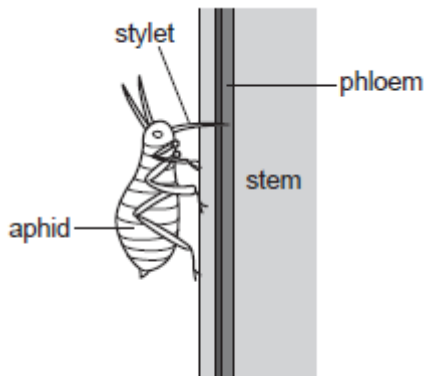


**AS Level Biology A**  
**H020/02** Depth in biology

**Question Set 13**

1. Aphids are small insects that feed on the sap that is translocated through the plant in the phloem. These insects insert their fine mouthparts, stylets, into phloem tissue and allow the sap to flow out of the phloem.

One method of collecting sap is to allow the aphid to feed as shown in Fig. 1.



**Fig. 1**

The aphid is then anaesthetised and the stylet is cut off close to the aphid's head. The sap can then be collected and analysed.

A researcher analysed the sap collected and the results are shown in Table 1.

Substance tested for	Conclusion
glucose	negative
starch	negative
sucrose	positive

**Table 1**

- (a) (i) Phloem tissue is made up of different cell types.

Identify the type of phloem cell into which the stylet is inserted to obtain the sap. **[1]**

**Sieve tube elements**

- (ii) Separate samples of the sap were tested for the presence of glucose, starch and sucrose.

Using Table 1, complete the following passage, using the most appropriate terms.

In order to test for the presence of glucose, ..... **Benedict's** .....  
..... **reagent** ..... was added to the sap sample and boiled. The final  
colour was..... **blue** ..... and so it was possible to arrive at the  
conclusion shown in Table 1.

When iodine solution was added to the sap sample, the final colour was  
..... **yellow-brown** ..... . To test for the presence of sucrose, the  
sample was first boiled with ..... After the rest of the test had been completed, the  
colour of the mixture indicated that sucrose was present in the sample.

[4]

- (b) Sucrose is carried in phloem sap from source to sink.

- (i) Explain why starch is not transported in the sap.  
**It is insoluble in water.**

[1]

- (ii) Suggest why sucrose is a more suitable transport molecule than glucose.  
**Sucrose is a more efficient energy storage molecule. It is a disaccharide and non-reducing sugar so is less reactive and no intermediate reactions with other molecules occur.**

[1]

**Total Marks for Question Set 13: 7**

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