PROVINCE OF KWAZULU-NATAL
DEPARTMENT OF EDUCATION

SUPPORT DOCUMENT

GRADE 10

LIFE SCIENCES

Term 2 Revision 2020 – Activity Document

Support and Transport in Plants

with TERM 2 REVISION –Solutions Document

Grade: 10

Topic: SUPPORT AND TRANSPORT IN PLANTS

A. TOPIC PLAN

Lesson	Aspect	Activities
1	• The need for support and transport systems in plants. • Distribution of different tissues in roots and stems	Tool 1 Activity 1
2	• The tissues responsible for transport and support • Structure of cells in different tissues.	Tool 2 Activity 2
3	• Secondary growth of the stem	 Activity 3
4	• Relationship between water loss and leaf structure • Factors that affect the rate of transpiration.	Activity 4
5	• Wilting and guttation • Intake of water and minerals into the xylem in roots: ✓ Transport of water and minerals to leaves ✓ Translocation of manufactured food from leaves to other parts of plants	Activity 5

TERMINOLOGY

The following terms should be covered in this topic:

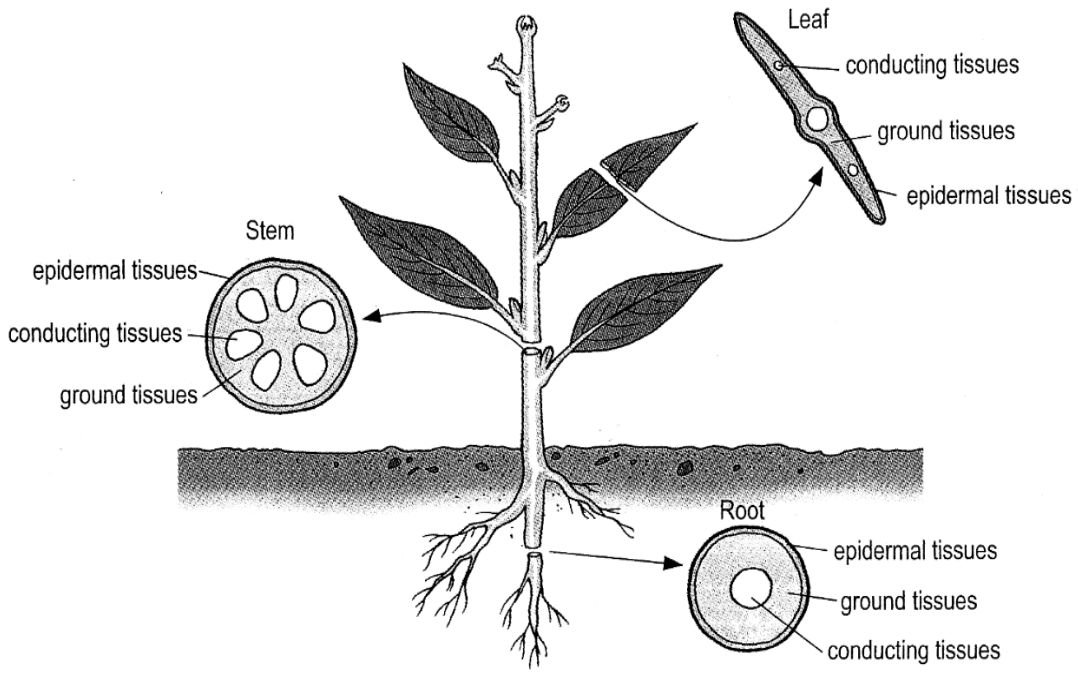
Organ	Wilting	Gaseous exchange	Stomata
Photosynthesis	Guttation	Transpiration	Guard cells
Xylem	phloem		

TEACHING TOOLS

Teaching Tool 1

1. The diagram below shows the cross section of the leaf, stem and root of a plant.

The three groups of tissues in root, stem and leaf



1.1 State TWO functions of the root. (2)
1.2 State TWO functions of the stem. (2)
1.3 Name the TWO conducting tissues found in the plant. (2)

Teaching Tool 2

2 The following diagrams show the distribution of different tissues in the root.

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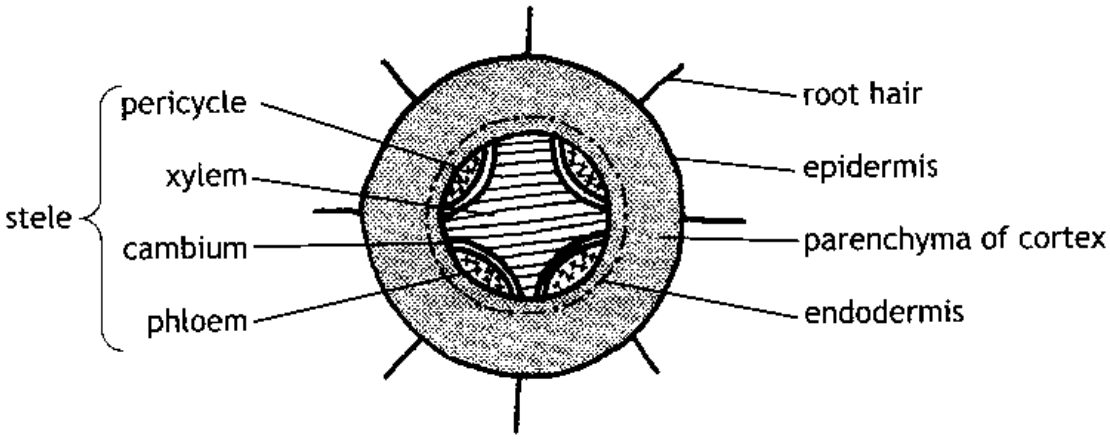

Transverse section of a young dicotyledonous root, in plan

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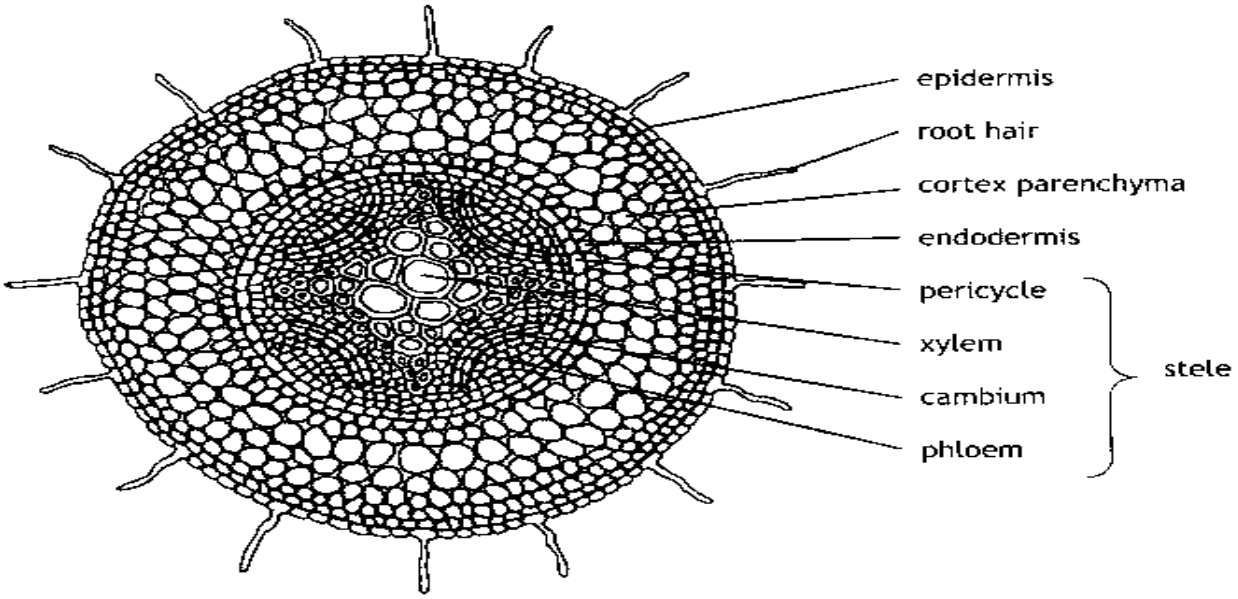
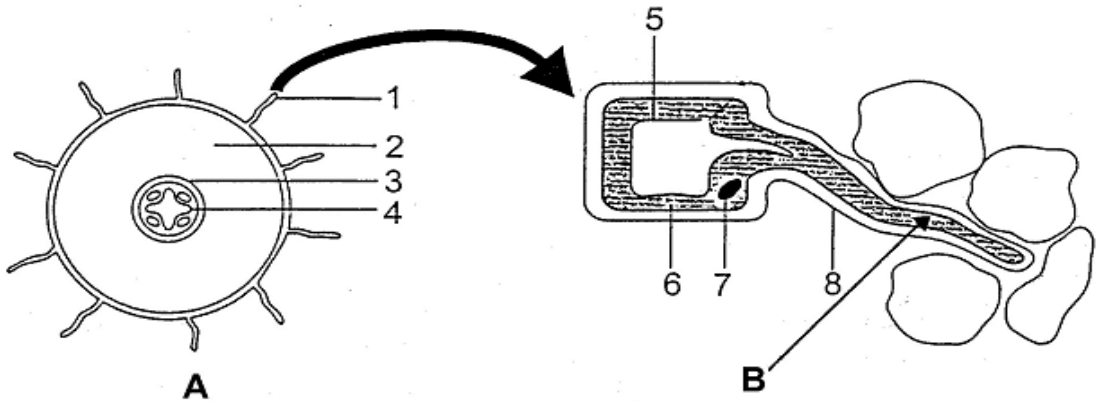


T/S of a young dicotyledonous root, in detail

2.1. List TWO ways a root can be identified from its internal structure. (2)
2.2 Name the finger-like outgrowth of the epidermis of roots. (1)
2.3 Name four tissues that make up the stele of the root. (4)

Activity 1

1. The diagrams below represent a plant organ.

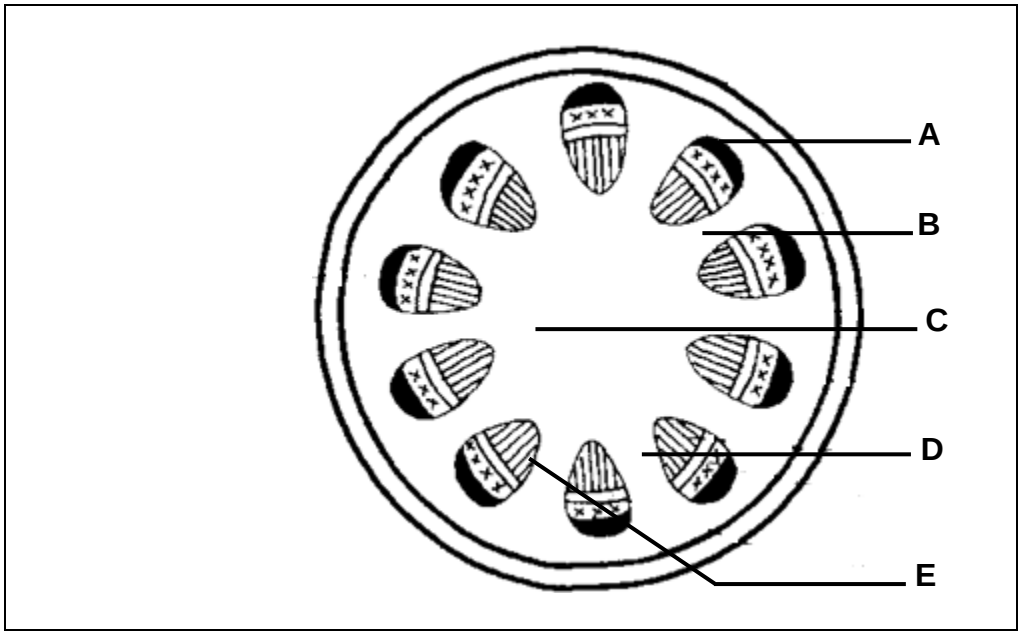


1.1 Which organ is represented by cross-section **A**? (1)
1.2 Identify parts numbered **2**, **5** and **8**. (3)
1.3 Give ONE function of each of the labels **3** and **4**. (2)
1.4 Explain TWO structural characteristics which allow effective functioning of part numbered **4**. (4)

(10)

Activity 2

2. The following diagram represents the internal structure of stem



2.1 Supply labels for parts **A**, **D** and **E**. (3)
2.2 State TWO waysthe above diagram represents the stem and not the root. (2)
2.3 State the function of **B** and **C**. (2)
(7)

Activity 3

3 The diagram below represents secondary thickening in a dicot stem
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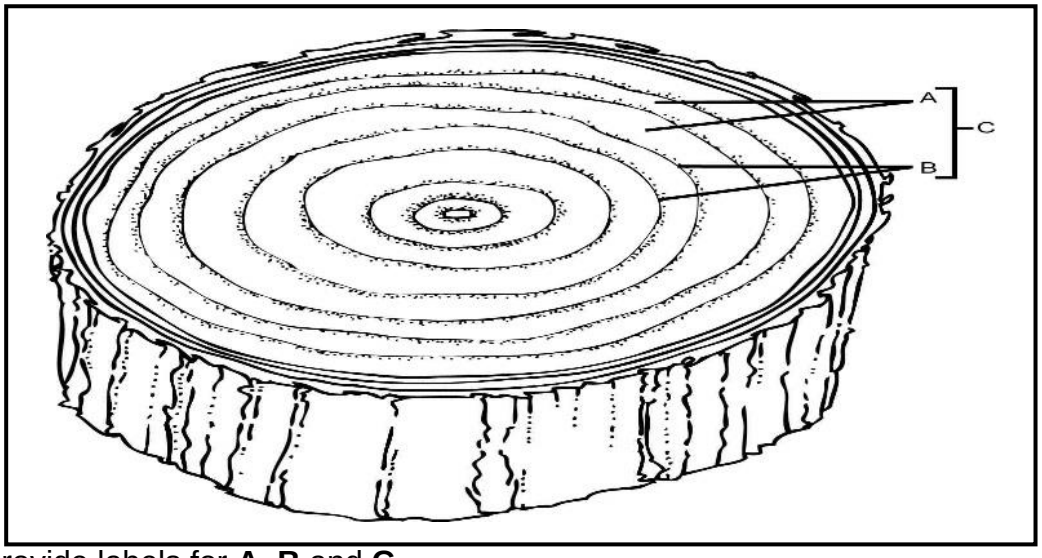


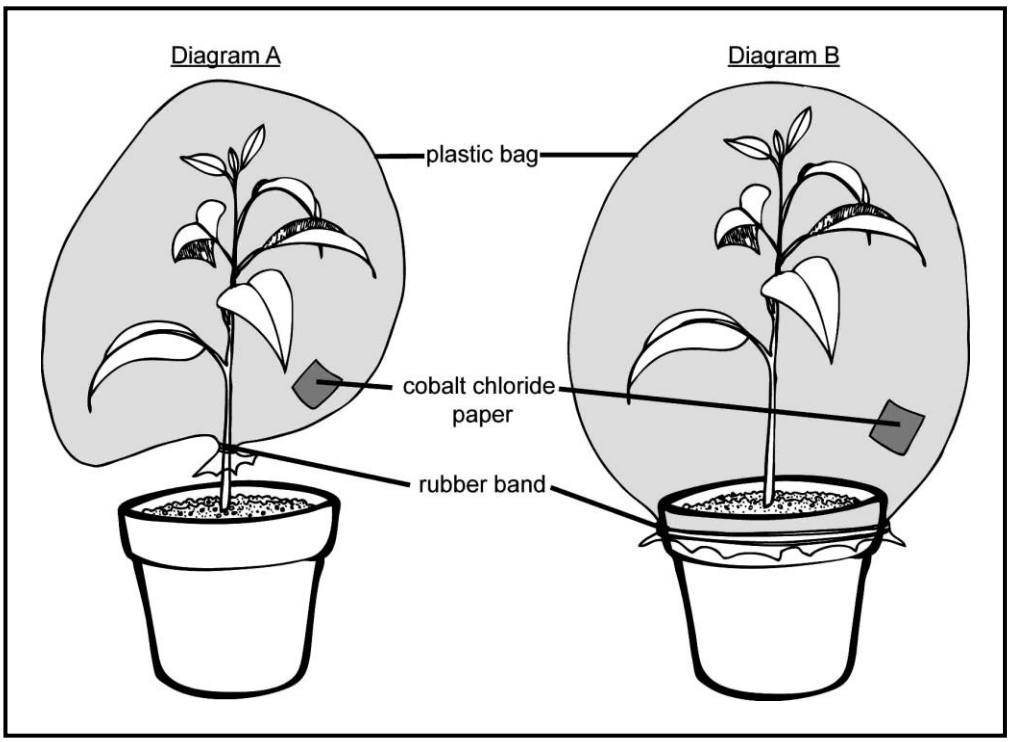
3.1 Provide labels for **A**, **B** and **C**. (3)

3.2 Explain the structural difference between the cells of A and B. (4)
3.3 How old is this tree? (2)
3.4 If a person were to carve his or her initials on the trunk of a tree one metre above the ground, how high above the ground would the initials be years later? Explain. (3)
3.5 Secondary growth has economic importance. Explain this statement. (3)

(15)

Activity 4

Examine diagram A and diagram B.



4.1 Why does the blue cobalt chloride paper turn pink in both diagram A and diagram B? (2)
4.2 In which diagram will the blue cobalt chloride paper turn pink the quickest? (1)
4.3 Explain your answer in QUESTION 4.2. (2)
4.4 What is the aim of the experiment in **diagram A**? (2)
4.5 How should a control for the experiment be set up? (2)
4.6 If cobalt chloride paper were not used, what would be observed after the experiment had been set up for a while? (1)
4.7 Name FOUR external factors that affect the rate of transpiration. (4)

(14)

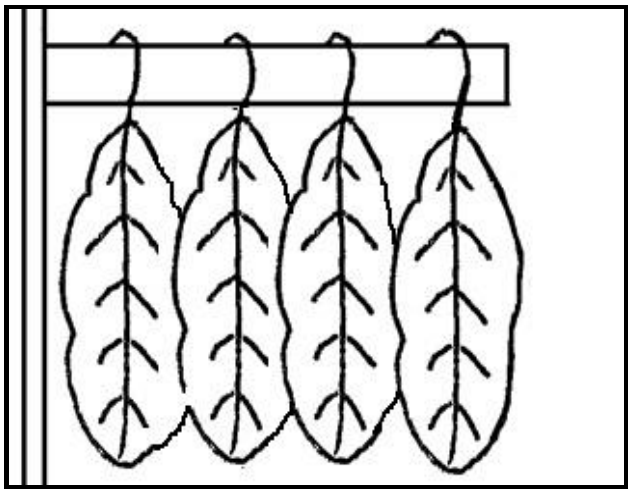
Activity 5

The wilting of leaves

Method

Use four fresh leaves of equal size from the same mesophytic plant and treat them a follows:

Leaf 1: covered both surfaces with petroleum jelly
Leaf 2: covered only upper surface with petroleum jelly
Leaf 3: covered only lower surface with petroleum jelly
Leaf 4: do NOT treated with petroleum jelly



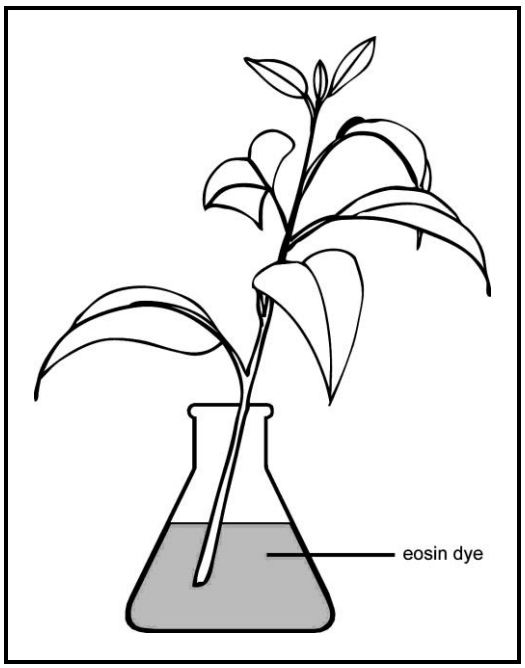
1 2 3 4

5.1 Write a hypothesis for this investigation (2)

5.2 What is the function of the petroleum jelly in this investigation? (3)
5.3 List your observations of this investigation (4)
5.4 Which one of these leaves will serve as a control? (1)
5.5 Mention THREE ways to improve the investigation to get more accurate results (3)
5.6 Write a conclusion for your investigation. (2)
(15)

Activity 6

6 Examine the diagram below and answer the questions that follow:



6.1 What is the aim of this experiment? (2)
6.2 Give the results of the experiment. (1)
6.3 How would the results compare if the leaves were cut off the plant? (2)
[5]

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Support and Transport in Plants

March 2020

TEACHING TOOL 1

1.

1.1. -To anchor the plant firmly to the soil✓
-Absorb water and mineral salts from the soil✓ (2)

1.2. They store food and water✓
They transport food from the leaves to the roots✓
The hold the flowers in a favourable position for pollination✓
(Any two) (2)

1.3. Xylem✓
phloem✓ (2)

[6]

TEACHING TOOL 2

2.

2.1 The xylem and phloem occupy the central stele ✓
Rots hairs are present✓
A clearly defined endodermis is present ✓
Xylem alternate with the phloem ✓ (any 2x1) (2)

2.2. Root hairs✓ (1)

2.3. Pericycle✓
Xylem ✓
Phloem✓
cambium✓ (4)

[7]

Activity 1

1.

1.1 Root✓ (1)

1.2. 2- Parenchyma cortex✓
5- Tonoplast✓
8- Cell wall✓ (3)

1.3 3- Direct water into the xylem of the stem✓
4- Transport water and minerals from the roots to the stem and to the leaves✓/It also gives strength to the plant (2)

1.4. - Cross walls are perforated or completely absent ✓xylem of roots thus forms continuous tubes with xylem of stems and leaves✓
- xylem vessels have no living contents✓ allowing water to flow freely inside✓
- walls of vessels tracheids not completely thickened✓ unthickened portions and pits allow water to move across the roots and stem ✓
(any 2x2) (4)

[10]

Activity 2

2.

2.1	A-epidermis✓	(1)
	B-sclerenchyma cap✓	(1)
	E-xylem✓	(1)
2.2	In stems the arrangement of vascular bundles form a ring while in roots it is in a star shape✓✓.	(2)
2.3	Function of B-support and strengthens the plant✓	(1)
	Function of C- Packaging tissue✓ Stores food✓	(1)
		[7]

Activity 3

3.

3.1.	A: Summer/spring wood (favourable conditions) ✓	(3)
	B: Winter/autumn wood (unfavourable conditions) ✓	
	C: Annual rings ✓	
3.2	A: The cell walls of secondary xylem/lignin are thinner ✓ and the lumen is bigger ✓.	(4)
	B: The cell walls of secondary xylem/lignin are thicker ✓ and the lumen is smaller ✓.	
3.3	Ten years old ✓✓	(2)
3.4	The initials will still be one metre above the ground ✓. As the trunk gets thicker ✓, the tree grows from the apical bud at the tip ✓.	(3)
3.5	Secondary growth produces wood ✓ for furniture ✓ and paper ✓.	(3)
		[15]

Activity 4

4

4.1	Water vapour was released by both plants ✓ via transpiration ✓.	2
4.2	B ✓	1
4.3	The moisture from the soil ✓ will also evaporate ✓.	2
4.4	The aim is to show that transpiration ✓ takes place mainly through the leaves ✓.	2
4.5	It would be set up as in diagram A ✓, except that the leaves of the plant would be removed ✓.	2
4.6	Water droplets would condense on the plastic ✓.	1
4.7	Temperature✓ Light intensity✓ Humidity✓ Wind✓	(4)
		[14]

Activity 5

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5.1.	A waxy layer/vaseline✓ will prevent the loss of water from the leaf✓	(2)
5.2	It prevents the loss of water from the leaf✓ and block the stomata✓ to prevent water loss✓	(3)
5.3	Leaf 1 shows the least amount of wilting✓ Leaf 2 shows wilting and more wilting than leaf A and C✓ Leaf 3 shows wilting but less than leaf B and D✓ Leaf 4 shows the most wilting✓	(4)
5.4	Leaf 4✓	(1)
5.5	Repeat the investigation a number of times✓ Use leaves from the same plant✓ Use the same size leaves✓ Use fresh leaves✓ (any3x1)	(3)
5.6	Since the leaf with Vaseline on both sides took the longest time to wilt it can be Concluded that a thick cuticle✓ and few/blocked stoma on both sides✓ will prevent the loss of water from the leaf.	(2)
		(15)

Activity 6

6.1.	To determine the path ✓ of water ✓	(2)
6.2	Xylem tissue stains red ✓.	(1)
6.3	Water would not be drawn up the plant (✓✓). OR Xylem tissue would not stain red (✓✓).	(2)
		[5]