Physical and chemical changes

YEAR 5

AUTUMN 2

LESSON FIVE

What can we do to investigate chemical reactions?

Do Now – Retrieval practice

1) **Circle the correct phrase in each of the following sentences**

a) In a chemical change/physical change/both, a new substance is created

b) In a chemical change/physical change/both, the same substance changes form.

c) In a chemical change/physical change/both, there is a change in appearance of the substance you start with.

2) **State whether each of the following examples is a chemical or a physical change:**

a. Making toast is a _____ change

b. A puddle evaporating is a _____ change

c. A firework exploding is a _____ change

d. Rain turning to snow is a _____ change

3) Fill in the gaps to describe particles in each state of matter

In solids: particles are very _____ together in a _____ pattern. Particles cannot _____ but can _____.

In liquids: particles are _____ together and in a _____ arrangement. The particles can _____ past each other.

In gases: particles are _____ _____ from each other and in a _____ arrangement. They are _____ constantly in all directions.

Read the passage below about how reactive substances can be

The strength of a chemical reaction can vary between different chemical changes. If there is more heat produced or more bubbles of gas produced more quickly, we say that the substances are **more reactive.**

What signs we see that show that substances are more reactive?

We would see _____

_____

_____

One way of understanding this is by thinking about what would happen if you lit a piece of paper with a match or if you lit some petrol - as petrol is more reactive, you would see a much larger amount of heat given off and possibly an explosion. It is because fuels like petrol are so reactive that having any kind of naked flame at petrol stations is forbidden.

What rule is put in place because of how reactive petrol is?

It is forbidden to _____

_____.

Observe the effect of changing the amount of vinegar on the reaction with sodium bicarbonate

Water and vinegar mixture	Result
¼ vinegar, ¾ water	
½ vinegar, ½ water	
¾ vinegar, ¼ water	
Only vinegar	

Fill in the pattern: The more vinegar there is in the mixture that is added to sodium bicarbonate, the _____.

Read the passage below about variables

In the demonstration above, there were independent, dependent and control variables. The independent variable (which is the thing that we change) was the amount of vinegar in our liquid mixture. The dependent variable (the thing we observe to see how it is affected) was the amount of bubbles that are produced when they are mixed together. The control variables (the things you keep the same to make sure it is a fair test) were the amount of liquid added and the amount of sodium bicarbonate powder.

What the independent, dependent and control variables?

_____ variable are the things you keep the same to make sure it is fair test.

_____ variable is the thing you change.

_____ variable is the thing you observe to see how it is affected.

Read the passage below about variables

Each metal has a different reactivity so the speed that hydrogen bubbles are produced depends on how reactive the metals are. The most reactive metals will produce the most bubbles. The least reactive will produce the least bubbles.

Another chemical reaction takes place if you mix vinegar and different types of metal. When the metal is placed in the vinegar, bubbles of a gas called hydrogen are made. A word equation to show this reaction is as follows:

Metal + vinegar → Hydrogen gas

What is produced when metals are put in vinegar?

_____ is produced when metals are placed in vinegar.

How can we tell which metal is the most reactive?

We tell which metal will be the most reactive because _____

_____.

You are going to investigate whether placing a different metal in vinegar changes the amount of bubbles that are produced. What would the independent, dependent and control variables be?

Independent variable: _____

Dependent variable: _____

Control variables: _____

_____

You are going to investigate which metal is the most reactive when it is placed in vinegar. You will have the following equipment available:

Equipment:

- 4 types of metal
- 4 cups
- Colourless vinegar

What steps can you take to carry out this investigation?

Write a draft method with a diagram to show what you will do:

_____

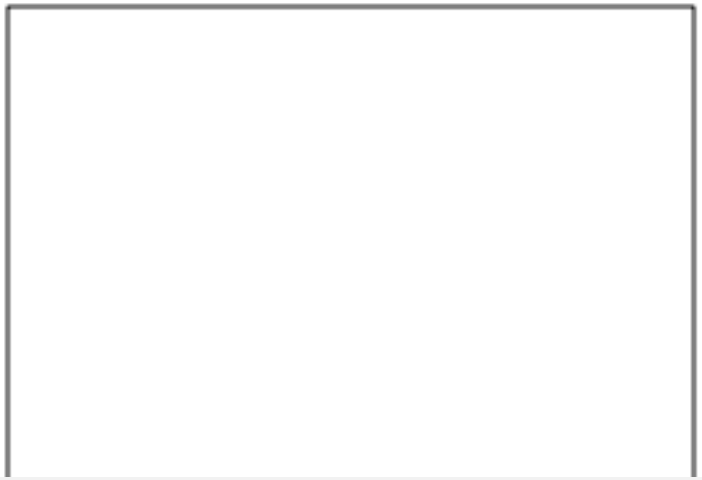
_____

_____

_____

_____

_____



Re-draft your method

Make a prediction - which metal do you think is the most reactive?

HINT: the more reactive the metal, the less shiny its surface is

I think _____ will be the most reactive metal. I will be able to tell if it is the most reactive metal because _____.

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Complete your learning review