MODULE: *Cells*

Pre Test
Marking Scheme

1. (5 minutes)
Read the information below and then answer the questions.

The structure of living things

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In 1838 two scientists were eating dinner and discussing the latest observations of living things made with a light microscope.

Suddenly they realised something. The structures they had observed inside living things were the same. A nerve cell from an animal contained many of the same parts as a leaf cell from a plant!

a. What two things had they discovered?

all living things are made of cells

an animal cell contains many of the same parts as a plant cell

b. What structures do animal and plants cells have in common?

Nucleus, Cytoplasm, Cell membrane, Mitochondria

c. How do plant and animal cells differ?

In addition to the nucleus, cytoplasm, and cell membrane the plant cells have chloroplasts, cell wall and large vacuole

d. Explain why they differ.

Plants make their own food through the process of photosynthesis. This process takes place in the chloroplasts. The cell wall and large vacuole are important in supporting the cell and plant.

2. (20 minutes)

Read the information below and then answer the questions.

MRSA

MRSA bacteria are harmless on your skin. But if they get in through a cut they may cause a fatal infection. Doctors fight most infections with antibiotics. Different antibiotics target different bacteria. But antibiotics cannot kill every type of bacteria that make us ill. These bacteria are resistant. Over the years, more and more types of bacteria – like MRSA – have become resistant to antibiotics. Sometimes, the genes in bacteria change, or mutate. This happens naturally. Most mutations are not useful to bacteria, but occasionally they make bacteria resist antibiotics.

Sam has a throat infection. He takes antibiotic tablets. The antibiotic kills nearly all the bacteria. But a few bacteria – the resistant ones – survive. These bacteria reproduce rapidly. This is natural selection.

Bacteria are more likely to become resistant if:

- lots of people take antibiotics for minor illnesses
- if people don't finish all the tablets
- if doctors prescribe the wrong antibiotics.

Resistant strains of bacteria spread quickly from person to person. This is because no one is immune to the bacteria, and there is no treatment that works. Therefore scientists are trying to find and develop new antibiotics and antiseptics.

One possibility is Cockroach brain juice. These are two investigations that have been carried out.

Hypothesis: Cockroach brain juice could cut MRSA infections in humans because it contains substances that kill bacteria.

Investigation 1

- grow two types of bacteria on agar plates
- add cockroach brain juice and leave for two hours at 37 ºC.

Type of bacteria	**Percentage of bacteria killed**
MRSA	More than 90
Escherichia coli	More than 90

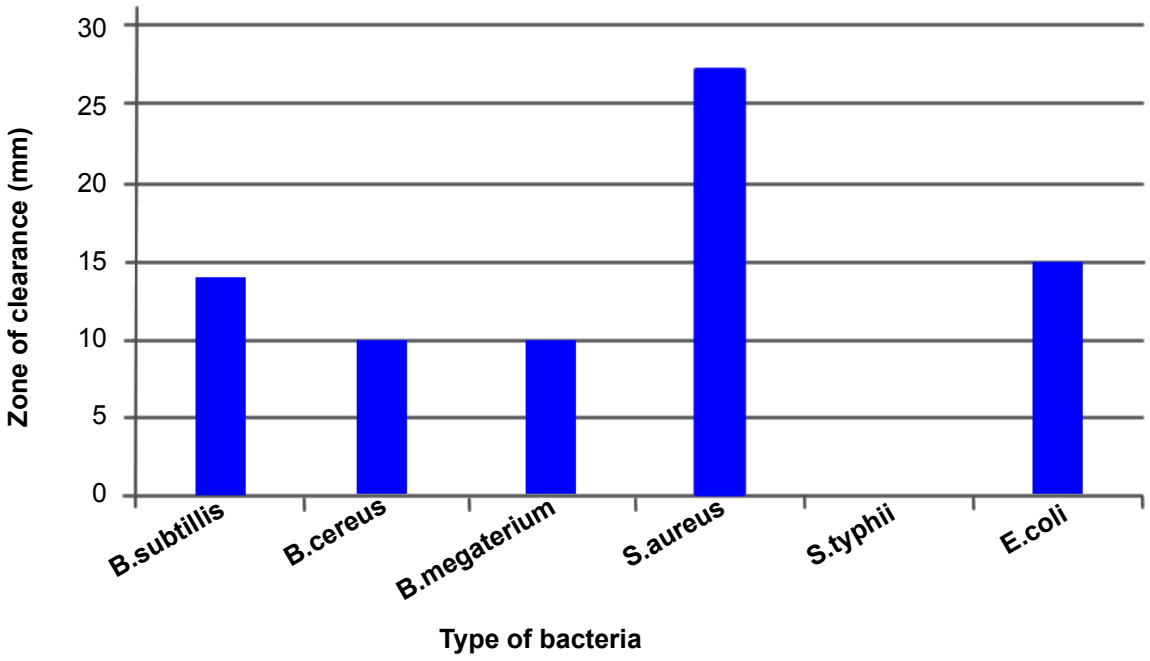
If an antibiotic kills 90% of the bacteria, your body's immune system can kill the rest.

Investigation 2

- grow different types of bacteria on agar plates
- add cockroach juice and leave overnight at 37 ºC.

The bigger the zone of clearance, the more bacteria are killed

Results



a. What type of microorganism is MRSA?

- Virus
- Protozoan
- Bacterium
- Yeast ✓

b. What do doctors normally use to treat MRSA?

Antibiotics

c. What natural process causes resistance?

Mutation

d. How have they become resistant?

People take antibiotics for minor illnesses; if people don't finish all the tablets; if doctors prescribe the wrong antibiotics

e. Why do resistant strains of bacteria spread so quickly?

Because no one has immunity to the bacteria

f. Do the results of investigation 1 support the hypothesis? Explain your answer.

To a certain extent. It has shown that it killed the bacteria in an agar plate, but it would also have to be trialled in clinical conditions

g. Which bacteria does cockroach brain juice kill most?

S. aureus

h. Which bacteria are resistant to cockroach brain juice?

S. typhil

i. Do the results of investigation support the results of hyphothesis? Explain your answer.

The juice has killed bacteria to a greater or lesser extent, although it did not test the effects on MRSA and the E.coli result was not the most successful. It did not kill any of the S.typhil

j. What do the researchers need to do to ensure the reliability of their results?

They need to repeat the investigations. They could check each other research by carrying out each others investigation using the same methodology to see if they get the same results

k. What would you need to know to be able to carry out the investigations?

You would need to know the complete methodology