1 Fig. 2.1 shows crop productivity for a range of plants but the bar graph is incomplete.

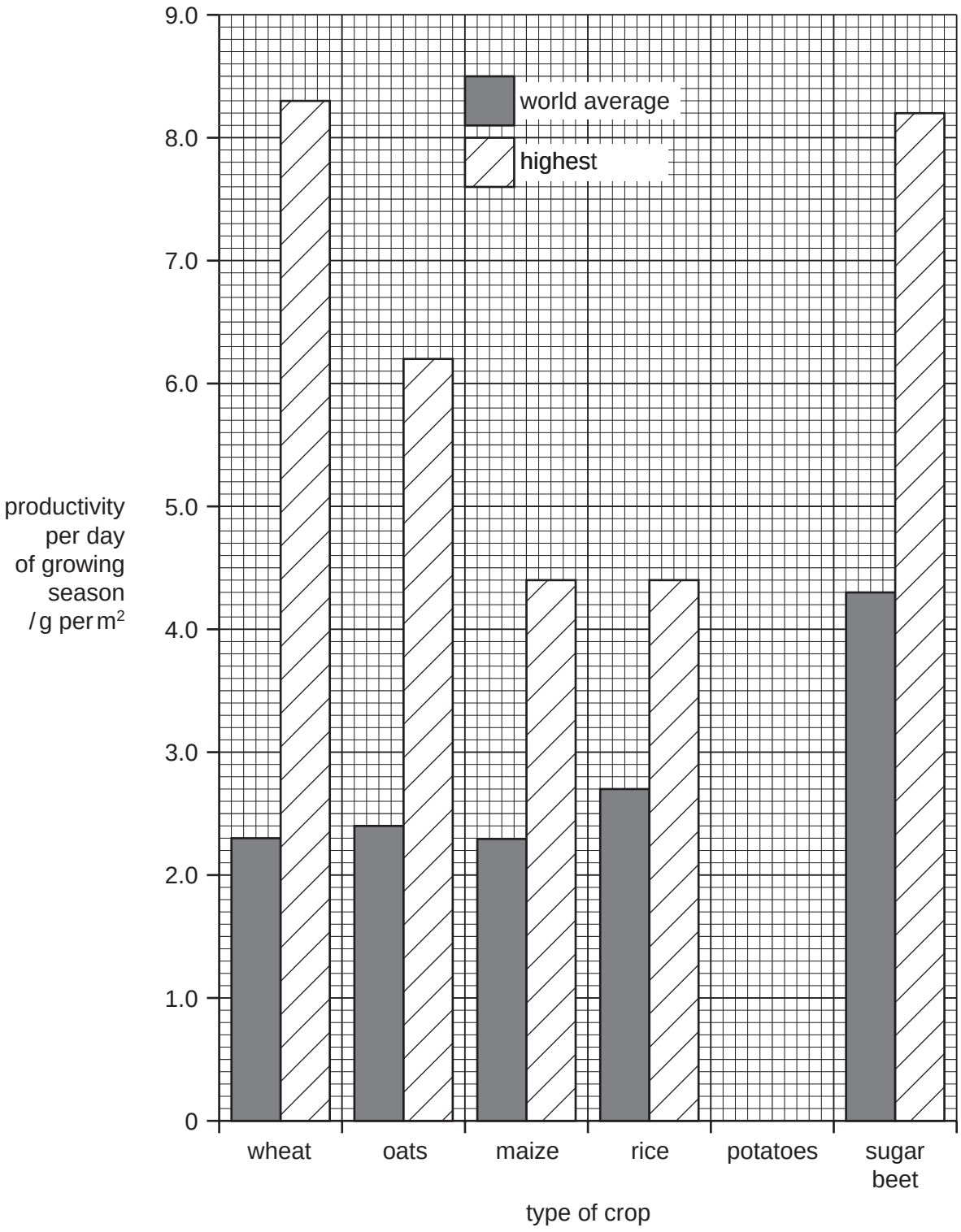

Fig. 2.1

(a) Complete Fig. 2.1 using the following data.

crop	productivity per day of growing season / g per m^2	
	world average	highest yield
potatoes		5.6

[2]

(b) State which crop has

(i) the highest average productivity,

.....

(ii) the greatest difference between the average yield and the highest yield.

..... [2]

(c) Outline how modern technology could be used to increase the productivity of a crop from the average yield to a high yield.

.....

.....

.....

..... [3]

(d) When the yield is measured, dry mass is always used rather than fresh mass.

Suggest why dry mass is a more reliable measurement than fresh mass.

.....

..... [1]

(e) Maize is often used to feed cows, which are grown to provide meat for humans.

Explain why it is more efficient for humans to eat maize rather than meat from cows that have been fed on maize.

.....

.....

..... [3]

(f) **(i)** Complete the equation for photosynthesis.

$$6CO_2 + 6H_2O \xrightarrow{\text{light energy}} C_6H_{12}O_6 + ...$$

[1]

(ii) Describe how leaves are adapted to trap light.

.....

.....

..... [2]

(iii) With reference to water potential, explain how water is absorbed by roots.

.....

.....

.....

..... [3]

(iv) Explain how photosynthesising cells obtain carbon dioxide.

.....

.....

..... [2]

[Total: 19]

2 The Ruddy duck, *Oxyura jamaicensis*, is a native of America.
A flock of 20 birds was introduced into Britain from America before 1950.
The original flock settled quickly in their new habitat and started breeding. Numbers now exceed 6000.
The White-headed duck, *Oxyura leucocephala,* (a native of Spain) is a closely related species to the Ruddy duck.
Female White-headed ducks are more attracted to male Ruddy ducks than to males of their own species.
Cross-breeding between the two species produces a new variety of fertile duck.
The White-headed duck is now threatened with extinction.
Some conservationists are considering a plan to kill the British population of Ruddy ducks to prevent the White-headed duck becoming extinct.

Fig. 6.1 shows a male Ruddy duck.

Fig. 6.1

(a) State two features, visible in Fig. 6.1, that distinguish birds, such as the Ruddy duck, from other vertebrate groups.

1 .....

2 ..... [2]

(b) **(i)** With reference to an example from the passage, describe what is meant by the term *binomial system*.

.....

..... [2]

(ii) State two reasons, based on information in the passage, why the Ruddy duck and White-headed duck are considered to be closely related.

1 .....

.....

2 .....

..... [2]

(c) **(i)** Explain why Ruddy ducks would **not become** ex conservationists carried out their plan.

.....

..... [1]

(ii) Suggest **one** factor, other than the breeding habits of the Ruddy duck, that could result in the extinction of a bird such as the White-headed duck.

.....

..... [1]

(d) The Ruddy duck feeds on seeds and insect larvae. The ducks are eaten by foxes and humans.

Explain why these feeding relationships can be displayed in a food web, but not in a food chain.

.....

.....

..... [2]

[Total: 10]