# Y6 Science – Animals, including Humans
# Key Concept – Structures and Functions

## Essential Knowledge

### What are the main parts of the human circulatory system?

The human circulatory system is a group of organs and vessels which transports blood around the body. It is comprised of the heart, blood and blood vessels. The heart and lungs are protected by the ribcage.

### How does the heart function?

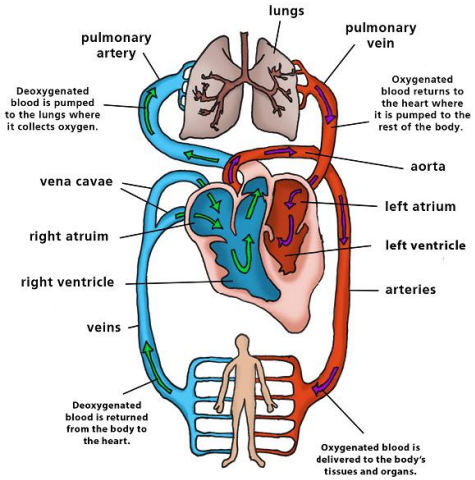
The heart sits within the chest cavity between the lungs and is about the size of a fist. The heart takes in blood low in oxygen from the body. It pumps it through the right side of the heart and on to the lungs. In the lungs the blood is re-oxygenated.

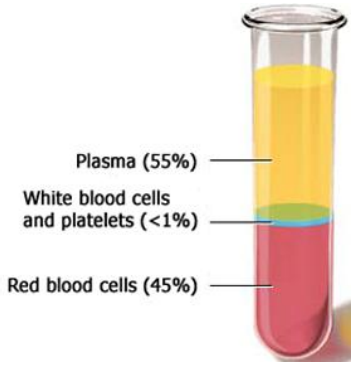
### Why is blood important to our body?

Blood travels around the body transporting nutrients that have been absorbed into the bloodstream from digestion. It also contains cells that help our bodies to fight infection and prevent bleeding too much if we are cut.

### How does exercise impact our heart?

Exercise makes our hearts stronger. When we move, run, or play sports, our hearts beat faster to pump blood around our bodies. Over time, this helps the heart muscle grow healthier and work more efficiently. Exercise also keeps our blood vessels clear, lowers the risk of heart disease, and gives us more energy.




## Aspirational Knowledge

Blood carries oxygen around the body, which is used to power it. This use of oxygen to create energy is called respiration.
Our heart rate increases so that oxygen that is used around the body can be replenished.

## Key Vocabulary

| | |
|---|---|
| **circulatory system** | the system that circulates blood through the body |
| **vein** | tubes forming part of the circulation system that usually carry de-oxygenated blood towards the heart |
| **arteries** | tubes forming part of the circulation system that usually carry oxygenated blood away from the heart to the rest of the body |
| **capillaries** | smallest blood vessel that form a network between arteries and veins |
| **blood** | red liquid that circulates in the arteries and veins |
| **heart** | a hollow muscular organ that pumps the blood through the circulatory system |
| **blood vessels** | a tube structure carrying blood through the body (vein, artery or capillary) |
| **blood cells** | cells that are normally found circulating in the blood (red and white blood cells) |
| **platelets** | tiny round cells that help make sure you don't bleed too much when you get a cut |
| **atrium** | an upper cavity of the heart where blood passes through to the ventricles |
| **ventricle** | the lower cavity of the heart where blood passes through |
| **aorta** | the main artery of the body, supplying oxygenated blood. |

## Working Scientifically

Plan different types of scientific enquiries to answer their own or others' questions, including recognising and controlling variables where necessary.

# Y6 Science – Animals, including Humans
# Key Concept – Structures and Functions

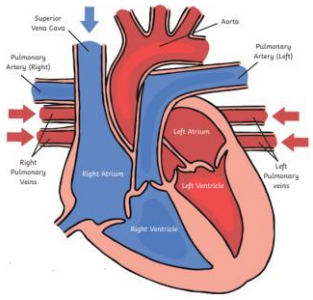
## Key Knowledge

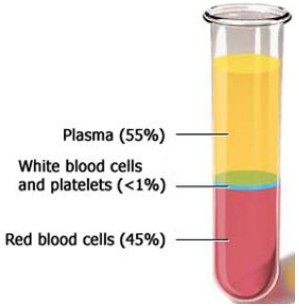
**What are the main parts of the human circulatory system?**
The heart, blood and blood vessels make up the circulatory system.

**How does the human heart work?**
The heart is a muscle.
It pumps blood around the body.
Blood carries oxygen we need to stay alive.

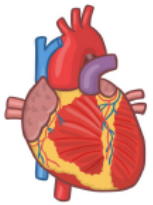
**Why is blood important to our body?**
Blood is important because it carries oxygen and food around our body to keep us alive and healthy.

**How does exercise affect our hearts?**
Exercise helps our hearts. When we exercise our hearts beat faster to pump the blood around our bodies. Exercise helps our hearts grow stronger.




## Key Vocabulary

| | | |
|---|---|---|
| **brain** |  | An organ it your body. It helps you think, learn, feel, remember, and tell the rest of your body what to do. |
| **heart** |  | Your heart is a muscle in your chest. It works like a pump that moves blood through your body, carrying oxygen and nutrients to keep you alive and healthy. |
| **lungs** |  | Lungs are organs inside your chest. They help you breathe in air and take the oxygen your body needs. |
| **ribcage** |  | Your ribcage is made of curved bones called ribs. It makes a strong cage around your heart and lungs to protect them, while still letting you breathe. |

## Working Scientifically

Plan different types of investigations to answer their own or others' questions, including thinking about how to make a fair and accurate test.

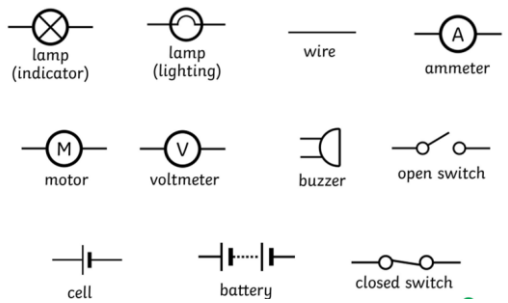
# Y6 Science – Electricity
# Key Concept – Cause and Effect

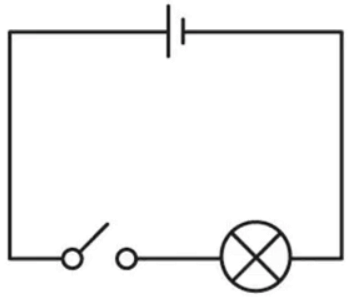
## Essential Knowledge

**What is electricity?**
Electricity is the flow of electrons around a circuit. It is a type of energy. Electricity is a natural force: it was not invented but discovered.

**How can an electrical circuit be modified?**
An electrical circuit is made up of different components. The components may be added or removed. The changes made in a circuit can affect how the electrical current flows.

**How do the components in a circuit affect each other?**
The electrical current flows through the components in a circuit to different effect. For example, electric current flowing through a lamp will cause light to be produced. Components can be represented by circuit symbols (see diagrams above). These allow complex circuits to be shown in simple ways.



## Aspirational Knowledge

Thomas Alva Edison is credited with producing the first practical lightbulb and the Direct Current electrical system.
Nikola Tesla is credited with the invention of Alternating Current, which is the electrical system that is primarily used in power supplies today.

## Key Vocabulary

| | |
|---|---|
| **electricity** | the flow of electrons through conductors, such as copper wires in a circuit |
| **circuit** | a complete path around which electricity can flow, including a source of electricity, such as a cell |
| **voltage** | the 'push' which causes electrons to move in a circuit |
| **current** | the amount of electricity flowing around a circuit |
| **component** | parts of a circuit, e.g. wires, batteries, cells, etc. |
| **insulator** | materials which do not allow electricity to flow through them |
| **conductor** | materials which allow electricity to flow through them |
| **complete circuit** | a circuit without any gaps, or breaks |
| **incomplete circuit** | a circuit with gaps, or breaks |
| **series circuit** | a single, looped circuit, with only one pathway for the electricity to flow around |
| **parallel circuit** | a closed circuit, with two or more pathways for the electricity to flow around |

## Working Scientifically

Use appropriate scientific language and ideas to explain, evaluate and communicate his/her methods and findings.

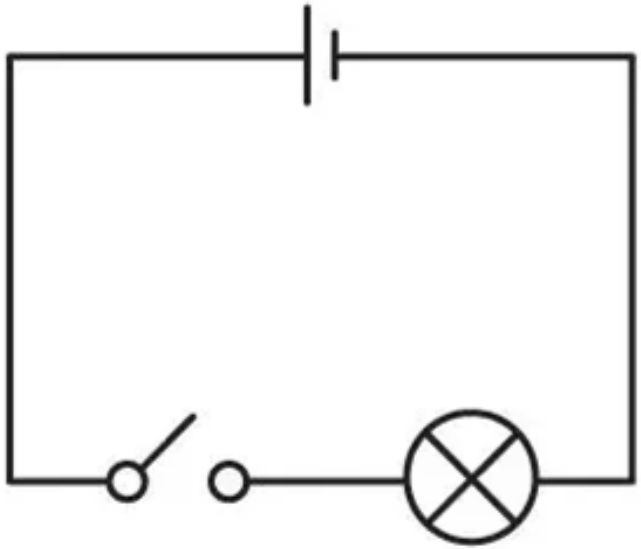
# Y6 Science – Electricity
# Key Concept – Cause and Effect

## Key Knowledge

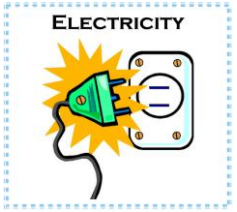
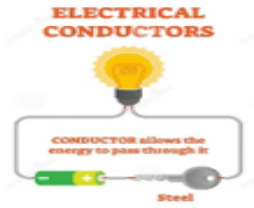
**What is electricity?**
Electricity is the flow of electrons around a circuit. It is a type of energy that is natural.

**How can an electrical circuit be changed?**
You can add or remove components in a circuit to change how it works.

**How do the parts of a circuit work together?**
Electricity flows around a circuit.
When it goes through a bulb, the bulb lights up.



## Key Vocabulary

| | | |
|---|---|---|
| **electricity** |  | Electricity is the flow of tiny particles called electrons through wires or other materials. This flow can make things like lights, fans, and machines work |
| **circuit** |  | A circuit is a path that electricity follows to move from a power source (like a cell) to something that uses electricity (like a bulb) and back again. If the path is broken, the electricity can't flow |
| **insulator** |  | Materials that **don't** let electricity pass through. |
| **conductor** |  | Materials that **do** let electricity pass through. |

## Working Scientifically

Use appropriate scientific language and ideas to explain, evaluate and say their methods and findings.

# Y6 Science – Evolution and Inheritance
# Key Concept – Change and Variation

## Essential Knowledge

**Why are offspring not identical to their parents?**

Cells contain genetic information in the form of DNA, which determine how a living thing will look and function. Offspring are a combination of both parents DNA.

**How are species adapted to their environment?**

Over time, species can change to better suit their environments. This change is called adaptation.

**How do theories of evolution develop?**

Many scientists, including Charles Darwin, believe that species evolved from one another over millions of years.

**How can fossils teach us about the past?**

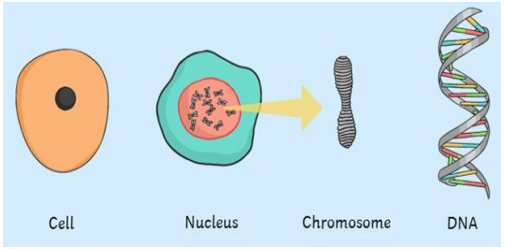
Palaeontologists use fossilised remains of species to support their theories of how living things changed over time.

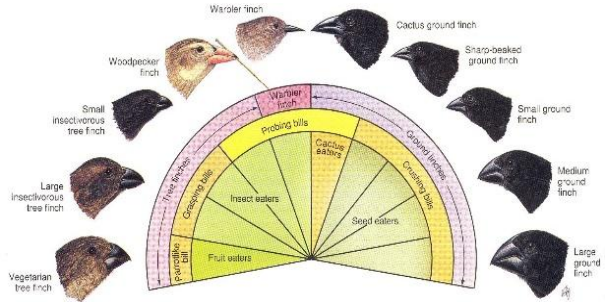
## Working Scientifically

Identify scientific evidence that has been used to support or refute ideas or arguments.

## Key Vocabulary

| | | | |
|---|---|---|---|
| **adaptation** | the way a species has changed to best suit its environment | **habitat** | the environment a living thing inhabits |
| **cells** | the building blocks of all living things | **inheritance** | the process of something being 'passed down' from parents |
| **DNA** | a molecule that carries all information about how a living thing will look and function | **offspring** | the young of a living thing |
| **evolution** | how living things have developed over time into new species | **natural selection** | the process where the strongest of a species survive |
| **fossil** | the petrified remains or impression of a prehistoric creature that are preserved in layers of rock | **sedimentary rock** | rock comprised of multiple layers that have built over time |
| **gene** | a short section of DNA | **variation** | the difference in DNA between individuals |




## Aspirational Knowledge

Some living things, like certain plants and bacteria species, reproduce asexually and do not need a second 'parent'. The DNA in the offspring is then identical to the parent.

# Y6 Science – Evolution and Inheritance
# Key Concept – Change and Variation

## Key Knowledge

**Why do children look different to their parents?**
Children's DNA comes from both parents, so they are a combination of the two.

**How do creatures change to suit where they live?**
Over time, living things can change to better suit their environments.

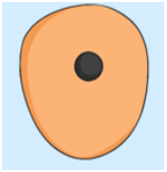
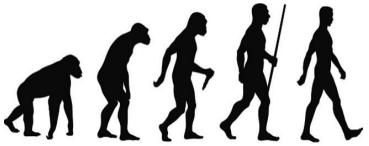
**How can we see evolution?**
Evolution can be seen when we look at how living things have changed over time.

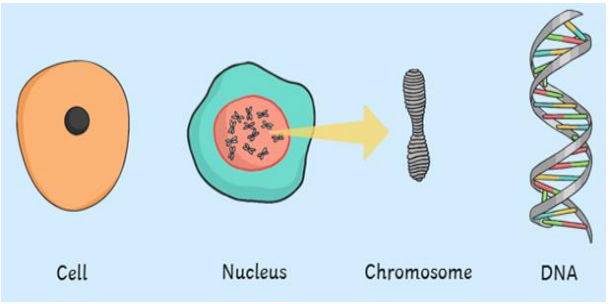
**What can we learn from fossils?**
Fossils show how living things changed over time.

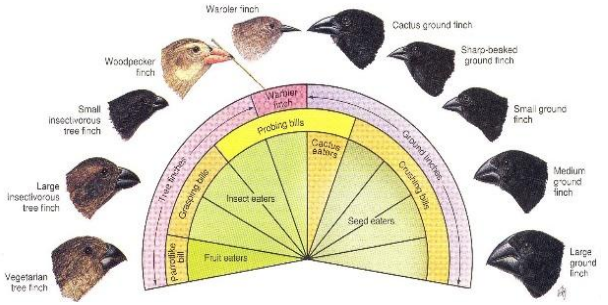
## Working Scientifically

Identify scientific evidence that has been used to support or disprove ideas or arguments.

## Key Vocabulary

| | | |
|---|---|---|
| **cells** |  | A cell is the smallest building block of all living thing. |
| **DNA** |  | A special code inside every living thing that tells the body how to grow, look, and work. |
| **evolution** |  | How living things change over a very long time. |
| **habitat** |   | Where a plant or animal lives. |



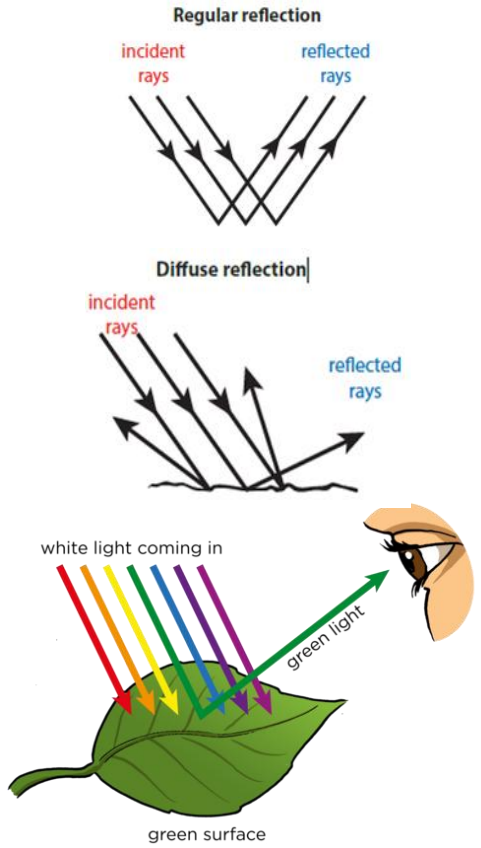



# Y6 Science – Light
# Key Concept – Cause and Effect

## Essential Knowledge

**How does light travel?**
Light is a type of energy, which is produced by light sources. Light appears to travel in straight lines, which are known as light rays. Objects can be seen, because light from a light source reflects off objects and into our eyes, through the cornea.

**How and why are shadows distorted?**
Shadows are created when objects block the path of light. The absence of light behind the object creates a dark space with less light. This is a shadow. Shadows are always the same shape as the object that cast them, although they may be a different size or distorted, depending on the position of the light source.




## Key Vocabulary

| | |
|---|---|
| **light source** | an object that creates its own light |
| **reflection** | when light 'bounces' off a surface |
| **angle of incidence** | the angle that a light ray hits a surface |
| **angle of reflection** | the angle that a light ray is reflected from a surface |
| **absorbed** | when light is not reflected |
| **distorted** | when the appearance of something is changed to look different than it really is |
| **shadow** | darkness created by light being blocked by an object |
| **transparent** | a property of material that allows light to pass through it easily |
| **translucent** | a property of material that allows some light to pass through it (semi-transparent) |
| **opaque** | a property of material that does not allow light to pass through it (not transparent) |

## Aspirational Knowledge

White light is made up of a spectrum of colours. When this hits a surface, only the surface's colour of light is reflected, while the others are absorbed. This is how we see colour.
Light reflects differently on different types of surfaces. Smooth, shiny surfaces are the best reflectors. On this type of surface, light rays will be reflected at the same angle that they hit the surface (regular reflection).
Rough, dull surfaces are not effective reflectors and cause fewer light rays to be reflected. These light rays will not be reflected at the same angle on a rough surface (diffuse reflection

## Working Scientifically

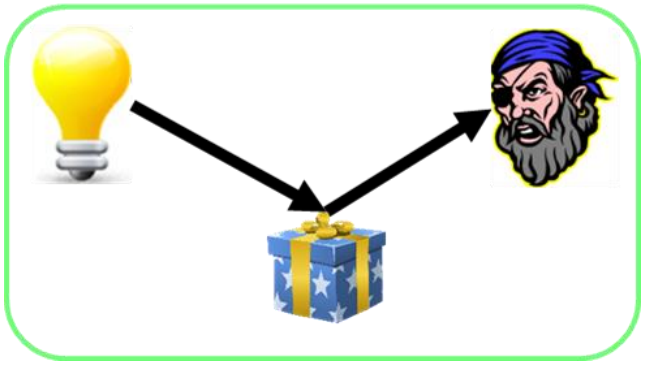
Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.
Record data and results of increasing complexity using scientific diagrams and labels.

# Y6 Science – Light
## Key Concept – Cause and Effect

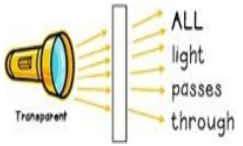
### Key Knowledge

**How does light move?**
Light appears to travel in straight lines, which are known as light rays.

**Why do shadows change?**
Shadows can be changed depending on where the light source is.



### Key Vocabulary

| | | |
|---|---|---|
| **light source** |  | something that makes light, so we can see. |
| **reflection** |  | when light 'bounces' off something. |
| **shadow** |  | a dark shape that happens when something blocks the light |
| **transparent** |  | when an object lets light pass through it, and you can see through it. |
| **opaque** |  | when an object does not let light pass through it, and you cannot see through it. |

### Working Scientifically

Take measurements using scientific tools and record data to show findings from experiments.

# Y6 Science – Living Things and their Habitats
# Key Concept – Similarity and Difference

## Essential Knowledge

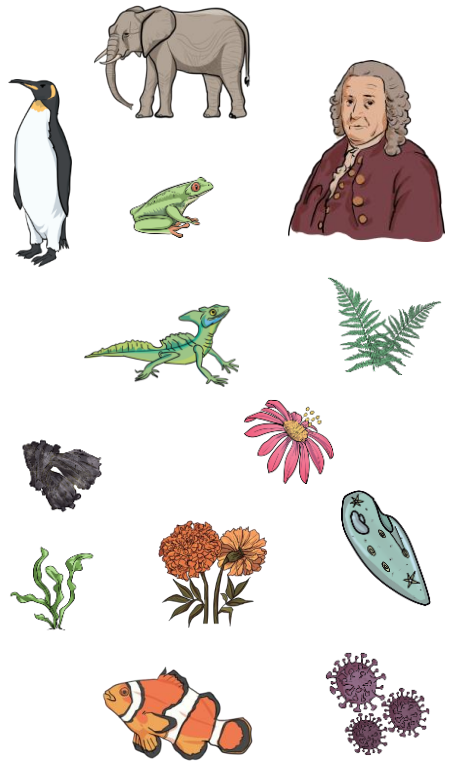
**How can living things be classified?**
All living things belong to different species. By comparing these species, they can be classified for example by appearance or diet.

**How do classification keys help to group a variety of living things?**
We can group living things into different groups based on their characteristics. We use a key to help us to compare and group them.

**How do we classify plants?**
We can group plants based on how they disperse their seeds: wind, explosion, animals or water. We can group plants on whether they grow a flower: flowering or non-flowering.

**What are the five main groups of micro-organisms?**
Microorganisms are very small living things. We can classify microorganisms into five groups: viruses, bacteria, fungi, algae and protozoa.

**Who was Carolus Linnaeus?**
Carolus Linnaeus (also known as Carl Linnaeus) was a scientist who developed a detailed way to classify all living things known as a taxonomy.



## Aspirational Knowledge

The Linnaeus taxonomy helps us to determine what each living thing is. His scientific process involved observing, recording the information and making conclusions.

## Key Vocabulary

| | |
|---|---|
| **amphibians** | an animal that is born in the water but develops lungs and lives on land later in its life |
| **birds** | a type of animal that has wings and is born from a hard-shelled egg |
| **carnivore** | a living things that just eats meat |
| **characteristic** | a feature or quality |
| **classification** | to categorise or group something |
| **fish** | a type of animal that lives in water and has scales, gills and fins |
| **herbivore** | a living thing that just eats plants |
| **invertebrate** | an animal that does not have a backbone |
| **mammal** | a type of animal that has hair on its body and usually drinks milk from its mother as a baby |
| **nutrition** | the food we eat |
| **omnivore** | a living thing that eats both plants and meat |
| **reproduce** | to create more of the same species |
| **reptiles** | a type of animal that is cold-blooded and has scaly skin |
| **vertebrate** | an animal with a backbone |

## Working Scientifically

Describe & evaluate their own and other people's scientific ideas using evidence from a range of sources.
Group and classify things and recognise patterns.

# Y6 Science – Living Things and their Habitats
# Key Concept – Similarity and Difference

## Key Knowledge

**How can we sort living things?**
Living things are sorted by comparing things such as what they look like.

**How do classification keys help group living things?**
We use classification keys to help us sort similarities and differences between living things.

**How do we sort plants?**
We compare plant characteristics to compare and group them.

**What are the five groups of micro-organisms?**
We can sort microorganisms into five groups: viruses, bacteria, fungi, algae and protozoa.

**Who was Carolus Linnaeus?**
Linnaeus was a scientist that made a way for us to sort living things.

## Working Scientifically

Describe their own and other people's scientific ideas using evidence.
Group and sort things and recognise patterns.

## Key Vocabulary

| | | |
|---|---|---|
| **amphibians** | an animal that is born in the water but develops lungs and lives on land later in its life |  |
| **birds** | a type of animal that has wings and is born from a hard-shelled egg |  |
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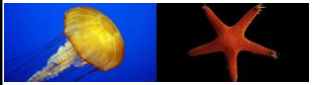
| **invertebrate** | an animal that does not have a backbone |  |
| **mammal** | a type of animal that has hair on its body and usually drinks milk from its mother as a baby |  |
| **omnivore** | a living thing that eats both plants and meat |  |
| **reptiles** | a type of animal that is cold-blooded and has scaly skin |  |
| **vertebrate** | an animal with a backbone |  |