Kirkcaldy High School

N3/4 Science

Human Health

Measuring Health

Name: _____

Class: _____

Teacher: _____

Expectations and Outcomes Learner Evaluation

Topic: Measuring Human Health

L1	**LI**	**Learn about the health triangle**	**Date**	☺ ? ☹
	SC	I can state that the health triangle is comprised of physical health, mental health and social health.		
		I can state that all three sides of the health triangle contribute to being healthy		
L2	**LI**	**Measuring Physical Health**		
	SC	I can give examples of how to measure our physical health. Such as: - Heath rate can be measured by a heart rate monitor - Temperature by a thermometer - Blood pressure by a		
L3	**LI**	**Learning about the Circulatory system**		
	SC	I can describe the circulatory system as being made up of the heart, veins and arteries.		
		I can state that the heart pumps blood around the body to delivery oxygen.		
L4	**LI**	**Learning about pulse rate and exercise**		
	SC	I can measure my own pulse rate.		
		I can state that pulse rate increases with exercise.		
L5	**LI**	**Learning about blood pressure**		
	SC	I can state the healthy range for blood pressure		
		I can state that blood pressure can be affected by stress, weight and if you are a smoker.		
	LI	**Learning about the Respiratory system**		
	SC	I can describe the respiratory system.		
	SC	I can state that the lungs take in oxygen and expel carbon dioxide.		

	SC	I can state that a normal breathing rate is between 12-20 breaths per minute.		
	SC	I can state that exercise increases breathing rate because muscles need more oxygen		
	LI	**Learning about ways to measure lung function**		
	SC	I can describe ways to measure lung function.		
	SC	I can state that peak flow is how fast air can be expelled from the lungs		
	SC	I can state that vital capacity is a measurement of lung volume		
	LI	**Research project about Vaping and the effects on health**		
	SC	I can find information about Vaping and health.		
	SC	I can present the information that I find as a poster/ power point presentation.		
	SC	I can discuss my research with		
	LI	To learn about body temperature and ways to measure it		
	SC	I can describe state the normal temperature range for the human body is 36.0-37.5^{o}C		
	SC	I can state that hypothermia is an abnormally low body temperature.		
	SC	I can state that hyperthermia is an abnormally high body temperature		

Date: _____

Health Triangle

Starter

1. How do you know if you are healthy?

_____

_____

2. How do you know if you are not healthy?

_____

_____

Learning Intentions

- To learn about the health triangle.

Success Criteria

- ❑ I can describe the health triangle as being composed of physical, mental and social health.
- ❑ I can state that all three sides of the health triangle contribute to being healthy.

Health Triangle

Good health means more than not being ill. Good health means being **physically** and **mentally** healthy and having a feeling of **social well-being.**

What does this mean?

Physical Health: The parts of the body *e.g.* heart, lungs, kidneys, skin, muscles, teeth, all work properly.

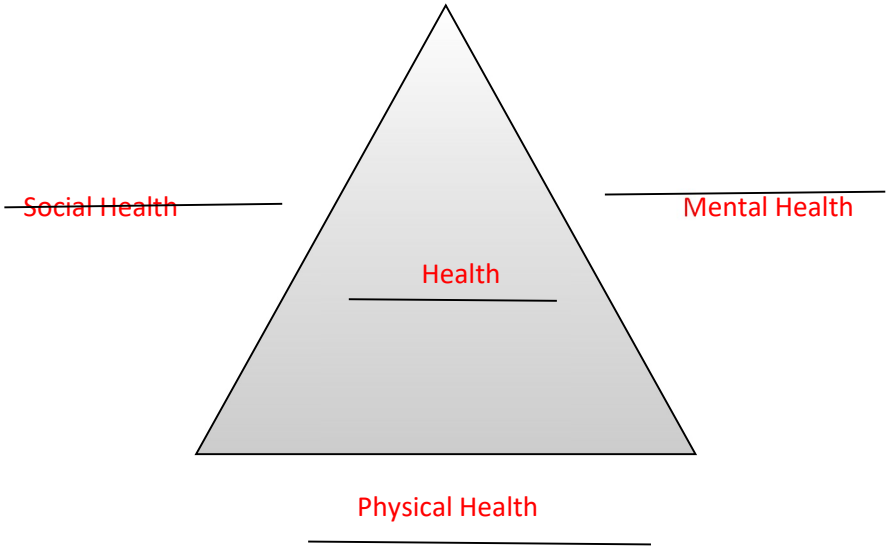
Mental Health: This means that someone's emotions or state of mind are balanced or normal.

{www.mind.org.uk is a good place for information}.

Social Health: This means how well someone can communicate with and form relationships with other people.

The Health Triangle Δ

There are three sides to having good health you can show the meaning of health using a triangle. Fill in the words from the slides.



Having a Healthy Lifestyle:

Having a healthy lifestyle allows you to live life to the full; because it **reduces** the chance of your health triangle **collapsing**.

Important parts of a Healthy Lifestyle

The things in the box below are important for a healthy lifestyle; put them in order of importance in the league table.

- Relaxing after working hard.
- A balanced diet.
- Keeping fit with regular exercise.
- Having an active hobby or activity e.g. football or dancing.
- Good personal hygiene (wash every day and when handling food).
- Avoiding health risks like smoking, too much alcohol or taking drugs.

Lifestyle League Table: - rate these parts of a healthy lifestyle. **1** is **Most** important, **6** is **least** important.

Factors affecting life style	**Importance**
Relaxing after working hard.	
A balanced diet.	
Keeping fit with regular exercise.	
Having an active hobby or activity e.g. football or dancing.	
Good personal hygiene (wash every day and when handling food).	
Avoiding health risks like smoking, too much alcohol or taking drugs.	

Physical Health

This aspect focuses on the body's ability to function correctly and efficiently. To increase your physical health, you can:

- Exercise **regularly**.
- Eating a balanced, nutritious **diet**.
- Get enough **sleep** and rest.
- Resisting harmful substances e.g. alcohol,**drugs**, tobacco.
- Maintain a healthy **weight**.
- Practice good personal **hygiene**.

Social Health

This aspect refers to a person's ability to interact with their surroundings. It includes family, peer relationships and public communication. To ensure good social health, you can:

- Learn how to **communicate** with others
- Show **respect**.
- **Care** for yourself and others.
- Seek and lend **support.**
- Have the ability to make **friends.**
- Know how to **interact appropriately** with different groups of people e.g. at work, at home, in public.

Mental Health

This aspect refers to how a person thinks, feels and how they cope with everyday life. Someone who has a good emotional health:

- Knows what they are **feeling** and can **express** those feelings in an appropriate manner.
- Enjoys learning and develops their **thinking skills**.
- Learns from their **mistakes** and accepts **responsibility**.

Task

Design a poster about the health triangle

Measuring Health

Starter

1. Draw the health triangle.

2. State two ways to stay physically healthy.

3. State 2 ways to maintain good mental health.

Learning Intentions

- To learn about ways to measure our physical health.

Success Criteria

❑ I can state some ways to measure our physical health.

Measuring Health

Many people need to know what a normal healthy person is like: **Doctors**, **Nurses**, **Sports Coaches** and **Nutritionists** (as well as you and I), need to know exactly what normal health is. They are then **able to tell** if someone is **unhealthy** or at risk of being unhealthy.

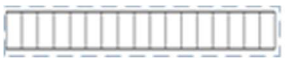
Physiology:

This is the science of how the human body works.

Physiologists have several ways of measuring the body to see what is normal for a healthy person.

Instruments to Measure human health

Instrument	Looks like	Used to measure
stethoscope		**Heart beat**
heart monitor		**Heart beat/rate**
stopwatch		**Time**
pulsometer		**Pulse rate**
sphygmomanometer		**Blood pressure**
spirometer		**Lung capacity**
Peak flow meter		**Lung capacity**

Instrument	Looks like	Used to measure
Skinfold callipers		**Body fat**
clinical thermometer		**Temperature**
liquid crystal thermometer		**Temperature**
digital clinical thermometer		**Temperature**
dynamometer		**Grip strength**
calibrated ruler		**Length**

What can we Measure to Show that Someone is Healthy?

There are several things that we can measure easily which show if a person is healthy or not. Write down the things a doctor might measure to see if we are healthy.

1. Temperature	4. Weight
2. Body fat	5. Pulse
3. Height	6. Blood pressure

Doctors use special instruments to make physiological measurements of our bodies.

You are going to carry out a series of experiments using some of the equipment mentioned above.

Circulatory System

Starter

1. State 3 ways to measure your health, include the equipment that would be used.

_____

_____

_____

Learning Intentions

- To learn about the circulatory system.
- To learn about the heart and how it works.

Success Criteria

- ❑ I can describe the circulatory system.
- ❑ I can state that the heart pumps blood around the body to delivery oxygen.

The Circulatory System

The circulatory system is made up of the **heart** and blood vessels.

The heart pumps **oxygen** and **food** around the body in the blood through blood vessels. It transports **oxygen** and also gets rid of waste materials (like **carbon dioxide**).

The Heart

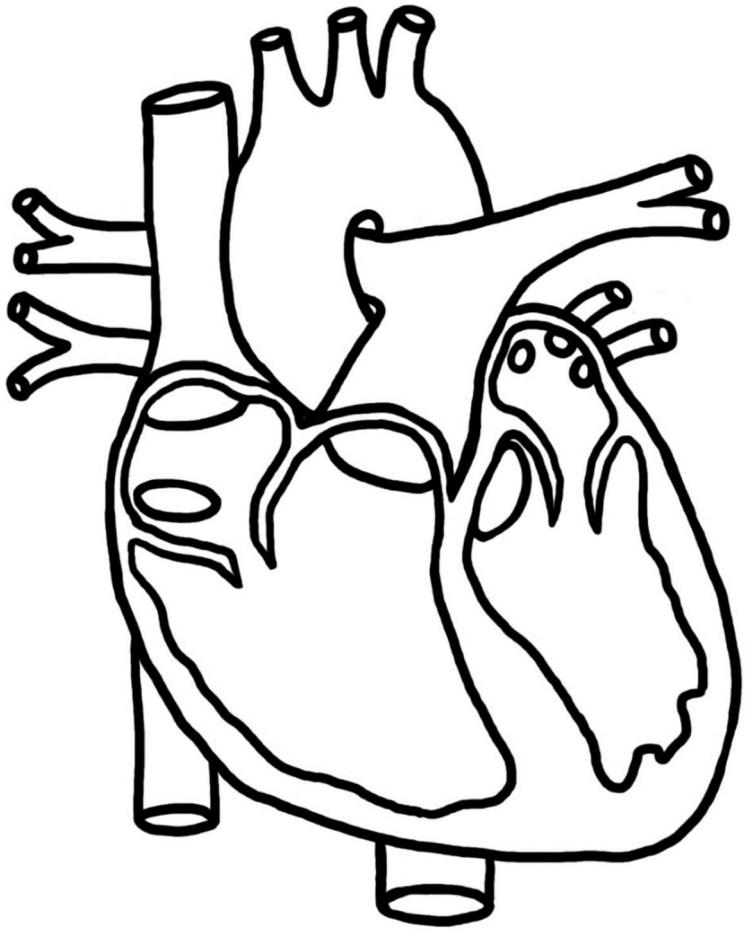
It contains **four** chambers and is connected to the rest of the body via blood vessels called **veins** and **arteries**.

The heart is a muscle. Cardiac muscle is very strong, it never has a rest!

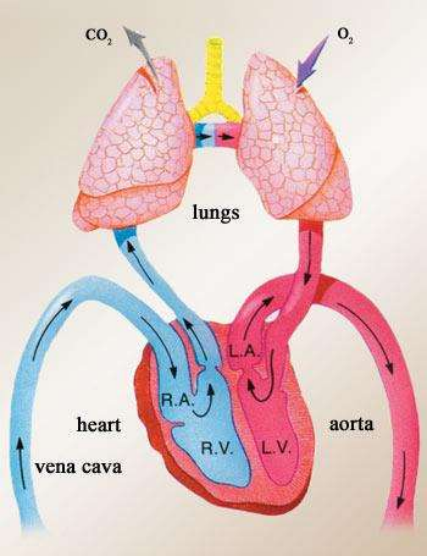
The Heart Diagram

On the diagram below, your teacher will help you to:

1. Draw arrows and label the chambers
2. Colour in the chambers red and blue to show areas of high oxygen and low oxygen
3. Add a key



Heart Summary



- There are **four** chambers inside the heart.
- The right side of the heart pumps blood to the **Lungs.**
- The left side of the heart pumps blood to the **rest of the body.**
- The left side of the heart pumps blood containing lots of **<u>Oxygen.</u>**

Measuring Heart Health

List the ways that we can check that our heart is healthy:

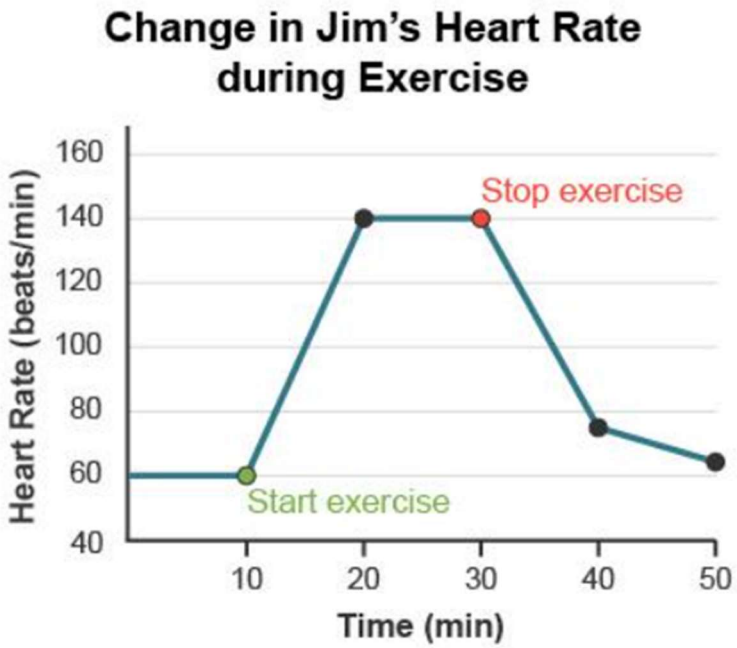
_____

_____

_____

Measuring Pulse Rate

Starter



1. What was Jims heart rate at the start of his exercise _____
2. What was the maximum heart rate that Jim's heart reached _____
3. At what time did Jim's heart rate reach 63 beats/minute _____

Learning Intentions

- To learn how to measure pulse rate.
- To learn about the effect of exercise has on your pulse rate.

Success Criteria

- ❑ I can measure my own pulse.
- ❑ I can state that exercise increases pulse rate as muscles require more oxygen.

Measuring Pulse Rate

Pulse rate is the number of times the heart **beats** per **minute.** Pulse rate can be measured using your fingers and a stopwatch, a pulsometer or a heart rate monitor.

Measuring your pulse rate

1. Set a Timer for 20 seconds, locate your pulse in your wrist or your neck.
2. Count the number of times your feel your pulse in 20 seconds.
3. Calculate the beats per minutes (x3).

Attempt	Beats per 20 seconds	Beats per minute
1		
2		
3		
	Average rate =	**bpm**

Factors affecting resting pulse rate

There are many things which can have an effect on your pulse rate. Fill in the table below to show how you think these factors impact on pulse rate.

Factor	Effect on Resting Pulse rate
Body size	**Increases as person gets heavier**
Age	**Lower in adults than children**
Fitness	**Decreases as a person gets fitter**

Any value between **50** and **100** beats per minute is within the normal range.

A pulse rate above **100** beats per minute (during rest) is normally unhealthy and can eventually lead to heart disease.

Pulse Rate and Exercise

When we exercise, our muscles need more **oxygen**. This means that our blood needs to be pumped round the body **faster**. This is why our heart rate **increases** when we exercise.

Athletes usually have a much lower resting pulse than normal because their hearts work much more **efficiently**. Their heart rate returns to normal after exercise much more quickly than in someone who is not used to training

Heart Rate Investigation

Aim (What do you hope to find out?):

_____

_____

Materials & method:

_____

_____

_____

- What equipment will you need?

_____

_____

- What is the independent variable? (The variable you are changing)

_____

- What is the dependent variable? (The variable you are measuring)

_____

- What variables will you keep the same?

_____

Hypothesis (What do you predict will happen?):

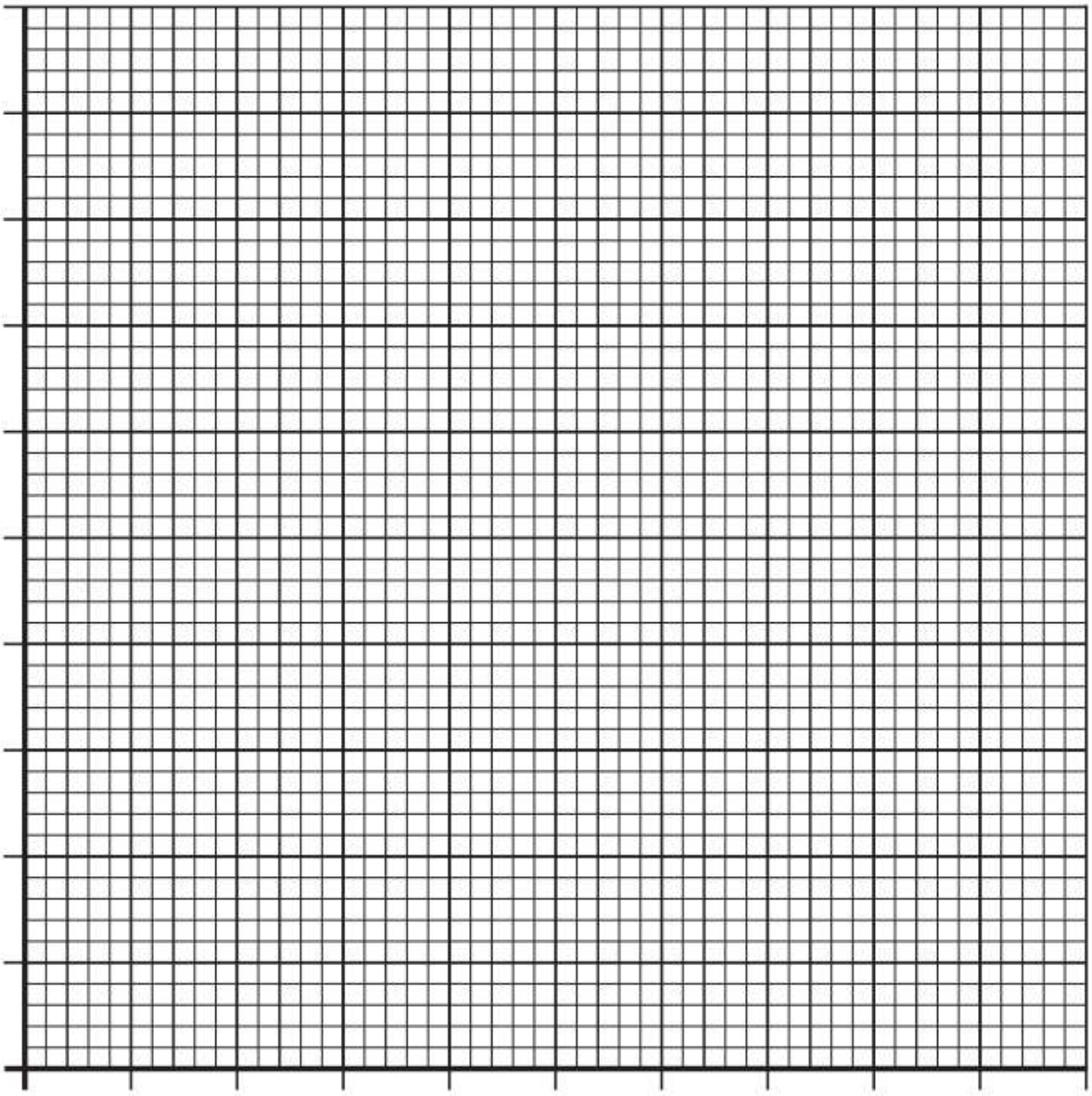
_____

_____

Results:

Type of Exercise	Heart Rate (Beats in 20 seconds)	Heart Rate (Beats per minute)

Graph:
Draw a bar chart to show how the type of exercise affects your heart rate (bpm).



Conclusion:

_____

_____

Evaluation (If you were to do the investigation again, how could you improve your results?):

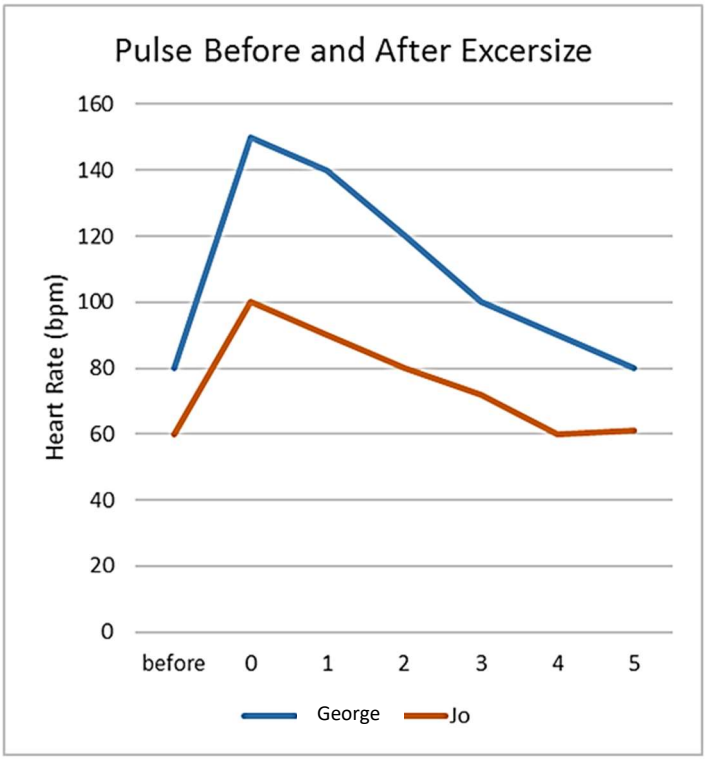
_____

_____

Which is right?

1. A high / low resting pulse rate shows that a person is fitter.
2. A fit person will have a much shorter / longer recovery time
3. What is George's resting pulse rate? _____ (remember units!)

Who is fitter?



4. What is Jo's resting pulse rate? _____
5. What happens to their pulse when they start to exercise? _____

_____

6. What happens to their pulse once they stop exercising? _____

_____

7. Who's body has the shortest recovery time? _____
8. Who is the fittest? _____

Blood Pressure

Starter

1. pupils out of a class of 20 have a resting heart rate of 64 beats per minute. What percentage of the class have this heart rate?

2. Our heart rate can increase from our resting rate for a number of reasons. State 2 reasons for an increase in heart rate.

Learning Intentions

- To learn about the Blood Pressure
- To learn about the normal range for healthy blood pressure.

Success Criteria

- ❑ I can describe what blood pressure is.
- ❑ I can state that the healthy range for blood pressure.
- ❑ I can state that blood pressure can be affected by stress, weight and if you are a smoker.

Blood pressure

Blood pressure can be measured using:

- **A stethoscope** and mercury or **analogue manometer.**
- digital **sphygmomanometer**

Blood pressure is measured in millimetres of mercury (mmHg) and is given as two figures:

Systolic pressure is the pressure when your heart pushes blood out

Diastolic pressure is the pressure when your heart rests between beats

Normal blood pressure is considered to be **120/80 mmHg**

Measuring Blood Pressure

Aim

To measure my own blood pressure using.

Method

Results

My Blood Pressure: _____..

Compare your blood pressure to the chart.

Is your blood pressure is in the healthy range _____.

Factors affecting blood pressure

There are various factors that can increase blood pressure, including:

- **Being overweight**
- **Lack of exercise**
- **High fat/salt diet**
- **Excessive alcohol consumption**
- **Stress**

The Respiratory System

Starter

1. Name the main organ in the respiratory system

2. Name the gas we breath in

3. Name the gas we breath out.

Learning Intentions

- To learn about the respiratory system.
- To learn about the different parts of our respiratory system and how it works.

Success Criteria

- ❑ I can describe the respiratory system.
- ❑ I can state that the lungs take in oxygen and expel carbon dioxide.

The Respiratory System

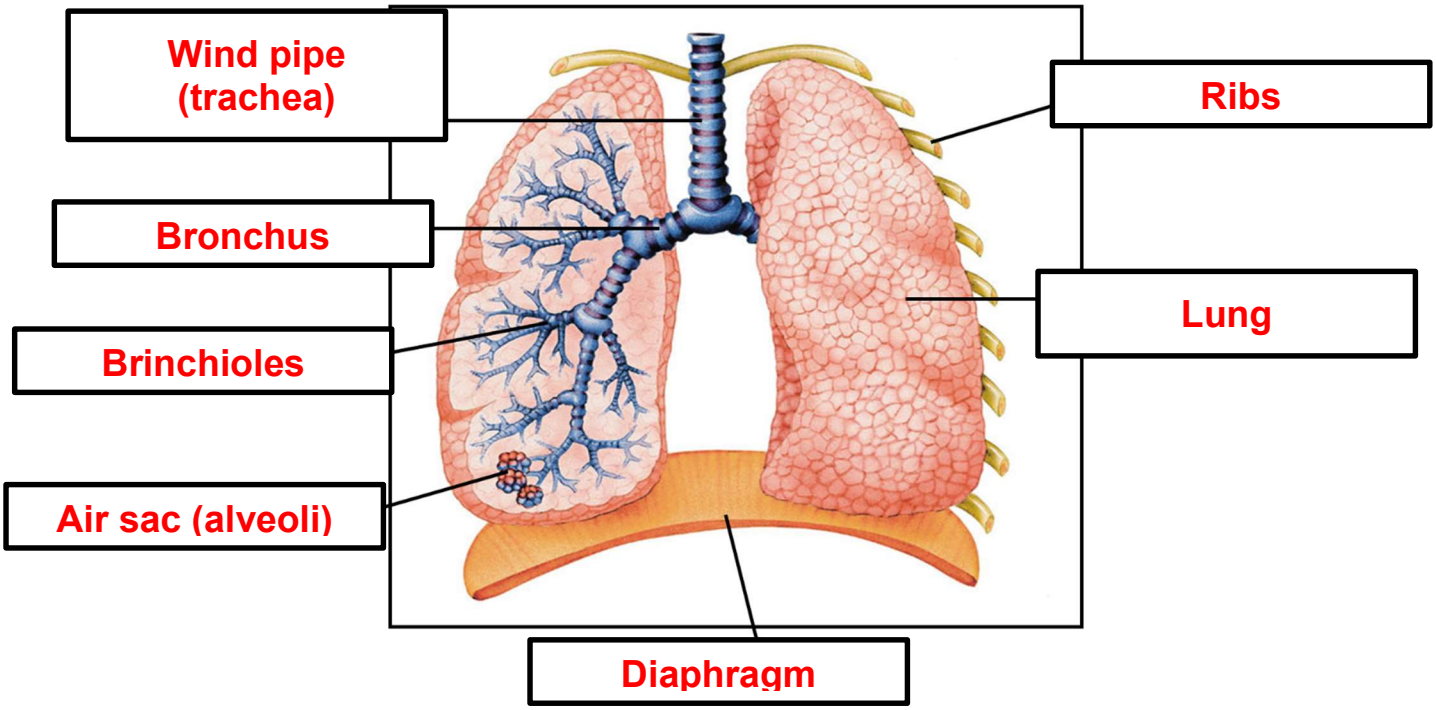
During breathing **oxygen** is breathed in and **carbon dioxide** is breathed out.

The inhaled air travels down the **wind-pipe** to the **bronchus**, then the **bronchioles** and finally to the **air sacs** (alveoli).

The oxygen passes from the alveoli into the tiny **capillaries** to be transported around the **blood**.

The carbon dioxide passes from the **blood** into the air sacs to be exhaled from the body.

Structure of the lungs



The windpipe and the bronchi have rings of **cartilage** in them. This makes sure that they always stay open.

Lung Dissection

Date: _____

Starter

1. Estimate the number of times you breath per minute.

2. Estimate the number of times a new born baby breaths per minute.

Learning Intentions

- To learn about breathing rate.
- To learn about how breathing rate is affected by exercise.

Success Criteria

- ❑ I can state that a normal breathing rate is between 12-20 breaths per minute.
- ❑ I can state that exercise cause an increase in breathing rate.

Breathing rate

Breathing rate is the **breaths** of **air** (inhalation and exhalation) taken per minute.

Breathing rate for a healthy adult is between 12-20 breaths per minute at rest.

Breathing rate depends on:

_____ _____

_____ _____

Aim

To find out the effect of exercise on breathing rate.

Method

1. Count the number of times you breath in one minute.
2. Exercise for 2 minutes
3. Measure your breathing rate in one minute.
4. Allow your breathing to return to normal before doing the next exercise.
5. Repeat for other types of exercise.

Results

Type of Exercise	**Breathing rate (Breaths per minute)**
At rest	

Conclusion

_____

_____

Measuring Lung Function Date: _____

Starter

Literacy task - Asthma

Asthma is a condition that affects the lungs, making it hard to breathe. Many young people, just like you, have asthma. It's essential to understand what asthma is, how it affects you, and how to manage it so you can live a healthy and active life.

Asthma is a chronic condition that affects the airways in your lungs. When you have asthma, your airways become inflamed and swollen, making it harder for air to flow in and out of your lungs. This inflammation can also cause your airways to become narrow and produce excess mucus, further blocking airflow.

Symptoms of Asthma
Wheezing: A whistling sound when you breathe.
Coughing: Especially at night or early in the morning.
Shortness of breath: Feeling like you can't catch your breath.
Chest tightness: A squeezing sensation in your chest.

Asthma symptoms can be triggered by various factors, including:
Allergens: Such as pollen, dust mites, pet dander.
Irritants: Like smoke, pollution, strong odours.
Respiratory infections: Such as colds or flu.
Physical activity: Especially in cold or dry air.
Stress or strong emotions.

Managing Asthma:
Managing asthma involves working with your doctor to create a personalized asthma action plan. This plan will include taking your prescribed asthma medications as directed. Avoiding triggers that worsen your symptoms.
Using a peak flow meter to monitor your lung function

1. What is asthma, and how does it affect the lungs?

2. List four symptoms of asthma.

3. Name two common triggers of asthma symptoms.

4. How can you manage asthma effectively?

Learning Intentions

- To learn about Peak flow measurements to measure our lung function.
- To learn about measuring vital capacity.

Success Criteria

- ❑ I can describe ways to measure lung function.
- ❑ I can state that peak flow is how fast air can be expelled from the lungs
- ❑ I can state that vital capacity is a measurement of lung volume.

Suggest ways to measure lung health.

_____

_____

Measuring Lung Function

What does **vital capacity** measure:

_____

_____

Vital capacity results: _____

What does **peak flow** measure:

_____

_____

Peak flow Results: _____

Smoking

Substance	**Effect on the body**
	A **poisonous** gas. Stops red blood cells from carrying **Oxygen** around the body. Your heart has to work harder so can cause heart disease.
	A drug made by tobacco plants. Increases **heart rate.** Highly **addictive**.
	Sticky substance that **clogs** lungs. Can cause **cancer**. It is also used to **lay roads**.

Smoking effect on sports performance

Smoking causes both immediate and long-standing effects on exercise and physical activity. smokers have:

- Less **endurance.**
- Poorer **physical** performance
- Increased rates of **injury** and complications
- less **benefits** from physical training.
- less muscular **strength** and **flexibility**.

Date: _____

Research Task: Vaping and Health

Starter

True or false

1. Vaping amongst secondary school children is rising.
2. 9% of 11–15-year-olds vape regularly.
3. The long-term effects of vaping on health are not known.
4. Vapes contain nicotine which is an addictive substance.

Learning Intentions

- To learn about Vaping and the associated health risks.
- To develop communications skills is sharing your research,

Success Criteria

- ❑ I can find information about Vaping
- ❑ I can present the information that I find as a poster/ power point presentation.
- ❑ I can discuss my research with others and answer questions about it.

Research

Questions that will help you get started:

- What is in a vape?
- How do they compare to cigarettes?
- What effects on health do they have?
- Why are they flavoured?
- What age groups are vapes mostly used by?

Research	Sources

Body Temperature

Starter

1. Comment on the health risks linked to vaping.

_____

_____

2. Comment on the health risks linked to smoking cigarettes.

_____

_____

Learning Intentions

- To learn about normal body temperatures.
- To learn about measuring body temperature.

Success Criteria

- ❑ I can describe state the normal temperature range for the human body is 36.0-37.5^{o}C
- ❑ I can state that hypothermia is an abnormally low body temperature.
- ❑ I can state that hyperthermia is an abnormally high body temperature.

Body Temperature

Normal Body Temperature

The normal temperature of the human body is **37^{o}C**.

The normal range of body temperature is **36.1 – 37.2^{O}C.**

Body temperature can be measured using various types of **thermometers.**

Measuring Body Temperature

Aim: To measure your body temperature using various thermometers.

Method: Body temperature was measured using a digital clinical thermometer and a liquid crystal strip thermometer.

	Body Temperature (°C)			
Thermometer	1	2	3	average
Glass clinical				
Digital clinical				
Liquid crystal strip				

Conclusion

_____

_____

Evaluation

_____

_____

Hypothermia – Low Body Temperature

Starter

1. Name the equipment to measure temperature.

_____

_____

2. State 2 ways to maintain a healthy body temperature in winter.

_____

_____

Learning Intentions

- To learn about hypothermia.

Success Criteria

- ❑ I can state that hypothermia is an abnormally low body temperature.
- ❑ I can state that hyperthermia is an abnormally high body temperature.

Hypothermia

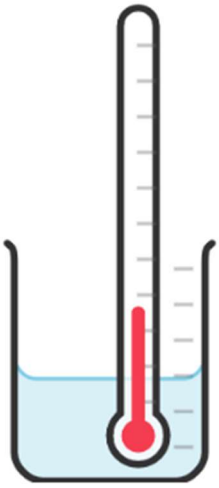
The body temperature can drop **dangerously low** if you live in a cold climate and don't have the correct clothing. Some materials can be described as **insulating** and good at keeping the body **warm**. Whilst other materials are less good at insulating and maintaining the body temperature.

Aim

To determine which materials that are good at minimising heat loss.

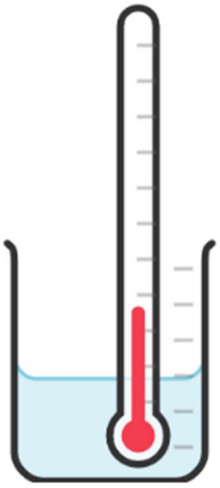
Method

1. Fill three beakers with 150 cm^3 of hot water.
2. One beaker will have no insulation.
3. Beakers 2 and 3 will have different insulation materials around them.
4. Record the start temperature for each beaker.
5. Record the temperature after 10 minutes.



1

No insulation



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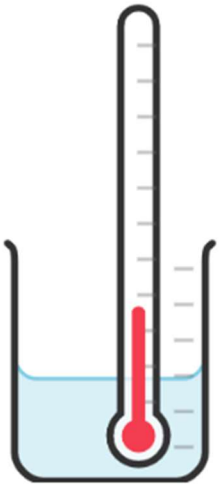
Material 1



3

Material 2

Results

	Temperature / °C		
Material	Start	Final	Change
None			

Conclusion

_____

_____

Evaluation

_____

_____

Hyperthermia – High Body Temperature

Starter

1. State the range for a normal body temperature.

2. State the term used to describe a dangerously low body temperature.

Learning Intentions

- ❑ I can state that hyperthermia is an abnormally high body temperature.
- ❑ I can state that if the body temperature is too high for too long the bodies cells and process cab be damaged.

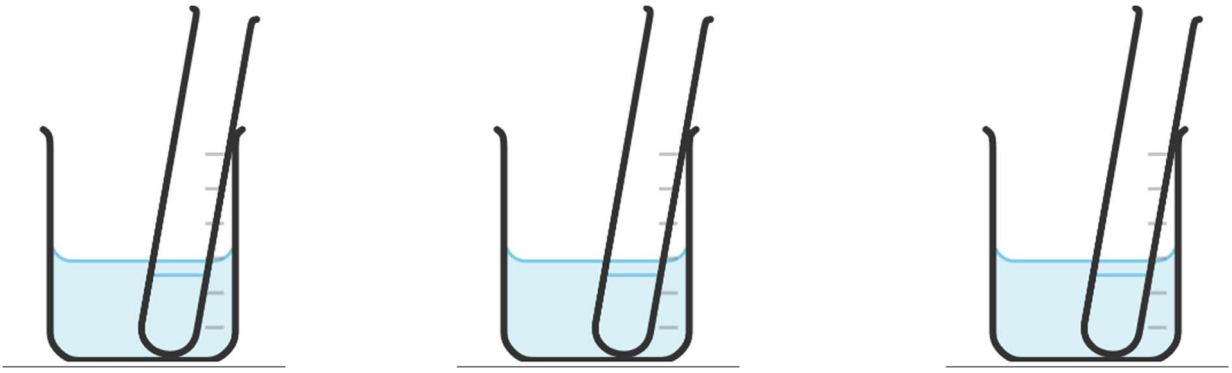
Hyperthermia

The body can have a **dangerously high** body temperature if you have an **infection** for example. If your temperature becomes too high this can cause damage to your body's **cells** and cell processes.

Aim

To investigate how temperature affects proteins in the body

Method



Cold water **30°C** **45°C**

1. Setup three beakers with 100cm^3 of water at different temperature.
2. Place a test tube containing egg white into each beaker.
3. Record your observations.

Results

Temperature (°C)	Observations

Conclusion

_____

_____

Extension Tasks

Questions

1. State the number hours of sleep should a 14-year-old aim for each night to maintain good health?

_____
_____

2. State the recommended daily intake of fruits and vegetables for a teenager?

_____
_____

3. State often should a 14-year-old engage in physical activity to stay healthy?

_____
_____

4. Sate some common signs that indicate a person might be stressed?

_____
_____

5. State why is it important to stay hydrated, and how much water should a 14-year-old drink daily?

_____
_____

6. State some ways to maintain good oral hygiene and why is it important?

_____
_____

7. State the range for a health heart rate.

_____
_____

8. State the range for healthy blood pressure.

_____

_____

9. State the range for healthy temperature.

_____

_____

10. Name the equipment that can be used to measure how well the lungs are functioning.

_____

_____

Inside the Human Body

I S Y E N D I K K N Q N M Q S N D H M E U S A X
D O A B F F C L G Q Z B H N D O Z M B J U G I W
K P S E V Y O Z G W I B U G V C E X U G G W D E
U I Q F C U B M U P Q F O Z N C M P A G K B F B
W A P O G H T U G M Y L I O G G G H J V X R T Z
E W U E U W O S G J M X Q G A W P G O C A V T N
A M S A L P E C M C G W Z L X O F C X U O C L B
N J V E A K Z L T K U K L E S I U E U N C U K B
K R W Q Y X L E S P K B T E K D D E L C N W I Y
H O R K T B X S J G L D Z N C X I X Y G J B F W
C M Z E X Q L H N A V P G B C H Y W S D I E G Z
C C L I W Q U V D P X A Y N D E D F H N W L N N
O Z B L O O D D T M H E R Z Y O F F Z O B S P R
N P B D U C E V Q P X M P S B K O S L U A O Z A
B V A L F R I T A S D U B E T S A T N W M J V D
T I P A K R D T N I J F P J Q L R N S J N Z Z Z
K R M A R K A N Y O K Q B D O N A G R O I H H G
E Q V F J U L W Y B B C C A O E Z J T B A G Q M
M N I E G I O Y O Q O F L R N J C X C U R D A F
E F Y Y T L P M C F E F D S D K Z D Z Y B L E L
J E V O U Z G C M B W S T O M A C H K K S R D L
T D O H E A R T Q J P P O O Z Q C C U G P F G N
L Y Q J E E N I T S E T N I D X I O L H E N K Y
S T H L E O C S R Z N N E D N T K K L M E T Y R

Muscles **Lungs** **Stomach** **Gall bladder** **Taste buds** **Brain**
Esophagus **Intestine** **Blood** **Heart** **Plasma** **Organ** **Kidneys**

Keyword	Definition

Colouring Sheet

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