

1 *Sorghum bicolor* is a cereal crop important in many dry areas of the world.

Fig. 4.1 shows some plants of *S. bicolor* growing in a field in China.



Fig. 4.1

(a) *S. bicolor* is a monocotyledon.

State **two** features that are used to identify plants as monocotyledons.

- 1
- 2 [2]

(b) Fig. 4.1 shows the flower heads of sorghum. Pollen is released from the individual flowers when they open.

Most sorghum flowers are self-pollinated and then self-fertilised.

(i) State the meanings of the terms *pollination* and *fertilisation*.

- pollination*
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-
- fertilisation*
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- [2]

(ii) Describe **two** implications of self-pollination.

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(c) Describe the events that occur in flowering plants after fertilisation to form a seed.

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(d) In India, the cultivation of sorghum has decreased because now people prefer foods based on wheat and rice.

There are alternative uses of sorghum in the production of new foods, processed foods and as feed for animals.

Explain why it is less efficient to feed crops, such as sorghum, to animals rather than to use them for human foods.

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[Total: 13]

2 Mammals and flowering plants both have internal fertilisation and internal development.

(a) Describe what happens after pollination that results in fertilisation in flowering plants.

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(b) Fig. 5.1 shows a fetus developing inside the uterus.

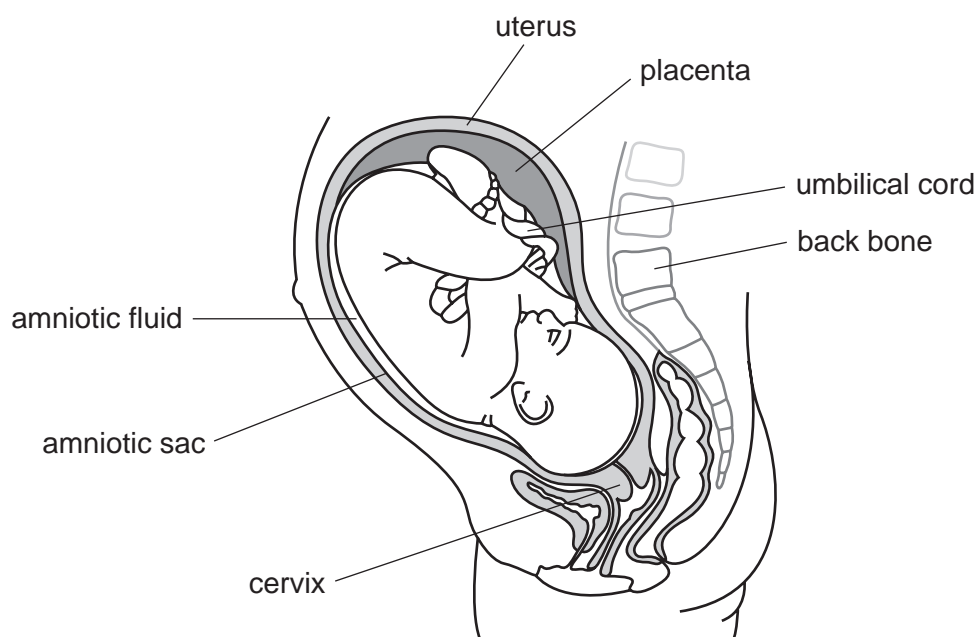


Fig. 5.1

Describe how the structures **named in Fig. 5.1** provide the following needs of the fetus.

protection

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constant temperature

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nutrients

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excretion of metabolic waste

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[Total: 11]

- 3 (a) In 2005, the World Health Organization estimated that there were 2.3 million children infected with HIV.

Most children become infected from their mothers at birth or during breast feeding. Very few become infected by movement of HIV across the placenta.

Without any treatment, 25-40% of babies of mothers who are HIV positive (HIV+) will be infected. However, there are very effective treatments that have reduced transmission rates to 1%.

This has been achieved by:

- encouraging mothers to be tested for HIV;
- treating mothers and new-born babies with drugs that prevent HIV spreading within the body and reduce the chances of infection at birth;
- advising mothers not to breast feed if they are HIV+.

Explain the meaning of the following terms as used in the passage above:

transmission;

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drug.

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- (b) In many countries, there are dangers in using milk powder because it cannot be prepared under sterile conditions.

Explain the dangers of feeding non-sterile milk to children who may be HIV+.

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(c) Even though there is a risk of HIV infection, it is sometimes advised that women breast feed their babies.

Explain the advantages of breast feeding.

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(d) State **two** ways in which an adult may become infected with HIV.

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2 [2]

[Total: 12]

- 4 Fig. 5.1 shows the structure of the placenta and parts of the fetal and maternal circulatory systems.

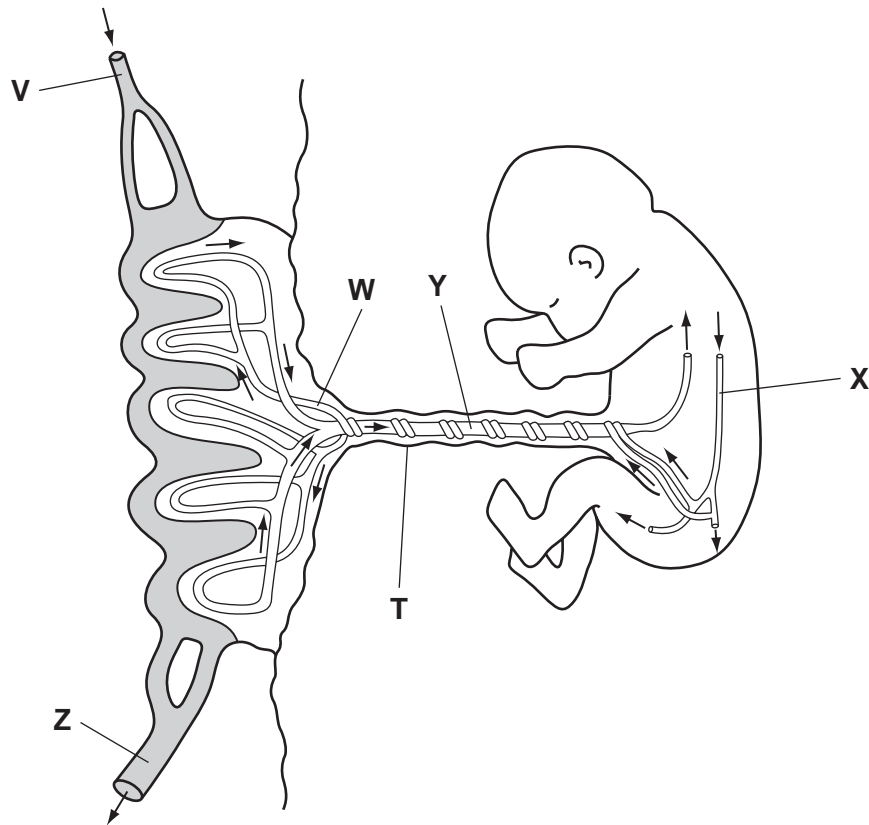


Fig. 5.1

- (a) (i) Complete Table 5.1 by listing the blood vessels that carry oxygenated blood. Use the letters in Fig. 5.1 to identify the blood vessels.

Table 5.1

circulatory system	blood vessels that carry oxygenated blood
maternal	
fetal	

[2]

- (ii) Name structure **T** and describe what happens to it after birth.

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(iii) The placenta is adapted for the exchange of substances between the maternal blood and the fetal blood.

Describe the exchanges that occur across the placenta to keep the fetus alive and well.

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(b) The placenta secretes the hormones oestrogen and progesterone.

Describe the roles of these hormones during pregnancy.

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[Total: 11]