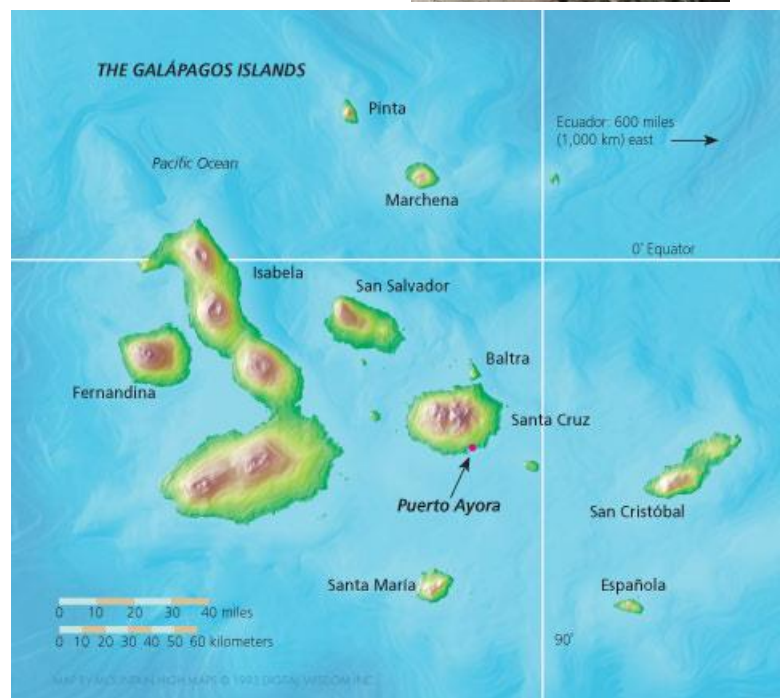
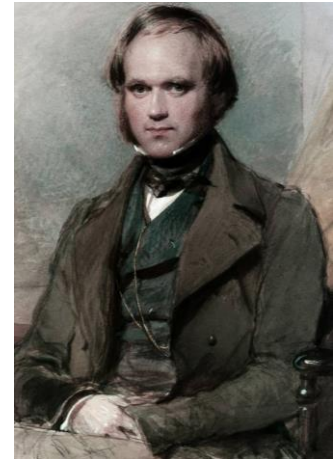


# SCIENCE HOMEWORK - 31.03.2020

Name \_\_\_\_\_ Date \_\_\_\_\_

## Subject : EVOLUTION

1. In 1835 Charles Darwin travelled around the world as the naturalist aboard: HMS Beagle. Darwin spent 19 days on a group of small islands off the coast of Ecuador, South America. Darwin noticed that some plants and animals on the islands were similar, but not the same, as those on the mainland; he thought that they must have originated from there. From this observation, Darwin concluded that species were not fixed, they can change.



- (a) What is the name of the islands off the coast of South America, to which Charles Darwin travelled?

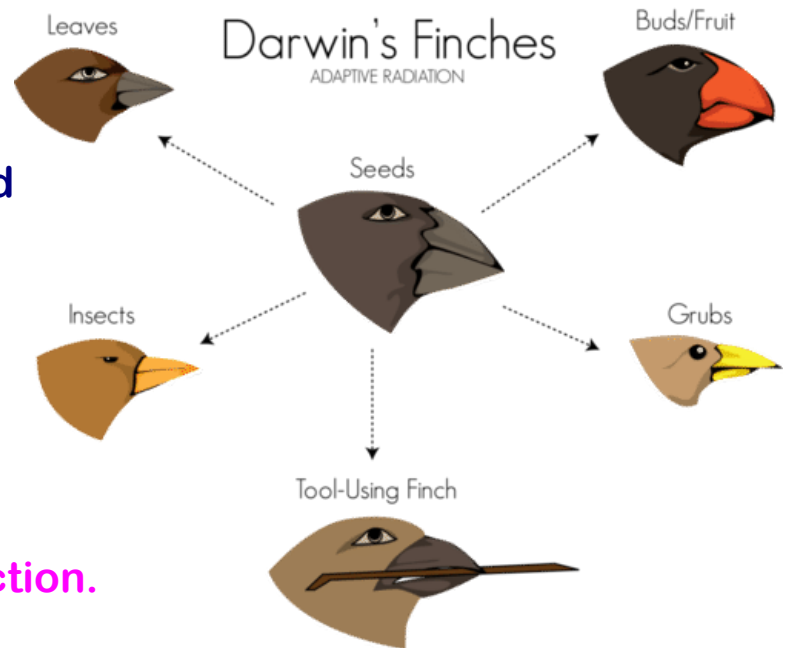
\_\_\_\_\_

- (b) What was the name of the ship upon which Darwin sailed? \_\_\_\_\_
- (c) What was Darwin's job aboard the ship? \_\_\_\_\_
- (d) How many days did Darwin spend on The Galapagos Islands? \_\_\_\_\_
- (e) Noticing that species on mainland South America and The Galapagos Islands were similar, but not the same. What conclusion did Darwin make about species.

\_\_\_\_\_

2. Darwin collected specimens of plants and animals from the islands. He noticed that the same species of finch which lived on each of the islands were slightly different.

In the "struggle for existence" some individuals survive better than others, Darwin called this **natural selection**. In 1859, Darwin proposed the theory of evolution by natural selection in his book called: **On the Origin of Species by Means of Natural Selection**.



Darwin's **theory of evolution** states that:

- individual organisms within a particular species show a wide range of **variation** for a characteristic;
- individuals with **characteristics most suited to the environment** are more likely to **survive** to breed successfully;
- the **characteristics** that have enabled these individuals to survive are then **passed on to the next generation**.

Use the information to answer these questions:

- (a) What is the main characteristic in Darwin's finches which show variation? \_\_\_\_\_
- (b) How does this characteristic suit the bird to its environment?

\_\_\_\_\_

\_\_\_\_\_

- (c) What happens to the most suited characteristics?

\_\_\_\_\_

\_\_\_\_\_

3. Darwin worked with a scientist called Alfred Russel Wallace; they proposed the theory of **SPECIATION**.

Speciation is how new kinds of plant or animal species arise.

One way that this can happen is when plants or animals become isolated by a physical barrier, which makes it impossible for them to breed with one another.

Each separate group develops different characteristics over millions of years and a new distinct species evolves.

The new species can no longer interbreed to produce fertile offspring.

What physical barrier separated Darwin's Galapagos Finches, leading to the evolution of different species?

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4. The publication of Darwin's book caused uproar.

In 1859, how did people believe that the Earth and all living creatures came into existence?

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5. Alfred Wallace is best known for his work on warning colouration in animals.



How is warning colouration an example of natural selection?

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6. How are these stags demonstrating behaviour which could lead to natural selection?



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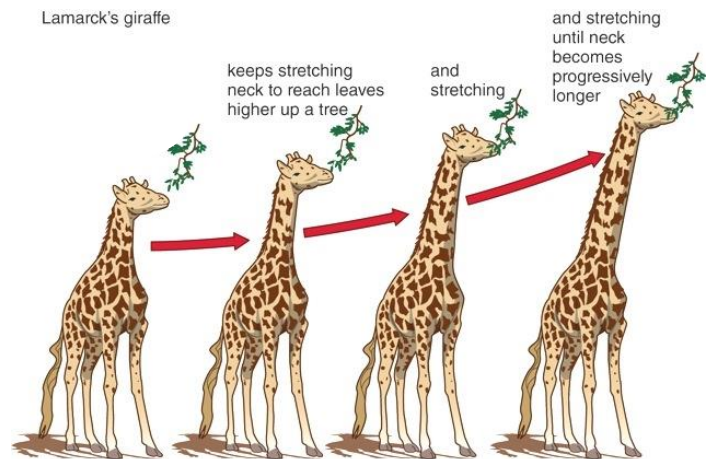
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7. Jean-Baptiste Lamarck was a French scientist who developed an alternative theory of evolution in the 19th century.

The lists below compare Darwin and Lamarck's explanation of why a giraffe has a long neck.



### Lamarck

1. a giraffe stretches its neck to reach food high up
2. the giraffe's neck gets longer because it's used a lot
3. the giraffe's offspring inherit its long neck

### Darwin

1. a giraffe with a longer neck can reach food high up
2. a giraffe is more likely to get enough food to survive to reproduce
3. a giraffe's offspring inherit its long neck

The reason that Lamarck's theory is not widely accepted is that if it were true, organisms would become more and more complex and simple animals would die out.

This photograph shows a simple, single celled animal called *Amoeba proteus*, which has lived on Earth for about 3.5 billion years.



(a) How do simple animals like amoeba disprove Lamarck's theory of evolution? \_\_\_\_\_



(b) What would this father's baby look like if Lamarck's theory of evolution was correct? \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

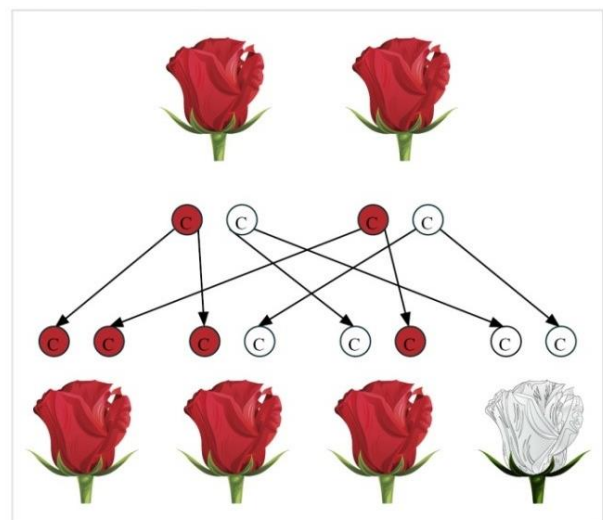
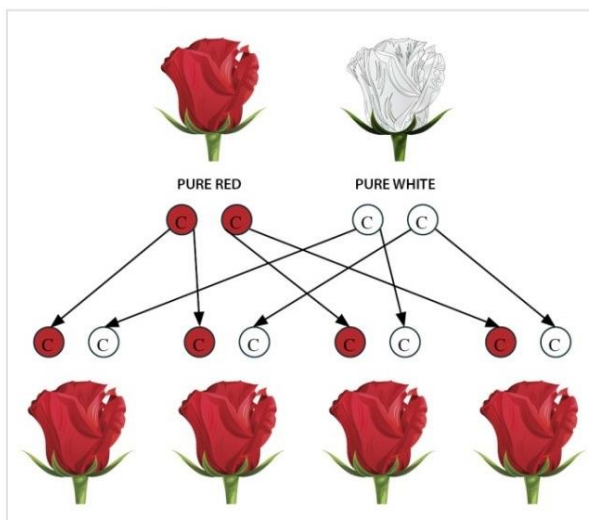


9.



The way in which characteristics are inherited was first explained by Gregor Mendel, who experimented with pea plants and presented his theory in 1865.

He found that when he bred red-flowered plants with white-flowered plants, all the offspring produced red flowers. If he bred these plants with each other, most of the offspring had red flowers, but some had white.

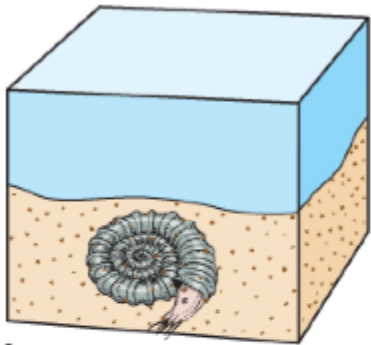


The importance of Mendel's discovery was not recognised until after his death, he observed:

".... a characteristic is determined by "units" that are passed on to descendants unchanged...."

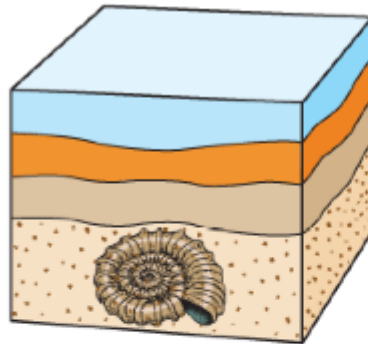
What do we call these "units" now? \_\_\_\_\_

10. Fossils of organisms which lived millions of years ago give us evidence of evolution.  
Steps in fossilisation:



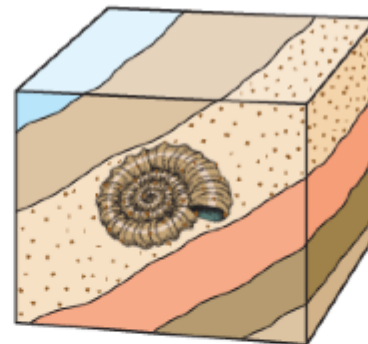
a

- **DEATH**  
the animal dies buried in sediment *e.g.* sand / mud
- more and more sediment builds up and turns to rock



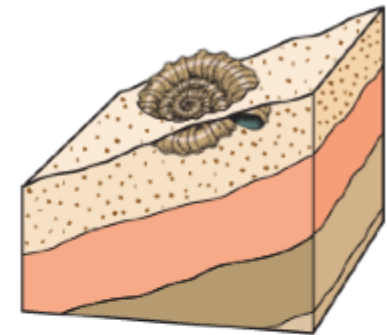
b

- **DECAY**  
the soft parts are decayed by bacteria and/or fungi
- hard parts *e.g.* shells/bones/teeth/hard wood did not decay
- **MINERALISATION**  
hard parts turned to rock forming a FOSSIL



c

- **GEOLOGICAL MOVEMENT**  
rock layers lifted up by earth movements



d

- **EROSION**  
rock broken down by wind and rain reveals fossil on surface

(a) Which parts of an animal or plant are usually fossilised? \_\_\_\_\_

\_\_\_\_\_

(b) Why aren't the soft parts of animals and plants fossilised? \_\_\_\_\_

\_\_\_\_\_

(c) What causes the soft parts of plants and animals to decay? \_\_\_\_\_

(d) Name the 3 main steps in fossilisation:

\_\_\_\_\_



11. Traces of organisms are also found *e.g.*, footprints, burrows, spaces left by plant roots -



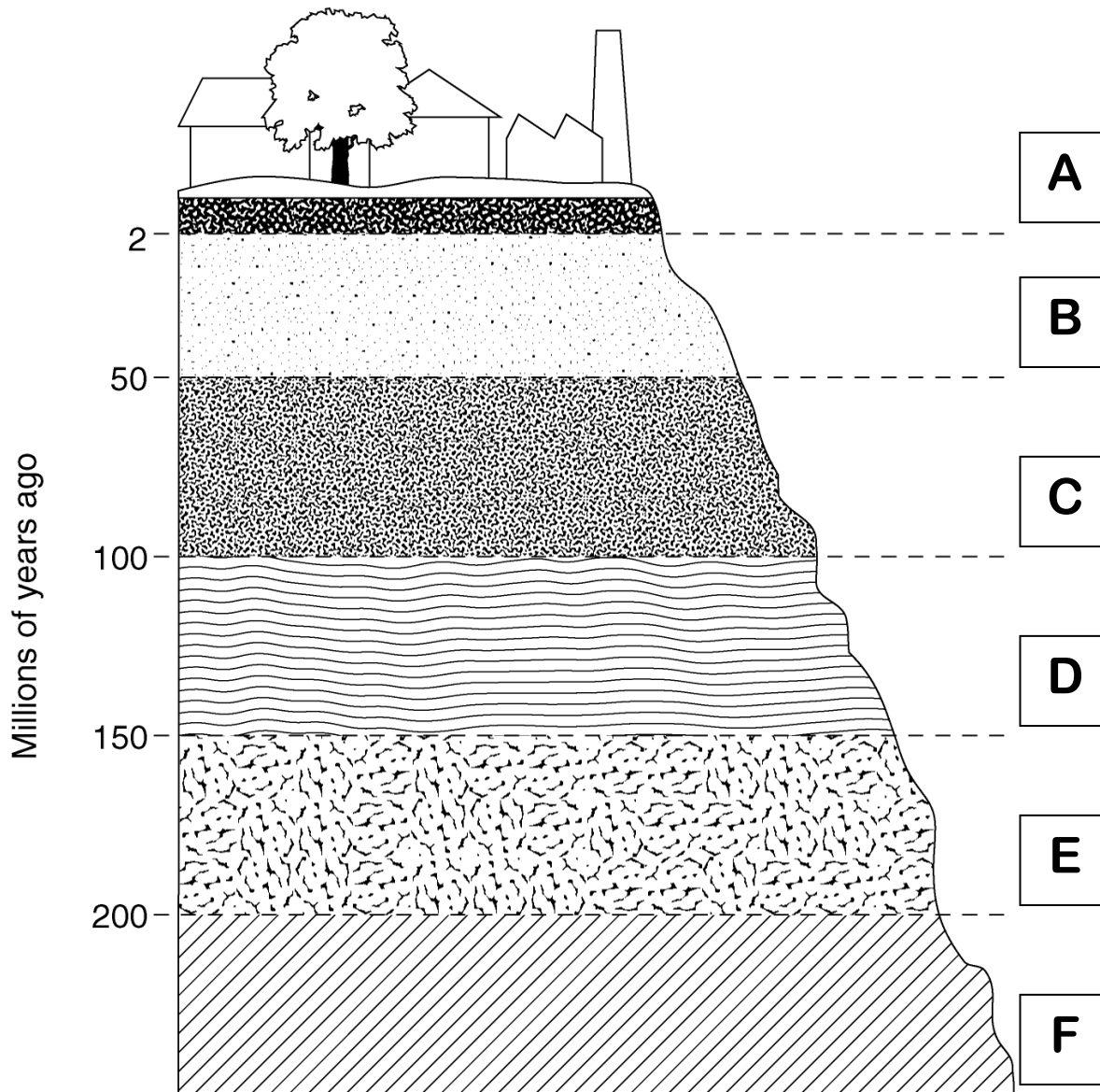
or whole animals.

What is the name of the substance which has trapped the mosquito and from where does it come?

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12. The diagram below shows different layers of rock.



In which layer of rock would you expect to find the oldest fossils?

\_\_\_\_\_

13. Complete these sentences about: THE FOSSIL RECORD

We know that animals and plants have changed over time, because fossils of some ancient organisms have survived in \_\_\_\_\_. Fossils are NOT a complete record of life on Earth, because the conditions necessary for fossilisation to take place are \_\_\_\_\_. Many early life forms were microbes with \_\_\_\_\_ bodies which decay, by the action of \_\_\_\_\_ and \_\_\_\_\_. Darwin predicted that there would be missing links in the fossil record because they have been destroyed or have not yet been \_\_\_\_\_.

14. This is a very famous fossil known as: **Archaeopteryx**, it was discovered in Germany in 1861. Archaeopteryx has teeth, feathers and a tail.

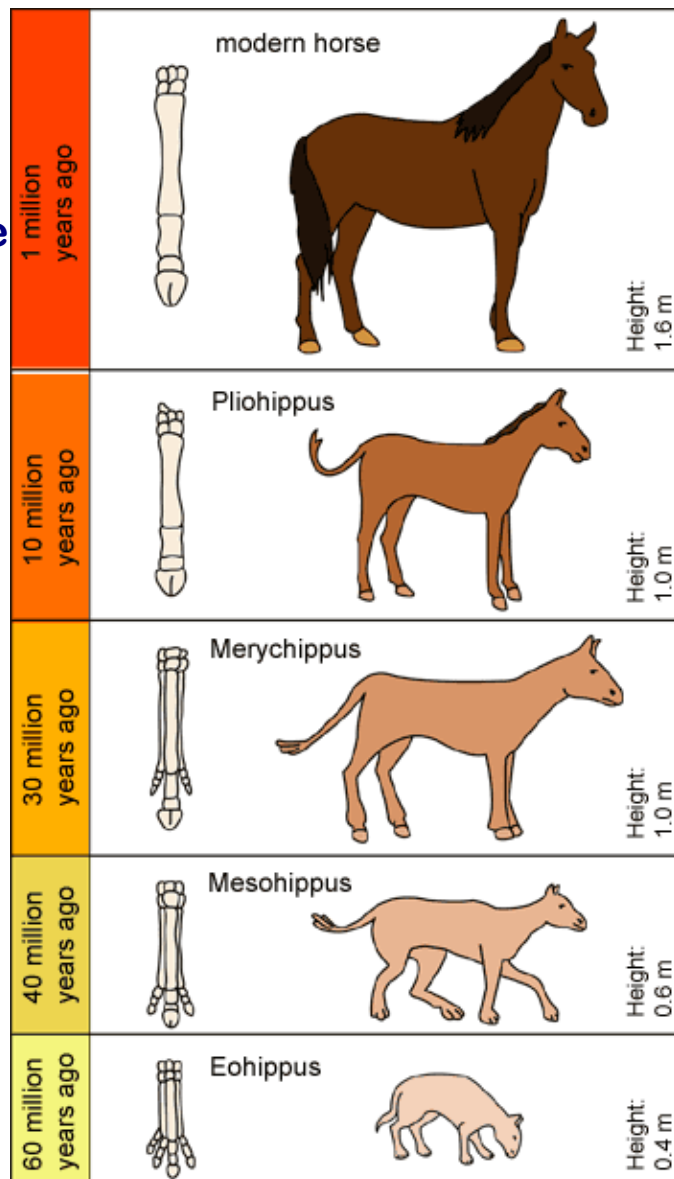


Archaeopteryx is a transitional fossil between dinosaurs and modern birds; which of its characteristics show that birds have evolved from reptiles?

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15. The horse is one of the few animals for which there is a fairly complete fossil record showing its evolution. Over 60 million years, the horse evolved from a dog-sized rainforest-dwelling creature, into an animal adapted to running over open country and standing up to 2 metres high.



(a) What trend do you notice has happened to the foot of the horse as it evolved?

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(b) Suggest a reason why this has happened.

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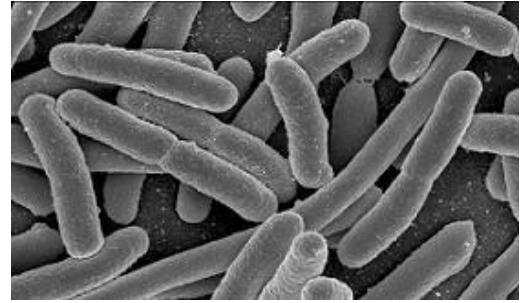


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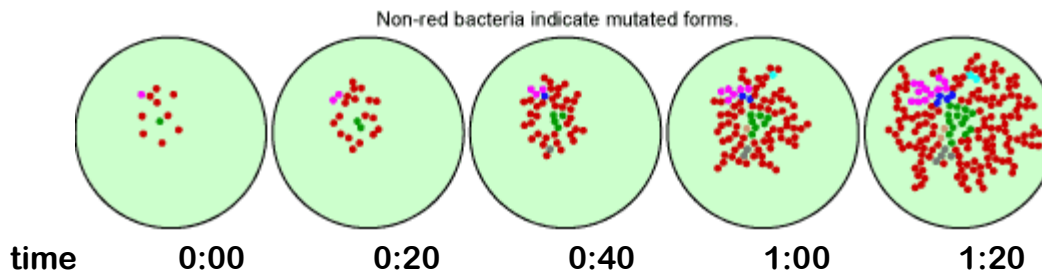


16. Every day we come into contact with millions of bacteria and viruses, some called pathogens, are harmful and cause disease.

These are *Escherichia coli* bacteria which cause food poisoning. When harmful bacteria enter our bodies we may be given antibiotics, which in the end, may not do us any good. Bacteria reproduce rapidly, so they evolve rapidly and may develop resistance to the antibiotic and will not be killed, so the patient becomes ill.



Bacteria can double their population every 20 minutes, this means that natural selection is in fast forward.



New gene combinations are passed on to the next generation and may give the bacteria resistance to the antibiotic we have taken. The new antibiotic resistant strain of bacteria will not be killed and we will not be cured of the disease.

(a) What are microbes which cause disease called? \_\_\_\_\_

(b) Why is the process of Natural Selection so rapid in some microorganisms? \_\_\_\_\_  
\_\_\_\_\_

(c) When a bacterium cannot be killed by an antibiotic, what medical problem does this cause? \_\_\_\_\_

(d) From where do microbes get the adaptation for antibiotic resistance?  
\_\_\_\_\_  
\_\_\_\_\_

17. Plants and animals need to evolve because environments gradually change. Sometimes the change is rapid, such as when the dinosaurs became extinct.



List the factors which may contribute to the extinction of a species:

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