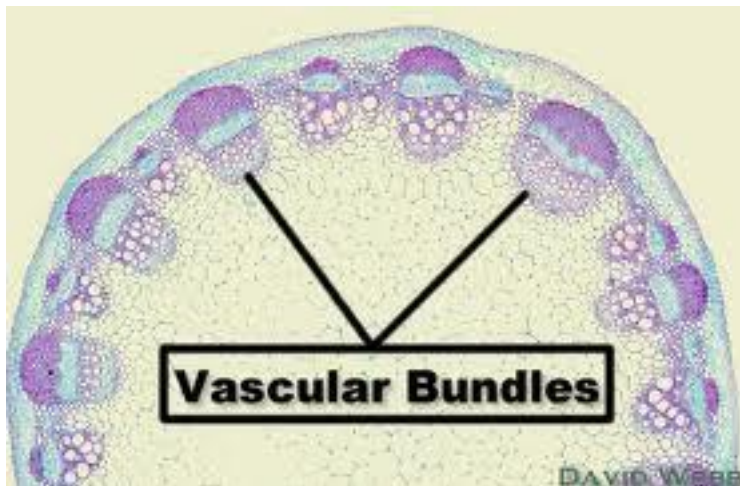


Plant Experiments:

1. To prepare and examine a transverse section of a dicot stem.

- Busy Lizzy, Begonia or Sunflowers.
- Cut out a short section of the stem between 2 nodes using a backed blade.
- Wet the blade *to reduce friction* and cut thin sections of the stem *cut away to prevent injury*. Cut at right angles to the stem and avoid wedge shaped specimen. **or** place into a slit that is cut in some elder pit.
- Store cut sections in a clock glass or petri dish of water *to prevent dehydration*.
- Transfer a thin section onto a microscope slide using a paint brush or forceps. Add a drop of water and lower coverslip onto the specimen at an angle *to prevent air bubbles obscuring the view*.
- Optional to stain with iodine, always use lowest objective lens first.



2. To Investigate the effect of IAA growth regulator on plant tissue.

• Serial Dilution

- Prepare stock solution by dissolving 100mg IAA in 2-3ml ethanol. When fully dissolved make up to 1L with distilled water.
- Label 8 petri dishes A-H.
- Pipette 9ml of distilled water into dish B-H. Pipette 10ml of stock solution into dish A. Then pipette 1ml of this stock solution into dish B and 1 ml of dish B into dish C. When you reach dish G remove 1ml and dispose in sink, leave dish H as control with 9ml water. **This produces a range of IAA solutions each one is 1/10 the concentration of the previous.**

Dish	A	B	C	D	E	F	G	H
IAA conc. (mg/l)	100	10	1	0.1	0.01	0.001	0.0001	0

• Investigate

- Photocopy a sheet of graph paper onto acetate sheets *to measure length of roots and shoots.*
- Place a circular acetate grid in lid of each petri dish
- Place 5 cress seeds evenly spaced on same line in grid
- Cover with filter paper
- Add 1/4 IAA solution of each to the filter paper
- Cover with cotton wool layers and add remaining IAA solution to each corresponding wool covered dish.
- Tape shut. Cut a slot in a large plastic bottle and stand the 8 petri dishes on their edge *to ensure root grows down and shoot grows up.*

- Incubate dishes at 25 degrees for 2-3 days.

Examine

- The roots and shoots in the control dish grew due to IAA produced by seeds themselves.
- The roots in dishes with high concentration didn't grow much (or at all) where as the shoots in these dishes grew more.
- The shoots in dishes with low concentration didn't grow much (or at all) where as the roots grew more.
- %increase= $\frac{\text{average length}-\text{average length of control}}{\text{average length of control}}$

$$\times \frac{100}{1}$$

3. To investigate the effect of water, oxygen and temperature on germination.

- Label 4 test tubes, A, B, C and D.

- Add water to B and D, leave tube A dry and fill C with boiled cooled water..
- Place 6 radish seeds in each tube.
- Place tube B in the fridge to create an environment of low temperature.
- Remember to put boiled water in C and cover with a layer of oil to create anaerobic conditions.
- Place A , D and C in an incubator at 25 degrees.
- D is the control.

4. Use starch agar plates to show digestive activity during germination

- Soak 4 broad bean seeds in water for 1-2 days.
- Boil 2 of these to kill them and wash the bench with disinfectant.
- Use a backed blade to split each bean in half. Cut away from you to prevent injury.
- Sterilize the half seeds by soaking them in disinfectant for 10 minutes. Wash this off then with water.
- Flame a forceps and allow it to cool to sterilize it.
- Using the forceps barely open the petri dish to prevent the entry of unwanted micro organisms.
- Label Dish A and place 4 unboiled half seeds face down on the starch agar.
- Label dish B and place 4 boiled half seeds face down on the starch agar.
- Place the covered dishes in a warm place for 2 days. Remove the seeds and add dilute iodine solution in their place.
- In dish A, the iodine is clear, this means that the starch has been digested by the seeds to maltose using the enzyme amylase.
- In B, the iodine turns blue black meaning starch is still present and has not been digested by the boiled, dead seeds. The seeds are dead and the enzyme amylase no longer works, hence the starch remains as is.

