GOVERNMENT OF WESTERN AUSTRALIA

West 1

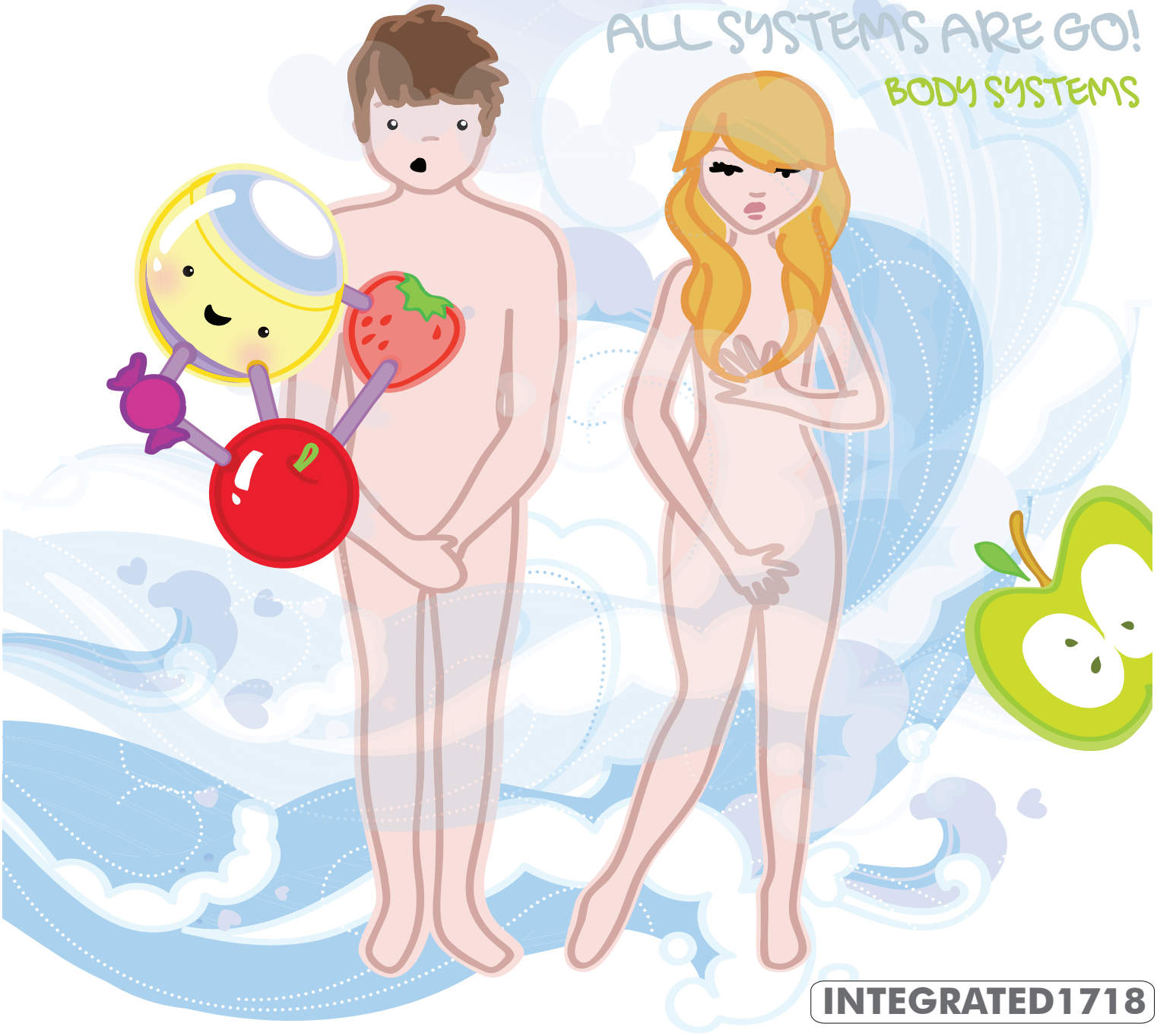
# INTEGRATED

## All Systems Are GO!

Body systems

Middle Childhood 4–7

Learning Resource




INTEGRATED1718

GOVERNMENT OF
WESTERN AUSTRALIA

INTEGRATED1718
ALL SYSTEMS ARE GO –
BODY SYSTEMS
ISBN 978-1-74205-674-6

9 781742 056746

ORDERING INFORMATION:
Contact WestOne Services on Tel: (08) 9229 5200 Fax: (08) 9227 8393 Email: sales.westone@dtwd.wa.gov.au
Orders can also be placed through the website: www.westone.wa.gov.au

# Integrated

# All Systems Are GO!
# Body systems

**Middle Childhood**

**Learning Resource**

First published 2010

ISBN 978-1-74205-674-6
SCIS 1484586



*Published by and available from*

WestOne Services

GOVERNMENT OF WESTERN AUSTRALIA

1 Prospect Place West Perth WA 6005
Tel: (08) 9229 5200 Fax: (08) 9227 8393
Email: sales.westone@dtwd.wa.gov.au
Website: www.westone.wa.gov.au

# Overview of *All Systems Are GO!*

*All Systems Are GO!* consists of three modules and a Teacher overview.

| Module | Outcomes focus |
|---|---|
| **1 Setting the scene** | **The Arts**<br>1. ARTS IDEAS<br>3. ARTS RESPONSES<br>**English**<br>8. READING<br>**Health and Physical Education**<br>1. KNOWLEDGE AND UNDERSTANDING<br>**Technology and Enterprise**<br>1. TECHNOLOGY PROCESS |
| **2 Body systems** | **The Arts**<br>1. ARTS IDEAS<br>3. ARTS RESPONSES<br>**English**<br>5. LISTENING<br>6. SPEAKING<br>8. READING<br>9. WRITING<br>**Health and Physical Education**<br>1. KNOWLEDGE AND UNDERSTANDING<br>**Technology and Enterprise**<br>1. TECHNOLOGY PROCESS<br>**Mathematics**<br>14.CHANCE AND DATA |

| Module | Outcomes focus |
|---|---|
| **3 Reproductive system** | **The Arts**<br>1. ARTS IDEAS<br>3. ARTS RESPONSES<br>**English**<br>5. LISTENING<br>6. SPEAKING<br>8. READING<br>9. WRITING<br>**Health and Physical Education**<br>1. KNOWLEDGE AND UNDERSTANDING<br>4. SELF-MANAGEMENT SKILLS<br>5. INTERPERSONAL SKILLS<br>**Technology and Enterprise**<br>1. TECHNOLOGY PROCESS |

Each module has a:

- student work plan
- learning activities section
- feedback and solutions section.

The resources and materials you will need for *All Systems Are GO!* are:

- paperclip for portfolio
- *Lockie Leonard, Human Torpedo* novel
- two strips of thick paper to make a bookmark
- two drinking straws
- *Boys and puberty*
- *Girls and puberty*
- *Where did I come from?*
- two round balloons
- two long balloons
- ten blank A4 sheets of paper
- INTEGRATED1721 *All Systems Are GO!* CD-ROM.

# Body systems

# Student work plan

| Learning activity | Description of learning activity | Learning focus |
|---|---|---|
| 2. Skeletal system | | |
| **2.1 Contents page** | Add information to portfolio | Development of organisational skills |
| **2.2 Keywords** | List of keywords that will be found throughout the module | To provide meaning for commonly used words |
| **2.3 How many bones?** | Quiz to determine knowledge about number of bones in the human body | Determining prior knowledge |
| **2.4 What's a bone?** | Identify syllables and write cinquain poetry | Development of poetry writing skills |
| **2.5 Name that bone** | Identify and label different bones of the body | Development of knowledge of skeletal system |
| **2.6 Types of bone** | Identify and label different types of bones | Development of knowledge of skeletal system |
| **2.7 What do bones do?** | Listen to an audio clip in order to complete a questionnaire | Development of listening skills |
| **2.8 Time to talk osteoporosis** | Checklist of conditions leading to osteoporosis | Promoting of discussion and sharing of thoughts |
| **2.9 Promote healthy bones** | Create an alternate line poem about osteoporosis | Development of poetry writing skills |
| **2.10 Reading *Lockie Leonard, Human Torpedo*** | Read the novel *Lockie Leonard, Human Torpedo* | Development of reading skills |

| Learning activity | Description of learning activity | Learning focus |
|---|---|---|
| 3. 120 days in the life of a red blood cell | | |
| **3.1 Contents page** | Add information to portfolio | Development of organisational skills |
| **3.2 A tour of the body** | Apply additions to a diagram of the respiratory and circulatory systems | Learning the structure and function of the different systems |
| **3.3 Circulatory system** | Apply additions to a diagram of the respiratory and circulatory systems | Learning the structure and function of the different systems, with a focus on the circulatory system |
| **3.4 The hardest working muscle** | Calculate the number of beats a heart performs over a lifetime | Mathematical activity to raise awareness of the function of the heart |
| **3.5 Clench your fist** | Trace fists to replicate heart size | Raising awareness of the size of the heart |
| **3.6 Parts of the heart** | Identify the parts of the heart | Increasing knowledge about the function of the heart |
| **3.7 The ultimate flow chart** | Establish the pathway of blood through the heart and lungs using a flow chart | Increasing knowledge about the function of the heart |
| **3.8 Make a stethoscope** | Practical application – make a simple stethoscope | Learning the structure and function of the different systems |
| **3.9 A tour of the body** | Apply additions to a diagram of the respiratory and circulatory systems | Learning the structure and function of the different systems |

| Learning activity | Description of learning activity | Learning focus |
|---|---|---|
| **3.10 Heart of love** | Create a same-word poem about love | Developing poetry writing skills |
| **3.11 Breathe in and out – the respiratory system** | Identify the parts and processes of the respiratory system | Increasing knowledge about the function of the lungs |
| **3.12 Illustrated word poems** | Create a word poem about the respiratory system | Developing poetry writing skills |
| **3.13 Breathing rate** | A series of activities to highlight the effect of smoking on breathing | Developing practical and graphing skills |
| **3.14 A tour of the body** | Apply additions to a diagram of the respiratory and circulatory systems | Learning the structure and function of the different systems |
| **3.15 Bypass for a healthy heart** | Raise awareness of factors contributing to risk of coronary heart disease | Matching words with phrases |
| **3.16 A tour of the body** | Apply additions to a diagram of the respiratory and circulatory systems | Learning the structure and function of the different systems |
| **3.17 Pulsating** | Practical application – pulse rate measurement | Learning the structure and function of the different systems |
| **3.18 A tour of the body** | Apply additions to a diagram of the respiratory and circulatory systems | Learning the structure and function of the different systems |
| **3.19 Keywords** | Crossword to find keywords that have been used throughout the module | Providing meaning for commonly used words |

| Learning activity | Description of learning activity | Learning focus |
|---|---|---|
| **3.20 Reading *Lockie Leonard, Human Torpedo*** | Read the novel *Lockie Leonard, Human Torpedo* | Developing reading skills |
| 4. In one end and out the other | | |
| **4.1 Contents page** | Add information to portfolio | Development of organisational skills |
| **4.2 The digestive system** | View video and match up structures and functions of the digestive system | Emphasis on listening and reading skills |
| **4.3 How much energy is that?** | Explain breakdown of food and relationship between food and weight | Developing a better understanding of how food is broken down and the importance of different food types |
| **4.4 How much exercise is that?** | Determine activities that burn up kilojoules consumed | Working with mathematical equations |
| **4.5 A poem about digestion** | Create a Haiku poem about the digestive system | Developing poetry writing skills |
| **4.6 A healthier diet** | Create a poster to promote a healthy diet and healthy eating | Developing artistic ability |
| **4.7 Keywords** | List of keywords that will be found throughout the module | Providing meaning for commonly used words |
| **4.8 Creating bodies** | Add information to original 'Creating bodies' activity | Providing opportunity to demonstrate acquired knowledge |
| **4.9 Reading *Lockie Leonard, Human Torpedo*** | Read the novel *Lockie Leonard, Human Torpedo* | Developing reading skills |

# Signposts

Look for signposts throughout the modules. They give instructions to help you with the learning activities.

Portfolio – This signpost tells you to present your work in your portfolio.

Reading – The reading signpost tells you to read from the suggested book.

Multimedia – The multimedia signpost tells you to use an audio CD, CD-ROM, video or DVD.

Computer – The computer signpost tells you to use a computer or the internet.

Feedback and solutions – The feedback and solutions signpost tells you to check your work by comparing it with the information provided.

Scissors – The scissors signpost tells you to cut out a page from the book.

# 2 Skeletal system

**The skeletal system refers to the bones in the body.**

**This section will discuss the structure and function of the skeletal system as well as looking at what makes and keeps bones healthy. It will also involve writing poetry related to the topic.**

## 2.1 Contents page

At the completion of this section, check to make sure you have the following activities included in your portfolio.

| Title of the activity | Tick |
|---|---|
| 2.2 Keywords | |
| 2.4 What's a bone? | |
| 2.5 Name that bone | |
| 2.9 Promote healthy bones | |

## 2.2 Keywords

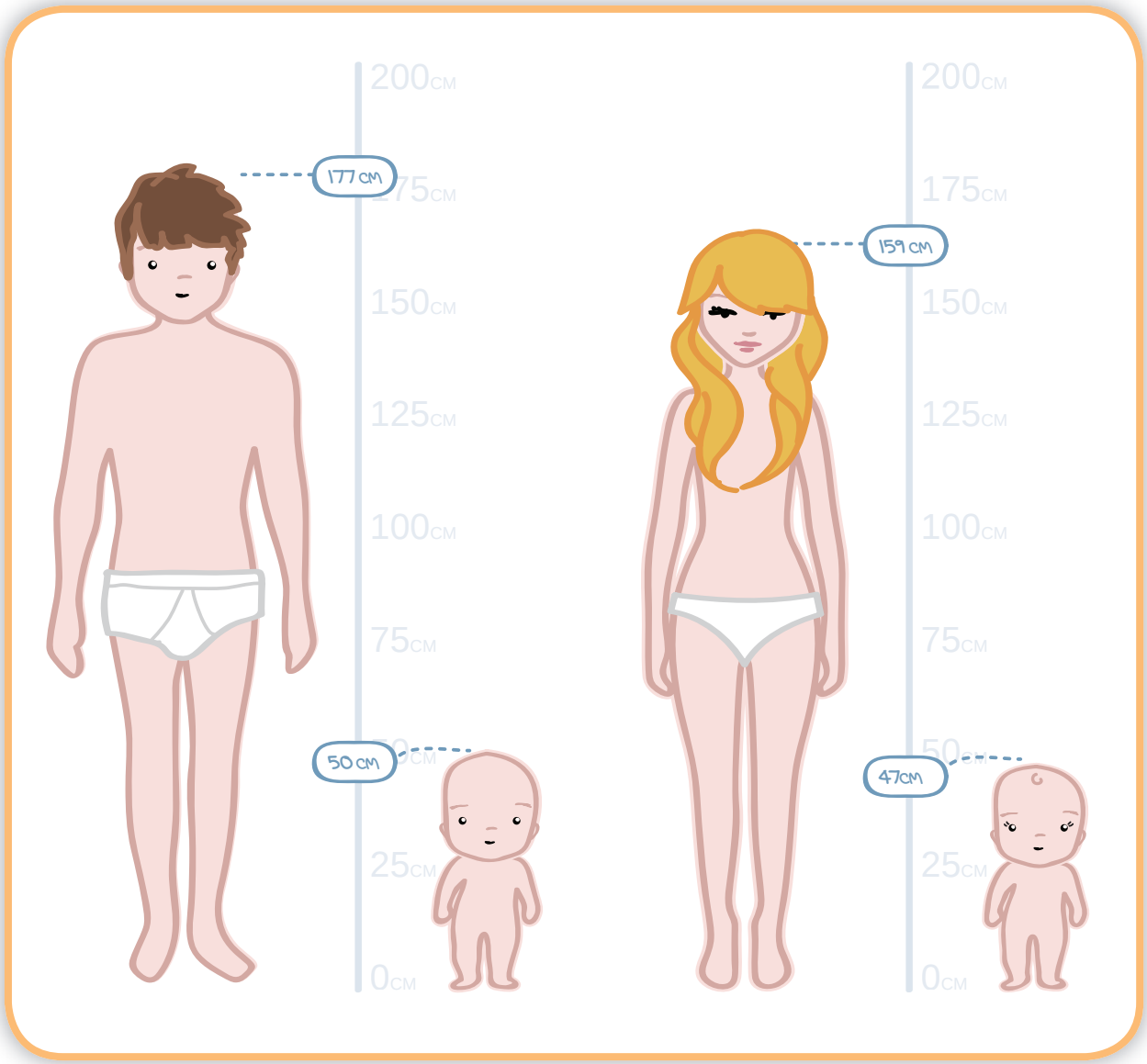
The meanings of the keywords below have already been included in the keywords section of your portfolio. As you work your way through this section on the skeletal system, find the keywords and their meanings, then add the keyword to your portfolio next to its meaning. Use the Feedback and solutions section if you need help.

alternate line poem
bone marrow
cancellous bone
cinquain
compact bone
muscular system
osteoporosis
periosteum
skeletal system
sutures
syllable

# 2.3 How many bones?

Look in your portfolio (activity 1.4 ‘Creating bodies’) to remind yourself of how much (or little) you know about the skeletal system.

The following diagram shows the average heights of babies and adults:




How tall are you and each of your family members? If you know, add your height to the diagram above. If not, find a way to measure each other and then add to the diagram.

Males will grow from an average of around 50 cm when they are born, to their maximum height (average of 177 cm) by the age of 21–25.

Females on average grow from around 47 cm at birth to roughly 159 cm by the time they are fully grown, around the age of 17–18.

A lot of changes happen to the body during that time.

Here is a quick quiz about the human body for you to try. Tick the answer you think is correct.

1. How many bones does an adult have?

   100 ○ 206 ○ 300 ○ 410 ○

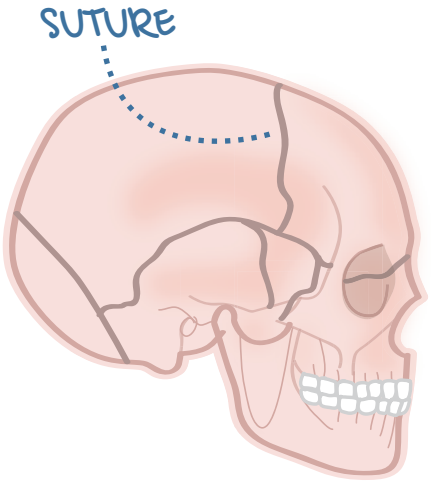
2. How many bones does a newborn baby have?

   100 ○ 206 ○ 300 ○ 410 ○

Check your answers in the Feedback and solutions section.

Did it surprise you that there was such a big difference? But why the difference?

Many bones in an adult's body start out as separate bones. The skull is a great example of this.




The top of the skull is called the cranium and, in a baby, the cranium consists of eight bones that are fitted together at joints called sutures.

Loosely interlock the fingers of your two hands as in the following diagram:

When you are born the bones in your cranium are quite loosely joined together (like your fingers). As you get older (up to the age of four) the sutures become much closer together, until the bones are 'fused' together to form one bone (similar to what happens if you interlock your fingers tightly).

# 2.4 What's a bone?

This seems a straightforward question, but there is a lot to know about bones.

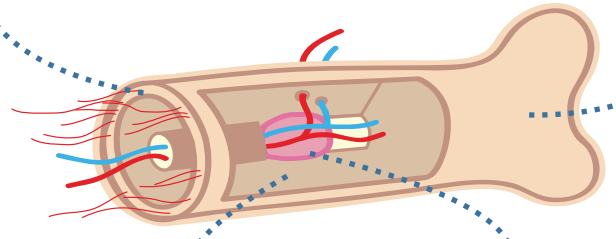
Most bones in your body are made of the same four materials:

**Periosteum** (*say* pair-ee-ost-tee-um)

- the outer surface of bone
- contains nerves and blood vessels that nourish the bone

**Compact** bone

- smooth and very hard
- the part you can see when you look at a skeleton



**Cancellous** (*say* kan-sell-us) bone

- layers within the compact bone
- looks like a sponge
- contains the bone marrow

**Bone marrow**

- like a thick jelly
- makes blood cells

## Poetry

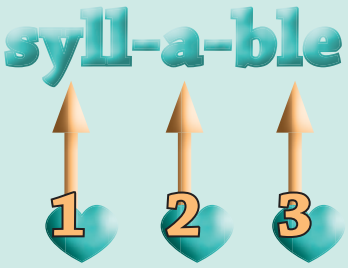
Now it's time to try and write some poetry to express your thoughts and feelings about the information you have learnt so far.

The first style of poetry we will try is known as cinquain (*say* sing-cane). It is based on the number of syllables used in each line.

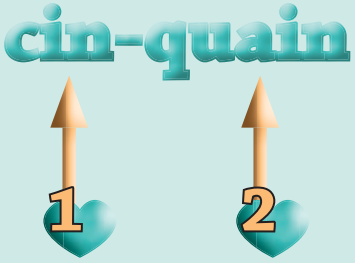
A syllable refers to how a word is broken down when you pronounce it.

For example,

the word syllable has three syllables:




and the word cinquain has two syllables:




In the following table indicate how many syllables each of the words has, and break the syllables up by putting a '-' in between each syllable.

| Word | Number of syllables | Syllables broken down |
|---|---|---|
| **body** | 2 | bod-y |
| **systems** | | |
| **cancellous** | | |
| **skeleton** | | |
| **bone** | | |
| **marrow** | | |
| **spongy** | | |
| **poetry** | | |

# All Systems Are GO!

A cinquain is a poem that has:

- 5 lines
- 2 syllables in the first line
- 4 syllables in the second line
- 6 syllables in the third line
- 8 syllables in the fourth line
- 2 syllables in the fifth line.

For example:

## Systems inside

***Systems.***
1 2 (number of syllables)

***In my body.***
1 2 3 4

***Working well together.***
1 2 3 4 5 6

***Trust my body to know what's right.***
1 2 3 4 5 6 7 8

***Live well.***
1 2

In the poetry section of your portfolio do the following.

- Create the subheading ‘Cinquain poetry’.
- Write a one or two sentence description of what a cinquain poem is.
- Write a cinquain poem using ‘Bones’ as a title and the information about bones that you have learnt so far.
- Make sure your poem matches the number of syllables required in a cinquain poem.

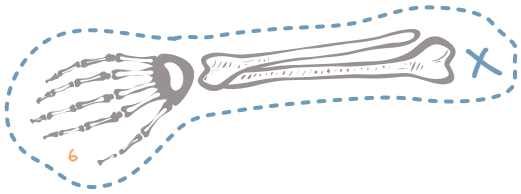
## 2.5 Name that bone

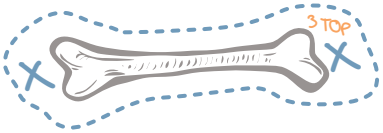
On the next page you will find a work sheet called ‘Name that bone’.

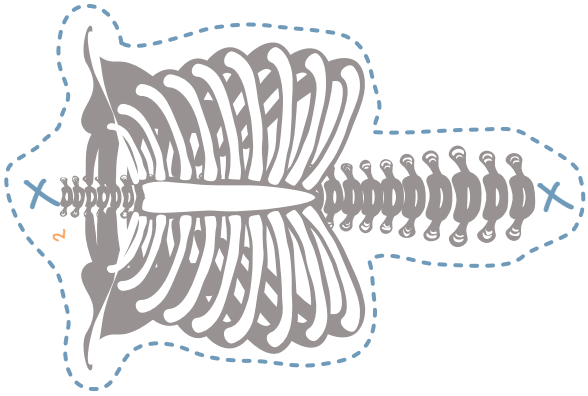

From this work sheet, complete the following.

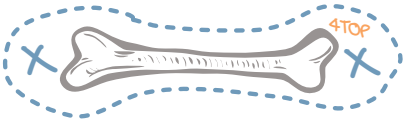
- Carefully cut out the different bones along the dotted lines.
- On an A4 sheet, put the heading ‘Name that bone’.
- Down the middle of the page, using glue or sticky tape, connect the different bones where indicated by the ‘x’, to make a human skeleton.

# Name that bone work sheet

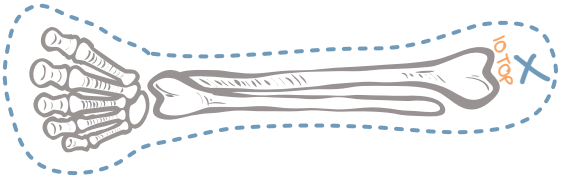


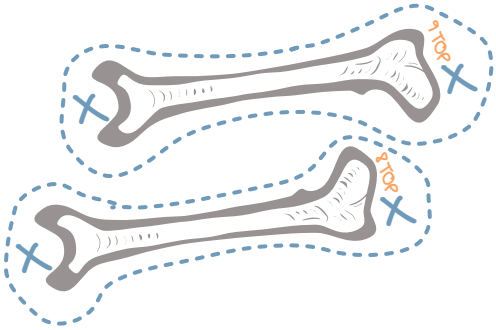



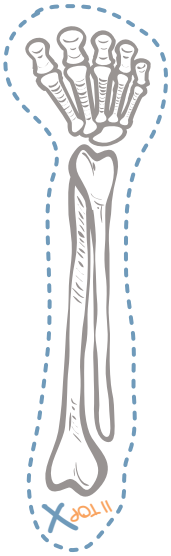



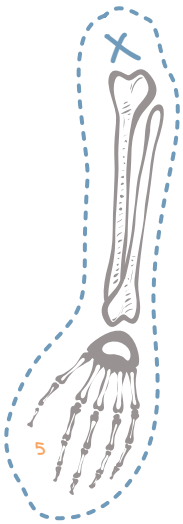



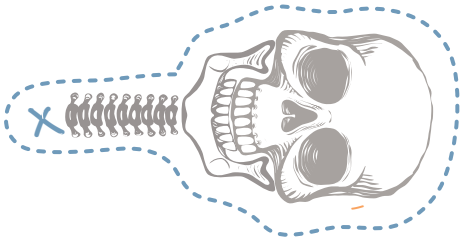




Using your computer skills, type ‘human skeleton’ into your search engine.

- Select a suitable website that will allow you to identify the location of the following bones of the body:


- On your ‘Name that bone’ work sheet, draw a line to the correct bone and label it.

Place your ‘Name that bone’ work sheet into your portfolio.

## 2.6 Types of bone

Bones come in all shapes and sizes. They are classified into four main categories: long bones, short bones, flat bones and irregular bones.

## Long bones

- have a body that is longer than it is wide
- have a growth plate at either end of the bone
- contain bone marrow.

## Short bones

- have a body that is approximately as wide as it is long
- provide support.

## Flat bones

- are strong flat plates of bone
- protect internal organs
- provide a wide area for muscle attachment.

## Irregular bones

- these include all the bones that don't fit into the other three categories because of their shape.

Have a look at your 'Name that bone' work sheet and then on the next page match the bones with their category by drawing a line to connect them.

**HINT:**
There are 7 long bones, 1 short bone, 4 flat bones and 1 irregular bone.

phalanges

skull

long

ribs

radius

carpals

short

fibula

pelvis

flat

ulna

vertebra

sternum

irregular

humerus

tibia

femur

# 2.7 What do bones do?

On your *All Systems Are GO!* CD-ROM, click on 'The purpose of the skeletal system'.

Listen to the information and then answer the questions below to see how well you were listening.

Your task is to try and recall as many of the correct answers as possible.

1. How many functions does the skeletal system perform?

   3 ◯ 4 ◯ 5 ◯ 6 ◯

2. What are the functions of the skeletal system?

   _____ _____

   _____ _____

   _____ _____

3. Give an example of a body part that exists inside and outside the framework of the skeleton.

   inside _____

   outside _____

4. Name the internal organs that these bones protect:

   cranium _____

   pelvis _____ _____

   ribs and sternum _____ _____ _____

   vertebral column _____

5 Which category of bones is responsible for the production of blood cells?

flat ○ long ○ irregular ○ short ○

6 Draw lines to match up the correct blood cell (on the left) with its function (on the right).

| | |
|---|---|
| red blood cell | fight infection |
| white blood cell | help blood clotting |
| platelets | provide oxygen to the body cells |

7 Complete the following sentences with the words listed to explain how the body is able to move.

nerves muscles bone brain message contract

The _____ sends a _____ via the _____ to the _____ telling them to _____ or shorten. The muscles are attached to the bones by tendons. When the muscle shortens, it pulls the _____ in the required direction, which allows us to move.

8 Which mineral helps keep our bones strong? _____

Check your answers in the Feedback and solutions section at the back of this book.

# 2.8 Time to talk osteoporosis

This is an important activity to share with your parents as they have a greater risk of getting osteoporosis (*say* os-tee-o-poor-o-sis) than you. Ask them to work through this activity with you.

Bones are a living tissue that is continually being broken down and then reforming. This occurs from birth through to old age.

If you don't look after your bones a condition known as osteoporosis can develop.

Osteoporosis is a condition where the bones become fragile and brittle because they lose minerals such as calcium more quickly than the body can replace them. This leads to a loss of bone thickness and, therefore, to a higher risk of fractures than in normal bone.

So, who is at risk?

The answer is everyone, but commonly women are at greater risk:

- because of reduced hormone levels after menopause
- because the body needs higher levels of calcium during pregnancy and breastfeeding, and will take from the bones if not enough is consumed.

Use the following checklist to see if some trusted adults in your life are likely to develop osteoporosis. Tick the boxes that apply to them.

| Likelihood of developing osteoporosis increased if: | Adult 1 | Adult 2 |
|---|---|---|
| There is a family history of osteoporosis. | | |
| You have had a broken bone as an adult. | | |
| You have been on long-term medication or drugs. | | |
| Your diet is low in dairy products. | | |
| You get less than 20 minutes of sun each day. | | |
| You are physically inactive. | | |
| You smoke. | | |
| You drink excessive amounts of alcohol. | | |
| You have a small frame and low body weight. | | |
| You are Caucasian or Asian. | | |

If you ticked three or more boxes for your adult then they might like to consider contacting someone who can give them more information. People who may be able to help include:

- a doctor
- an accredited practising dietician.

## 2.9 Promote healthy bones

For the next five minutes, get up out of your chair and if possible do one of the following things.

- Enjoy a glass of milk.
- Go outside and stand in the sunshine (remember to take a hat and sunscreen with you).
- Go for a walk or run, or do some other activity that involves moving from one point to another.

Welcome back!

You may be wondering why you were asked to try one of those things. The answer is that the activities all relate to the three things you need to promote healthy bones:

### Healthy bones

#### Calcium from

- dairy products
- fish products
- green vegetables
- supplements

#### Vitamin D from

- sunshine
- dairy products
- cereals
- pastries
- fish
- supplements

#### Exercise

Exercise stimulates bone growth and directs bone growth and calcium where it is needed – bone cells detect where there is stress and put down more tissue in that spot.

However, too much exercise can reduce calorie levels and bone density from which the body may not recover, especially during growth periods such as the teenage years.

## Poetry

Now let's write a poem about healthy bones. This is a good opportunity to try a different style of poetry.

Alternate line poems give you the opportunity to write about a subject from a different point of view. Think of it as two voices telling you different things. One line is one voice talking, and the next line is the other voice talking and so on with each alternate line. It is a bit like having the devil whispering in one ear and the angel whispering in the other.

Below is an alternate line poem based on a dilemma that a character in a book is faced with about diving into a river where he can't see the bottom.

The poem begins with the problem:

*To dive, he says to dive*
*and if I don't they'll call me names*
*but if I break my arm*
*like silly, stupid scaredy cat*
*or leg or neck*
*and push me*
*or even die*
*scowl and hiss*
*so who cares if I don't*
*tell my friends*
*I could test it later*
*then I'll be unhappy*
*if it was OK may be then*
*so I think*
*I'll just wait and see*

Anon

Now look at the poem if all of the alternate lines are put together:

| Line | |
|---|---|
| 1 | *To dive, he says to dive* |
| 3 | *but if I break my arm* |
| 5 | *or leg or neck* |
| 7 | *or even die* |
| 9 | *so who cares if I don't* |
| 11 | *I could test it later* |
| 13 | *if it was OK may be then* |
| 15 | *I'll just wait and see* |

| Line | |
|---|---|
| 2 | *and if I don't they'll call me names* |
| 4 | *like silly, stupid scaredy cat* |
| 6 | *and push me* |
| 8 | *scowl and hiss* |
| 10 | *tell my friends* |
| 12 | *then I'll be unhappy* |
| 14 | *so I think* |

Sometimes the best way to write this kind of poem is to write every second line (one voice), and then go back and write the other lines (the other voice). That way you can write the 'two voices' as you hear them.

In the poetry section of your portfolio under your cinquain poem, do the following.

- Create the subheading ‘Alternate line poetry’.
- Write a one or two sentence description of what an alternate line poem is.
- Write an alternate line poem that discusses different factors of osteoporosis. For example, one ‘voice’ could look at things you could do to reduce the chance of getting osteoporosis, while the other ‘voice’ could look at the things that cause a person to get osteoporosis. Try to include some feelings you think you might have in this situation.

## 2.10 Reading *Lockie Leonard, Human Torpedo*

Take 25 minutes now to read some more of your novel *Lockie Leonard, Human Torpedo*.

# 3 120 days in the life of a red blood cell

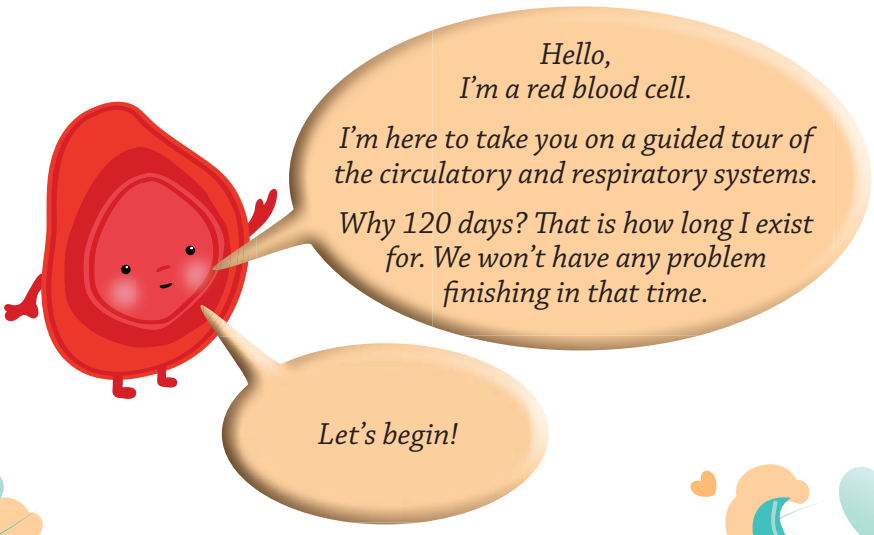
**Welcome to the circulatory system and the respiratory system!**

**The circulatory system and the respiratory system are closely linked. Between them, they are responsible for the transport of different materials to and from the cells of the body.**

## 3.1 Contents page

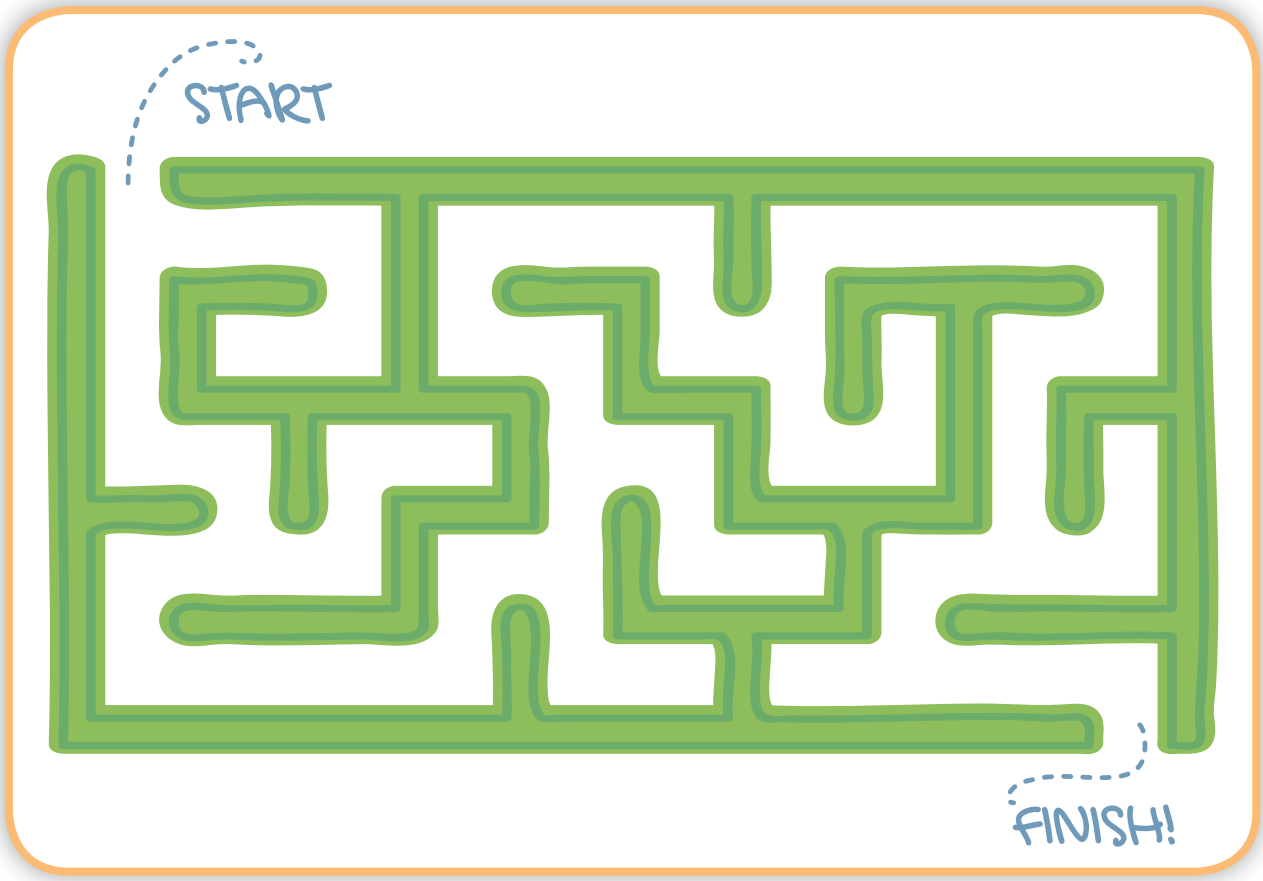
At the completion of this section, check to make sure you have the following activities included in your portfolio.

| Title of the activity | Tick |
|---|---|
| 3.2 A tour of the body | |
| 3.10 Heart of love | |
| 3.12 Illustrated word poems | |
| 3.19 Keywords | |



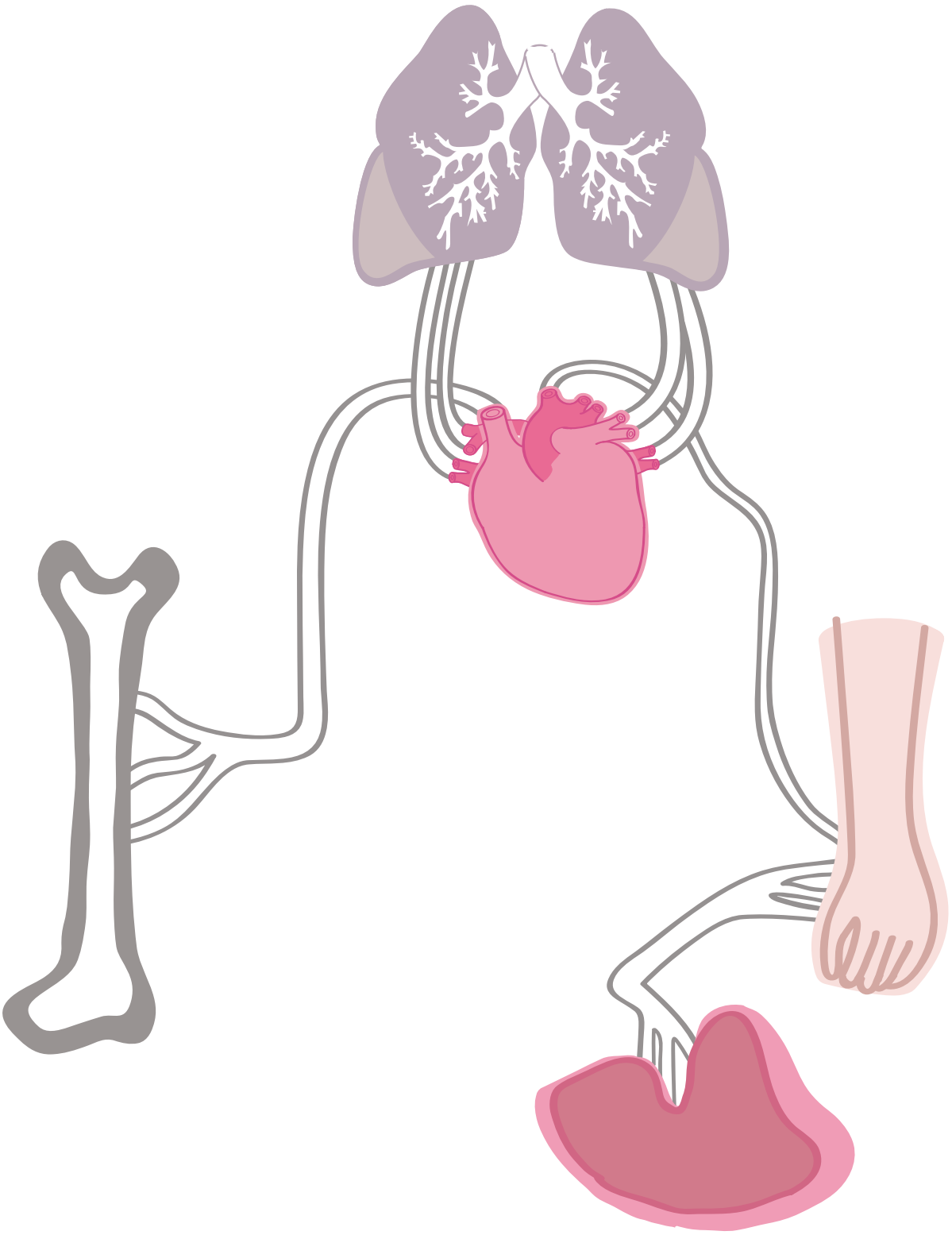
# 3.2 A tour of the body

Complete this maze.

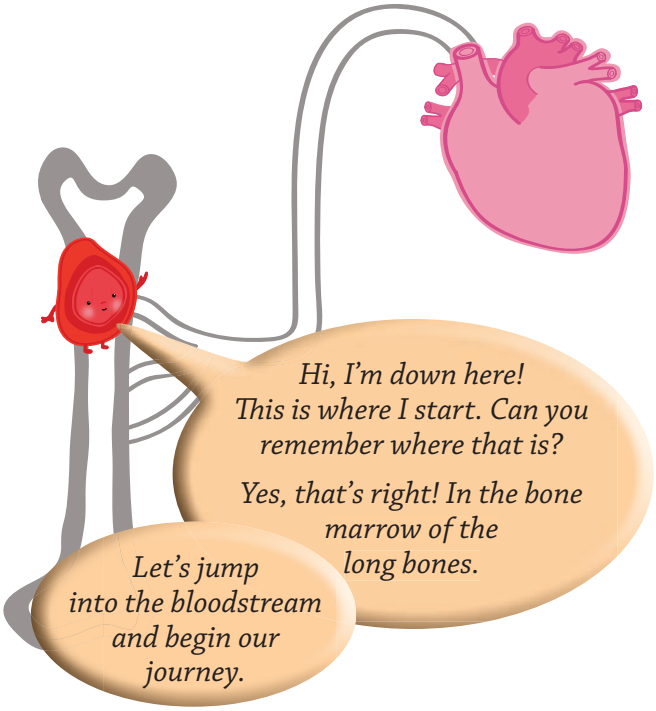



The bloodstream is like a maze as it makes its way through the body visiting every cell. There is only one direction that the blood can go, even though there are lots of different pathways that it can take.

On the next page is a diagram of the various parts of the body that will be discussed in this section. You will be asked to add to this page as you make your way through the module. On the top of the page, put the heading ‘Body tour diagram’. Place it in your portfolio once it is finished.



# 3.3 Circulatory system




The circulatory system is responsible for transporting oxygen and nutrients to the cells of the body, and for taking away the waste products. It consists of the heart and three types of blood vessels:

- capillaries
- veins
- arteries.

The capillaries are the smallest of the blood vessels, and attach to every part of the body that needs blood. They are responsible for exchanging water, oxygen and nutrients with the waste products within the body tissue.

Go to The Le@rning Federation learning object 'Body parts: Heart and circulation'.

- Click on 'Let's go!'
- Click on 'Capillaries' to see how they work.

This shows where our red blood cell friend leaves the bone marrow and jumps into the bloodstream.

The capillaries leave the body tissue and blood flows back into the second type of blood vessels – the veins.

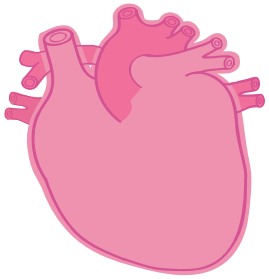
Veins always carry blood back towards the heart so that they can fill up with oxygen again. Because the blood in the veins has no oxygen, it becomes dark red in colour but actually looks blue.

Look at your wrist area or perhaps the back of your hands. The veins are quite close to the surface and you can see that they look blue. This is because the blood in them has no oxygen in it.

Refer to The Le@rning Federation learning object ‘Body parts: Heart and circulation’.

- Click on ‘Let’s go!’.
- Click on ‘Veins’ to see how they work.

On your Body tour diagram, complete the following.



- Label the capillary attached to the bone by drawing a line to it and writing the word ‘capillary’.
- Label the vein that heads back to the heart by drawing a line to it and writing the word ‘vein’.
- Using a blue pen, draw small arrows inside the vein from the bone to the heart.

## 3.4 The hardest working muscle

Choose one of the following exercises to try:

- push-ups
- sit-ups
- chin-ups.

How many can you do in one attempt? Have a go!

Which exercise did you do? _____

How many did you do? _____

The muscles that you used for the exercise eventually get tired causing you to stop after a few attempts. Your muscles are strong and getting stronger but they will never work as hard as one particular muscle.

That's right! Your heart!

Your heart is the hardest working muscle in the body.

The average heart rate for a person when they are resting is 70 beats per minute (bpm).

Using your calculator, work out these numbers.

## If a person 'rests':

### for one hour

multiply 70 bpm by 60 mins

70 x 60 = _____ beats

### for one day

multiply 70 bpm by 60 mins by 24 hours

70 x 60 x 24 = _____ beats

### for one year

multiply 70 bpm by 60 mins by 24 hours by 365 days

70 x 60 x 24 x 365 = _____ beats

The average Australian female will live for 84 years.

To calculate the number of heartbeats in an average female's life, multiply 70 bpm by 60 mins by 24 hours by 365 days by 84 years:

70 x 60 x 24 x 365 x 84 = _____ beats

If you ‘rest’ for your entire life, your heart will beat over three billion times. Imagine how many more times your heart beats through everyday activities such as exercising.

Your heart is basically a pump that literally lasts a lifetime. Wouldn’t your mum and dad love a car engine that could do that?

## 3.5 Clench your fist

Clench your fist and place it on this page.

Using a pen, trace around your fist and under your wrist to complete a circle-like shape.

### Did you know?

**Did you know that your heart is about the same size as your fist?**
**This was the case when you were a baby, and it always will be the case.**

Now get an adult to draw their fist over the top of yours and look at the difference. Their heart is the same size as their fist as well.

**Did you know?**

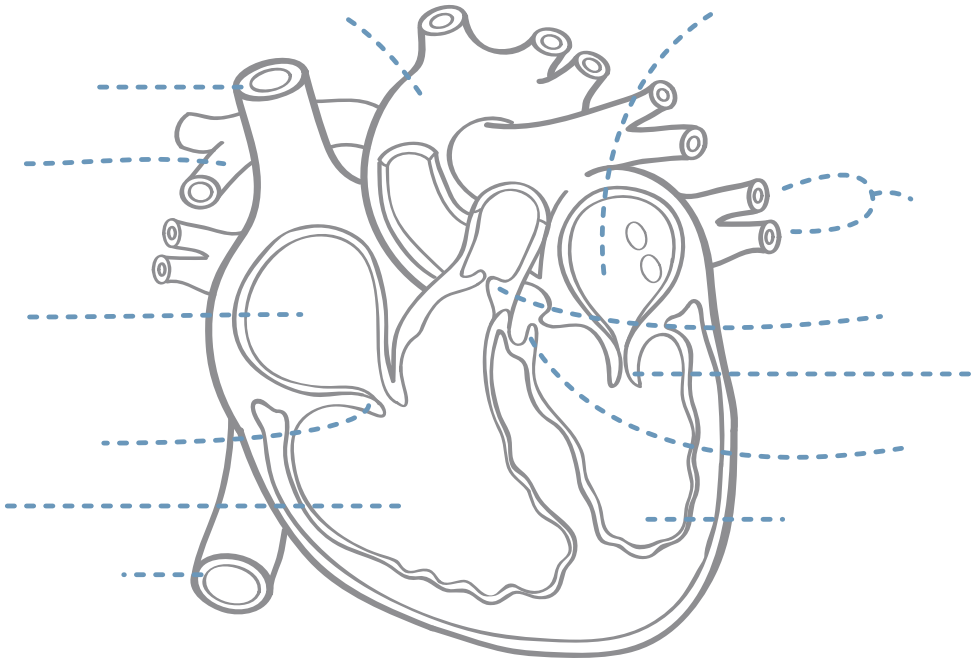
**Did you know that a horse has a heart about the same size as a basketball?**

# 3.6 Parts of the heart

The heart is a muscle that is divided into four chambers separated by valves. These valves open and close to make sure that the blood only flows in one direction. Blood is pumped into the heart through veins and taken away by the arteries, passing through the lungs on the way.

In your search engine, type in ‘parts of the heart’ and find a diagram that shows the inside of the heart as well as the arteries and veins. Using the diagram from the website, label the following diagram of the heart with the parts of the heart listed below:

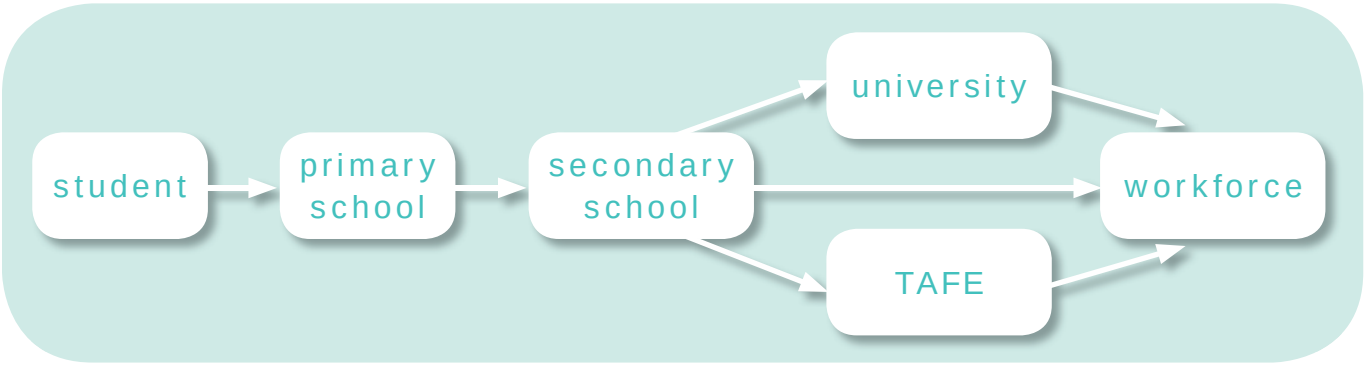
left atrium
pulmonary vein
tricuspid valve
aorta
aortic valve
pulmonary artery
superior vena cava
pulmonary valve
left ventricle
right ventricle
inferior vena cava
right atrium
mitral valve



## 3.7 The ultimate flow chart

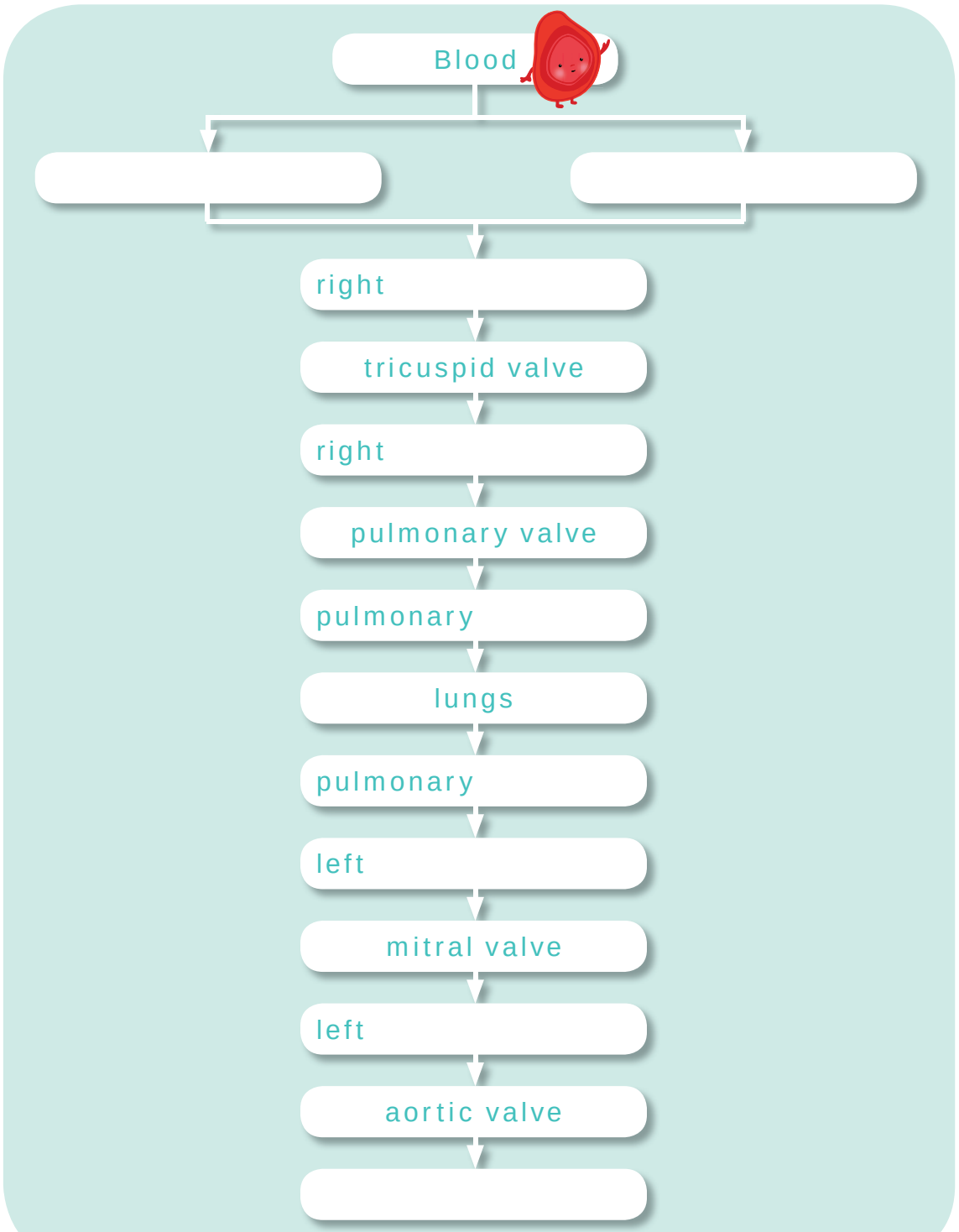
A flow chart is a diagram that uses pictures or words to explain the order in which things occur.

For example, a simple flow chart can be used to explain how students complete their education:




The process of our red blood cell passing through the heart and lungs is the ultimate ‘flow’ chart.

To start your flow chart, imagine that our red blood cell friend has come from the bone marrow. Use the parts in your heart diagram as well as the results from your search engine to complete the flow chart of blood through the heart and lungs.



## 3.8 Make a stethoscope

The sound of the heart is best described as ‘lubb-dub, lubb-dub’. The heartbeat sound comes from the opening and closing of the valves as it forces the blood to travel in and out of the heart. A doctor can use a stethoscope to listen for the heartbeat.

You can make a very simple type of stethoscope yourself.

Find a cylinder-shaped object like the cardboard roll found in the centre of a roll of toilet paper. Ask someone if you can listen to their heart.

The heart is located just under and left of the sternum (breastbone). The sternum is the bone that runs down the middle of the chest. Find the bottom of the sternum and move to the left-hand side by about five centimetres. Place the end of the cardboard roll against the person’s chest and listen through the other end.

Can you hear the lubb-dub, lubb-dub?

See if the person can hear your heartbeat.

Refer to The Le@rning Federation learning object ‘Body parts: heart and circulation’.

- Click on the stethoscope picture.
- Click on the picture of the ear to hear the real sound your heart makes.

## 3.9 A tour of the body

On your body tour diagram, complete the following.

- Label the heart by drawing a line to it and writing the word ‘heart’.
- Identify the pulmonary arteries on both sides of the heart. Using a blue pen, draw small arrows to show the direction of blood flow from the heart to the lungs.

# 3.10 Heart of love

When someone says they love something or someone, quite often the image we think of is the heart. The shape of the love heart, though, is not quite like the real heart.

There have been many poems written about love. Like any other poetry, poems about love take many forms. The example below begins each line of the poem with the same words.

***In the middle of my lunch the phone rang***

***In the middle of my lunch I spoke to my friend***

***In the middle of my lunch my friend said to me***

***In the middle of my lunch I should receive a call on the phone then***

***In the middle of my lunch, you'll never guess what happened.***

Anon

This poem uses the first line form. It is a fairly whimsical, light-hearted piece of poetry about a person's lunch.

In the poetry section of your portfolio under your alternate line poem, do the following.

- Create the subheading 'Same word poetry'.
- Write a one or two sentence description of what a same word poem is.
- Write a same word poem about something that you love. It could be about your mum and dad, your pet dog or perhaps food.
- Your poem needs to have each line begin with the words 'I love'.

# 3.11 Breathe in and out – the respiratory system

All we have to do is breathe in and out. Our body does the rest!

It didn't start that way. Before you were born, you did your breathing through the umbilical cord that connected you and your mum. It was not until you were born and let out your first cry that your lungs began to work. Ever since then, your lungs have helped you to breathe in and out.

On your computer, type in the following: <kidshealth.org>.

Click on:

- 'Kids site'
- 'How the Body Works'
- 'LUNGS' (in the magnifying glass)
- 'MOVIE' .

Watch the video about the respiratory system.

Match the following words with the correct definition by writing the word in the space provided on the next page.

| | |
|---|---|
| | responsible for the process of exchanging gases |
| | the action we do to allow the exchange of gases |
| | a gas that is breathed out as a waste product |
| | a gas that is breathed in to supply cells of the body |
| | the small tubes inside the lungs |
| | the air sacs found at the end of the bronchioles |
| | the wide, flat muscle that inflates and deflates the lungs |
| | organ of the body where gases are exchanged |
| | another name for the windpipe |
| | small blood vessels where gases are exchanged |

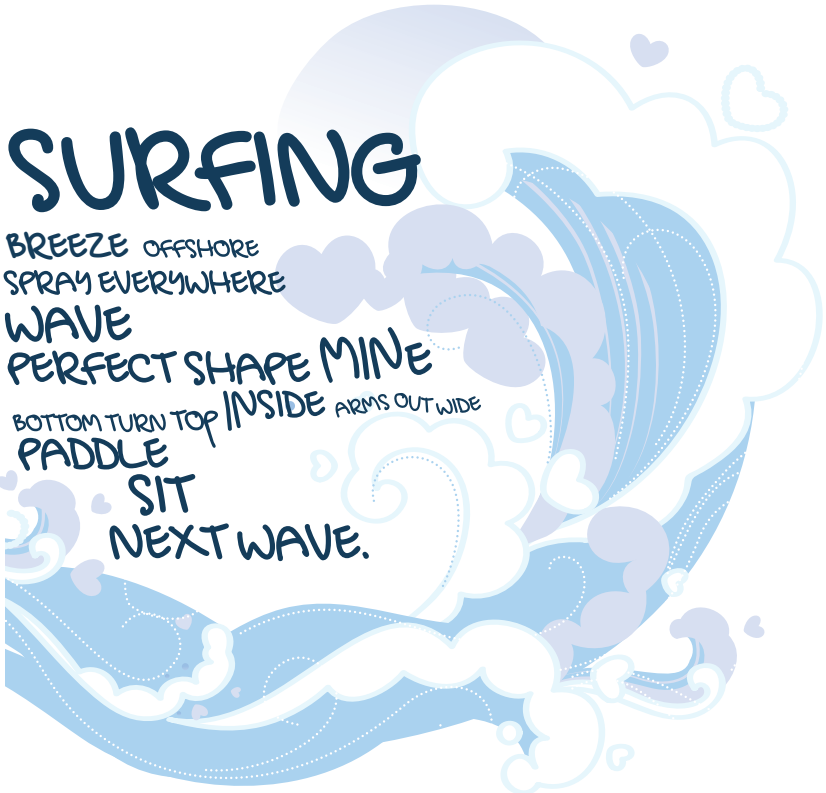
# 3.12 Illustrated word poems

In the poems you have already written you may have found:

- Poems can be about any topic.
- The lines don't have to be the same length.
- A lot of the enjoyment is gained from writing for yourself rather than for others.
- The poem doesn't have to rhyme.
- Poems are a good way to express how you 'think and feel' about a topic.

Often a poet has a picture or image in mind when writing poetry. When reading poetry, images often come to our minds as well.

Look at the illustrated poem below.




Notice how the single words are all about the topic or the scene.

The illustrations add to the images the words create.

In the poetry section of your portfolio under your same word poem, do the following.

- Create the subheading ‘Illustrated word poem’.
- Write a one or two sentence description of what an illustrated word poem is.
- Write an illustrated word poem about the respiratory system by:
  - using the keywords discussed in 3.11 ‘Breathe in and out’
  - organising the words into lines in a sequence that you like
  - trying another way of organising the words.
- Select the poem you like best and give it a title.
- Illustrate your poem with images from the words in the poem.

Sometimes even sensitive topics and personal writing can be shared. Poets do this by signing the writing using a ‘nom de plume’ – an assumed or false name.

- Sign your poem (choose a nom de plume, anon or your own name).

## 3.13 Breathing rate

The faster a car drives, the more petrol it uses. This is because the engine has to work harder to make the car go faster.

Your breathing is the same. Let’s test that!

1. **Find a watch or clock with a second hand.**
   - For the next 30 seconds, breathe normally and count how many times you breathe in. Write your answer below.

     Number of breaths in 30 seconds = ____
   - On a scale of 1–5 with 1 being easy and 5 being difficult, indicate how hard it was for you to breathe. Put a number in the box. ____

**2 Find a suitable location and run as fast as you can for 30 seconds.**

- When you are finished, stand still for 30 seconds and count how many times you breathe in. Write your answer below:

  Number of breaths in 30 seconds = ____

- On a scale of 1–5 with 1 being easy and 5 being difficult, indicate how hard it was for you to breathe. Put a number in the box. ____

Write a sentence to explain why you took more breaths after running compared to when you were sitting still. In your answer use the words: oxygen, carbon dioxide and body cells.

Have you heard of emphysema? (*say* em-fur-seem-a)

Emphysema is a type of lung disease where the alveoli (part of the respiratory system) are damaged. Emphysema is characterised by a shortness of breath and, unfortunately, there is no cure. One of the main causes of emphysema is cigarette smoking.

To see the effect of emphysema:

- Type the address <www.quit.org.au> into your browser.
- Click on ‘Media & advertising’.
- Click on ‘Quit television advertisements’.
- Click on ‘2005 advertisements’.

There are many different advertisements relating to smoking. The advertisement titled ‘Lung disease’ is a good one about the effect of emphysema. Watch this video to help you to comment on the following statement.

‘It is much more difficult for a person to breathe if they smoke cigarettes.’

Explain what reasons you think might cause this.

But, how does it feel to have difficulty in breathing? If you suffer from asthma you may already know.

**SAFETY HINT:**
**Talk to an adult before doing this activity.**

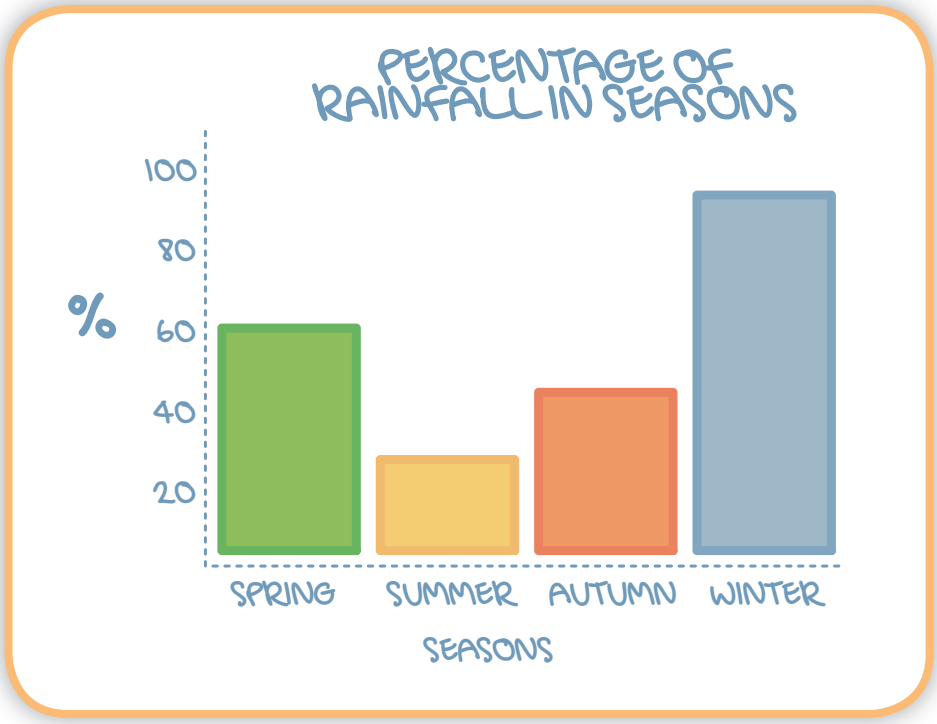
You need two drinking straws for this activity.

- Join the two straws together to make one long one by placing the end of one straw into the end of the other straw.
- Place the straw in your mouth and find a way of sealing your nose (perhaps by pinching it). Make sure you only breathe through the straw.
- Sit in a chair and breathe through the straw for 30 seconds.
- On a scale of 1–5 with 1 being easy and 5 being difficult, indicate how hard it was for you to breathe. Put a number in the box.
- Now run as fast as you can for 30 seconds. When you are finished, stand still for 30 seconds and breathe through the straw again.
- On a scale of 1–5 with 1 being easy and 5 being difficult, indicate how hard it was for you to breathe. Put a number in the box.

Breathing through two straws is how a person who smokes regularly would feel after running for 30 seconds.

One way of effectively providing information about something like breathing rates is through a graph. A graph needs to be labelled correctly so that the information is easy to understand. Information should be provided for the X and Y axes, and the graph should have a title.

For example:




Design a graph that provides the information you collected from these activities:

- sitting and breathing
- running for 30 seconds and breathing
- sitting and breathing through two straws
- running for 30 seconds and breathing through two straws.

## 3.14 A tour of the body

On your body tour diagram, complete the following.

- Draw a line to the lungs and add the label ‘lungs’.
- Using blue and red pens, show the change to blood cells that occurs in the heart and lungs, drawing blue arrows to show the blood cells without oxygen, and red arrows to show the blood cells with oxygen.

As we complete this section on the lungs, it is a good time to revise the pathway we have just covered.

Refer to The Le@rning Federation learning object ‘Body parts: Heart and circulation’.

- Click on ‘Let’s go!’.
- Click on ‘Pulmonary circulation’ to follow the pathway through the heart and lungs.

## 3.15 Bypass for a healthy heart

Refer to The Le@rning Federation learning object ‘Body parts: Heart and circulation’.

- Click on ‘Let’s go!’.
- Click on ‘Arteries’ to see how they work.

Arteries carry oxygen-rich blood away from the heart and into the body.

The different chambers and blood vessels connected to the lungs have already been discussed. But the heart itself is a muscle. Therefore, like all muscles in the body, it needs to be supplied with oxygen-rich blood. The arteries that do this are called coronary arteries.

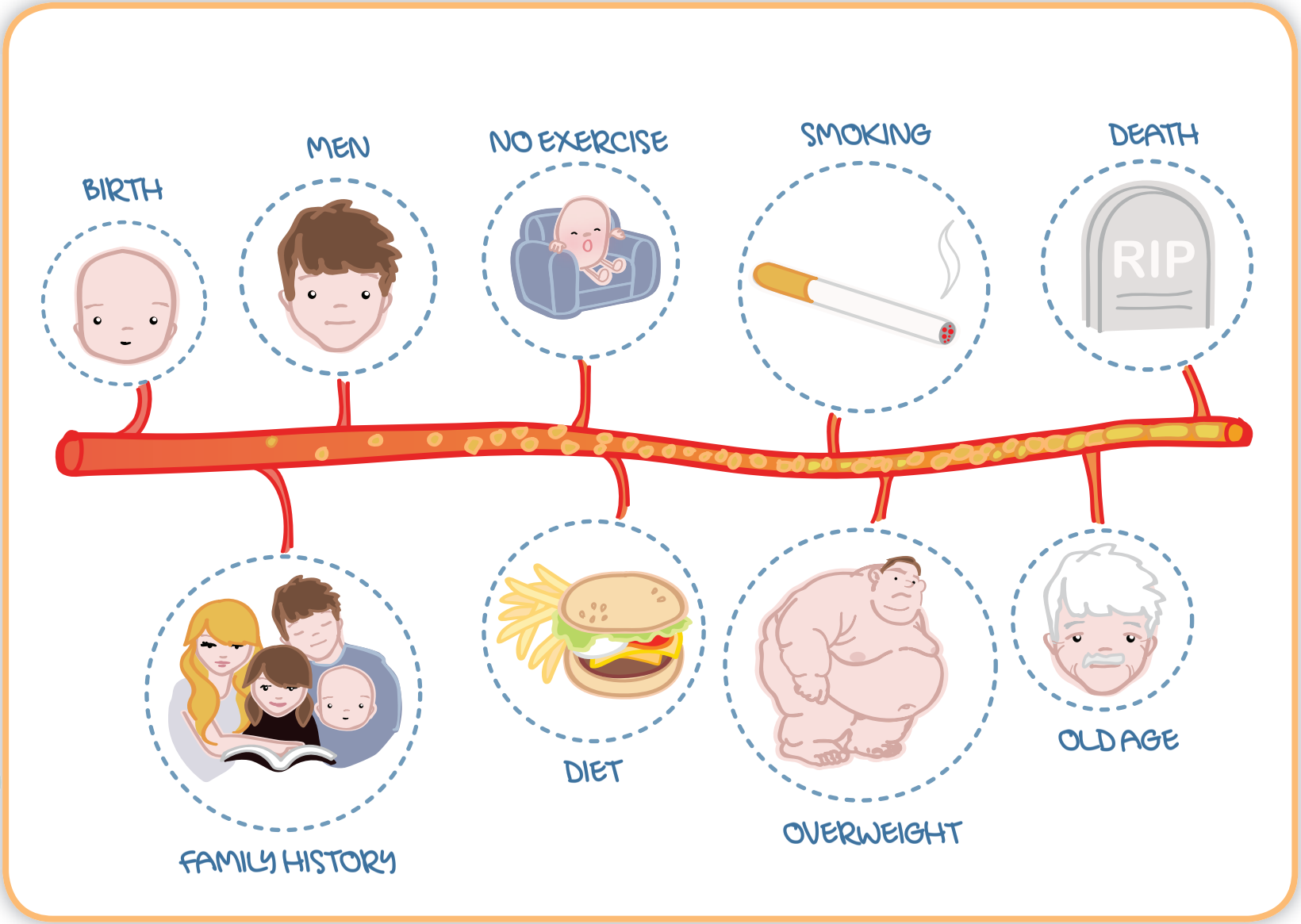
Refer back to The Le@rning Federation learning object ‘Body parts: Heart and circulation’.

- Click on ‘Let’s go!’.
- Click on ‘Heart’ to see where the coronary arteries are located.

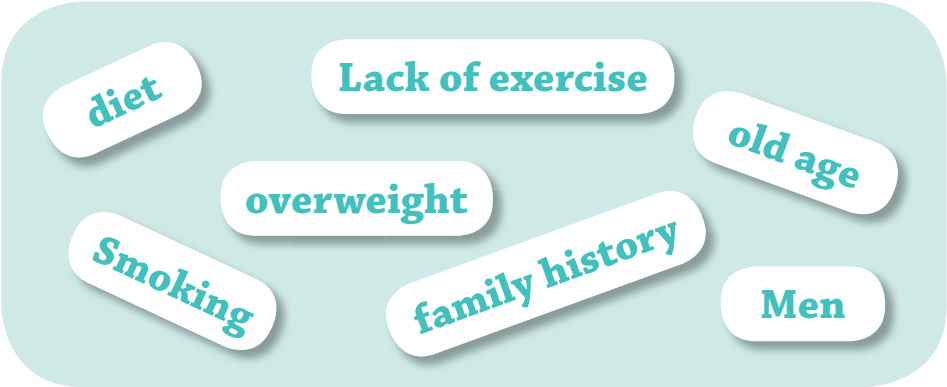
Heart disease is one of the major leading causes of death in Australia. Heart disease can be caused by a number of factors.

One factor is fatty deposits known as cholesterol (*say* ko-less-tear-ol). The coronary arteries become blocked by these fatty deposits until blood is eventually unable to get to the heart muscle, causing it to stop moving, which in turn stops it pumping blood around the body.

Let's follow the life of a coronary artery and see what factors cause trouble:



Many factors contribute to heart disease. Insert the correct word or phrase to complete the following sentences.




You have an increased chance of heart problems if you have a _____ _____ of heart disease.

_____ have a greater risk of heart problems than women do, and at an earlier age.

The chance of having heart problems is increased if you are _____.

The risk of having heart problems increases with _____ _____.

_____ increases the risk of heart problems.

Having a high fat content in your _____ increases the chance of heart problems.

_____ _____ _____ increases the chance of becoming overweight, and of heart problems.

# 3.16 A tour of the body

On your body tour diagram, complete the following.

- Using a red pen, draw arrows showing the direction of the blood from the heart to the wrist.
- Draw a line to the wrist and add the label ‘wrist’.

# 3.17 Pulsating

Why are we stopping at the wrist?

The wrist is an important part of the body for several reasons, one of them being that it is an easy way for us to check our pulse rate.

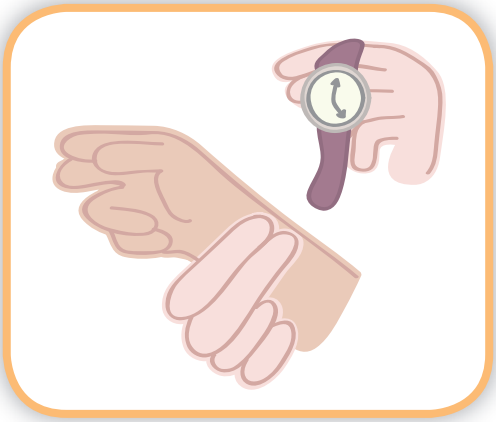
A person’s pulse rate indicates how fast or slow their heart is beating. This is important to know for health reasons, and it is a great way to measure your level of fitness.

To feel your pulse:

- Use your index and long finger (don’t use your thumb as it has its own pulse).
- Press lightly with your two fingers on the thumb side of your wrist, just below where the hand starts.
- Move your fingers around until you can feel a beat.

To measure your pulse rate:

- You will need a clock with a second hand.
- Find your pulse and watch the second hand of your clock.
- Count the number of beats you feel in 20 seconds.
- Multiply this number by three to find out the number of beats per minute (bpm), ie 20 secs x 3 = 60 secs.



### Example

If you felt 25 beats in 20 seconds, then your bpm would be calculated by:

25 x 3 = 75 bpm

An average resting pulse rate is approximately 70–80 bpm.

Depending on what you are doing, your pulse rate can vary quite a lot. Try the following activities to find out how much your pulse can vary.

## 1 Resting pulse rate

- Lie down on the floor.
- After two or three minutes, find your pulse and count the beats for 20 seconds.
- Multiply this number by three.
- Write your resting pulse rate in the box below.

My resting pulse rate = ☐

## 2 Walking pulse rate

- Walk at a normal pace for one minute.
- After one minute of walking, find your pulse and count the beats for 20 seconds.
- Multiply this number by three.
- Write your pulse rate in the box below.

My walking pulse rate = ☐

## 3 Running pulse rate

- Run at a reasonable pace for one minute.
- After one minute of running, find your pulse and count the beats for 20 seconds.
- Multiply this number by three.
- Write your pulse rate in the box below.

My running pulse rate = ☐

## 4 Resting pulse rate

- Lie down on the floor again.
- Measure your pulse after one, two and three minutes.
- Write your pulse rates in the boxes below.

one minute = ☐ two minutes = ☐ three minutes = ☐

A good way to find out how fit you are is to measure how long it takes you to get back to your resting pulse rate after you have been exercising. The quicker you return to your resting pulse rate, the fitter you are.

In the same way as you did for the breathing activity, design a graph that provides the information relating to your pulse rate for the different activities:

- resting pulse rate
- walking pulse rate
- running pulse rate
- resting pulse rate after exercise at one, two and three minutes.

## 3.18 A tour of the body

On your body tour diagram, complete the following.

- Using a red pen, draw arrows showing the direction of the blood from the wrist to the spleen.
- Draw a line to the spleen and add the label ‘spleen’.


## 3.19 Keywords

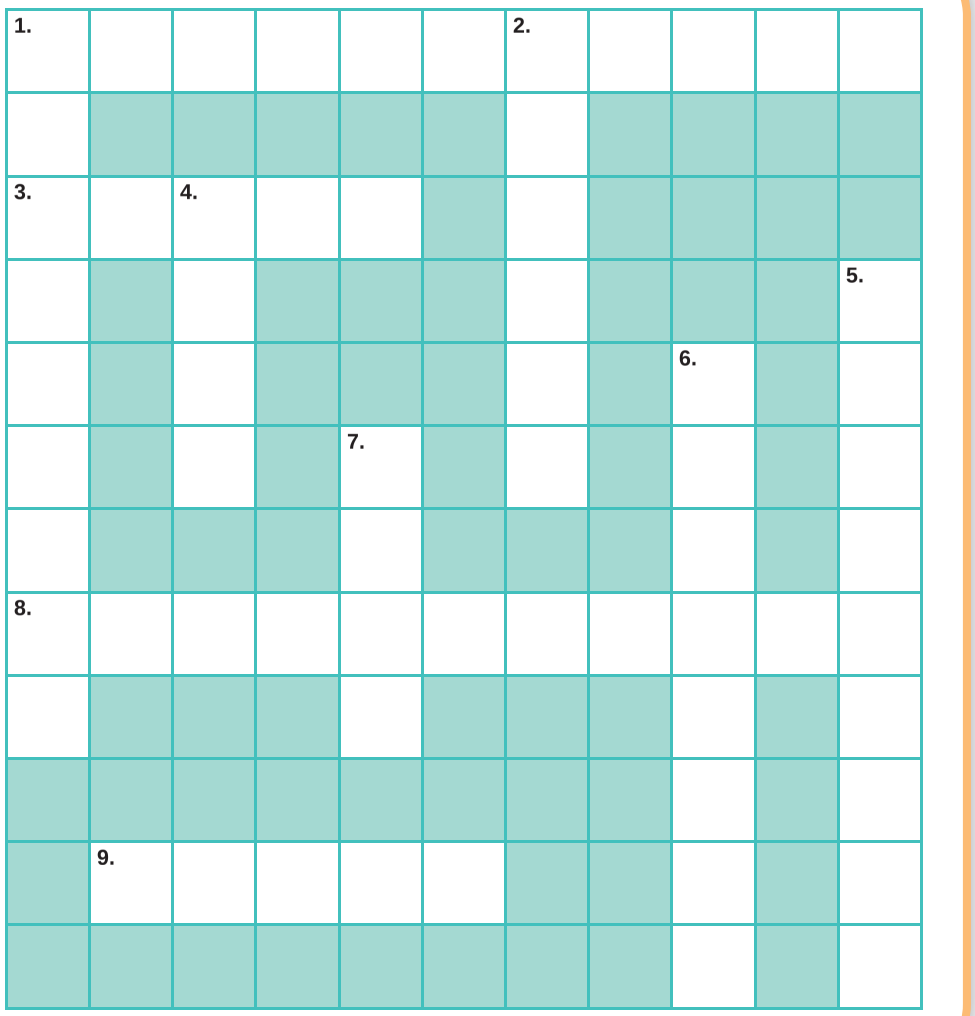
On your computer, type in the following: <kidshealth.org>.

Click on:

- ‘Kids site’
- ‘How the Body Works’
- ‘HEART’ (in the magnifying glass)
- ‘MOVIE’.

Watch the video about the circulatory system.

Use this video and, if necessary, read back through the section on the respiratory and circulatory systems to help you complete the following crossword.




## Across

1. The system responsible for transporting oxygen and nutrients to the cells of the body, and for taking away the waste products
3. Indicates how fast or slow the heart is beating
8. System responsible for the process of exchanging gases
9. Acts as a pump to assist blood flow around the body

## Down

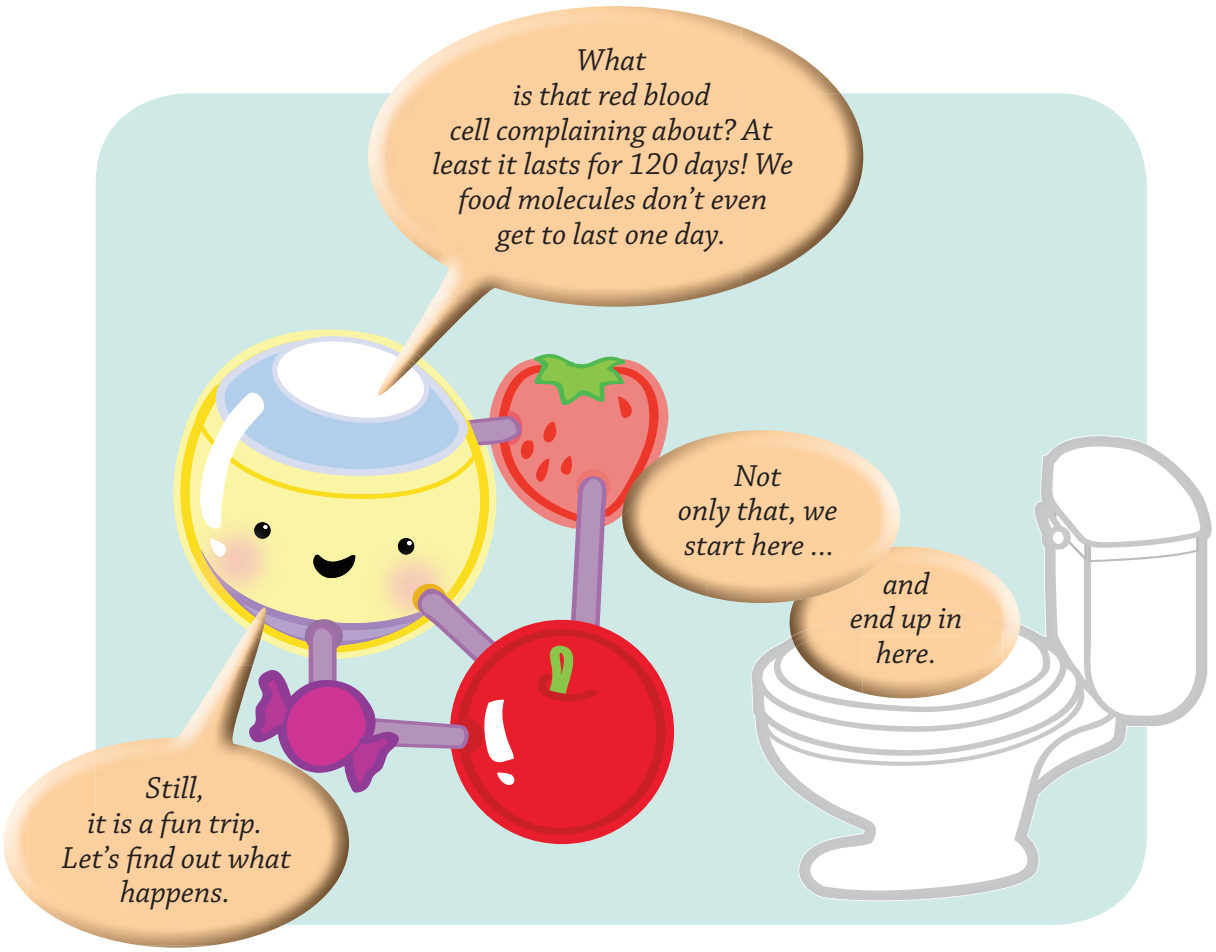
1. Vessel responsible for exchanging water, oxygen and nutrients with the waste products within the body tissue
2. Vessel responsible for carrying oxygen-rich blood away from the heart and into the body
4. Organ of the body where gases are exchanged
5. A type of lung disease where the alveoli are damaged
6. Artery that supplies the heart muscle with blood
7. Vessel that carries blood back towards the heart

When you have found all 10 clues, add them to your keywords table in your portfolio by matching them with the correct meaning provided.

# 3.20 Reading *Lockie Leonard, Human Torpedo*

Take 25 minutes now to read some more of your novel, *Lockie Leonard, Human Torpedo*.

# 4 In one end and out the other




## 4.1 Contents page

At the completion of this section, check to make sure you have the following activities included in your portfolio.

| Title of the activity | Tick |
|---|---|
| 4.2 The digestive system | |
| 4.5 A poem about digestion | |
| 4.6 A healthier diet | |
| 4.7 Keywords | |
| 4.8 Creating bodies | |

# 4.2 The digestive system

The following two sheets provide information about the digestive system. Cut out both sheets before continuing.

Your task is to label the parts of the digestive system and place the information into the correct position on the page.

To complete this task:

- Cut out the sheet with the diagram on it.
- Put the heading 'The digestive system' on top of the page with the diagram on it.

On your computer, type in the following: <kidshealth.org>.

Click on:

- 'Kids site'
- 'How the Body Works'
- 'STOMACH' (in the magnifying glass)
- 'MOVIE'.

Watch the video about the digestive system to help you with the following activity.

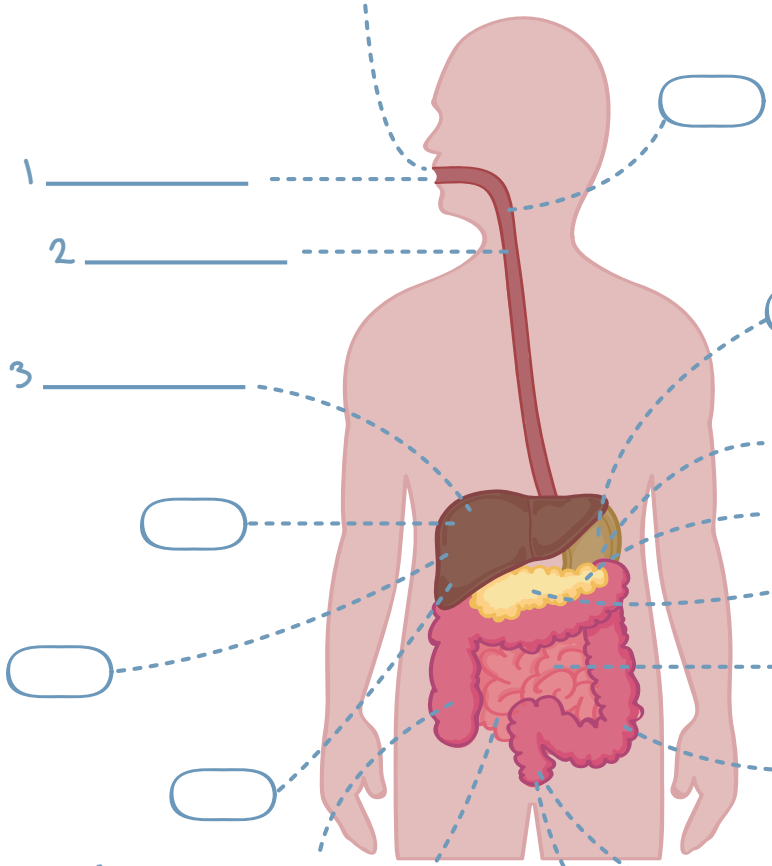
- Label the parts of the digestive system. The parts are numbered 1–8.
- Read the information in the information boxes. Now write in the correct letter (A–M) in the correct position on the diagram.

Include your finished product in your portfolio.

THE DIGESTIVE PROCESS

DIGESTIVE SYSTEM DEFINITION

ROLE OF ORGANS



1 _____

2 _____

3 _____

4 _____

5 _____

6 _____

7 _____

8 _____

DIGESTIVE TRACT

a body system that breaks down and handles food

b break down food and convert it into energy to allow the body to work and grow

c long muscular tube that starts at the mouth, finishes at the anus and is about nine metres in length

d begins with chewing, mashing and grinding of food before saliva begins to break the food down

e soft tube that starts in the throat and empties food into the stomach

f food particles mix with stomach acids and enzymes

g place where the majority of digestion takes place

h produces bile to help release the nutrients from food so that they can be absorbed and circulated around the body via the bloodstream

i produces enzymes to help release the nutrients from food so that they can be absorbed and circulated around the body via the bloodstream

j turns the fats, carbohydrates and proteins into building blocks to allow the body to work and grow

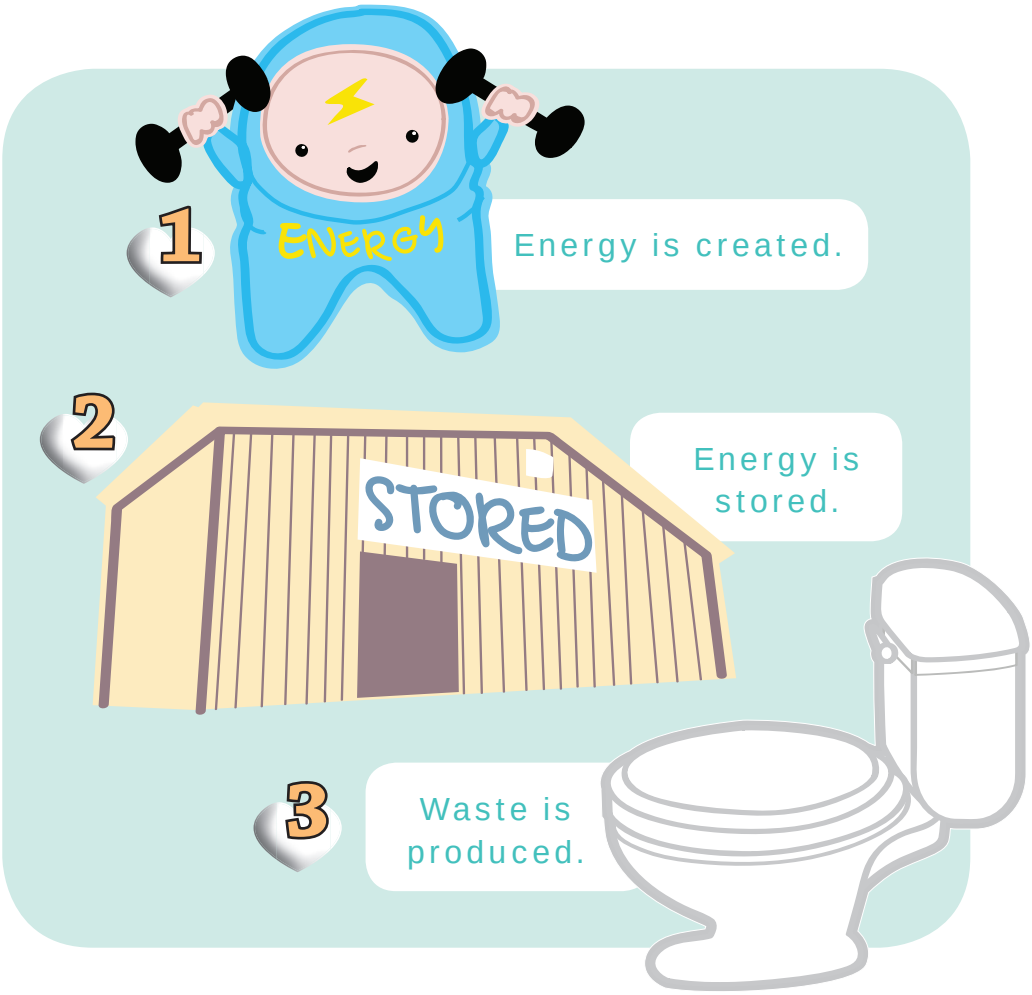
k removes harmful substances from the blood

l removes water and forms faeces

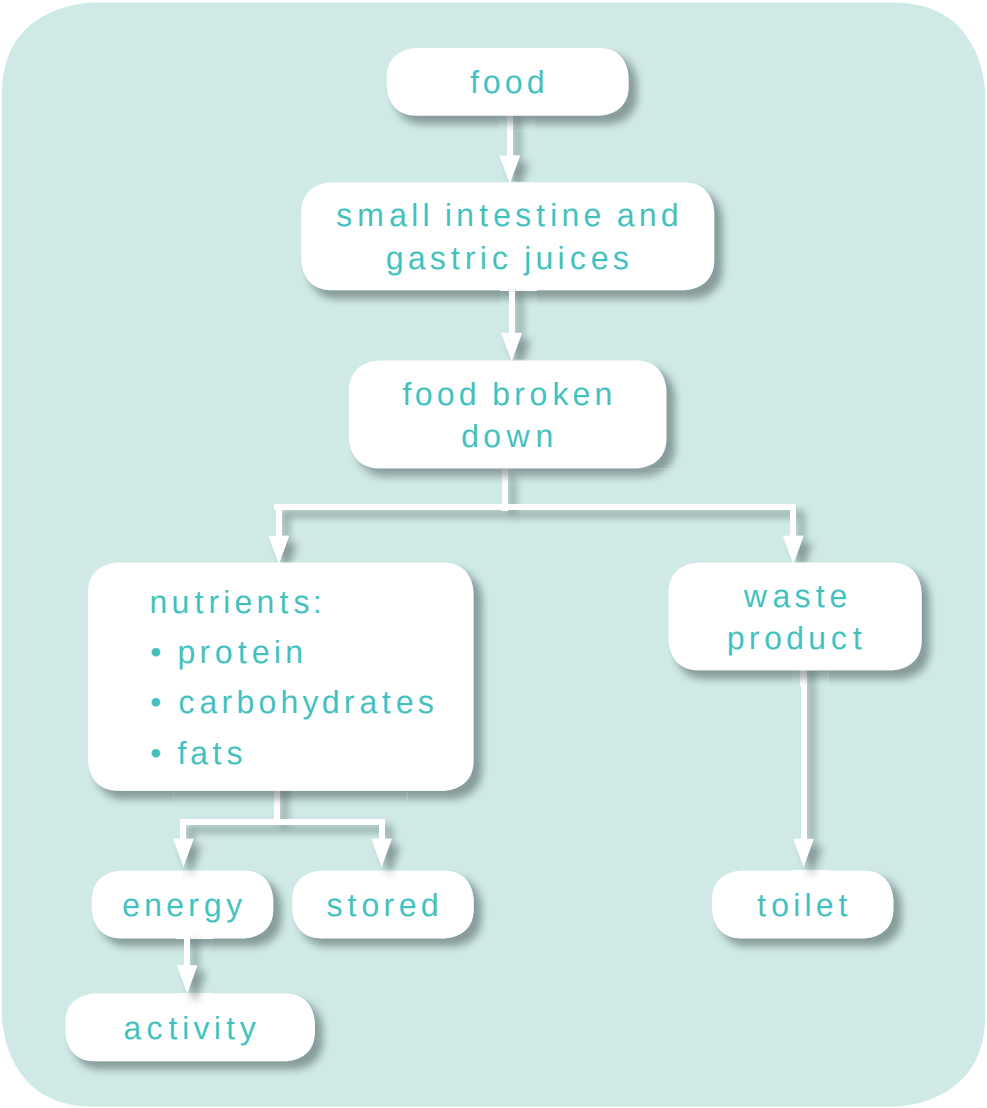
m passes waste products out of the body through the anus

# 4.3 How much energy is that?

When you chew a piece of food, three things will happen:




Now consider the following flow chart of the digestive system. In the space provided, try and explain the pathway of a piece of food as presented in the flow chart. Describe the digestive process using the information provided. When you finish, see how accurate you were by checking the answer in the Feedback and solutions section.



A person's weight is directly related to how much energy (food eaten) is used compared to how much energy is being stored. There are three possible outcomes that can occur.

**Energy in = energy used**

result: weight stays the same

**Energy in > energy used**

result: weight gain

**Energy in < energy used**

result: weight loss

The three main nutrients found in food are carbohydrates, protein and fats. Most of our energy comes from carbohydrates, as these are broken down the quickest. Proteins and fats (fats in particular) take much longer to be broken down. If more of these nutrients are consumed than used, they are stored in the body, causing us to gain weight.

The energy in food is measured in kilojoules (kJ). This measurement can help people work out how much energy is being consumed and how much energy is being used.

In the two tables on the following page are examples of two different meals that a person might consume. To help you fill in the tables go to the website: <www.betterhealth.vic.gov.au>.

In the website:

- Underneath ‘Healthy living’, click on ‘Calculators’.
- Click on ‘Food search’.
- Type in each example of food into the ‘Food search’ area to help you complete the tables.

Then add the numbers in the columns to determine the totals of each category.

For example, if you type in ‘apple’ the following information will be given.

| Food per 100 g | Kilojoules (kJ) | Saturated fat content (g) | Sugar content (g) | Sodium (salt) content (g) | Walking distance (metres) |
|---|---|---|---|---|---|
| **Apple** | 217 | 0 | 10 | 1 | 824 |

The list below explains the categories in each of the columns.

**Food:** all amounts are relating to a 100 gram serving of the food.

**Kilojoule:** the amount of energy that the food provides.

**Saturated fat content:** the unhealthiest form of fat; eating this increases the risk of heart disease.

**Sugar content:** contributes to weight gain without contributing any nutritional value.

**Sodium content:** higher salt content increases the risk of various health problems.

**Walking distance:** the amount of distance required to use the kilojoules indicated.

## Meal one

| Food per 100 g | Kilojoules (kJ) | Saturated fat content (g) | Sugar content (g) | Sodium (salt) content (g) | Walking distance (metres) |
|---|---|---|---|---|---|
| **hamburger** | | | | | |
| **soft drink** | | | | | |
| **sundae** | | | | | |
| **french fries** | | | | | |
| Total | | | | | |

## Meal two

| Food per 100 g | Kilojoules (kJ) | Saturated fat content (g) | Sugar content (g) | Sodium (salt) content (g) | Walking distance (metres) |
|---|---|---|---|---|---|
| **grilled fish** | | | | | |
| **water** | | | | | |
| **green beans** | | | | | |
| **orange** | | | | | |
| Total | | | | | |

When you have completed all your calculations, compare the totals of the two meals.

| | Kilojoules (kJ) | Saturated fat content (g) | Sugar content (g) | Sodium (salt) content (g) | Walking distance (metres) |
|---|---|---|---|---|---|
| **Meal one** | | | | | |
| **Meal two** | | | | | |

In terms of health considerations and weight gain, Meal one is obviously unhealthier because the total of each category is at least four times greater than Meal two.

Choose a typical meal that you might eat that has a main dish, a side dish, a drink and a dessert. Complete the table below using your choices and the calculators on the *Better Health* website.

| Food per 100 g | Kilojoules (kJ) | Saturated fat content (g) | Sugar content (g) | Sodium (salt) content (g) | Walking distance (metres) |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| Total | | | | | |

# 4.4 How much exercise is that?

In the last activity, we used walking as an example of how to burn kilojoules. But, every activity burns up energy, even sleeping. So what activities can you do to use up those kilojoules?

Here are a few ideas. The kilojoules burned are the result of participating in each activity for 20 minutes.

| Activity | kJ burned |
|---|---|
| using TV remote control | <4.2 |
| getting up to change TV channel | 12.6 |
| walking the dog | 352 |
| washing and waxing the car | 252 |
| using the lift, 3 floors | <4.2 |
| walking up 3 floors | 63 |
| climbing stairs (72 steps per minute) | 399 |
| climbing stairs (92 steps per minute) | 546 |
| cycling on flat ground | 525 |
| driving a car in traffic | 238 |
| gardening | 462 |
| golf | 420 |
| office work (general) | 105 |
| playing cricket | 672 |
| playing pool | 273 |
| playing squash | 840 |
| playing tennis | 588 |
| playing football | 588 |
| playing table tennis | 378 |
| playing cards | 168 |
| running (at moderate pace) | 866 |
| vacuuming | 233 |
| walking rapidly | 534 |
| swimming (50 m in 45 sec) | 933 |

In activity 4.3 ‘How much energy is that?’, Meal one provided 15 926 kilojoules.

To burn off those kilojoules so that a person did not gain any weight would take the following amount of exercise:

kilojoules of meal ÷ kilojoules of activity x 20 minutes

**playing tennis:**

15 926 ÷ 588 x 20 = 541 minutes (9 hours)

**swimming:**

341 mins (5.7 hours)

**vacuuming:**

1367 mins (22.7 hours)

**using the TV remote control:**

75 838 mins (1263 hours)

You should at least get up to change the TV channel. It will mean that you only take 421 hours to burn off that meal compared to 1263 hours.

Choose some activities from the list that you like to participate in. Using the formula above, work out how long it would take to burn off the energy you gained from the meal you chose in the last activity.

Total number of kilojoules in meal =

### Time taken to burn off energy

| Activity | Time taken to burn off energy |
|---|---|
| 1 | |
| 2 | |

## 4.5 A poem about digestion

In this section you will learn about another form of poetry known as haiku (*say* high-koo). A haiku poem has simple rules that are similar to the cinquain poetry you tried earlier.

A haiku poem has three lines of poetry:

- a first line of five syllables
- a second line of seven syllables
- a third line of five syllables.

As long as your poem has three lines that each have the correct number of syllables, then you have written a haiku. The easiest way to hear how many syllables are in a word is to 'clap the beats' as you say the word. For example:

| Word | Spoken | Claps | Syllables |
|---|---|---|---|
| **it** | it | 1 | 1 |
| **hello** | hel-lo | 2 | 2 |
| **surprising** | sur-pri-sing | 3 | 3 |
| **distinguishing** | dis-tin-guish-ing | 4 | 4 |
| **anti-corruption** | an-ti-cor-rup-tion | 5 | 5 |

Clap each of these words to reinforce your understanding of syllables.

Now read the following examples and see how the syllable count appears below each word.

| Small | rabbit | hopping. | | |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |

| Running | quickly | through | the | bush. | | |
|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

| Catch | him | if | you | can. |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |

Your task now is to create a haiku poem using the digestive system as your theme.

In the poetry section of your portfolio under your Illustrated word poem, do the following.

- Create the subheading ‘Haiku poem’.
- Write a one or two sentence description of what a haiku poem is.
- Write a haiku poem using the digestive system as your theme.
- Make sure your poem matches the number of lines and syllables required for a haiku poem.
- Sign your poem (choose a nom de plume or your own name).

## 4.6 A healthier diet

Speaking generally, Australia has become a nation of overweight people. In fact we are in the top 10 nations for having overweight people.

Educating people to eat a healthy diet and maintain a healthy weight is a difficult task because it's hard to get people to take notice of something that will mean changing a lifestyle they have become accustomed to.

Your job is to create a poster that promotes healthy eating and healthy ways to lose weight.

Use the information and ideas from this section in your poster and include:

- a heading
- some pictures that promote healthy eating and healthy ways to lose weight
- a message that promotes healthy eating and healthy ways to lose weight.

When you have completed your poster, place it in your portfolio.

## 4.7 Keywords

The meanings of each of these keywords have spelling mistakes included. You need to find the spelling mistakes, and then write the correct information into the keywords table in your portfolio.

| Keyword | Meaning | Number of misspelt words – add correct spelling |
|---|---|---|
| **digestive system** | body system that brakes down and handals food | 2 |
| **energy** | reesults from the breakdown of food to supply the body with phuel to purform everyday activities | 3 |
| **kilojoule** | the uknit used to measure the level of nnergy | 2 |
| **haiku** | a threee line poem based on the number of sillables used in each line | 2 |

## 4.8 Creating bodies

It is time to revisit your ‘Creating bodies’ activity 1.4 from the first module, ‘Setting the scene’.

Now that you have gained some more knowledge about each body system, return to your original work and fill in any gaps that you may have by adding new information, and as much information as you can, to the areas below:

- the diagrams naming the parts of the various systems
- the explanations of the purpose (function) of each of the systems
- the descriptions of how each system works to achieve the purpose you have described.

## 4.9 Reading *Lockie Leonard, Human Torpedo*

Take 25 minutes now to read some more of your novel *Lockie Leonard, Human Torpedo*.

Very shortly, you are going to begin activities relating to the Lockie Leonard novel. You need to make sure that you have read pages 5–20 before beginning the activities.

# Body systems

# Feedback and solutions

# 2 Skeletal system

## 2.1 Contents page

At the completion of this module, check to make sure you have the following activities included in your portfolio.



## 2.2 Keywords

As you work your way through this section on the skeletal system, find the keywords and their meanings, then add the keyword to your portfolio next to its meaning.

alternate line poem
bone marrow
cancellous bone
cinquain
compact bone
muscular system
osteoporosis
periosteum
skeletal system
sutures
syllable

| Keyword | Meaning |
|---|---|
| alternate line poem | a poem that follows one point of view on one line followed by a different point of view on the next line |
| bone marrow | part of the bone that makes blood cells |
| cancellous bone | layers within the compact bone that contain the bone marrow |
| cinquain | a five line poem based on the number of syllables used in each line |
| compact bone | the part you can see when you look at a skeleton |
| muscular system | composed of a system of muscles attached to bones that allows movement of the body |
| osteoporosis | when the bones become fragile and brittle because they lose minerals |
| periosteum | the outer surface of bone |
| skeletal system | the bones in the body |
| sutures | joints where bones are fused together |
| syllable | how a word is broken down when you pronounce it |

## 2.3 How many bones?

How many bones?

An adult has 206 bones. A baby has 300 bones.

# 2.4 What's a bone?

Indicate how many syllables each of the following words has.

| Word | Number of syllables | Syllables broken down |
|---|---|---|
| **body** | **2** | bod-y |
| **systems** | **2** | sys-tems |
| **cancellous** | **3** | can-cell-ous |
| **skeleton** | **3** | skel-e-ton |
| **bone** | **1** | bone |
| **marrow** | **2** | mar-row |
| **spongy** | **2** | spong-y |
| **poetry** | **3** | po-e-try |

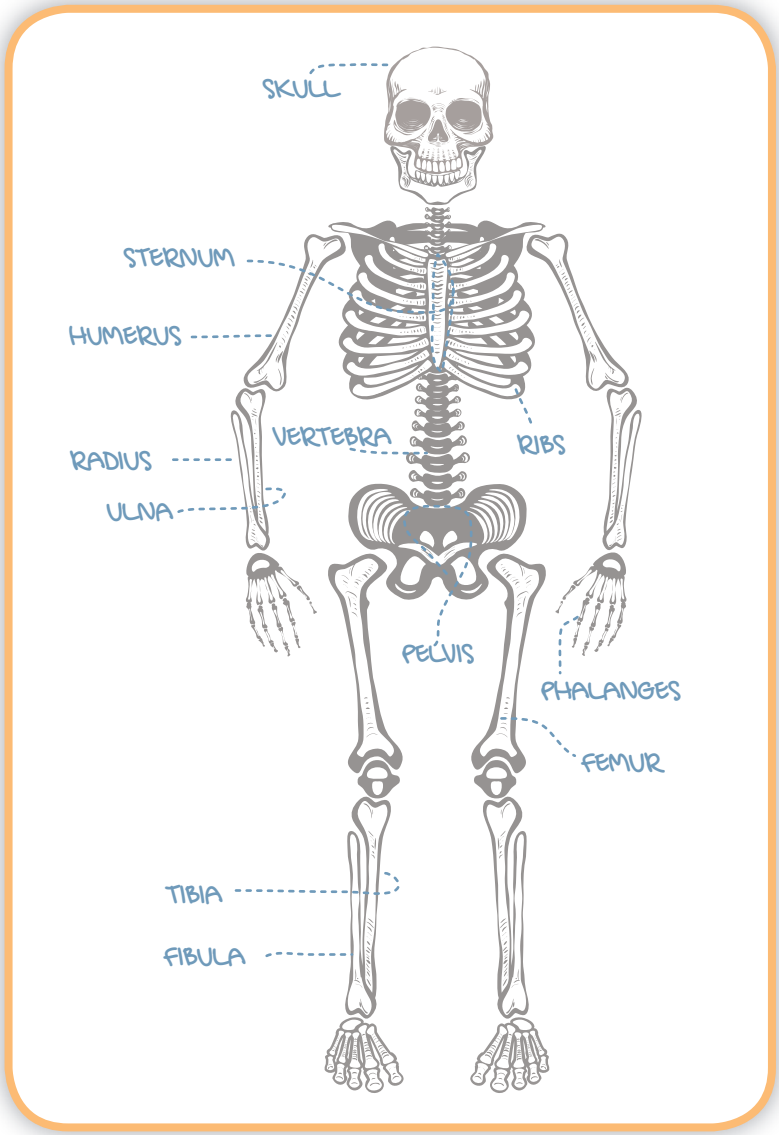
Write a cinquain poem using 'Bones' as a title and the information about bones that you have learnt so far.

Make sure that your poem follows the cinquain pattern:

- 5 lines
- 2 syllables in the first line
- 4 syllables in the second line
- 6 syllables in the third line
- 8 syllables in the fourth line
- 2 syllables in the fifth line.

# 2.5 Name that bone

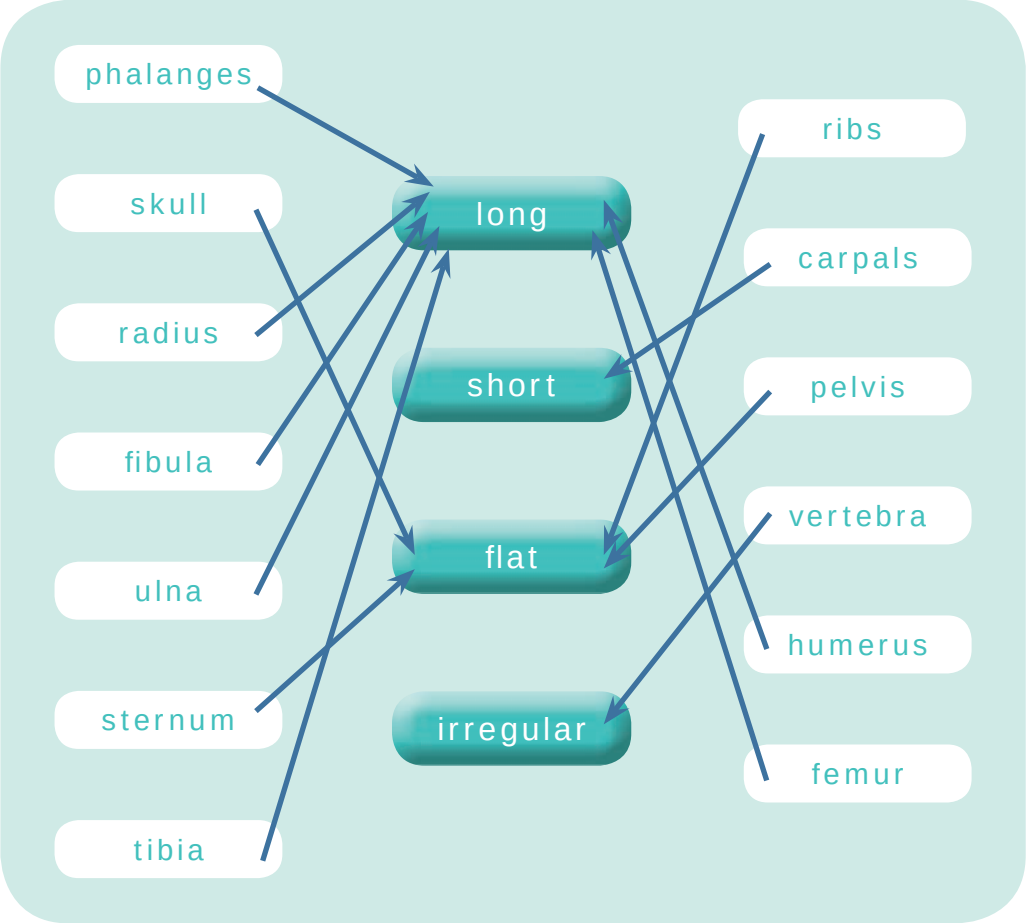
Connect the different bones where the ‘x’ indicates where to make a human skeleton.




Notice how phalanges is the name given to both the fingers and the toes.

## 2.6 Types of bone

Match the following bones with their category by drawing a line to connect them.




## 2.7 What do bones do?

Listen to the information from the CD-ROM and then answer the questions below to see how well you were listening.

'The purpose of the skeletal system' questionnaire:

1. How many functions does the skeletal system perform?

3 ○ 4 ○ 5 ✓ 6 ○

**2** What are the functions of the skeletal system?

The five functions of the skeletal system are:

- to provide a framework for the body
- to protect the internal organs
- the production of blood cells
- to help with movement
- the storage of minerals.

**3** Give an example of a body part that exists inside and outside the framework of the skeleton.

inside heart, brain and lungs
outside muscles, skin and hair

**4** Name the internal organs that these bones protect:

cranium
brain

ribs and sternum
heart
lungs
some of the digestive organs

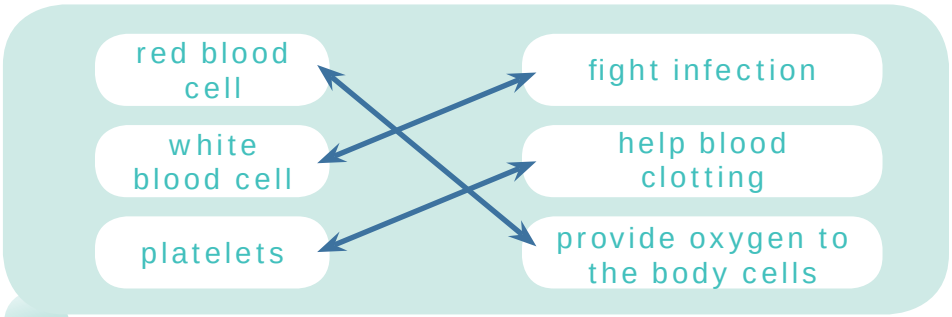
pelvis
digestive organs
reproductive organs

vertebral column
spinal cord

**5** Which category of bones is responsible for the production of blood cells?

flat ○ long ✓ irregular ○ short ○

**6** Draw lines to match up the correct blood cell (on the left) with its function (on the right).



7 Complete the following sentence with the words listed to explain how the body is able to move.

The brain sends a message via the nerves to the muscles telling them to contract or shorten. The muscles are attached to the bones by tendons. When the muscle shortens, it pulls the bone in the required direction, which allows us to move.

8 Which mineral helps keep our bones strong? Calcium.

## 2.8 Time to talk osteoporosis

Here is a checklist for you to determine if osteoporosis has a chance of occurring in the family.

Use the information in the checklist to stimulate discussion about the condition of osteoporosis, and how it might affect your family.

## 2.9 Promote healthy bones

Write an alternate line poem that discusses different factors of osteoporosis.

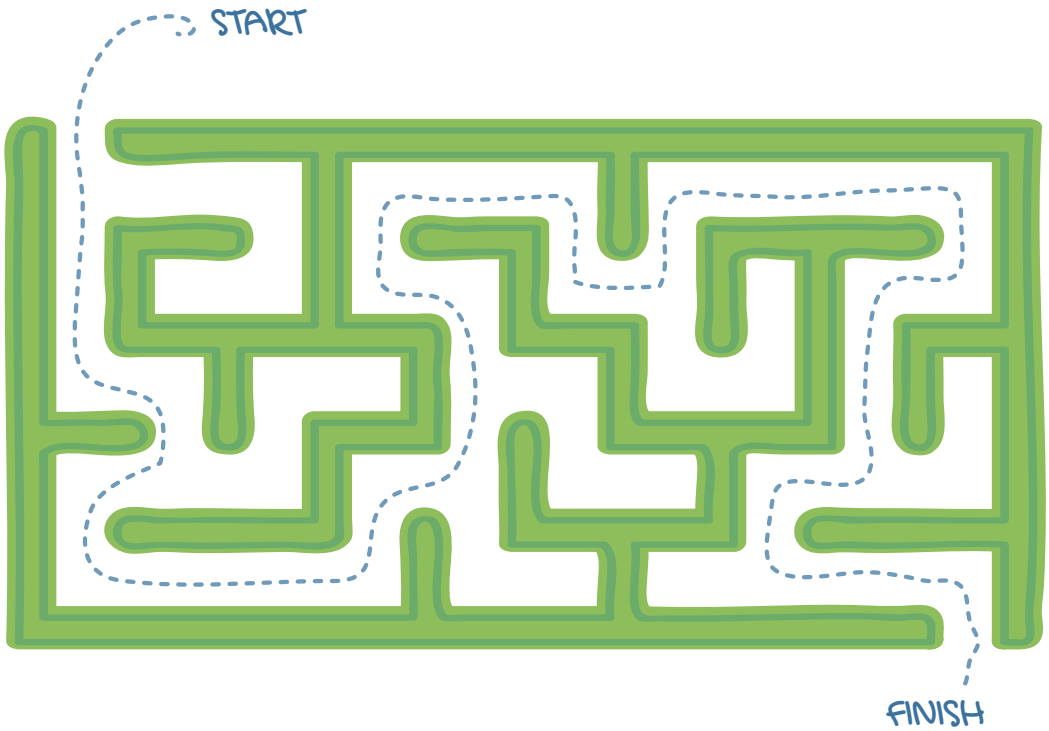
Make sure that your poem:

- refers to both sides of osteoporosis (cause and prevention)
- includes feelings you think you might have in this situation
- follows the format of alternate line poetry.

# 3 120 days in the life of a red blood cell

## 3.2 A tour of the body

Can you complete the maze?



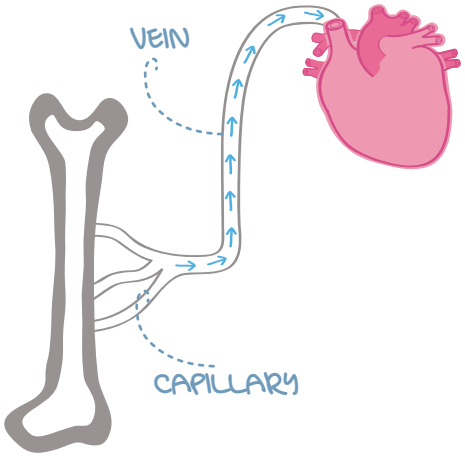

Below is a diagram of the various parts of the body that will be discussed in this section. You will be asked to add to this page as you make your way through this module.

Follow the instructions throughout this section to ensure that your additions are accurate.

## 3.3 Circulatory system

On your body tour diagram, complete the following:

This section of your body tour diagram should look like the diagram:




## 3.4 The hardest working muscle

Using your calculator, work out these numbers.

**for one hour**

multiply 70 bpm by 60 mins

70 x 60 = 4200 beats

**for one day**

multiply 70 bpm by 60 mins by 24 hours

70 x 60 x 24 = 100 800 beats

**for one year**

multiply 70 bpm by 60 mins by 24 hours by 365 days

70 x 60 x 24 x 365 = 36 792 000 beats

To calculate the number of heartbeats in an average Australian female's life – multiply 70 bpm by 60 mins by 24 hours by 365 days by 84 years.

70 x 60 x 24 x 365 x 84 = 3 090 528 000 beats

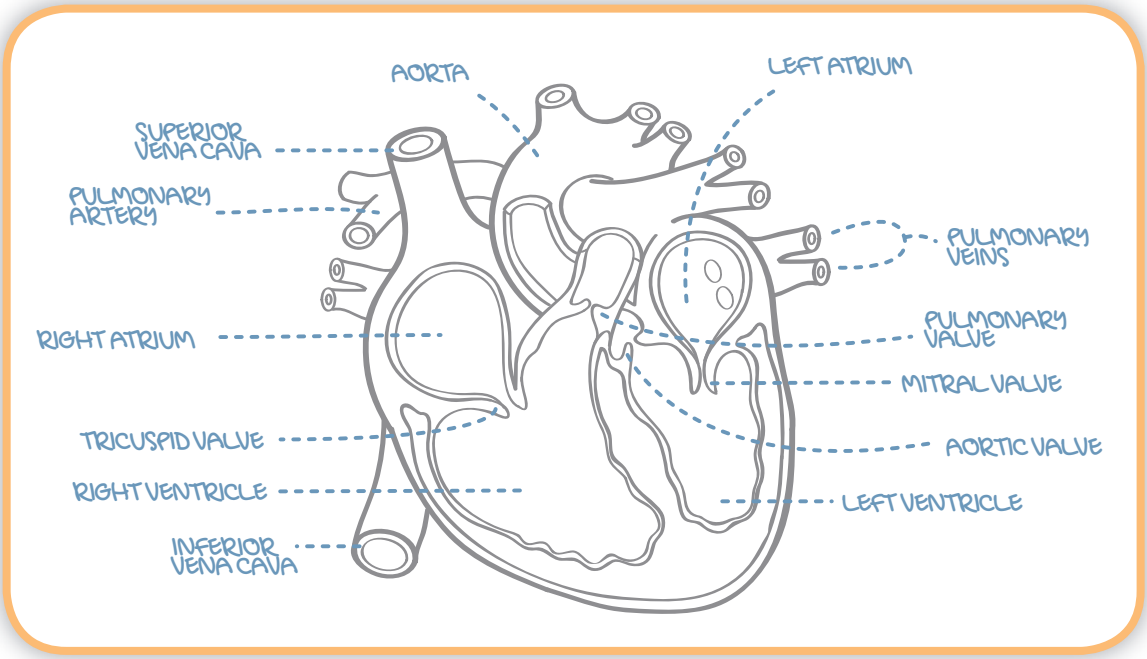
## 3.5 Clench your fist

Using a pen, trace around your fist and under your wrist to complete a circle-like shape.

Note the difference in size between your fist and an adult's fist. Adults have bigger bodies and, therefore, need a larger heart to pump blood around.

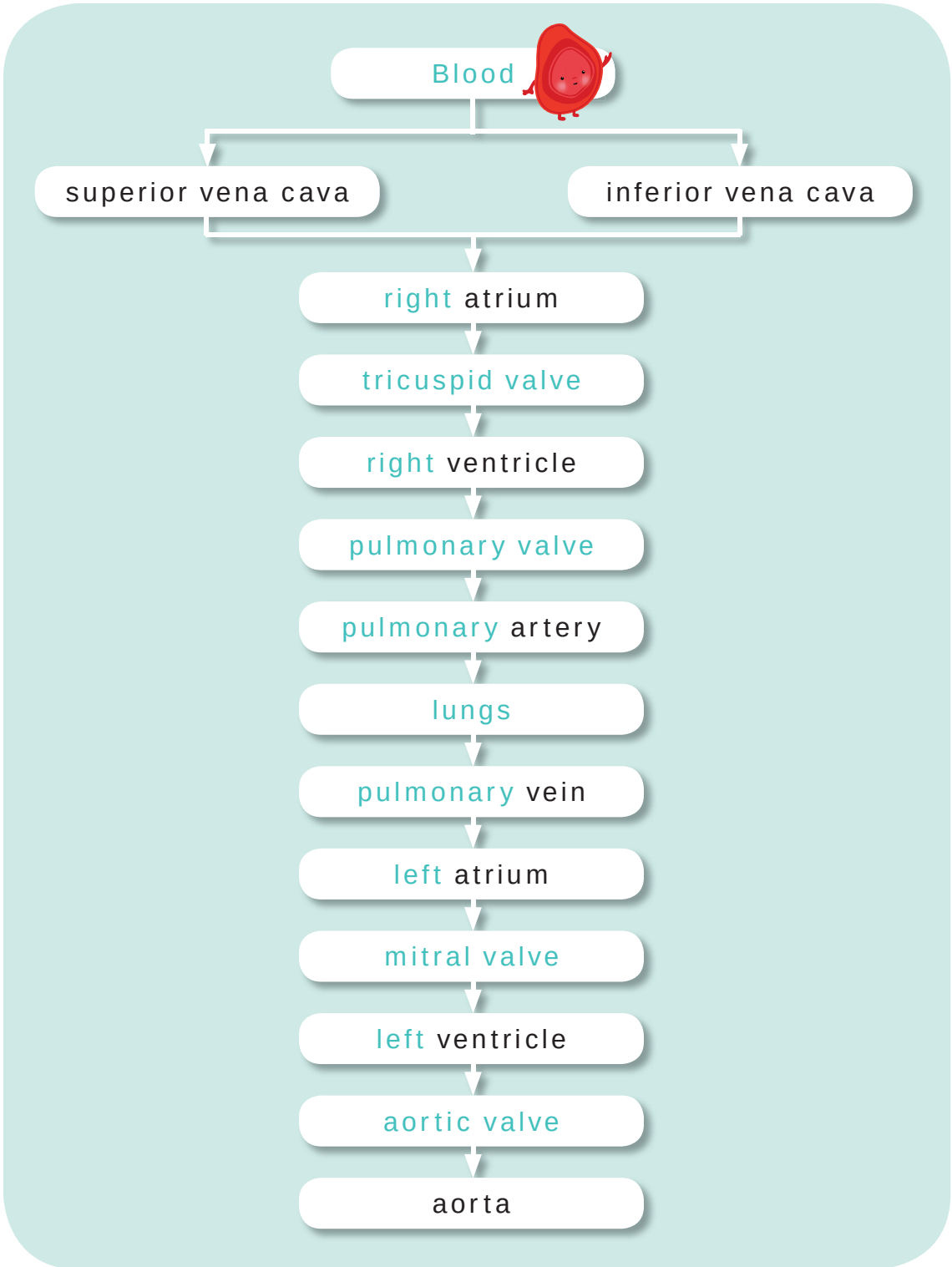
## 3.6 Parts of the heart

Use this diagram to help you label the following parts of the heart below.




## 3.7 The ultimate flow chart

Use the parts in your heart diagram, as well as the results from your search engine, to complete the flow chart of blood through the heart and lungs.



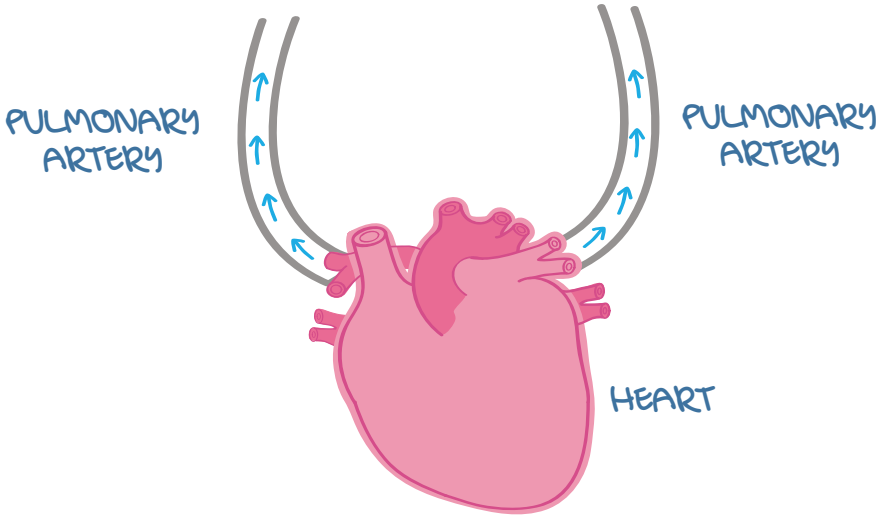
## 3.8 Make a stethoscope

Make a very simple type of stethoscope.

Anything that is long and hollow should be a suitable object that acts like a stethoscope.

## 3.9 A tour of the body

On your body tour diagram, complete the following.




## 3.10 Heart of love

Write a same word poem that is about something that you love.

Make sure that each line of your poem begins with the words ‘I love’.

## 3.11 Breathe in and out – the respiratory system

Match the following words with the correct definition by writing the word in the space provided:

| | |
|---|---|
| **respiratory system** | responsible for the process of exchanging gases |
| **breathing** | the action we do to allow the exchange of gases |
| **carbon dioxide** | a gas that is breathed out as a waste product |
| **oxygen** | a gas that is breathed in to supply cells of the body |
| **bronchioles** | the small tubes inside the lungs |
| **alveoli** | the air sacs found at the end of the bronchioles |
| **diaphragm** | the wide, flat muscle that inflates and deflates the lungs |
| **lung** | organ of the body where gases are exchanged |
| **trachea** | another name for the windpipe |
| **capillary** | small blood vessels where gases are exchanged |

## 3.12 Word poems

Write a word poem about the respiratory system.

Make sure that you include the following words:

respiratory system
breathing
carbon dioxide
oxygen
bronchioles
alveoli
diaphragm
lung
trachea
capillary

Sign your poem with either an assumed or false name or with your real name.

# 3.13 Breathing rate

Indicate how hard it was for you to breathe.

For the four activities:

- sitting and breathing
- running for 30 seconds and breathing
- sitting and breathing through two straws
- running for 30 seconds and breathing through two straws.

Your scale should progressively indicate a greater level of difficulty.

For example:

1 easy 2 quite easy 3 OK 4 a little difficult 5 difficult

Write a sentence to explain why you took more breaths after running compared to when you were sitting still.

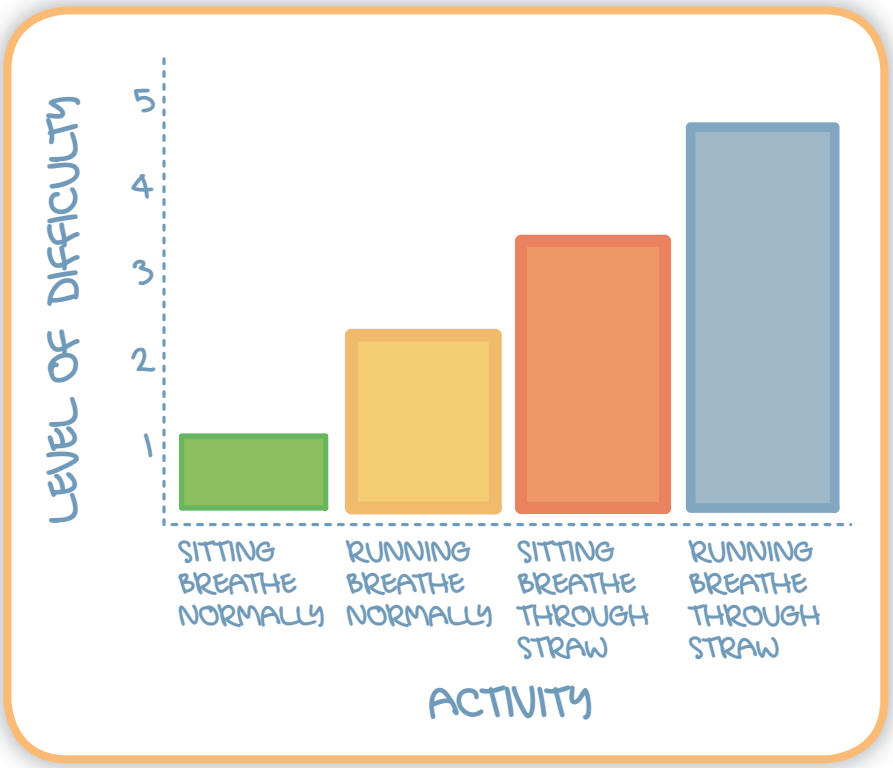
Because the cells of the body are working harder, they are using up more energy. Therefore, the respiratory system needs to work harder to supply the cells with oxygen and remove the carbon dioxide.

Explain why it is much more difficult for a person to breathe if they smoke cigarettes.

The chemicals in cigarettes destroy the alveoli in the lungs resulting in less air sacs to help exchange gases. Therefore, the person needs to breathe harder to get the required oxygen to the body cells.

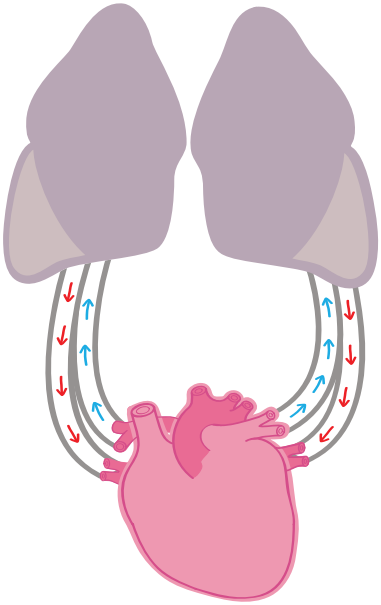
Design a graph that provides the information relating to the difficulty of breathing scale of 1–5.

Your graph should look like the following graph.




## 3.14 A tour of the body

On your body tour diagram, complete the following.



## 3.15 Bypass for a healthy heart

Many factors contribute to heart disease. Insert the correct word or phrase to complete the following sentences.

You have an increased chance of heart problems if you have a **family history** of heart disease.

**Men** have a greater risk of heart problems than women do, and at an earlier age.

The chance of having heart problems is increased if you are **overweight**.

The risk of having heart problems increases with **old age**.

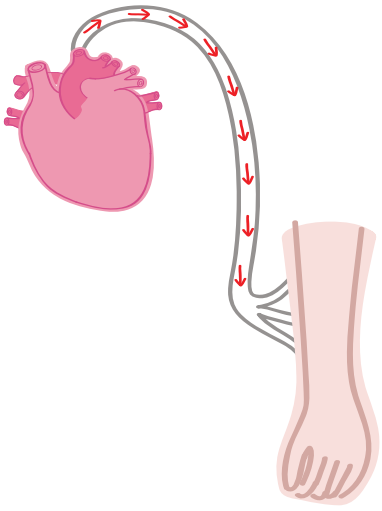
**Smoking** increases the risk of heart problems.

Having a high fat content in your **diet** increases the chance of heart problems.

**Lack of exercise** increases the chance of becoming overweight, and of heart problems.

## 3.16 A tour of the body

On your body tour diagram, complete the following.



# 3.17 Pulsating

Find your resting pulse rate.

The most accurate time to measure your resting pulse rate is when you first wake up in the morning, because you have been lying still for a long time and your heart has not had to work so hard.

Find your walking and running pulse rate.

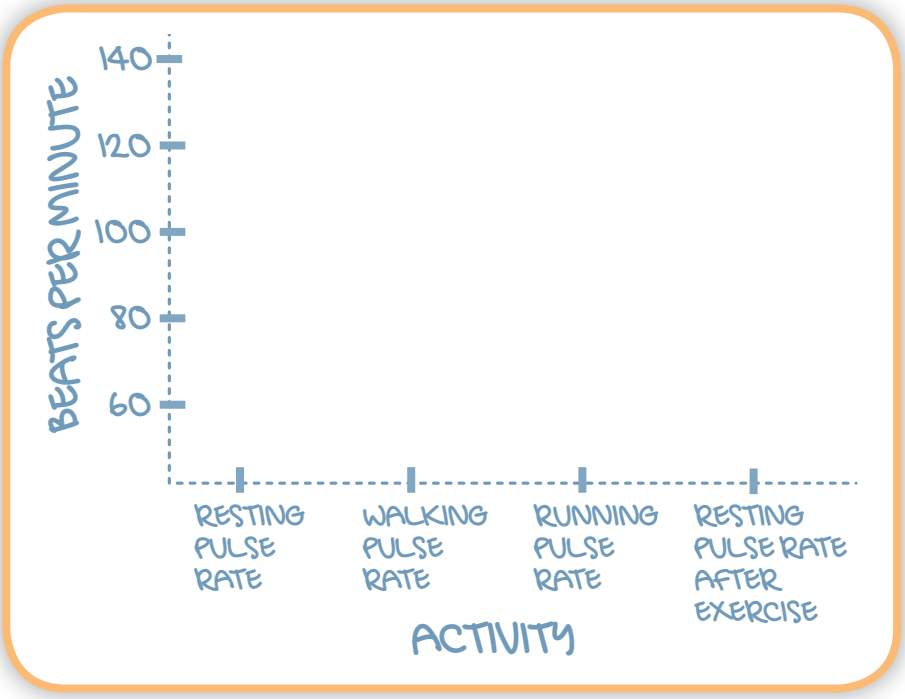
The harder you exercise, the more your heart has to work to supply the necessary oxygen to the body cells.

Find your resting pulse rate after exercise.

Your level of fitness is reflected in the time you take to get your pulse rate back to its resting rate. The quicker it returns, the less your heart has to work.

Design a graph that provides the information relating your pulse rate for the different activities.

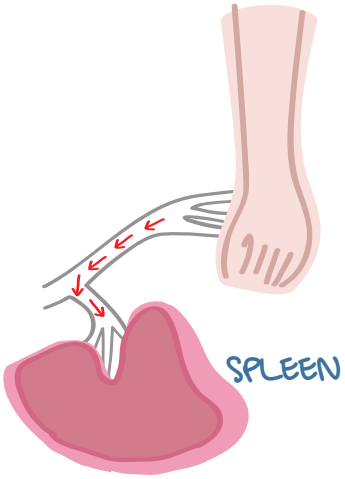
Your graph will look something like this:




(Answers will vary.)

## 3.18 A tour of the body

On your body tour diagram, complete the following.




## 3.19 Keywords

Use this video and, if necessary, read back through the section on the respiratory and circulatory systems to help you complete the crossword.

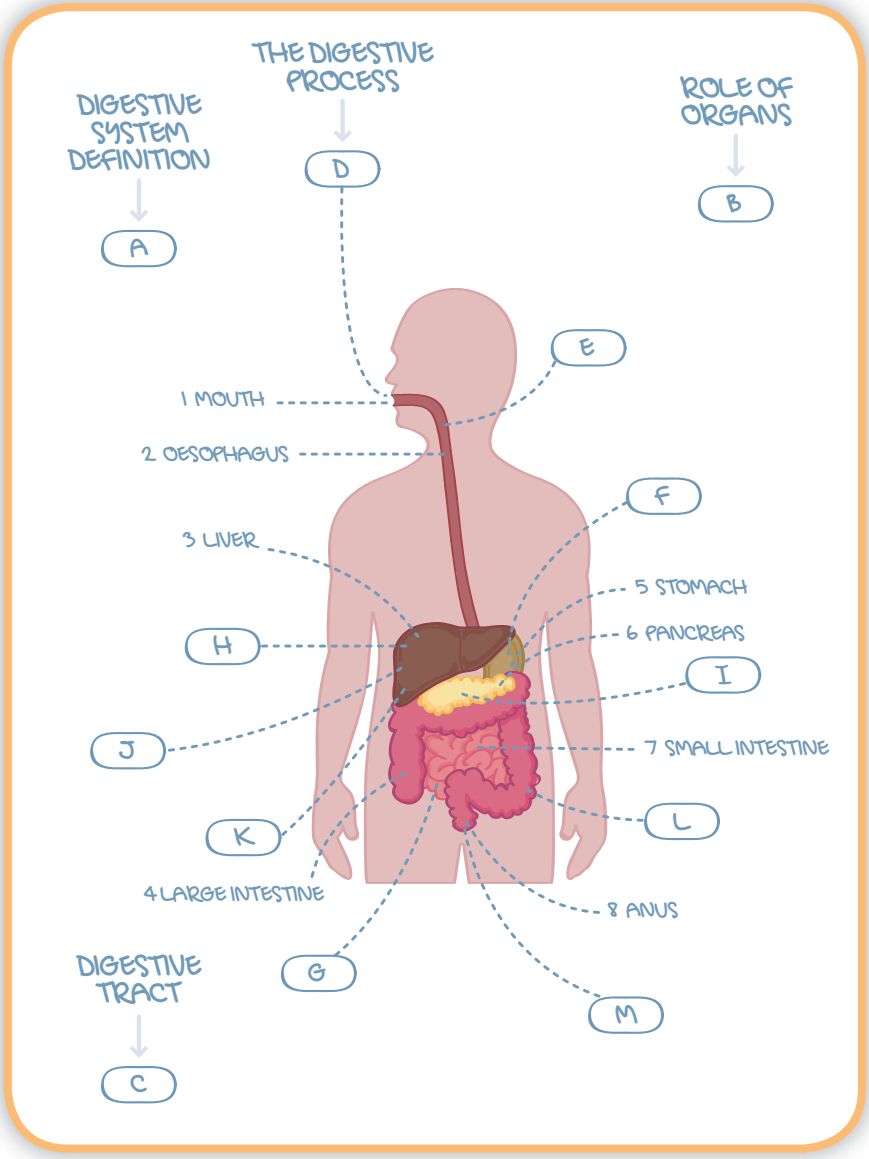
| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. C | I | R | C | U | L | 2. A | T | O | R | Y |
| A | | | | | | R | | | | |
| 3. P | U | 4. L | S | E | | T | | | | |
| I | | U | | | | E | | | | 5. E |
| L | | N | | | | R | | 6. C | | M |
| L | | G | | 7. V | | Y | | O | | P |
| A | | | | E | | | | R | | H |
| 8. R | E | S | P | I | R | A | T | O | R | Y |
| Y | | | | N | | | | N | | S |
| | | | | | | | | A | | E |
| | 9. H | E | A | R | T | | | R | | M |
| | | | | | | | | Y | | A |

# 4 In one end and out the other

## 4.2 The digestive system

Your task is to label the parts of the digestive system and place the information into the correct position on the page.

Make sure you have labelled all of the parts, and that your information boxes match those in the answer below.



# 4.3 How much energy is that?

Explain the pathway of a piece of food as presented in the flow chart. Describe the digestive process using the information provided.

Your answer should be similar to the one below.

Food is chewed and swallowed before making its way to the stomach and small intestine where it is broken down by the gastric juices into the three main nutrients: protein, carbohydrates and fats.

These nutrients are then either used as energy that the body requires for such activities as movement, or they are stored in the body for possible future use. Any broken-down food that is not required by the body is removed by the body as waste product.

In the following tables are examples of two different meals that a person might consume. To help you fill in the tables go to the website: **<www.betterhealth.vic.gov.au>.**

Answers may vary slightly but should be similar to the following.

## Meal one

| Food per 100 g | Kilojoule (kJ) | Saturated fat content (g) | Sugar content (g) | Sodium (salt) content (g) | Walking distance (metres) |
|---|---|---|---|---|---|
| **hamburger** | 1075 | 4 | 0 | 478 | 4073 |
| **soft drink** | 168 | 0 | 10 | 11 | 636 |
| **sundae** | 1451 | 6 | 53 | 130 | 5496 |
| **french fries** | 1510 | 4 | 0 | 171 | 5721 |
| Total | **4204** | **14** | **63** | **790** | **15 926** |

## Meal two

| Food per 100 g | Kilojoule (kJ) | Saturated fat content (g) | Sugar content (g) | Sodium (salt) content (g) | Walking distance (metres) |
|---|---|---|---|---|---|
| **grilled fish** | 567 | 2 | 1 | 76 | 2147 |
| **water** | 0 | 0 | 0 | 2 | 0 |
| **green beans** | 130 | 0 | 1 | 6 | 491 |
| **orange** | 156 | 0 | 8 | 2 | 591 |
| Total | **853** | **2** | **10** | **86** | **3229** |

## 4.4 How much exercise is that?

Work out how long it would take to burn off the energy you gained from the meal you chose in the last activity.

Follow this formula:

kilojoules of meal ÷ kilojoules of activity x 20 minutes

If you want to convert to the number of hours, divide the resulting number by 60.

## 4.5 A poem about digestion

Create a haiku poem using the digestive system as your theme.

Make sure your poem matches the rules of a haiku poem, and is about the digestive system.

## 4.6 A healthier diet

Create a poster that promotes healthy eating and healthy ways to lose weight.

Suggestions for your poster include:

- using the diagram of the digestive system as a background to your message
- emphasising the importance of carbohydrates, proteins and fats in your diet
- featuring the link between energy intake and energy used to maintain a healthy weight
- promoting activities that will help burn up energy.

## 4.7 Keywords

Find the spelling mistakes and then write the correct information into the keywords table in your portfolio.

| Keyword | Meaning |
|---|---|
| **digestive system** | body system that breaks down and handles food |
| **energy** | results from the breakdown of food to supply the body with fuel to perform everyday activities |
| **kilojoule** | the unit used to measure the level of energy |
| **haiku** | a three line poem based on the number of syllables used in each line |

# 4.8 Creating bodies

Return to your original ‘Creating bodies’ work and fill in any gaps you may have.

Add to the following sections with any new information you have learnt, providing as much information as you can:

- the diagrams naming the parts of various systems
- the explanations of the purpose (function) of each of the systems
- the descriptions of how each system works to achieve the purpose you have described.