

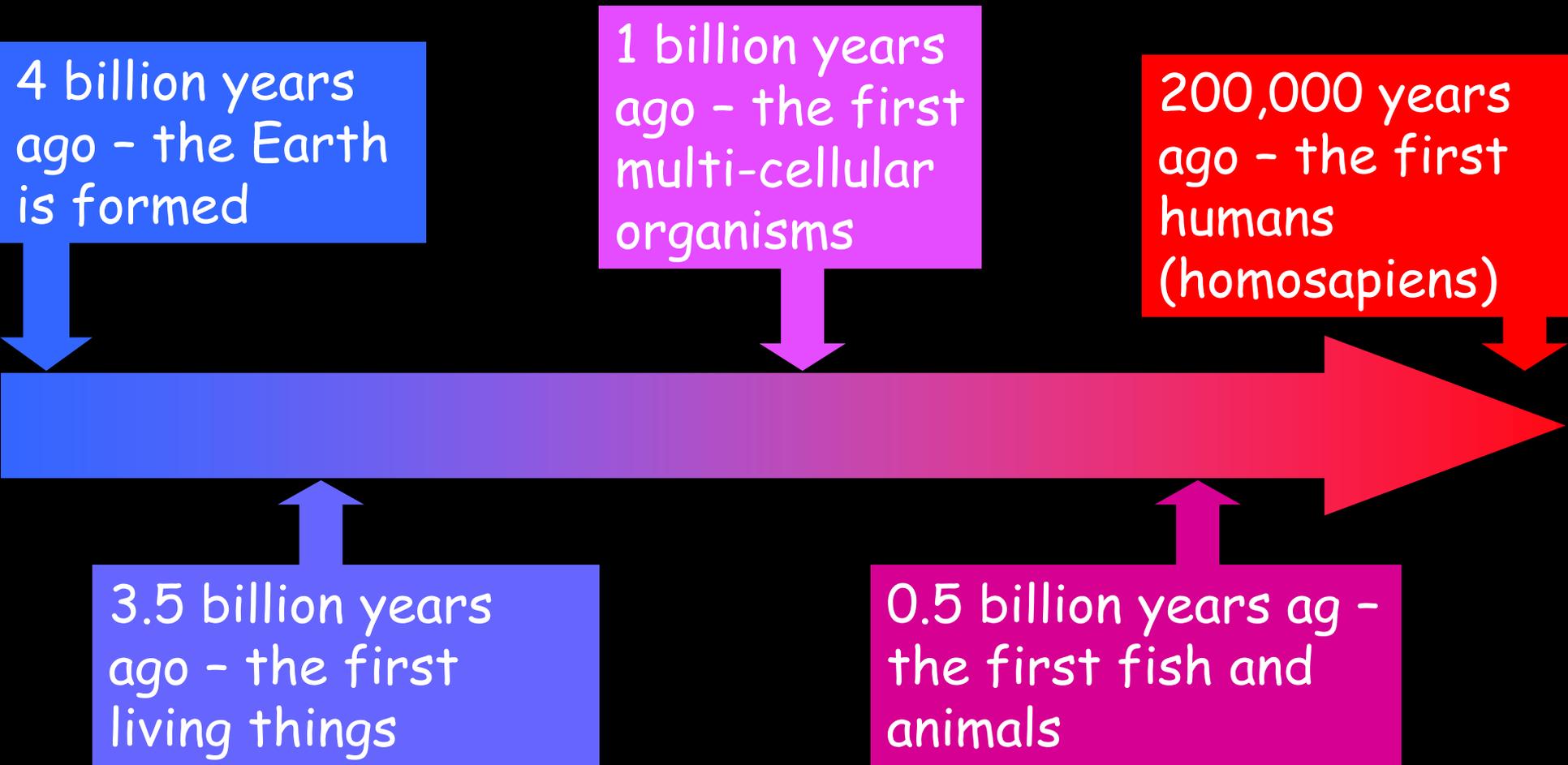
Life on Earth

(OCR)



Life developing on Earth

15/12/2011



Common Ancestors

Modern DNA research shows that all forms of life share a lot of their DNA. This is used as evidence to suggest that all forms of life descended from common ancestors (the Theory of Evolution).

85% shared DNA



98.8% shared DNA



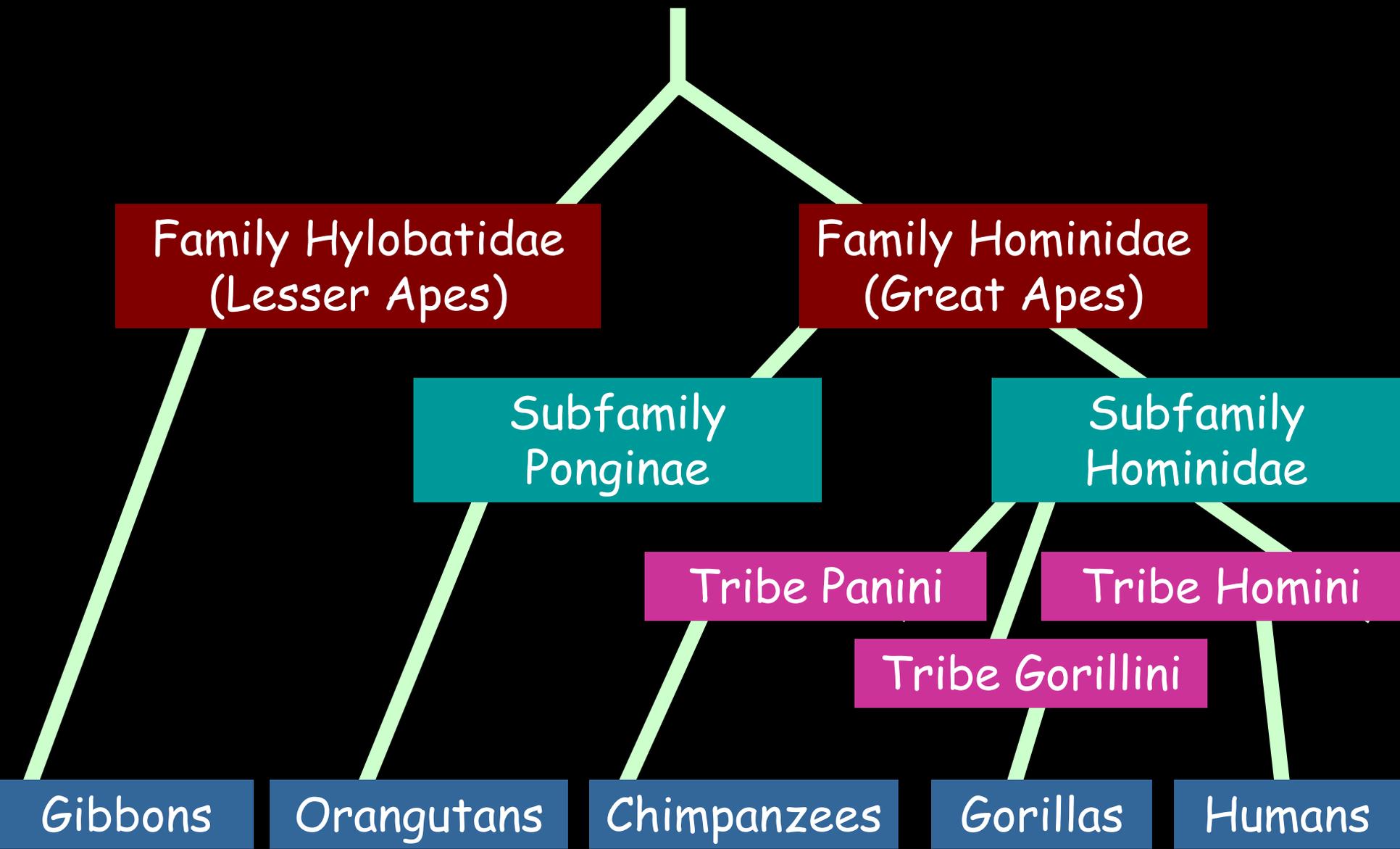
Evolution



Evolution is the slow, continual change of organisms over a very long time. All living things on the Earth have developed from the first simple life forms that arrived 3,000,000,000 years ago. This happened through a process called "Natural Selection."

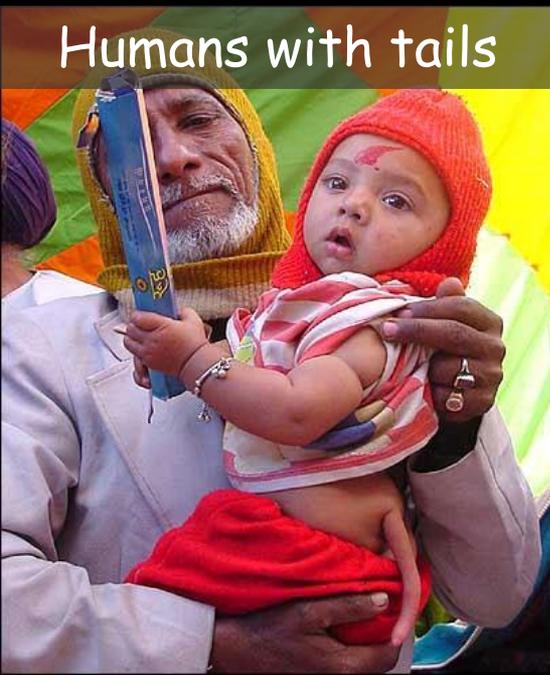
Charles Darwin (1809-1882)

The "Evolution Tree" for Humans



Evidence for Evolution

15/12/2011



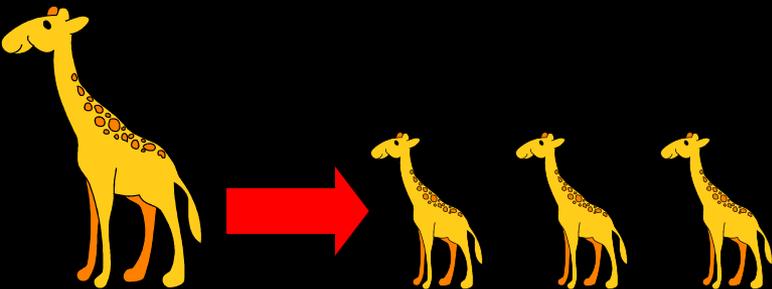
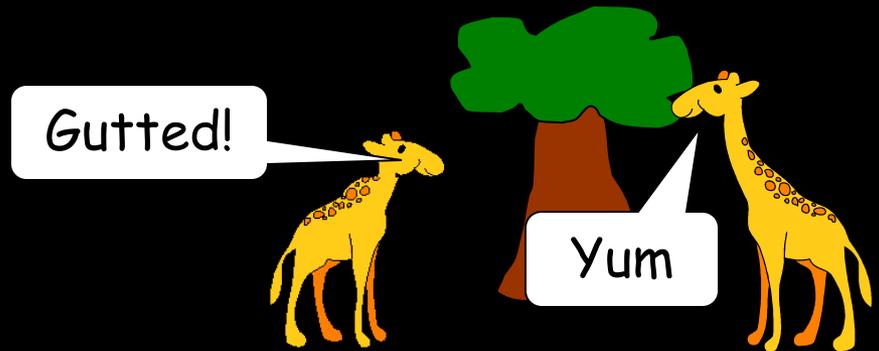
Natural Selection

1) Each species shows variation:



2) There is competition within each species for food, living space, water, mates etc

3) The "better adapted" members of these species are more likely to survive - "Survival of the Fittest"



4) These survivors will pass on their better genes to their offspring who will also show this beneficial variation.

An example -the Peppered Moth

Peppered moths are originally white. However, a genetic mutation can occur to make them be black. How has this helped their survival in the wake of the industrial revolution?

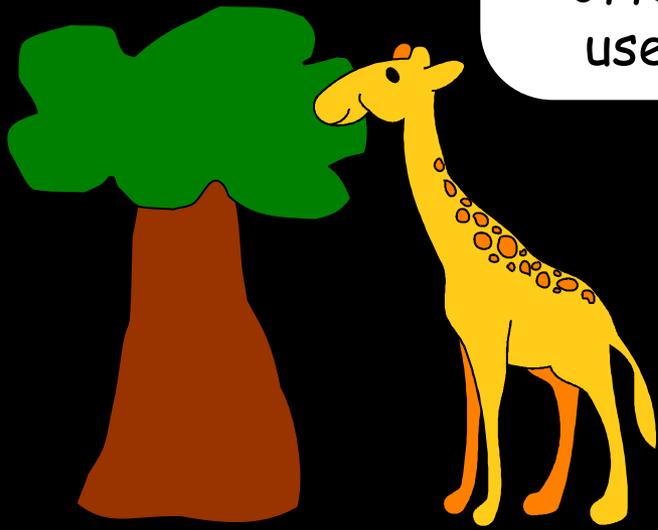
- 1) Variation
- 2) Competition
- 3) Survival of the fittest
- 4) Passing on of genes



Darwin vs Lamarck

Darwin wasn't the first to come up with evolution - he was simply the one credited with explaining how it worked (i.e. Natural Selection). An earlier scientist called Lamarck explained evolution by different means:

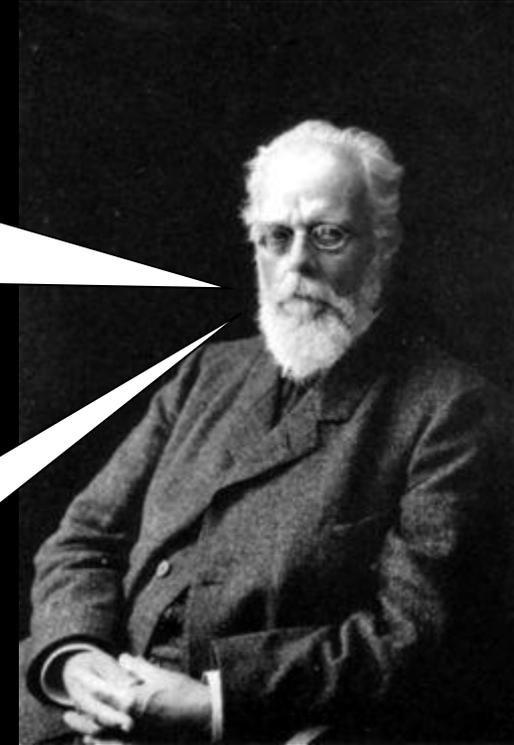
The giraffe has a long neck because it "stretches" its neck to reach the food, and these long necks are passed on to their offspring. Organs which aren't used will eventually disappear.



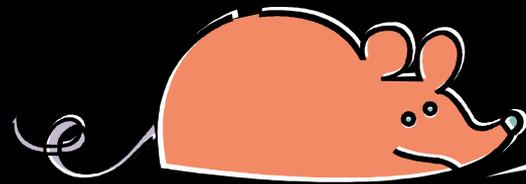
Jean Baptiste
Lamarck
(1744 - 1829)

Weismann vs Lamarck

Lamarck was very clever but I proved him wrong by cutting off mice tails:

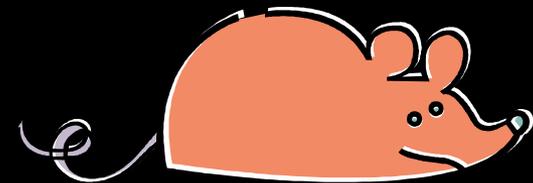


August Weismann (1834-1914)

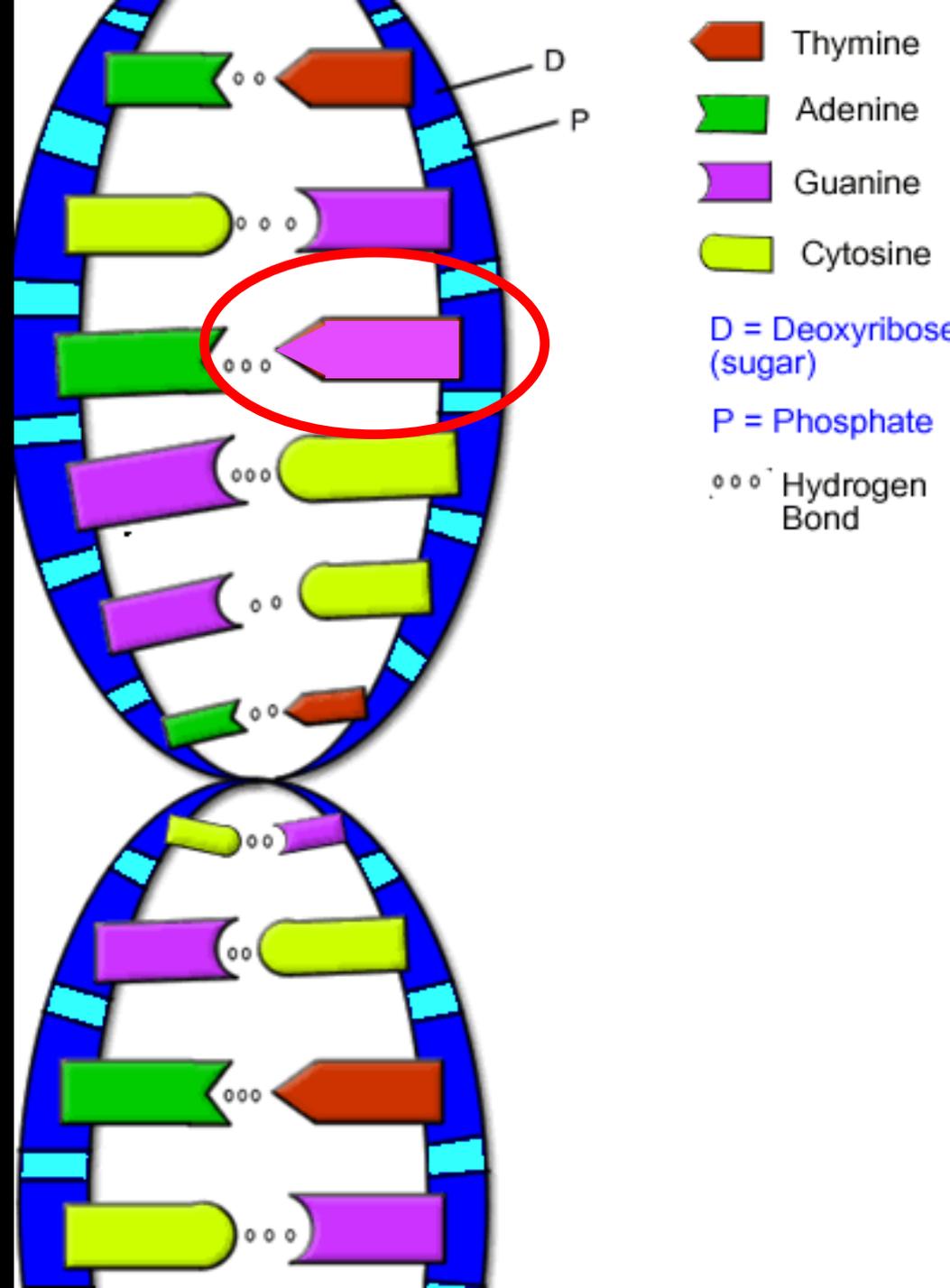


Eek!

These mice produced offspring with tails again, so Lamarck must be wrong!



Mutating DNA



Extinct Species

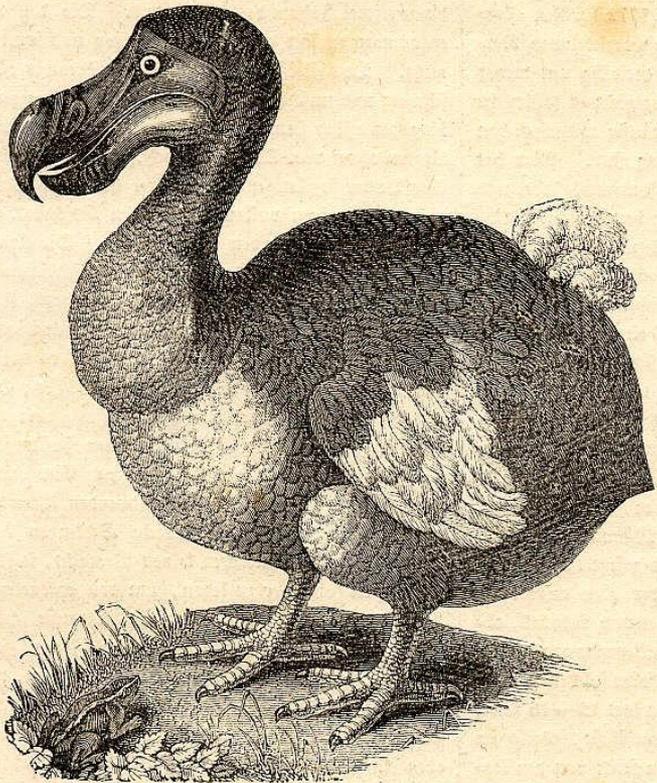


Fig. 1795. — Dronde.

Dodo



Sabre-toothed tigers
and mammoths

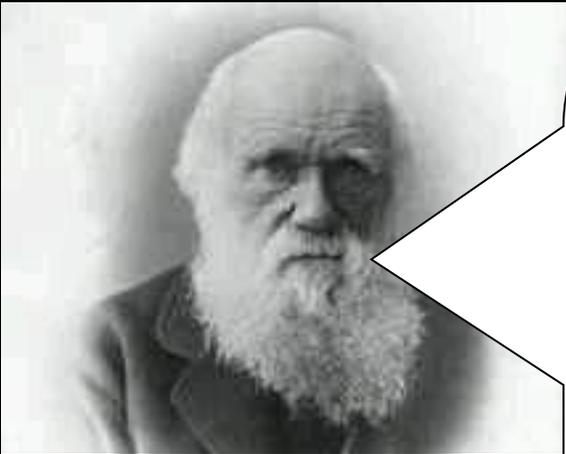


Endangered Species

15/12/2011



Extinction



Extinction can happen due to an organism's inability to adapt and die because of:

- 1) Increased _____
- 2) New predators
- 3) Changes in the _____
- 4) New diseases

Alternatively, a "mass extinction event" can happen, for example the extinction of the _____.

In modern days animals are in danger due to _____ activity, e.g. pollution, hunting, _____ etc..

Words to use: deforestation, competition, dinosaurs, human, environment

Protecting endangered species ^{15/12/2011}



1) Creating wildlife parks and sanctuaries



2) Creating "seed banks" like the Millennium Seed Bank in Kew Gardens

Selective breeding



I raise cows. Each type of cow is good at a certain job. The Friesian cow produces large quantities of milk, the Jersey cow produces very nice milk and the Hereford cow produces lot of beef.

If, for example, I want lots of milk I would only breed Friesian cows with each other - this is **SELECTIVE BREEDING**.



Friesian



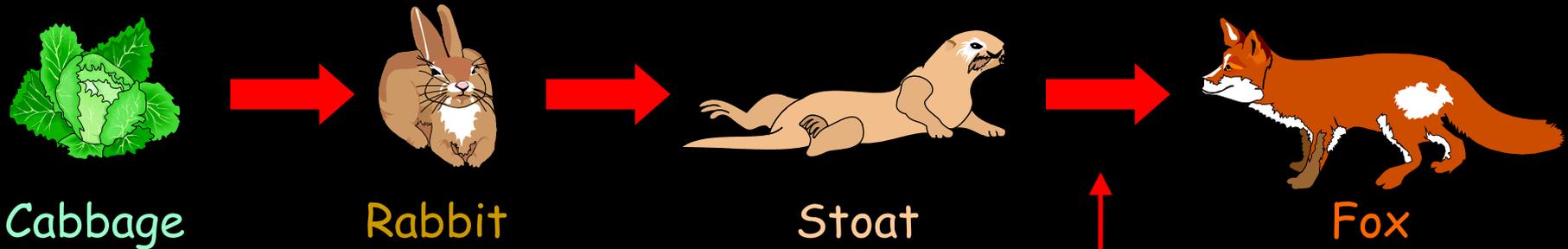
Jersey



Hereford

Food chains

A food chain shows where the energy goes in a food chain (in other words, "what gets eaten by what"):



Cabbage

Rabbit

Stoat

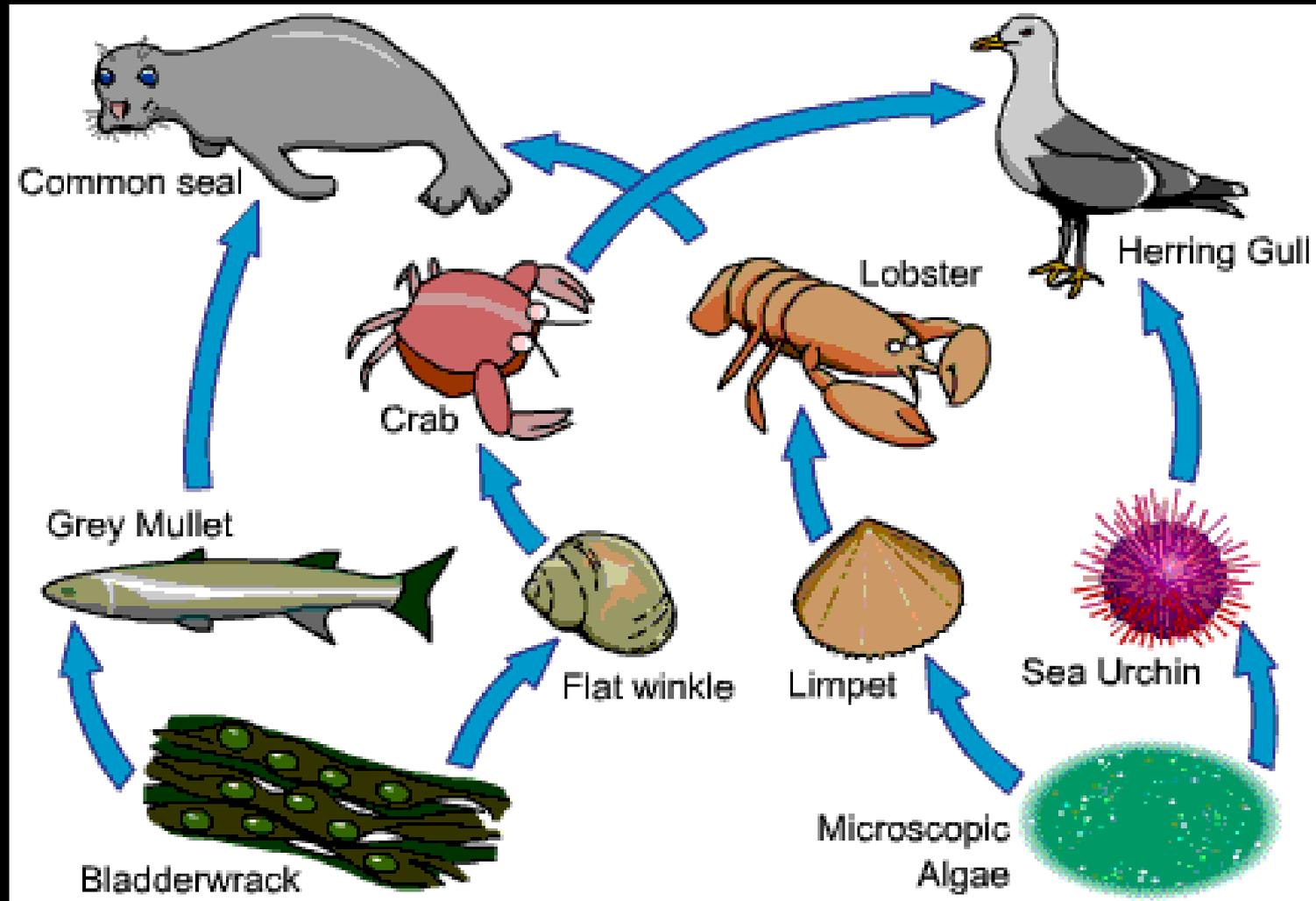
Fox

Plants convert the sun's energy into food

The arrows indicate where the energy is going

Food webs

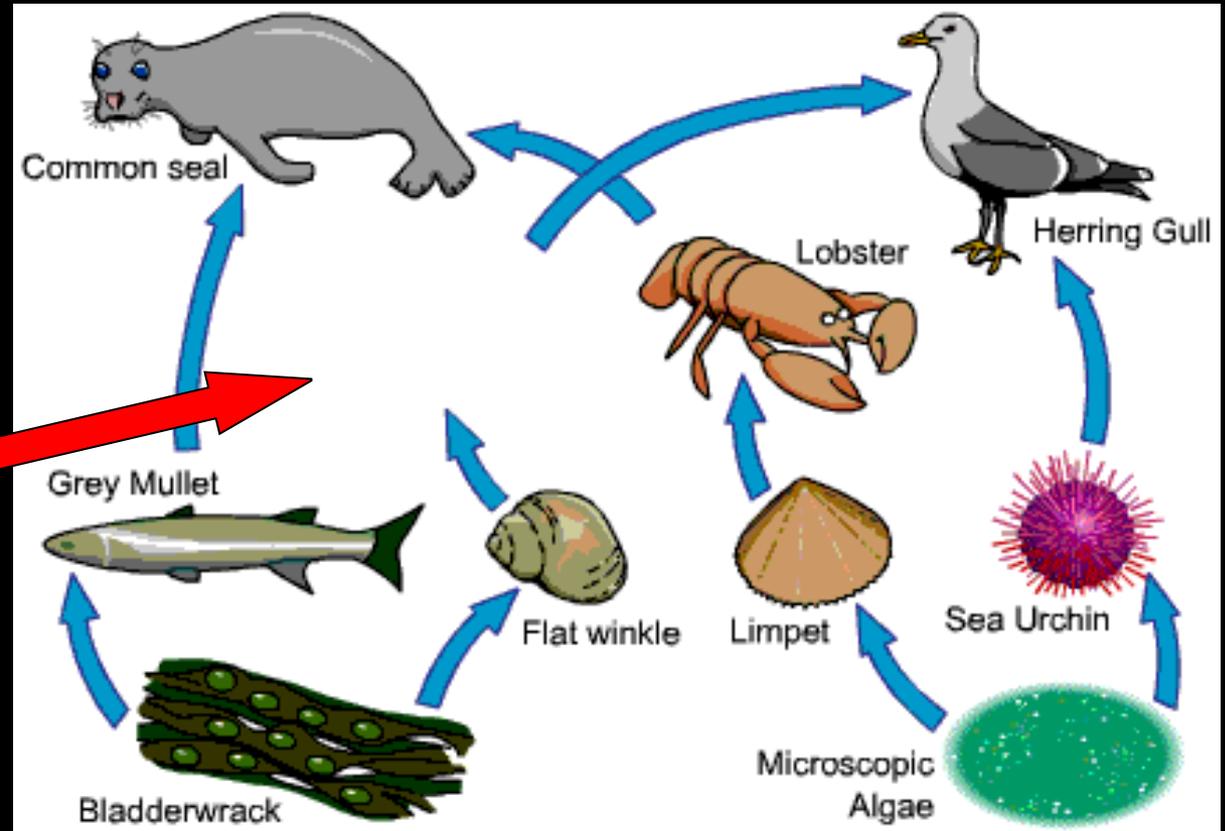
Food webs contain many interlinking food chains...



Breaking the links

Q. What would happen if an animal or organism was "taken out"?

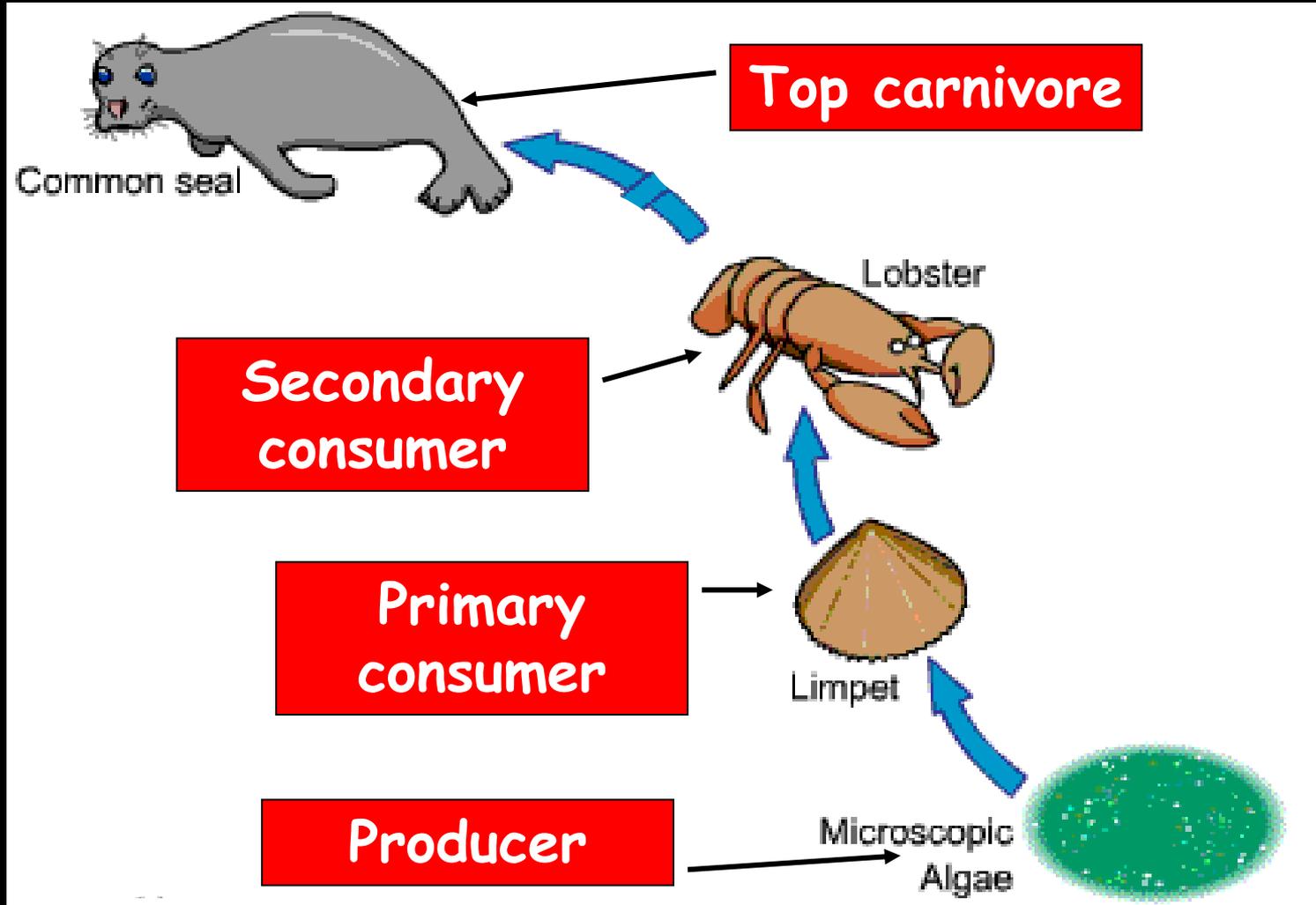
e.g take out the crab:



1) What would happen to the population of flat winkles?
They would probably _____ because...

2) What would happen to the population of herring gulls?
They would probably _____ because ...

Consider one food chain...



Your Body's Communication Systems

Basically, your body communicates with itself in two ways; using hormones and using a nervous system.

Facts about hormones

- They are chemicals
- They're relatively slow
- They last a long time

Facts about nerve impulses

- They are electrical signals
- They are quick
- They last a short time

The human body regulates things like temperature and water levels using both of these systems. This is called "homeostasis"

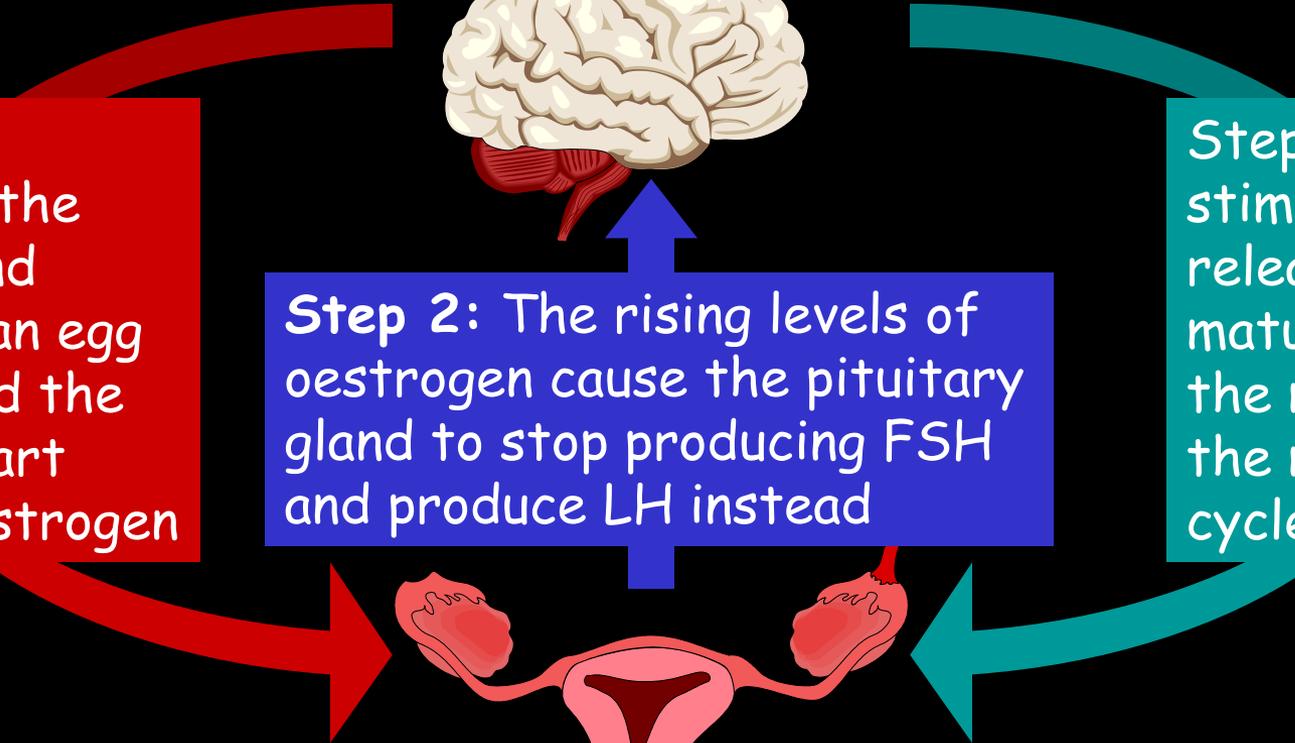
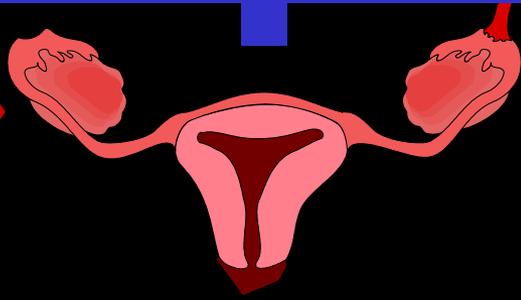
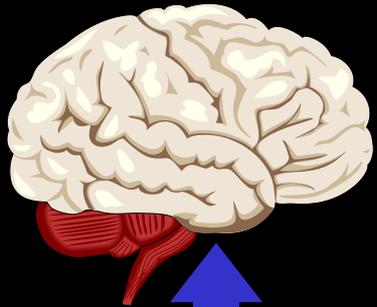
An example of hormones - Fertility

3 hormones are involved in the menstrual cycle: oestrogen, LH and FSH. Here's how:

Step 1: FSH produced by the pituitary gland causes both an egg to mature and the ovaries to start producing oestrogen

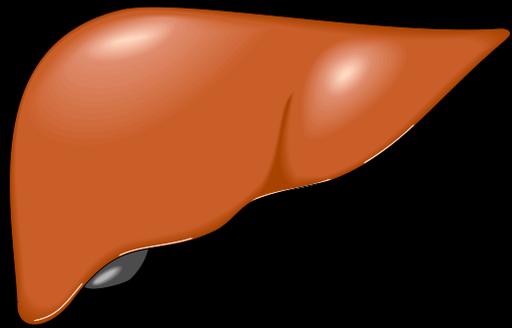
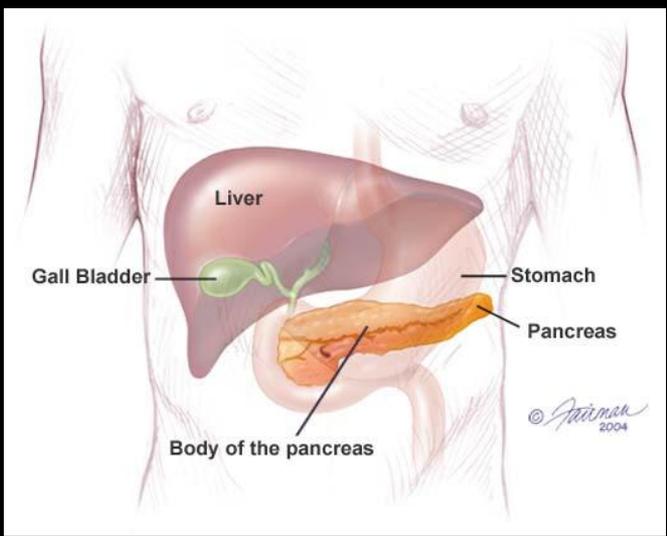
Step 2: The rising levels of oestrogen cause the pituitary gland to stop producing FSH and produce LH instead

Step 3: LH stimulates the release of the mature egg in the middle of the menstrual cycle



Another example - Controlling Blood Sugar levels

We need glucose in our bodies to help our cells to respire and produce energy. What happens if we have too much glucose?



If blood sugar is too high the pancreas releases the hormone insulin

The liver then converts glucose into insoluble glycogen and is removed from the blood

Diabetes

Diabetes is a _____ in which a person's blood sugar (i.e. glucose) level may rise to a _____ level. This is because the _____ doesn't produce enough _____.

Diabetes can be treated by _____ carefully or by injecting extra insulin when needed. Diabetics have to test their blood sugar level before they decide how much insulin to _____ themselves with.

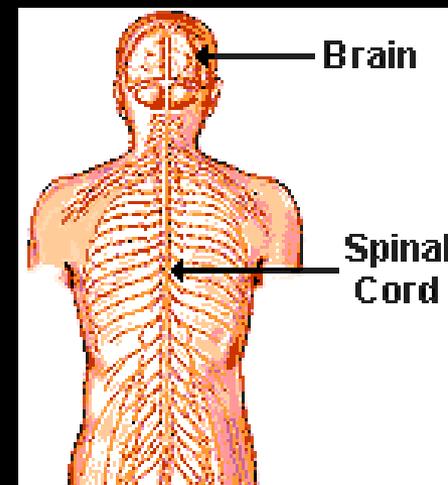
Words - insulin, disease, inject, dangerous, eating, pancreas

The Nervous System

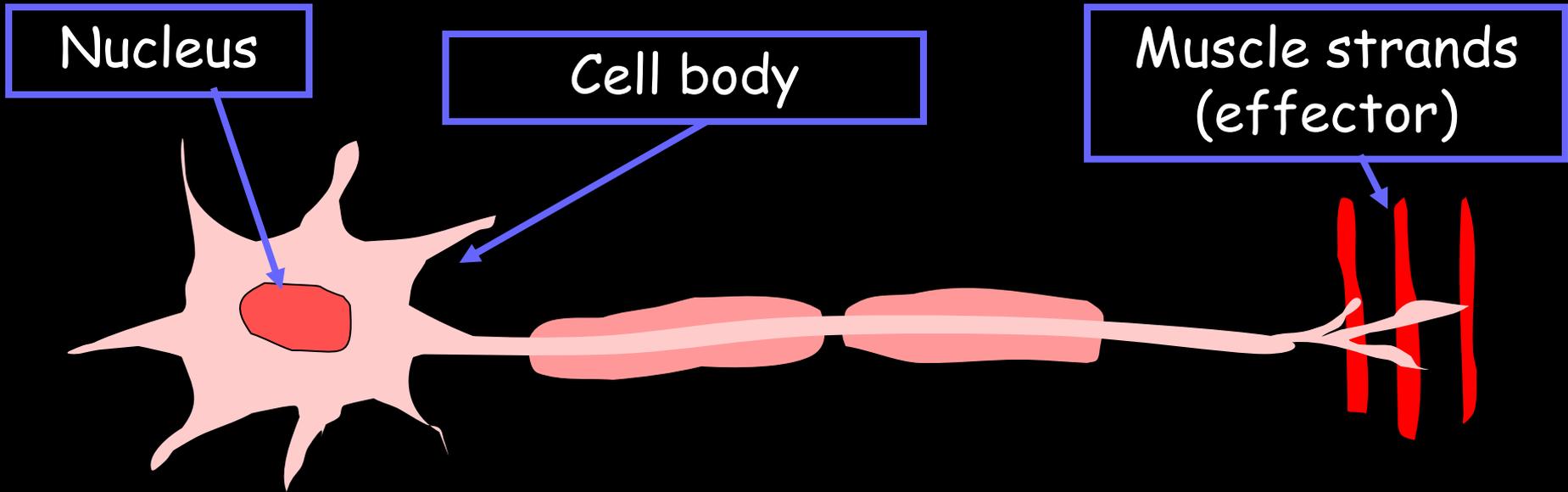
The **CENTRAL NERVOUS SYSTEM (CNS)** enables us to react to our surroundings. It consists mainly of the brain, the spinal chord, nerve cells ("neurons") and receptors.

Types of receptor:

- 1) Light receptors in the eyes
- 2) Sound receptors in the ears
- 3) Taste receptors on the tongue
- 4) Smell receptors in the nose
- 5) Touch, pressure and temperature receptors in the skin
- 6) Changes of position receptors in the ears (balance)

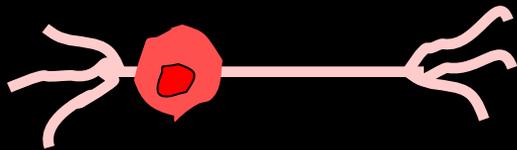


Types of nerve cell



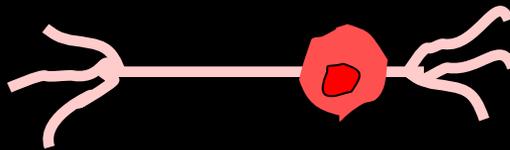
Nerve cells (neurones) are elongated with branched endings to connect to many muscles fibres.

1) Motor neurone



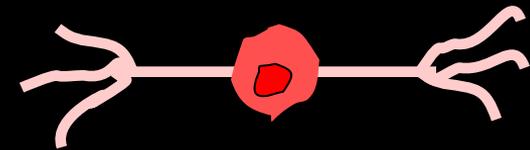
Impulse →

2) Sensory neurone



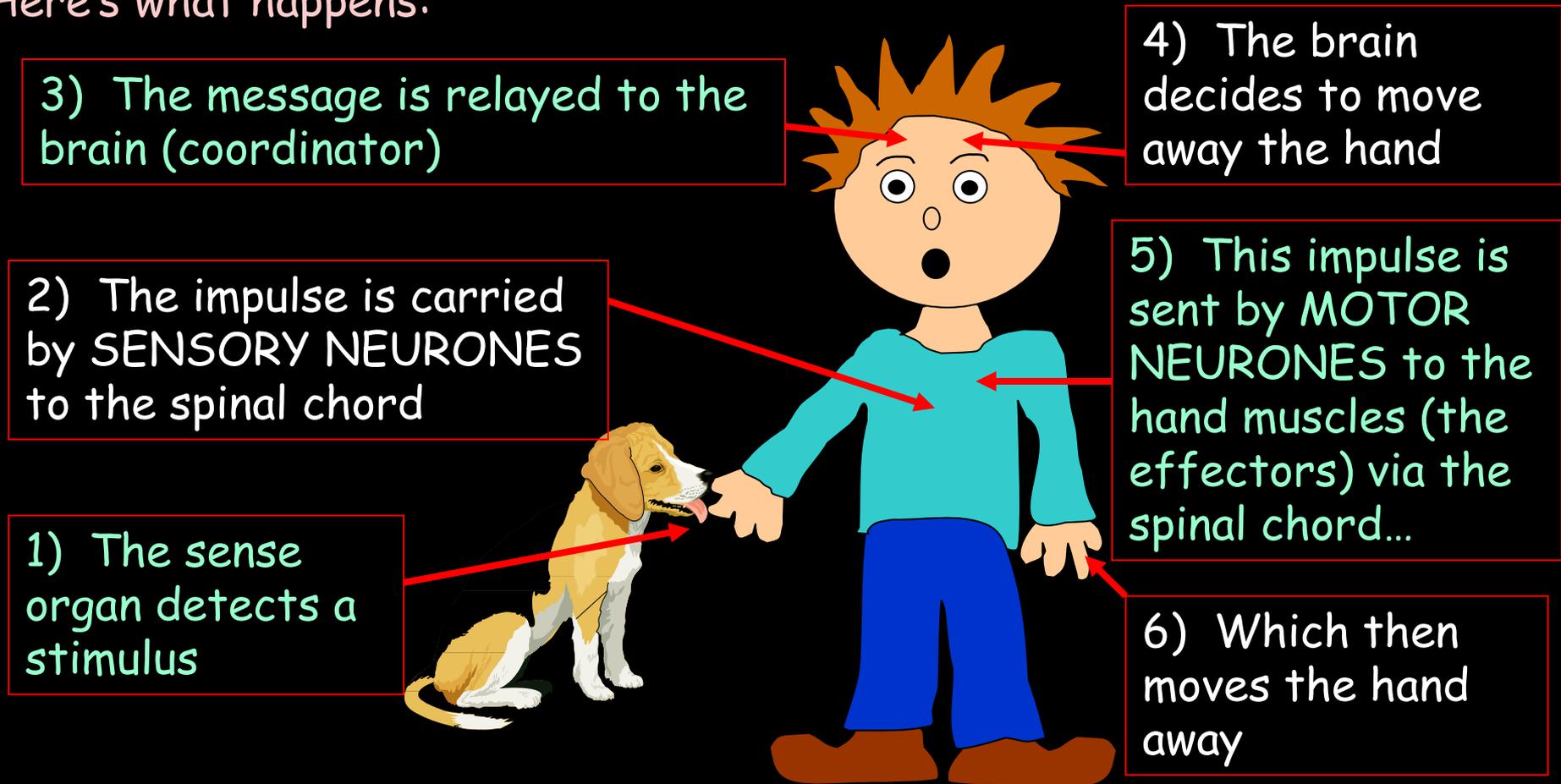
Impulse →

3) Relay neurone



Conscious actions

A conscious action is one where the brain makes a considered response. Here's what happens:



Sense organ → Sensory neurone → Synapse → Relay neurone
 → Synapse → Motor neurone → Muscle

Reflex actions

Sometimes conscious action is too slow to prevent harm, e.g...



In situations like this the body bypasses the brain to produce a quicker response. Here's how it works...

Reflex actions

