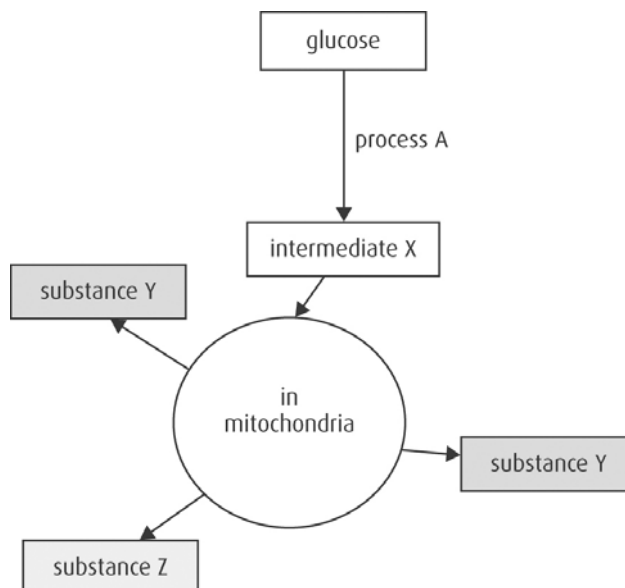


## Extension worksheet – Chapter 3

- 1** The diagram below shows some of the events involved in respiration.



- a** Name the process A. (1)
  - b** Name intermediate X. (1)
  - c** Name the two substances Y and Z produced by aerobic respiration in the mitochondria. (2)
  - d** During anaerobic respiration, intermediate X can be converted to other products in the cytoplasm. Name the substances produced in:
    - i** animals (1)
    - ii** yeast. (1)
- 2** Copy the paragraph and fill in the spaces in the account of protein synthesis below. (11)

Messenger RNA is formed by the process of \_\_\_\_\_ from nuclear DNA. It passes through pores in the \_\_\_\_\_ into the cytoplasm. Here it attaches to a \_\_\_\_\_ on the \_\_\_\_\_. Amino acids are brought to the mRNA by tRNA, which attach to the \_\_\_\_\_ of the mRNA by their \_\_\_\_\_. Amino acids are joined together by \_\_\_\_\_ bonds to form a \_\_\_\_\_. This molecule is released from the \_\_\_\_\_ and moves to the \_\_\_\_\_, where it is modified to form \_\_\_\_\_.

- 3 The table below shows some properties of mRNA and tRNA. Copy and complete the boxes to show whether the feature is present or absent in each molecule. (10)

Property	mRNA	tRNA
contains codons		
may contain several genes		
associates with any amino acid		
contains the base uracil		
contains 70–90 nucleotides		

- 4 The table below summarizes the results of an experiment in which light of different intensities was shone onto a sample of Canadian pondweed and the rate of oxygen released was measured. The experiment was conducted at two different carbon dioxide concentrations, which were achieved by enriching the water with sodium hydrogencarbonate. The different light intensities were obtained by placing a lamp at different distances from the container of pondweed.

Distance of lamp from plant / m	2.00	1.50	1.00	0.75	0.50	0.25
Rate of oxygen release / $\text{mm}^3 \text{min}^{-1}$ 1% $\text{CO}_2$	0.2	0.4	0.7	1.4	1.4	1.4
Rate of oxygen release / $\text{mm}^3 \text{min}^{-1}$ 2% $\text{CO}_2$	0.6	0.8	1.1	1.6	1.8	1.8

- a Plot the results on graph paper using the same axes for both curves. (4)
- b Use the 2%  $\text{CO}_2$  line on your graph to outline the relationship between light intensity and the rate of photosynthesis. (2)
- c Explain how and why the rates of photosynthesis at 1%  $\text{CO}_2$  and 2%  $\text{CO}_2$  are different. (2)
- d Is this method of assessing the rate of photosynthesis an indirect or direct method? (1)
- e Name **two** other methods of estimating the rate of photosynthesis. (2)
- 5 Biological washing powders contain enzymes that digest stains on clothing.
- a Which enzymes would you expect washing powders to contain? (2)
- b What advice would you give on how to get the best results from a biological washing powder? (3)

- c Using your knowledge of enzymes and cell structure, match the following types of enzyme to the industrial production processes in which they are used.

(6)

Enzymes:

- protease (protein-digesting enzyme)
- cellulase (cellulose-digesting)
- amylase (starch-digesting)

Processes:

- making syrups
- fruit juice production
- softening vegetables
- meat tenderising
- removing hair from hides
- removing the testa from grains