

## Unit 3 Sustainability & Interdependence

### Key Area 5 Symbiosis

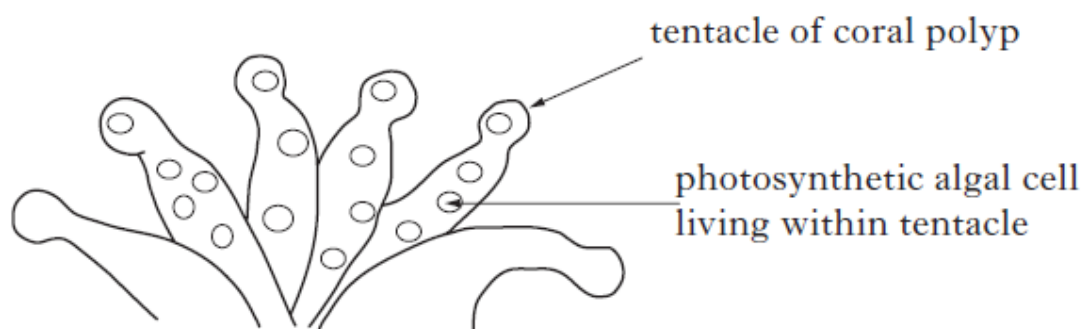
1. Adult beef tapeworms live in the intestine of humans. Segments of the adult worm are released in the faeces and embryos which develop from them remain viable for five months. The embryos may be eaten by cattle and develop in their muscle tissue.

Which row in the table below correctly identifies the various roles in the tapeworm lifecycle?

|   | <i>Role of human</i> | <i>Role of embryo</i> | <i>Role of cattle</i> |
|---|----------------------|-----------------------|-----------------------|
| A | Host                 | Resistant stage       | Secondary host        |
| B | Host                 | Vector                | Secondary host        |
| C | Secondary host       | Vector                | Host                  |
| D | Secondary host       | Resistant stage       | Vector                |

- 2.

The tentacles of coral polyps have a symbiotic relationship with photosynthetic algal cells as shown in the diagram.



- (a) (i) Name the type of symbiosis shown by the relationship between coral polyps and the photosynthetic alga.

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1

- (ii) State **one** benefit to the algal cells of this relationship.

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1

- (b) Symbiotic relationships have arisen by co-evolution.

Describe **one** piece of evidence that would support this statement.

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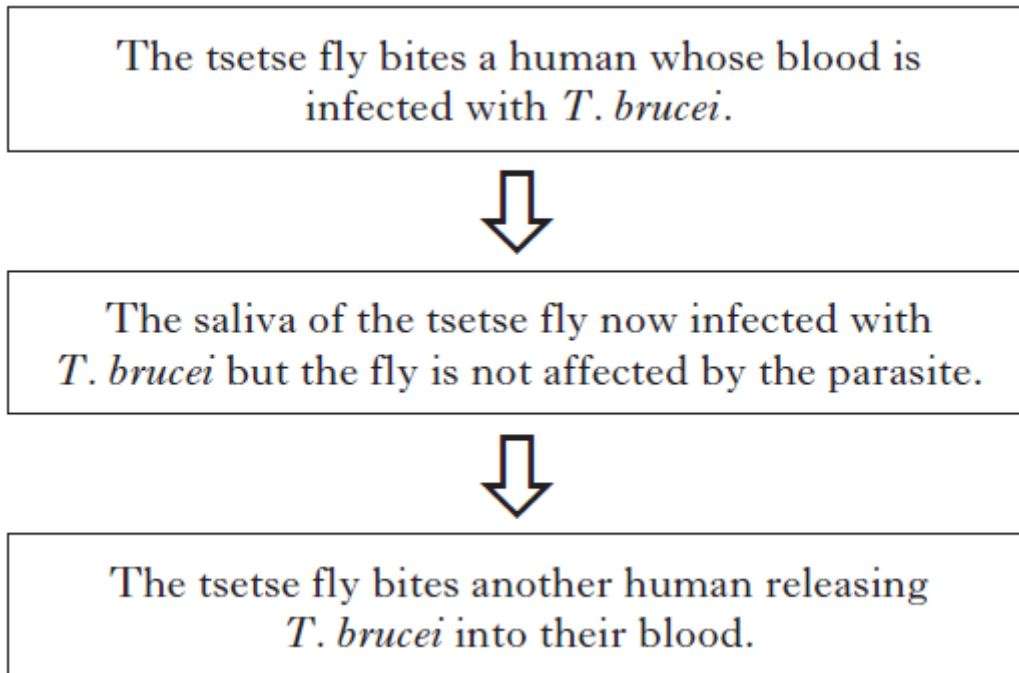
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3.

- (a) The unicellular organism *Trypanosoma brucei* is a parasite which attacks the human nervous system causing sleeping sickness.

Sleeping sickness occurs in regions of the world such as Africa where tsetse flies are found.

The diagram below shows how the tsetse flies are involved in the transmission of sleeping sickness.



- (i) Give the meaning of the term parasite.

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1

- (ii) Parasitism is one form of symbiosis.

Name **one** other type of symbiosis.

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1

(iii) The tsetse fly transmits *T. brucei* from one human to another.

Give the term which describes organisms which transfer parasites to hosts.

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1

(b) (i) In an effort to control sleeping sickness in a region of Africa, infertile male tsetse flies were released into wild fly populations.

Suggest how this measure could reduce the number of cases of sleeping sickness in this region.

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2

(ii) The release of infertile male tsetse flies is a form of biological control.

Describe **one** other form of biological control of a pest.

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1

(iii) Identify a possible risk to a food web which could be associated with the use of a biological control method.

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1

4. Flashlight fish, *Photoblepharon*, have organs beneath their eyes containing bacteria which give out light. The fish use the light to attract prey and the bacteria gain nutrients from the fish.

This is an example of

- A altruism
- B mutualism
- C parasitism
- D competition.

5. Oxpeckers are birds which form symbiotic relationships with zebra. The oxpeckers eat parasites which live on zebra skin.

(a) (i) State the meaning of the term symbiosis.

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1

- (ii) Explain the benefits to both the oxpeckers and the zebra of this relationship.

Oxpeckers \_\_\_\_\_

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1

Zebra \_\_\_\_\_

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1

- (iii) Give the term which describes symbiotic relationships that benefit both species.

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1

(b) The zebra skin parasites cannot survive away from their zebra hosts and are transmitted to new hosts when zebra come into direct contact with each other.

(i) Explain why parasites cannot survive without their host.

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1

(ii) Other than by direct contact, describe **one** way in which a parasite can be transmitted to a new host.

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1

6.

Adult beef tapeworms live in the intestine of humans. Segments of the adult worm are released in the faeces. Embryos that develop from them remain viable for five months. The embryos may be eaten by cattle and develop in their muscle tissue.

Which row in the table below identifies the roles of the human, tapeworm embryo and cattle?

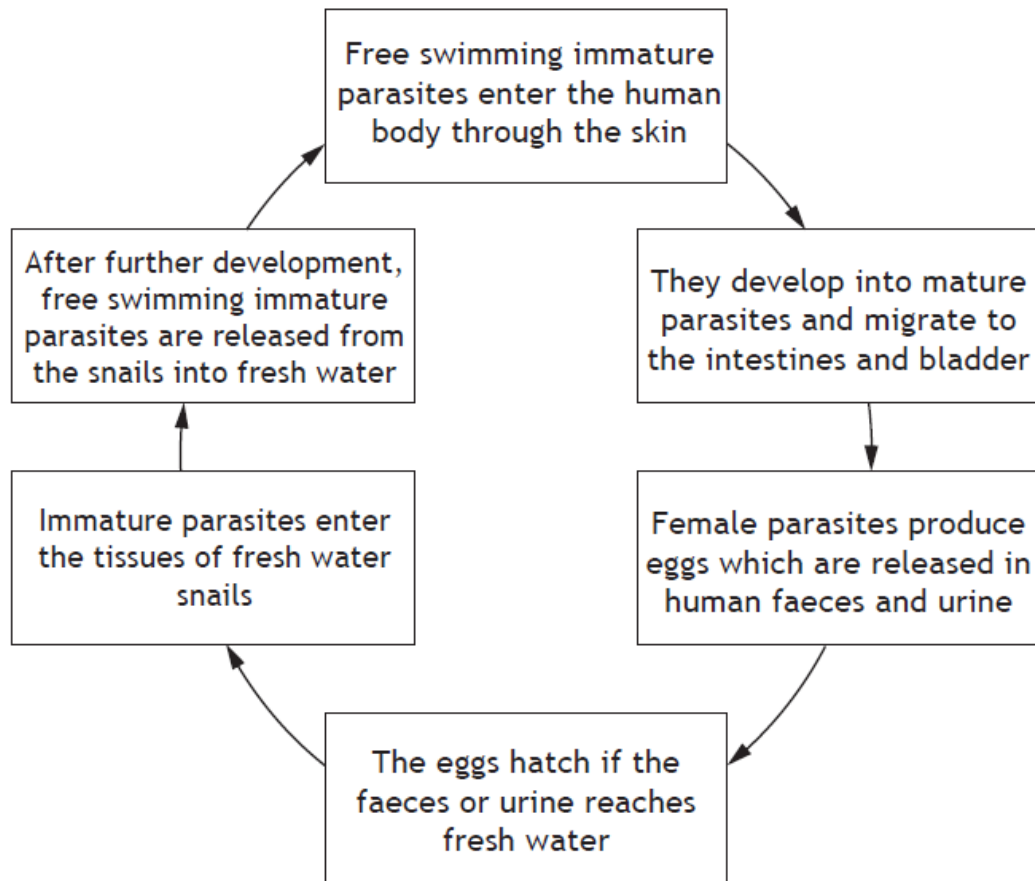
|   | <i>Role</i>    |                        |                |
|---|----------------|------------------------|----------------|
|   | <i>human</i>   | <i>tapeworm embryo</i> | <i>cattle</i>  |
| A | host           | resistant stage        | secondary host |
| B | host           | vector                 | secondary host |
| C | secondary host | vector                 | host           |
| D | secondary host | resistant stage        | vector         |

7.

The parasite *Schistosoma mansoni* causes the condition schistosomiasis in humans.

The condition is common in tropical regions where the parasite is often present in fresh water. Humans can be infected if they enter water containing the parasite.

The life cycle of *Schistosoma mansoni* is shown below.



(a) Explain why *Schistosoma mansoni* is described as a parasite. 1

\_\_\_\_\_

(b) Identify the secondary host and suggest a benefit to *Schistosoma mansoni* of including a secondary host in its life cycle. 2

Secondary host \_\_\_\_\_

Benefit \_\_\_\_\_

\_\_\_\_\_

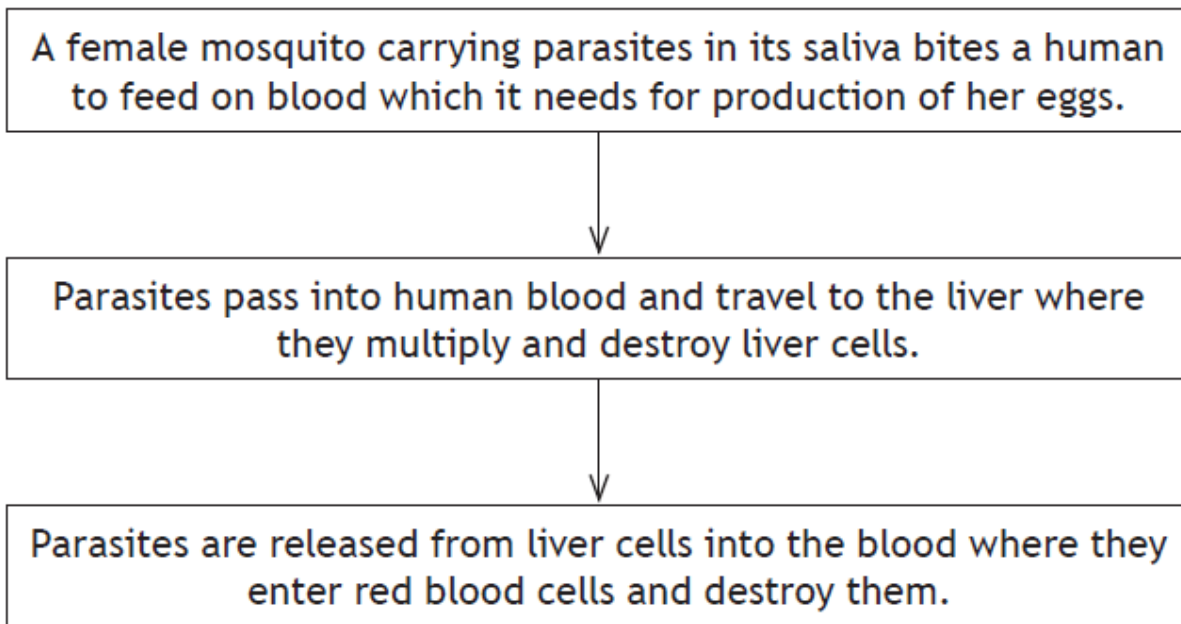
(c) Describe one measure which could be adopted to reduce the number of cases of schistosomiasis.

1

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8.

Malaria is a disease in humans caused by a parasite which is transmitted from human to human by mosquitoes. The stages of infection in humans are shown in the flow diagram below.



(a) (i) Identify the vector in this parasitic relationship.

1

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(ii) Give a reason why only female mosquitoes transmit the malaria parasite.

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(b) Explain the effect of a parasitic relationship on the host.

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(c) Two methods used to control the spread of malaria are described below.

Method 1 – mosquito repellent applied to the skin.

Method 2 – anti-malarial drugs that kill the parasite.

Choose one of these methods and explain how it can reduce the number of cases of malaria.

1

Method \_\_\_\_\_

Explanation \_\_\_\_\_

\_\_\_\_\_

9.

The following statements describe symbiotic relationships between organisms.

- 1 Mistletoe plants absorb nutrients from apple trees on which they grow.
- 2 Egyptian Plover birds clean the teeth of Nile crocodiles and feed on the debris they remove.
- 3 Tapeworms live in the small intestine of pigs and absorb some of their nutrients.

Which of these relationships can be described as parasitic?

- A 2 only
- B 3 only
- C 1 and 2 only
- D 1 and 3 only