Chapter review questions

1 plasmid DNA, flagella, non-cellulose cell wall

2 dissolved sugars and minerals

3 water and carbon dioxide

4 They contain chloroplasts, which contain a green substance called chlorophyll and are where photosynthesis occurs.

5 They have a tail to propel them towards the ovum and a relatively large number of mitochondria to release the energy from glucose during respiration.

6 cardiac, smooth and skeletal

7 The sample is placed in a drop of water or stain on a microscope slide. A thin coverslip is placed on top of this. The slide is then placed onto the stage.

8 Flagella rotate to move bacterial cells.

9 a) left: scanning electron microscope; right: transmission electron microscope

b) advantage: higher magnification; disadvantage: any from large and expensive, and require biological samples to be dead.

10 Prokaryotic cells do not have a nucleus whereas eukaryotic cells do, they are single celled and they are smaller than eukaryotic cells.

11 It is the site of chemical reactions and is mainly water.

12 They are where proteins are made.

13 Plant and animal cells both have a membrane, which lets substances into and out from the cell. They both have cytoplasm, which is the liquid in which reactions occur and cell components such as ribosomes are found. They both have ribosomes, which are the site of protein synthesis. They both have mitochondria, which are the site of respiration. Only plant cells have chloroplasts, which are the site of photosynthesis. Only plant cells have a vacuole in which dissolved sugars and minerals are stored. Plant cells have a wall to provide structure, which is not seen in animal cells.

14 This is filled with water in which dissolved sugars and mineral ions are found. Vacuoles are found in plant cells.

15 A nerve cell has a long section called an axon down which electrical impulses move. This cell is insulated by a myelin sheath to make this movement faster.

16 They have a have a biconcave shape (dips in the middle on both sides) and no nucleus to maximise their surface area to carry more oxygen.

17 The shortest distance between two points that a microscope can determine as two separate points.

18 a) sperm cell and ovum

b) around 20 micrometres (μm)

c) Sperm cells need to be able to swim long distances to reach the ovum and so need the energy released from glucose during respiration in mitochondria.

19 Cells with more mitochondria are able to release more energy from glucose in respiration. Cells with more mitochondria are usually more active, like sperm or muscle cells.

20 'Turgid' is used to describe swollen cells.

21 Carbon dioxide and water move out of animal cells because they are the products of respiration.

22 Xylem cells are long and have thick, reinforced walls to allow water to move up by transpiration.

23 Prokaryotes probably evolved before eukaryotes because they are missing some cell components that eukaryotic cells possess.

24 a) It is 2.6 cm long in the image and so has been magnified 20 times.

b) It has a large surface area to speed up osmosis.