Year 9 Science: Cell structure: organelles, plant and animal cells, bacteria

Name: _____ Date: _____

Try these without your notes first, then check the answer key.

Practice

1. A student says plant cells have chloroplasts instead of mitochondria. Explain what is wrong.

2. A cell has DNA, a membrane, cytoplasm and a cell wall, but no nucleus. Is it prokaryotic or eukaryotic, and what kind of organism is it likely to be?

3. An onion cell is 300 µm long. How long will it look in an image at ×100, in mm?

4. Why does a lettuce left without water go floppy? Use the words vacuole and cell wall.

5. Why did scientists need the electron microscope to understand how mitochondria work?

Fix the mistake

6. Correct this statement: "Animal cells have a cell wall too, just a thinner one."

7. Correct this statement: "Bacteria have no nucleus, so they have no DNA."

8. Correct this statement: "Actual size = image size × magnification."

9. Correct this statement: "24 mm ÷ 400 = 0.06, so the cell is 0.06 µm across."

Answer key (for parents and tutors)

1. A student says plant cells have chloroplasts instead of mitochondria. Explain what is wrong.
   Plant cells have both. Mitochondria release energy from glucose in every plant cell, and chloroplasts make that glucose in the green parts.
2. A cell has DNA, a membrane, cytoplasm and a cell wall, but no nucleus. Is it prokaryotic or eukaryotic, and what kind of organism is it likely to be?
   Prokaryotic, because the DNA is not inside a nucleus; it is most likely a bacterium.
3. An onion cell is 300 µm long. How long will it look in an image at ×100, in mm?
   300 µm × 100 = 30,000 µm = 30 mm.
4. Why does a lettuce left without water go floppy? Use the words vacuole and cell wall.
   Without water the large vacuoles shrink and stop pushing out against the cell walls, so the cells go soft and the leaves droop.
5. Why did scientists need the electron microscope to understand how mitochondria work?
   Mitochondria are only about 1 µm across and their inner folds are far smaller than the 0.2 µm limit of a light microscope; only an electron microscope magnifies and resolves enough to show them.
6. Correct this statement: "Animal cells have a cell wall too, just a thinner one."
   Animal cells have only a cell membrane; the stiff cellulose wall is found in plant cells, which is why animal cells can change shape.
7. Correct this statement: "Bacteria have no nucleus, so they have no DNA."
   Bacteria do have DNA, usually one loop loose in the cytoplasm; having no nucleus only means it has no membrane around it.
8. Correct this statement: "Actual size = image size × magnification."
   Divide instead: actual size = image size ÷ magnification, because the real cell is smaller than its image.
9. Correct this statement: "24 mm ÷ 400 = 0.06, so the cell is 0.06 µm across."
   The answer is in the unit you divided, so it is 0.06 mm, which is 60 µm; convert to µm before dividing to avoid this.