Answer key

Metabolism test

1. What is an anabolic reaction?

A reaction in which smaller molecules or atoms are combined to form larger molecules (1)

2. Does an anabolic reaction require an input of energy? Explain.

Yes. When smaller molecules or atoms form chemical bonds, energy is required to create the chemical bonds. (2)

3. Give one example of an anabolic reaction which occurs in human cells and indicate where in the cell the reaction occurs.

Protein synthesis - amino acids are joined together to form large protein molecules. This occurs at the ribosomes. (another example ~~of~~ is synthesis of ATP from ADP and P which forms in the mitochondria) (1)

4. What is a catabolic reaction?

A reaction in which larges molecules are broken down into smaller molecules or atoms (1)

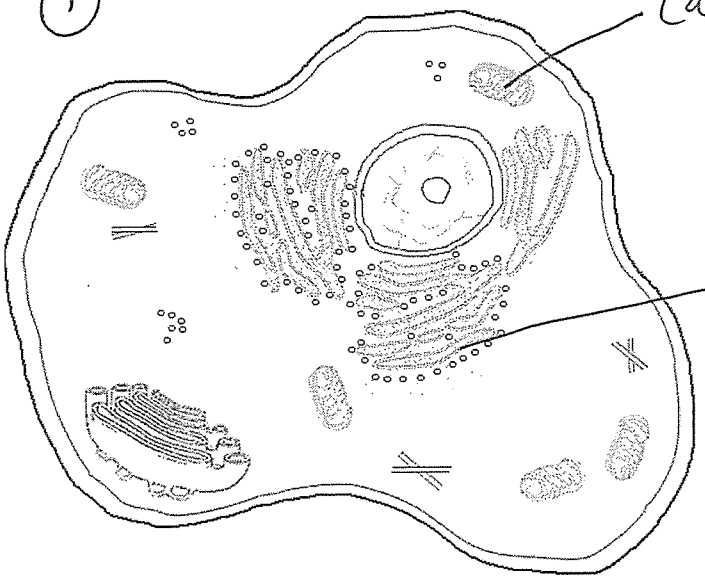
5. Does a catabolic reaction require an input of energy? Explain.

No net input. Catabolic reactions release energy, as the chemical bonds between combined molecules are broken and the energy in ~~those~~ bonds ~~are~~ is released. (2)

6. Discuss one example of a catabolic reaction and describe where it occurs in human cells.

Respiration - glucose is broken down into water and CO_2 and or lactic acid. Aerobic respiration occurs in the cytoplasm and mitochondria, anaerobic respiration occurs in the cytoplasm. (2)

7. On the diagram of a cell which is shown below, mark in where protein synthesis, an anabolic reaction, and where aerobic respiration, a catabolic reaction, occur.



8. Write a word equation for anaerobic respiration.

glucose → lactic acid + energy (1)

9. Write a word equation for aerobic respiration.

glucose + oxygen → carbondioxide + water + energy (1)

10. Complete the table below to contrast the two processes of aerobic and anaerobic respiration.

	Aerobic respiration	Anaerobic respiration
Site of occurrence	first part in cytoplasm then in mitochondrion (1)	in cytoplasm (1)
Requirements for oxygen	oxygen required (1)	no oxygen required (1)
Products in animal (human) cells	carbon dioxide + water (+ energy) (1)	lactic acid (+ energy) (1)
Amount of ATP produced from 1 molecule of glucose	large amount (36-38 ATP) (1)	small amount (2 ATP) (1)