hydrochloric acid. Immediately, a lot of fizzing could be seen and the test tube became hot. After some time, the reaction finished to leave a blue

solution of copper chloride.

Use the table below to list the indicators of reaction that were observed by Henrik in this reaction.

	Observed	Not Observed
Colour change	○	○
Energy change	○	○
Gas produced	○	○
Solid formed	○	○

Question 7

Read carefully the description of an experiment performed in a science lab:

Grace poured a small volume of the colourless solution potassium iodide into a clean test tube. To the same test tube she added an equal volume of the colourless solution lead chromate. Immediately, a yellow solid was formed which, after some time, settled to the bottom of the test tube.

Use the table below to list the indicators of reaction that were observed by Grace in this reaction.

	Observed	Not Observed

Colour change	○	○
Energy change	○	○
Gas produced	○	○
Solid formed	○	○

Question 8

Read carefully the description of an experiment performed in a science lab:

John was testing how well a new fuel burned. He placed a small quantity of the fuel in a spirit burner and placed it under a beaker of water. When he ignited the spirit burner, he noted that the fuel burned with a smoky yellow flame and the temperature of the water increased slowly.

Use the table below to list the indicators of reaction that were observed by John in this reaction.

	Observed	Not Observed
Colour change	○	○
Energy change	○	○
Gas produced	○	○
Solid formed	○	○

Question 9

Use the table below to decide whether each of the changes listed is a chemical change or a physical change.

	Chemical change	Physical change
Melting	○	○
Burning	○	○
Evaporating	○	○
Dissolving	○	○
Condensing	○	○

Question 10

Sam was trying to get some sugar back from sugar solution.

She gently heated the sugar solution in an evaporating basin.

1. She observed steam evaporating from the basin and some white crystals forming.

2. As she continued to heat it, she observed the crystals at first melt into a syrup.

3. With continued heating, they formed a black sticky tar-like substance which smelled of burnt sugar.

Match the different stages of the process (1, 2, 3) with whether Sam was observing a physical change at that point, or a chemical change.

	Chemical change	Physical change
1	○	○
2	○	○
3	○	○

ANSWERS

Answer 1

Correct Answers

	Chemical Change	Physical Change
Wood burning	⊙	○
Water evaporating	○	⊙
Salt dissolving	○	⊙
Egg frying	⊙	○
Ice melting	○	⊙
Metal rusting	⊙	○

Answers Explanation

A chemical reaction involves the production of one or more new products; for example, the rusting of iron is the process of iron slowly reacting with oxygen (corrosion) to form iron oxide. Ice melting, on the other hand, is a physical change - you start with water and end up with water but in a different state.

Answer 2

Correct Answers

Answer 1 ⊙ Gas burning on a hob

Answers Explanation

Chocolate melting and clothes drying are physical changes and not chemical changes. Gas burning, on the other hand, changes the gas into water and carbon dioxide (new substances!).

Answer 3

Correct Answers

Answer 1 ⊙ Paint drying

Answers Explanation

Paint drying is simply a physical change, whereas petrol burning and fireworks exploding both involve chemical reactions, with new substances being formed in each case.

Answer 4

Correct Answers

Answers Explanation

Got this now? A **chemical reaction** involves new substances being formed, like when flour, eggs, butter and sugar are baked to form a cake!

Answer 5

Correct Answers

Answers Explanation

So what's ice? Solid water. What does it melt to form? Liquid water. Is it still water (H_20)? Of course it is! So, physical change then. No new substances.

Answer 6

Correct Answers

	Observed	Not Observed
Colour change	⊙	○
Energy change	⊙	○
Gas produced	⊙	○
Solid formed	○	⊙

Answers Explanation

When producing reports on experiments, scientists must list all their observations carefully as they all form part of the evidence of what took place during the experiment. Henrik would have mentioned the fizzing (gas produced), the tube getting hot (energy change) and the fact that the green solid ended up as a blue solution once the reaction was over (colour change). Did you spot all of those?

Answer 7

Correct Answers

	Observed	Not Observed
Colour change	⊙	○
Energy change	○	⊙
Gas produced	○	⊙
Solid formed	⊙	○

Answers Explanation

Here, Grace would have noted the colour change (colourless to yellow) as well as the fact that a solid (precipitate) was formed from the two solutions. Hopefully, you spotted those too!

Answer 8

Correct Answers

	Observed	Not Observed
Colour change	○	⊙
Energy change	⊙	○
Gas produced	⊙	○
Solid formed	○	⊙

Answers Explanation

The yellow flame produced is not a sign of a chemical change, but it is a sign of the energy released when the fuel burns. You need to be observant to be a good scientist!

Answer 9

Correct Answers

	Chemical change	Physical change
Melting	○	⊙
Burning	⊙	○
Evaporating	○	⊙
Dissolving	○	⊙
Condensing	○	⊙

Answers Explanation

Physical changes are more common in the home than chemical changes. Think about all the different changes that happen in your home, especially when cooking dinner. The only one of the changes above that was a chemical change is burning.

Answer 10

Correct Answers

	Chemical change	Physical change
1	○	⊙
2	○	⊙
3	⊙	○

Answers Explanation

To start off with, the water evaporated (liquid water to water vapour), so a physical change. Then, in 2, the sugar crystals at first melted (solid to liquid, but still sugar) until finally, in 3, the sugar burned - it reacted with oxygen in the air to form a mixture of gases (released) and black syrupy stuff, but no longer pure sugar. Did you get them all right? This is a pretty challenging scientific concept to grasp, but also very important, so well done for getting to grips with it in this activity.

Total score: