**Topic 9.2 (AHL) – Phloem Transport**

**Understandings, Applications and Skills** (This is what you will be assessed on)

|  |  |  |
| --- | --- | --- |
|  | **Statement** | **Guidance** |
| 9.2.U1 | Plants transport organic compounds from sources to sinks. |  |
| 9.2.U2 | Incompressibility of water allows transport along hydrostatic pressure gradients. |  |
| 9.2.U3 | Active transport is used to load organic compounds into phloem sieve tubes at the source. |  |
| 9.2.U4 | High concentrations of solutes in the phloem at the source lead to water uptake by osmosis. |  |
| 9.2.U5 | Raised hydrostatic pressure causes the contents of the phloem to flow towards sinks. |  |
| 9.2.A1 | Structure–function relationships of phloem sieve tubes. |  |
| 9.2.S1 | Identification of xylem and phloem in microscope images of stem and root. |  |
| 9.2.S2 | Analysis of data from experiments measuring phloem transport rates using aphid stylets and radioactively-labelled carbon dioxide. |  |

**Recommended resources:**

Mrs. Tyler’s Website

Bioninja

Allott, Andrew. *Biology: Course Companion.* S.l.: Oxford UP, 2014. Print.

1. State the function of phloem.
2. Distinguish between source and sink in terms of molecules in plants.
3. The phloem is made up primarily of sieve elements and companion cells.
	1. Explain the structure and function of sieve element cells.
	2. Explain the structure and function of companion cells.
4. Label and Annotate the diagram below to explain how the structure of the phloem is related to its function.



1. Define active translocation.
2. Complete the table below to show the sources and sinks of sugars and amino acids carried in plant sap.

|  |  |  |
| --- | --- | --- |
|  | **Sugars** | **Amino Acids** |
| Sources |  |  |
| Sinks |  |  |

1. Explain (in detail) how each of the following two things help sucrose move through the plant from source to sink.
	1. Active Transport
	2. Hydrostatic Pressure
2. Outline how sucrose is loaded at the source. [Use the terms osmosis and water potential/hydrostatic pressure in your answer].
3. Outline how sucrose is unloaded at the sink. [Use the terms osmosis and water potential/hydrostatic pressure in your answer].
4. Draw and annotate a picture that shows the process of translocation. (Include sink/root, sieve plate, companion cells, source/leaf, phloem, xylem.
5. Summarize the 7 steps of translocation theory.
6. Outline how aphids are used to measure sap flow rate.