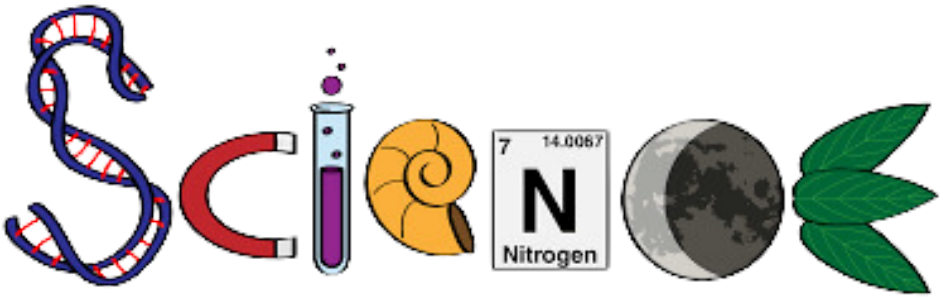
Meopham School



HOMEWORK BOOKLET

Year 9 Term 3

What Happens in a Chemical Reaction?

Homework 1

The equation for the reaction between sodium bicarbonate (bicarbonate of soda) and acetic acid (vinegar) is shown below.

reactants → **products**

$NaHCO_3 + CH_3COOH \longrightarrow CH_3COONa + CO_2 + H_2O$

sodium bicarbonate + acetic acid ⟶ sodium acetate + carbon dioxide + water

1. Complete the table to show how many atoms of each element are in the reactants and the products.

Element	Symbol	Number of Atoms in the Reactants	Number of Atoms in the Products
carbon			
hydrogen			
oxygen			
sodium			

2. What do you notice about the number of atoms of each element when you compare the reactants and products?

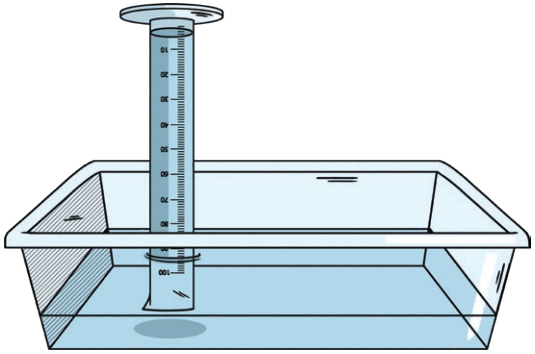
3. Predict what will happen to the mass of the reaction mixture when a chemical reaction occurs. Explain your answer.

Homework 2

Rates of Reaction: Gas Production **Storyboard**

Each of the statements describe one stage in a method. The method is used to investigate the effect of changing the concentration on the rate of a reaction by measuring the production of a gas. Cut out the statements. Match each one to the picture representing the stage in the method it describes. Then, stick the statements in the correct place.

01



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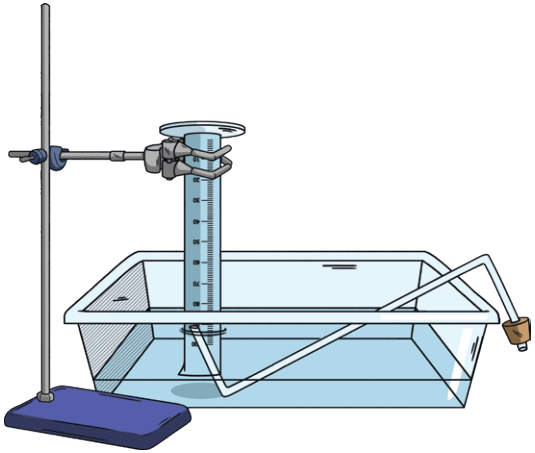

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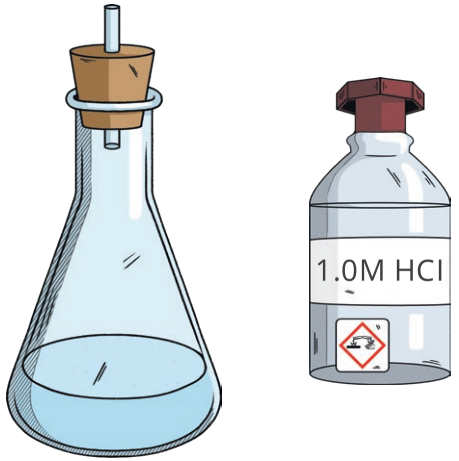
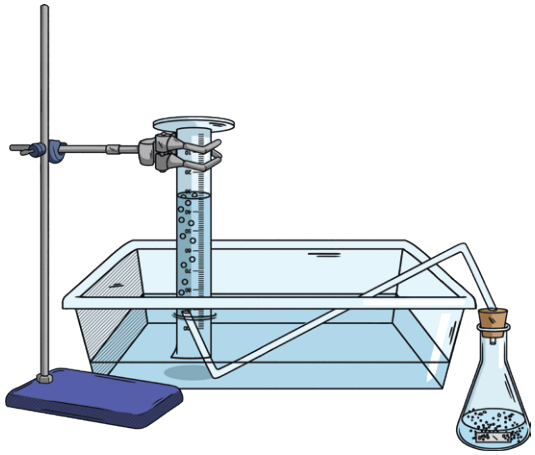


Homework 2

Rates of Reaction: Gas Production **Storyboard**

04

05



06

Homework 2

Rates of Reaction: Gas Production **Storyboard**

Clamp the measuring cylinder into place using a clamp stand. Place one end of a delivery tube into the upside-down measuring cylinder. Gently feed the other end through the hole in a rubber bung.

Repeat the investigation using 1.5M hydrochloric acid. Plot both sets of results on the same graph.

Lightly rub a 3cm piece of magnesium ribbon with sandpaper to remove its oxide layer. Add the piece of magnesium to the hydrochloric acid in the conical flask. Quickly replace the rubber bung. Start a stopwatch.

Measure the volume of gas produced every ten seconds until no more gas is produced. Record your results in a suitable table.

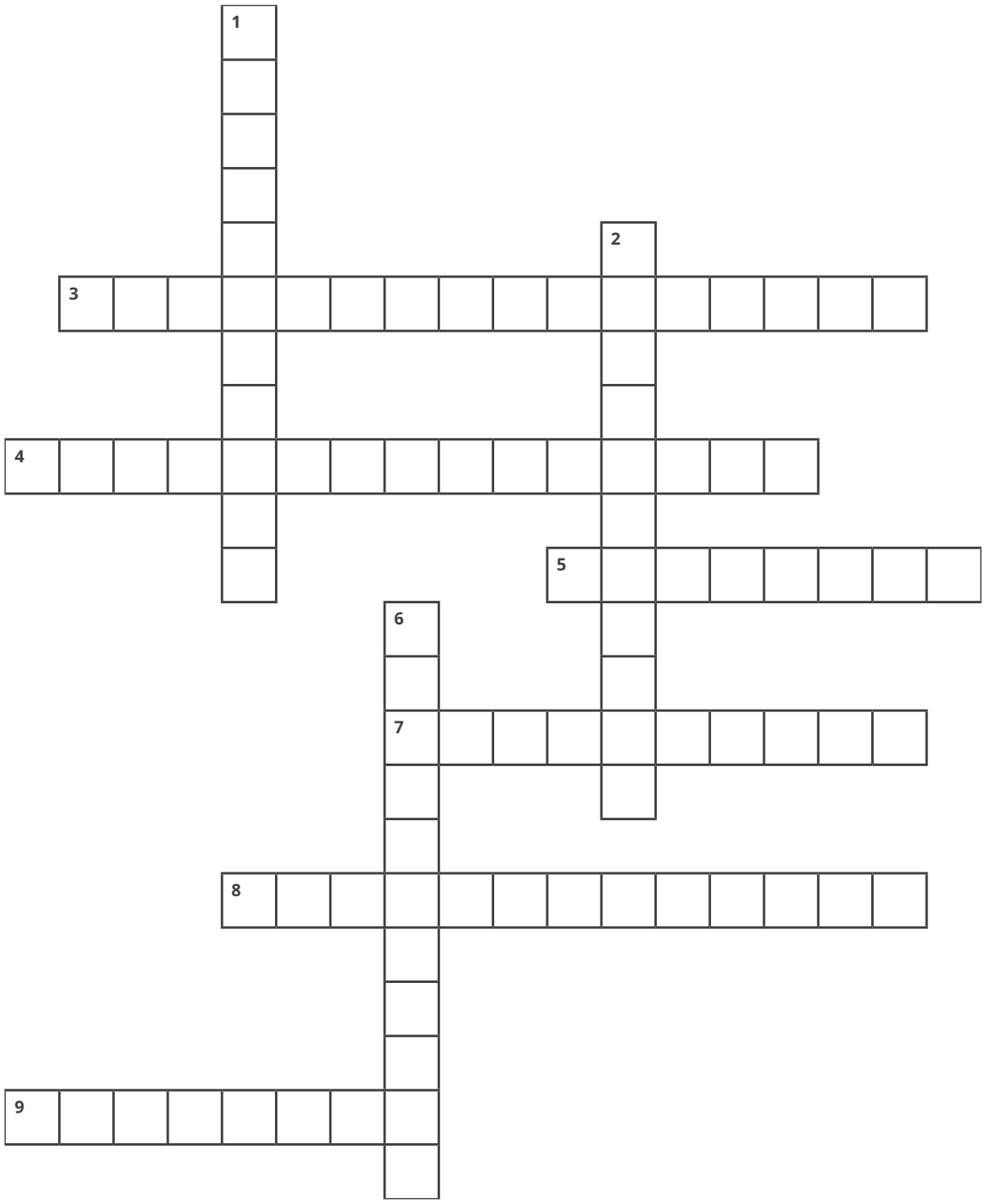
Half-fill a water trough with water. Submerge a measuring cylinder in the water trough and turn it upside-down, ensuring all air bubbles are removed. The bottom of the measuring cylinder should remain below the surface of the water to prevent any water from escaping.

Add 50cm3 of 1.0M hydrochloric acid to a conical flask. Ensure the rubber bung with the delivery tube fits securely in the top.

Homework 3

The Rate and Extent of Chemical Reactions
Crossword

Each of the answers to the clues relates to the rate and extent of chemical reactions. Solve the clues to complete the crossword. Choose the answers from the box below. The numbers at the end of each clue tell you how many letters there are in the answer.



activation energy	concentration	reversible
catalyst	equilibrium	surface area
collision theory	pressure	temperature

Homework 3

Across

3. The minimum amount of energy that particles must have to react. (10,6)

4. The theory that explains how various factors affect rates of reaction. Chemical reactions can occur only when reacting particles collide with each other and with sufficient energy. (9,6)

5. A substance that increases the rate of a chemical reaction by lowering the activation energy without being used up in the reaction. (8)

7. A word to describe a reaction in which the products can react to produce the original reactants. This type of reaction can be represented by: $A + B \rightleftharpoons C + D$. (10)

8. A factor that affects both the rate of a reaction and the position of equilibrium of a reversible reaction. This factor is a measure of the mass of solute per given volume of solution. (13)

9. A factor that can affect both the rate of a reaction and the position of equilibrium of a reversible reaction involving gaseous reactants. (8)

Down

1. A stable situation reached when the forward and reverse reactions in a reversible reaction occur at exactly the same rate in a closed system. (11)

2. A factor, measured in degrees Celsius (°C), that can affect the rate of a reaction. Increasing this factor will favour the endothermic direction of a reversible reaction. (11)

6. A factor that can affect the rate of a reaction involving at least one solid reactant. (7,4)

Reaction Profiles

Homework 3

1. What is activation energy?

   Tick **one** box.

   The amount of energy that is transferred in a reaction. ☐

   The maximum amount of energy that can be released in a reaction. ☐

   The minimum amount of energy that particles need to react. ☐

2. What is an endothermic reaction?

   Tick **one** box.

   A reaction that has no overall energy change. ☐

   A reaction that releases energy to the surroundings. ☐

   A reaction that takes in energy from the surroundings. ☐

3. What happens to the temperature of the surroundings when an endothermic reaction takes place?

   _____

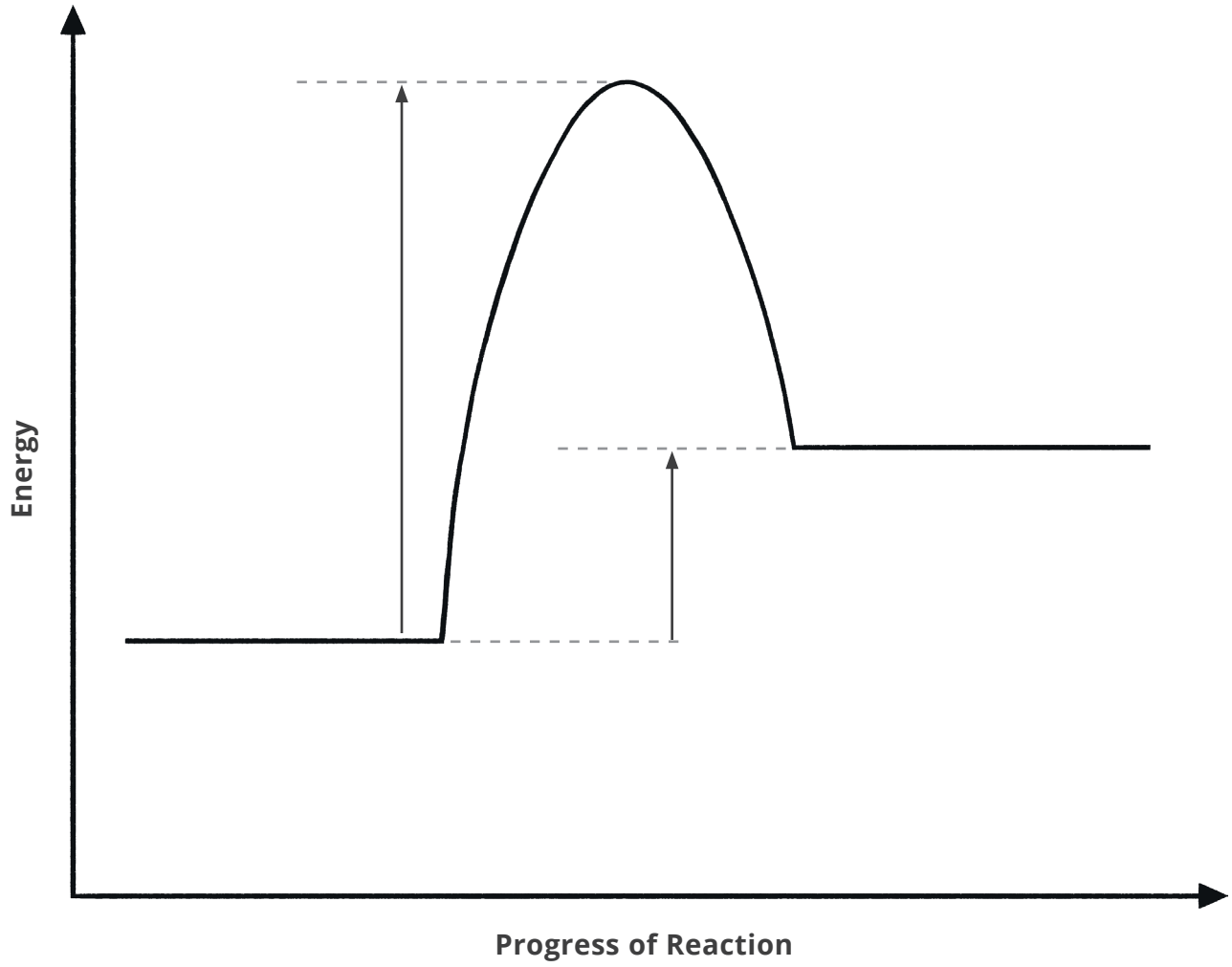
4. Four types of reaction are listed in Table 1. Tick **one** box in each row to decide whether they are examples of endothermic or exothermic reactions.

Table 1

Reaction	Endothermic	Exothermic
combustion		
neutralisation		
thermal decomposition		
the reaction within a sports injury pack		

4. **Figure 1** shows an unlabelled reaction profile.

Figure 1



a. Use the words from the box below to label the reaction profile.

activation energy	overall energy change	products	reactants

b. Name the type of reaction shown in **Figure 1**.

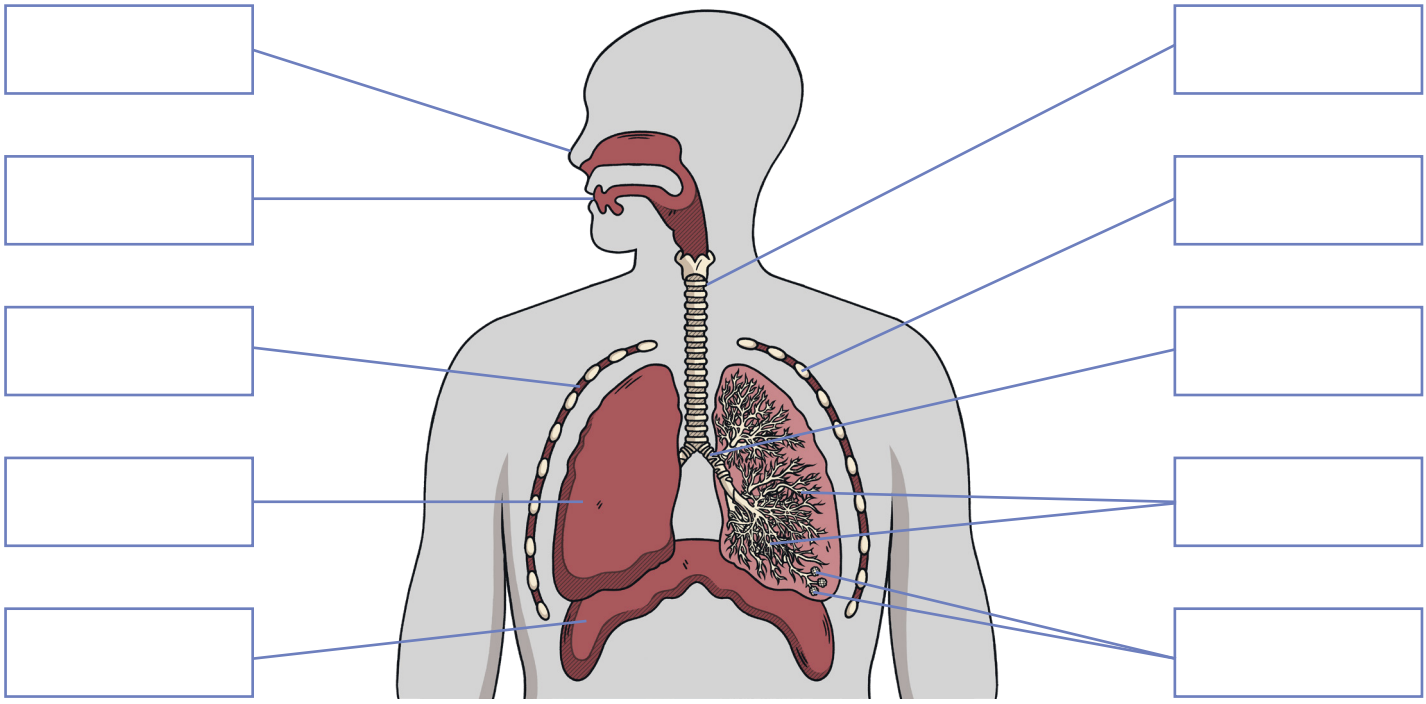
_____

c. A catalyst is added to the reaction shown in **Figure 1**. Describe the effect the catalyst would have on the activation energy of the reaction.

_____

Human Gas Exchange System **Cut and Stick**

Homework 4



Name of Part	Description
trachea	
bronchi (singular: bronchus)	
bronchioles	
alveoli (singular: alveolus)	
intercostal muscles	
diaphragm	
ribs	
lungs	

Homework 4

Cut out the labels below and stick them in the correct position on the diagram. Then, cut out the descriptions and use them to complete the table.

alveoli	bronchioles	bronchus	diaphragm	intercostal muscle
lung	mouth	nose	rib	trachea

A dome-shaped, flat muscle that sits underneath the ribcage. It contracts and relaxes to change the volume of the chest, causing the movement of air into and out of the lungs.
A pair of organs through which air is moved in and out when we breathe.
Muscles found between the ribs. They contract and relax to help move air into and out of the lungs.
Small tubes that lead from the bronchi to the alveoli.
Tiny air sacs arranged in clusters throughout the lungs. They provide a large surface area for gas exchange to take place.
The bones that protect the organs in the chest.
The tube through which air travels from the mouth and nose to the lungs. Also known as the windpipe.
The two tubes that lead from the trachea into the lungs.

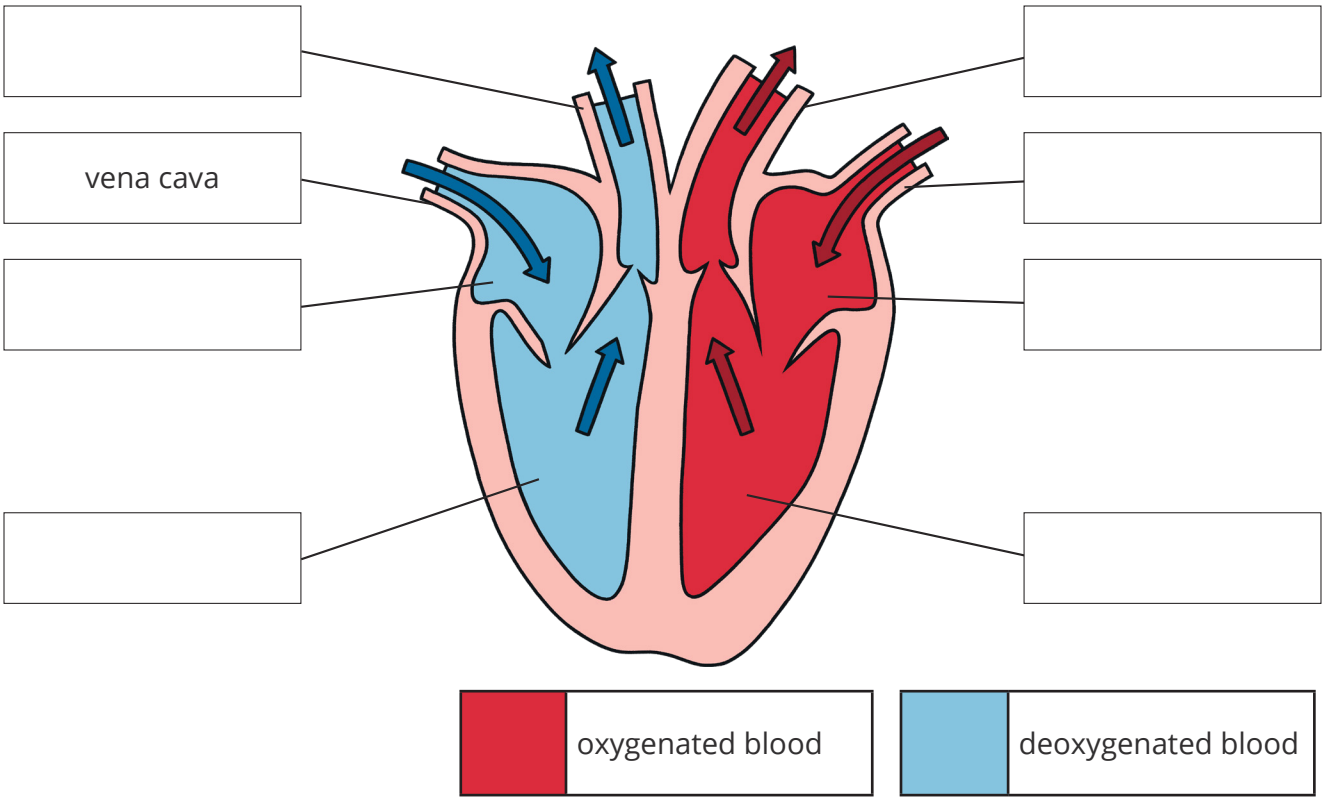
The Heart

Homework 5

The heart is part of the circulatory system. Humans have a double circulatory system; the heart pumps the blood through two circuits. The right side of the heart pumps blood to the lungs and the left side of the heart pumps blood to the rest of the body.

Blood enters the heart through the **vena cava** and passes into the **right atrium**, then into the **right ventricle**. The muscles in the right ventricle wall push the blood through the **pulmonary artery**, which carries the blood to the lungs. At the same time, blood from the lungs enters the heart through the **pulmonary vein**, passes through the **left atrium** and into the **left ventricle**. Muscles in the left ventricle wall push the blood through the **aorta**, which takes the blood to the rest of the body.

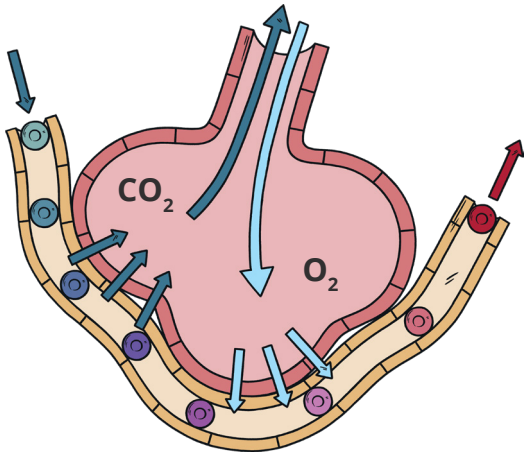
1. Label the parts of the heart in the diagram below.



2. Explain why the muscle wall on the left side of the heart is thicker than the wall on the right side of the heart.

3. Explain why the heart has valves between the chambers.

Blood arriving at the right side of the heart is **deoxygenated**. The right side of the heart pumps blood to the lungs. Blood returning to the left side of the heart is **oxygenated**. The diagram below shows blood passing through a capillary close to an alveolus in the lungs.



4. Use the diagram to describe the process of gas exchange in the lungs. Try to include all the key words in the box.

alveoli	carbon dioxide	diffuses	exhaled
inhaled	oxygen	red blood cells	

The left side of the heart pumps oxygenated blood to the rest of the body.

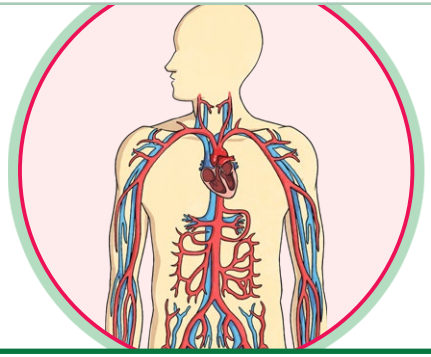
5. Describe what happens to the substances in the blood as it passes close to the body tissues. Try to include all the key words in the box.

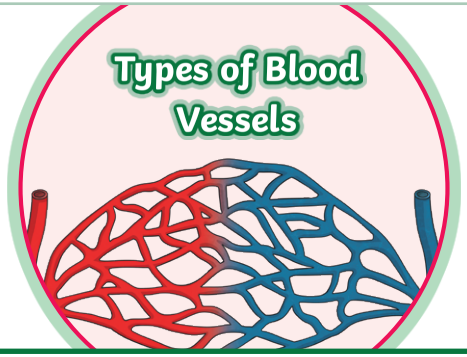
carbon dioxide	diffuses	glucose	energy
muscle	oxygen	respiration	

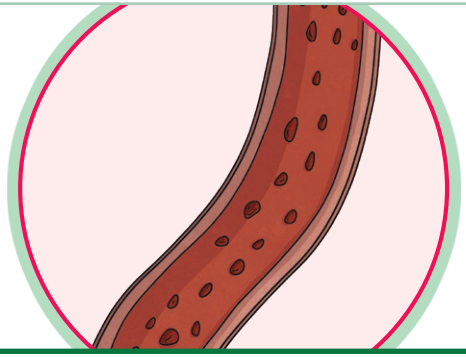
Homework 5

Types of Blood Vessels

In the boxes below, write down everything that you know and have found out about different types of blood vessels. What are the different types of blood vessels? What is their function? How does their structure support their functions?







Type of blood vessel:

Function:

Structure:

Type of blood vessel:

Function:

Structure:

Type of blood vessel:

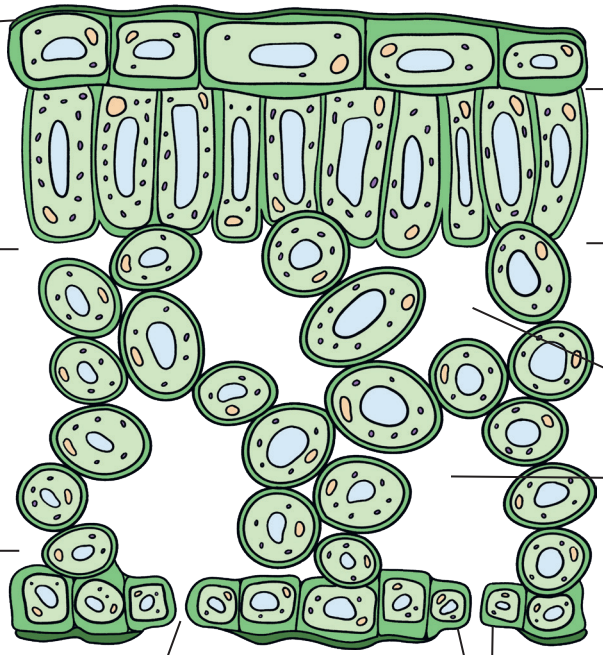
Function:

Structure:

Homework 6

Structure of a Leaf

Complete the boxes to name the structures that make up the leaf and describe the function of each part.



Structure:	Structure:
Function:	Function:
Structure:	Structure:
Function:	Function:
Structure:	Structure:
Function:	Function:

Transport in Plants

Homework 6

Re-write the descriptions below and sort them into the correct column to show whether they describe the xylem or the phloem.

Xylem	Phloem

The ends of the cell walls break down to form pores.	Substances move in both directions throughout the plant.
Transport through this vessel is known as translocation.	Strengthened by lignin.
Mature cells that make up the tissue are dead.	The cells that make up the tissue are living.
Work with companion cells.	Involves the transport of water and mineral ions.
Involves the transport of dissolved sugars.	Transport through this vessel is known as the transpiration stream.
The cell walls break down to form hollow tubes.	Substances move in one direction from the roots to the leaves.