



TEACHER NOTES SCIENCE



TO BE USED IN CONJUNCTION WITH WORKSHEETS 6A TO 6F

Lesson 1: The Lungs

Strand: Living Things.
Strand Unit: Human Life.

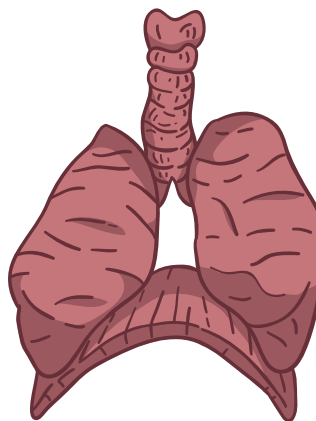
Aims:

1. To examine the structure of the body's breathing system.
2. To study the journey air takes when we breathe in through the nose and mouth and out again.
3. To show how the lungs extract oxygen from air.
4. To examine breathing rates before and after exercise.

Resources: Worksheet 6A.

Suggested Activities:

1. Ask the children to predict how long they can hold their breath. Experiment in pairs using a stopwatch. Discuss with the children how long they think they could survive without eating or drinking water. (We could live without food for a month, and water for a few days but we cannot survive without air for more than a few minutes.)
2. Encourage the children to draw the journey of air through the respiratory system. Use a poster or model to trace the journey of air from the nose and mouth down into the lungs and back out. Identify the names of the internal organs involved in this process. Encourage the children to make an informed drawing of where the air goes and compare it to their original thoughts. Ask the children to label the various sections of the breathing system.
3. During PE ask the children to record how many breaths per minute they take before and after the session. Ask the children if they feel out of breath. Why do they think this is happening? What might they need to do to stabilise their breathing again?
4. Fill a five-litre bottle with water. Submerge the bottle in a basin that is half full of water. Remove the cap from the 5-litre bottle when it is submerged under the water. This ensures that no air gets into the bottle before the investigation. Ask the children to predict how many litres of air their lungs can hold. This is called lung capacity. The fitter a person is the greater their lung capacity. Place a length of tubing up into the bottle. Invite a child to blow into the bottle with one continuous breath until they can blow no more. The amount of water displaced from the five-litre bottle is equal to their lung capacity.



Teacher Information: The Respiratory System

The respiratory system is made up of the organs that help us to breathe.

Mouth and Nose

Air is drawn into the body through the mouth and nose. The nose is connected to the back of the mouth through two tubes. The nose helps to remove some dirt and germs from the air. These germs and dirt get stuck in the mucus in the nose and are removed from the body when a person blows their nose.

Trachea

The trachea is also called the windpipe. It is located in the front of the neck and connects the mouth and nose to the lungs. The windpipe is shaped like a tube and feels like it is protected by tough rings.



Can you feel your trachea? Only air goes into the trachea. A special flap of skin stops food from passing into it. This is called the epiglottis. Sometimes a little bit of food gets past the epiglottis; this causes you to cough.

Bronchi

The bronchi are two air tubes that branch off from the trachea and carry air directly into the lungs.

Bronchioles

When air enters the lungs, it goes through many smaller tubes, bronchioles, until it reaches tiny air sacs or alveoli.

Alveoli

The air sacs look like bunches of grapes at the end of the bronchial tubes. In the alveoli, oxygen (O_2) is drawn from the air into the blood, while carbon dioxide (CO_2) is taken from the blood. We then breathe out the carbon dioxide.

Diaphragm

The diaphragm is a large muscle located at the bottom of the chest which controls breathing. When your diaphragm moves down you breathe in and when it moves up you breathe out.

Lesson 2: The Brain

Strand: Living Things.

Strand Unit: Human Life.

Aims:

1. To outline the function of the brain.
2. To highlight the reasons why protective head gear is essential when playing contact sports such as camogie or hurling.

Resources: Worksheet 6B.

Suggested Activities:

1. Have the students put their two fists together. This represents the two hemispheres in the brain, the right and the left. The two fists together equate approximately to the size of the brain.
2. Discuss with the children how the brain is naturally protected and how we should protect it further while playing sports.
3. Have the children experiment in pairs to test their reaction time. One child is assigned to hold the reaction tester (template on sheet) between the open forefinger and thumb of their partner. A weight in the form of a paper clip with blue-tack must be attached to the end of the tester. The child must not be physically touching the tester. Without giving their partner notice, the child must drop the tester. The other child has to react and catch the tester as quickly as possible. The point at which the child catches the tester is then used to calculate their reaction time in seconds.



4. Discuss what reactions we need in playing different Gaelic sports. Can we speed up our reaction times?
5. Experiment to see can we 'train the brain'. Have the children build a tower of cubes using no thumbs. Have their partner record the time. Can the children repeat the activity and speed up their time?

Teacher Information: The Brain

The brain is the body's control centre. It is connected to a thick cord of nerves, the spinal cord, which runs down the middle of the spine. Have the children bend over and feel their spine. Discuss with the children why they think the nerves are located in the spine. The spinal cord is connected to a network of smaller nerves which are found throughout the body and form what is known as the nervous system. These nerves carry messages from the brain to all the parts of the body. The time taken for messages to be sent and received through this system is termed the body's 'reaction time'.

How is the brain protected?

The brain is protected by the part of the skeleton called the 'skull'. There is a space between the brain and the skull that is filled with fluid. This acts as a protective cushion for the brain. To further protect the brain we must wear helmets when playing hurling and camogie.

Lesson 3: The Heart

Strand: Living Things.

Strand Unit: Human Life.

Aims:

1. Examine the body's circulatory system.
2. Outline the function of the heart.

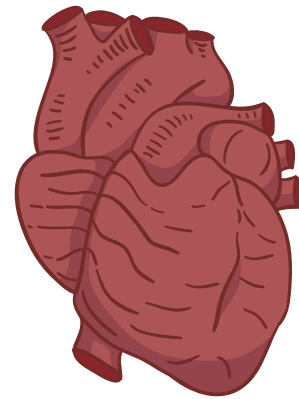
Resources: Worksheet 6C.

Suggested Activities:

1. Explain to the children that the heart is in fact a large muscle.
2. What other muscles are found in the body? What muscles in particular do we use when playing Gaelic games?
3. Ask the children to draw an outline of the body and identify the location of the heart. Then show the children an illustration or model of the heart and have them readjust their drawings.
4. Have the children make a fist with their hand. This is about the size of their heart.
5. Ask the children to feel their heartbeat by locating their pulse. Where can you find your pulse? What does a doctor use to listen to your heartbeat? To find your heart rate count how many beats you feel per minute. Record your heartbeat at rest. Do some physical activity and record the heartbeat again. Ask why the heart is beating faster now?
6. Get the children to imitate their heartbeat by clapping their hands.
7. Ask the children to examine the food pyramid so that they can identify the foods which keep the heart healthy.

Teacher Information: The Heart

The heart is a large muscle. It is divided into two cavities. A thick wall called the septum separates the left side from the right side. The function of the heart is to pump blood around the body. This is called 'circulation'. The heart is made up of four different chambers. There are two chambers on each side of the heart. One chamber is on the top and one chamber is on the bottom. The two chambers on top are called the 'atria'. The two chambers on the bottom are called the 'ventricles'.



Our Blood

The blood is the body's transport system. It brings oxygen and nutrients to all parts of the body and removes waste. Blood is made up of three types of cells and they move around in liquid called plasma. Red blood cells carry oxygen, white blood cells fight disease when we are sick, while platelets help the blood to clot, for example when you fall.

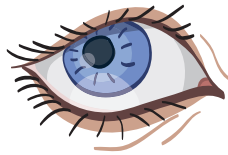
The heart is like a pump. The right side of the heart pumps blood from the body to the lungs and the left side takes blood from the lungs and pumps it around the body.

Why does my heart beat faster when I exercise?

The heart pumps blood around the body, which provides oxygen for the various muscles and organs. When we are exercising the body needs more oxygen. Therefore, the heart needs to pump faster to get more oxygen around the body. When we relax after exercise, the heartbeat starts to slow down again.

Lesson 4: The Eye

Strand: Living Things.
Strand Unit: Human Life.

**Aims:**

1. To examine the various parts of the eye and the eye's role when playing sport.
2. To identify which eye is the dominant eye and find the blind spot.
3. To discuss ways in which players' eyes can be protected while playing Gaelic Games.

Resources: Worksheet 6D.

Suggested Activities:

1. Discuss the different parts of the eye.
2. Carry out an experiment to find out which eye is the dominant eye. Ask the children to select a vertical line in the room, for example the door, window or whiteboard. Have them line up their forefinger with the vertical line that they have selected and close their right eye. Is your finger still in line with the object? Repeat the activity using the left eye. Again, is your finger still in line with the object? The eye that kept your finger most in line with the selected line is your dominant eye.
3. Carry out an experiment to find the blind spot on our eye.
4. Use optical illusions to assess if the brain can trick the eye. Look at the **Worksheet 6D** to see which line is longer and then measure them.

**Teacher Information: The Eye**

The eyes have lenses that place a small, upside-down image of what you are looking at onto the back of each eye. The brain then takes these two different pictures, one from each eye, and puts them together. The iris is the part of the eye that is coloured. The white of the eye is called the sclera.

What protects my eyes?

Eye lashes help keep the dust out of your eyes. Eyelids help protect your eyes and keep them moist. The average person blinks about 12 times per minute or around 10,000 times a day.



Lesson 5/6: Designing A GAA Jersey, How A Hurley Is Made

Strand: Materials.

Strand Unit: Properties And Characteristics Of Materials.

Aims:

1. To study the process used to make a hurley, from the ash tree to the finished product.
2. To identify important properties and characteristics of GAA jerseys.
3. To explore the concept of a fair test.
4. To conduct fair tests which examine the elasticity, durability and absorption properties of different materials used to make jerseys.
5. To design and make an imitation GAA jersey.

Resources: DVD, Worksheet 6E.

Suggested Activities:

1. Before showing the DVD, ask the children to draw a picture of a hurley manufacture, from its origin as part of an ash tree. After watching the DVD ask the children to draw a new storyline outlining the manufacture of a hurley.
2. Provide the children with a range of GAA jerseys. Have the children examine how they feel.
3. Discuss with the children what properties a jersey should possess. Should it be strong, have elasticity and be absorbent? Why? Why not?
4. Provide the children with a variety of man-made and natural materials. Encourage the children to test the materials for one of the desirable properties of a jersey.
5. Discuss with the children how a fair test can be designed to test the various properties of the different materials. For example, to test for absorbency in a material then:
 - (i) What is the variable? (The different materials.)
 - (ii) What has to be the same? (The size of material, amount of water applied to each piece of material, amount of time the water is left.)
6. Have the children conduct similar fair tests for some of the other properties.
7. Having conducted the fair tests and recorded the results, ask the children to select the best material with which to make a GAA jersey.
8. Have the children examine the labels of jerseys and discuss what materials they are made from.



Lesson 7: Friction

Strand: Energy and Forces
Strand Unit: Forces

Aims:

1. To explore how different forces can be applied to a sliotar, football or handball to make it move.
2. To examine the effect of friction on movement by experimenting with a ball on various surfaces such as carpet, concrete, grass or tile-surface.

Resources: Worksheet 6F.

Suggested Activities:

1. Experiment with the sliotar or football to see how many different ways there are to apply a force to the ball. Then conduct a fair test. What will be the variable? The variable is the force applied. What will remain constant? The ball, the size of the ball, the material from which the ball is made and the starting position of the ball will remain constant. Have the children apply a different force to the same ball and record which force moves the ball the greatest distance.
2. Experiment to explore the effect of friction on the movement of a ball on different surfaces. Conduct a fair test to examine the effect of the friction. What is the variable? The different surface is the variable. What is the same? The ball used and the force applied (i.e. release a ball down a slope and vary the surfaces onto which it rolls) remain the same.



Teacher information: Friction

Friction is all around us. Like gravity, it is a force. Friction occurs when two objects rub together, the rougher the surfaces the greater the friction.

Why is friction important to us?

Sometimes if you run out onto wet grass in your runners, you will almost slip and fall over. This is because we need a certain amount of friction to get a grip. Two smooth surfaces, such as the runners and the wet grass, give very little friction. This is why sportspeople wear boots with cogs in them. The cogs make one of the surfaces rougher and therefore increase the level of friction. This friction gives a better grip. Think of a hurley. We sometimes put a strap or grip around the handle. This increases the friction when we hold the hurley, thereby enabling the hurler to get a firmer grip on the stick.

What is air resistance?

Objects that move through the air experience the frictional force of the air. This force acts in the opposite direction to the movement of the object. Air resistance acts against gravity on falling objects. As the speed of the falling object increases, so does the level of air resistance. The level of air resistance is also influenced by surface area: the greater the surface area of an object, the greater the air resistance. For example, if we drop a pen and a copy page they will fall to the ground at different rates, as the surface area of the copy page is greater than that of the pen.

