CLASS X/ BIOLOGY
CONTROL AND COORDINATION

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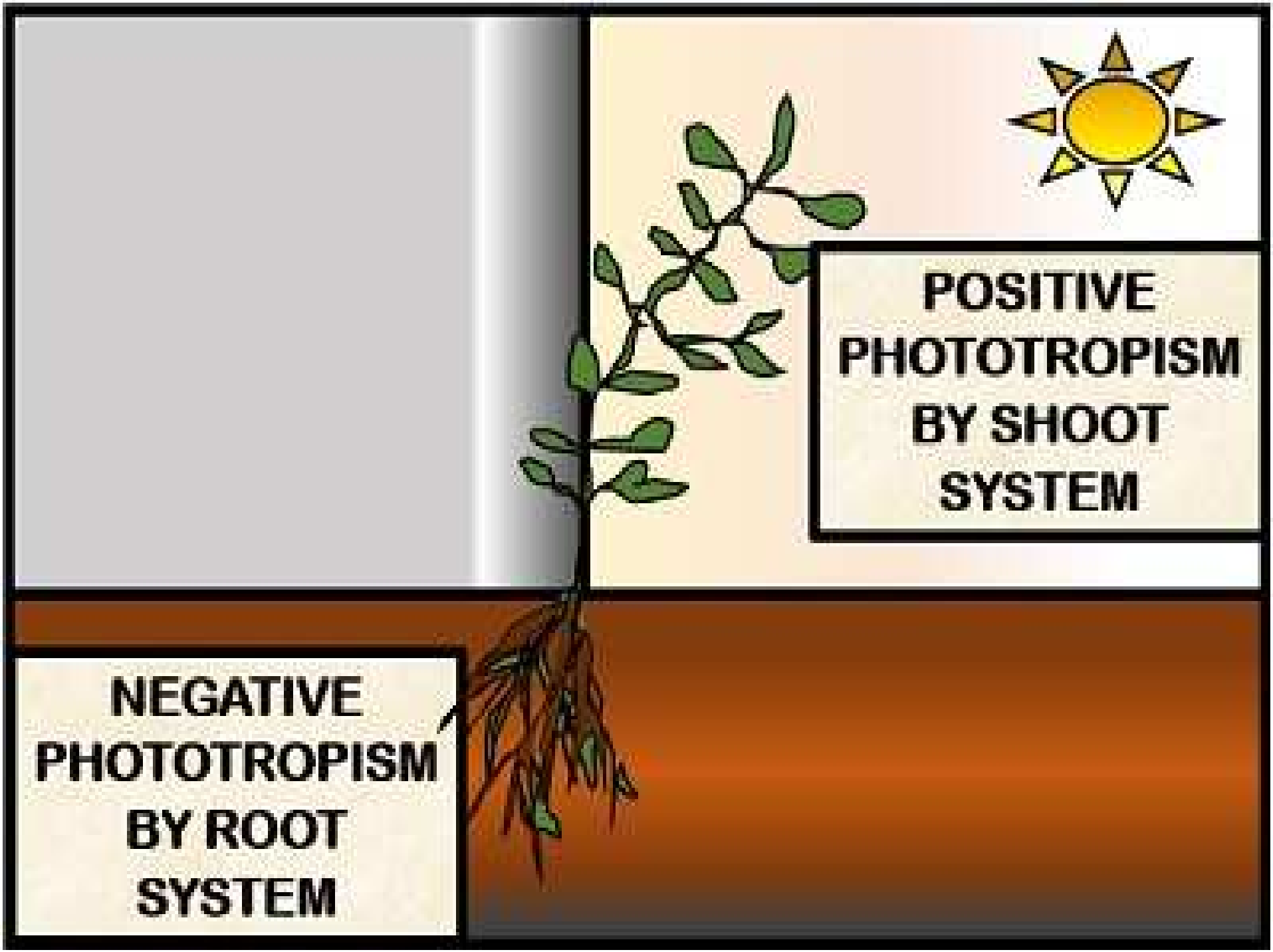
PLANT MOVEMENTS

IT IS OF 2 TYPES :

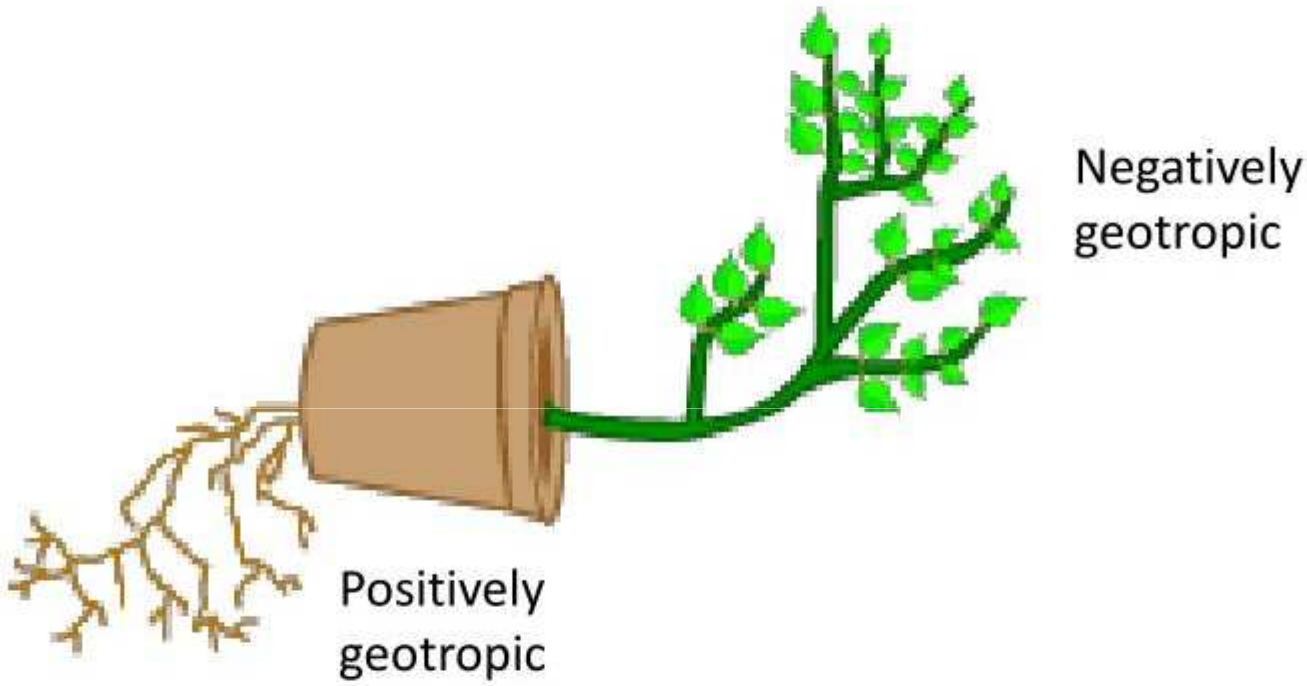
1. TROPIC MOVEMENTS
2. NASTIC MOVEMENTS

TROPIC MOVEMENTS : Tropic movements are caused by external stimulus coming from one direction only. such movements are called tropic movements and the phenomenon is known as Tropism.

Tropism is a directional of a part of a plant. The growth of a plant part is response to a stimulus can be towards the stimulus as positive stimulus and away from the stimulus is known as negative stimulus.


POSITIVE PHOTOTROPISM BY SHOOT SYSTEM
NEGATIVE PHOTOTROPISM BY ROOT SYSTEM

Geotropism



Response of a to grow toward or away from gravity.

TROPIC MOVEMENTS

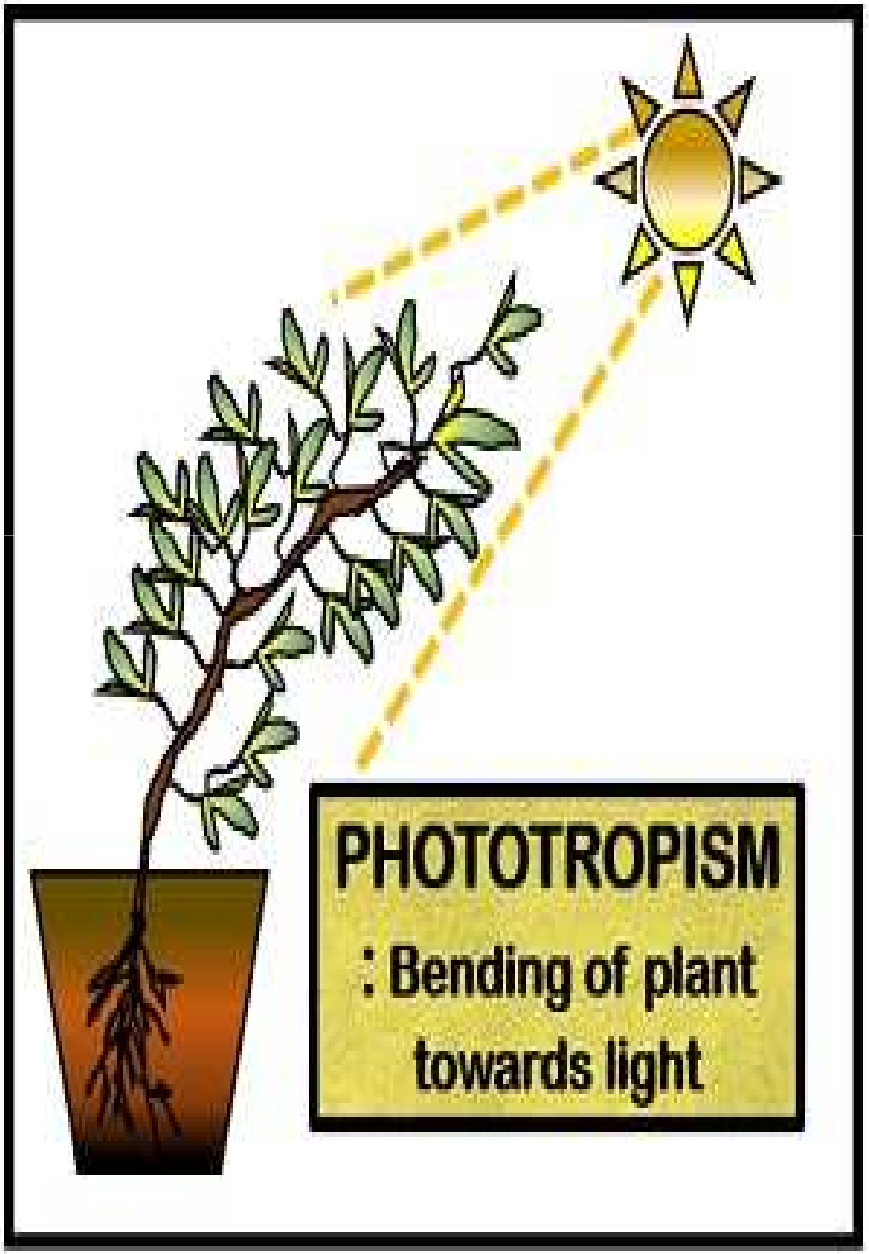
Depending upon the nature of the stimulus there are various type of tropic movements.

1. **Geotropism** – In response to gravity
2. **Phototropism** – In response to light
3. **Hydrotropism** – In response to water.
4. **Chemotropism** – In response to chemicals
5. **Thigmotropism** – In response to touch

Describe an activity to demonstrate Phototropism

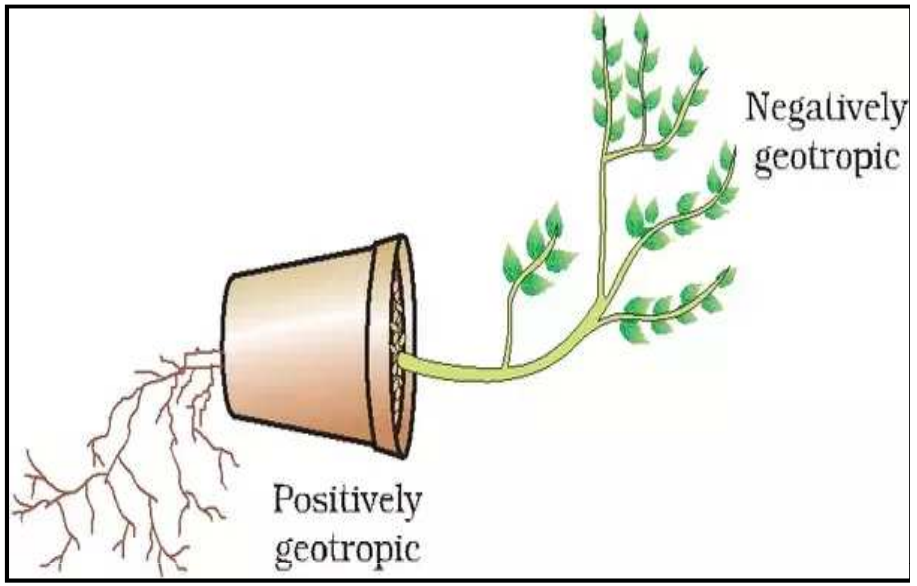
1. We require to keep a potted plant growing in a transparent jar.
2. Then we shall place this potted plant in the open so that it receive lights.
3. We will observe the plant grows straight towards the sunlight and the root grows straight in the downwards direction.
4. Then we require to keep this potted plant inside a dark chamber in a small opening on one side for light to come in.
5. We will observe the stem of the plant bends towards the opening through which light in coming.

   These observation show the stem of a plant response to light and bends towards it that is they are positively phototropic and as the roots a moving away from the light so they are negatively phototropic.



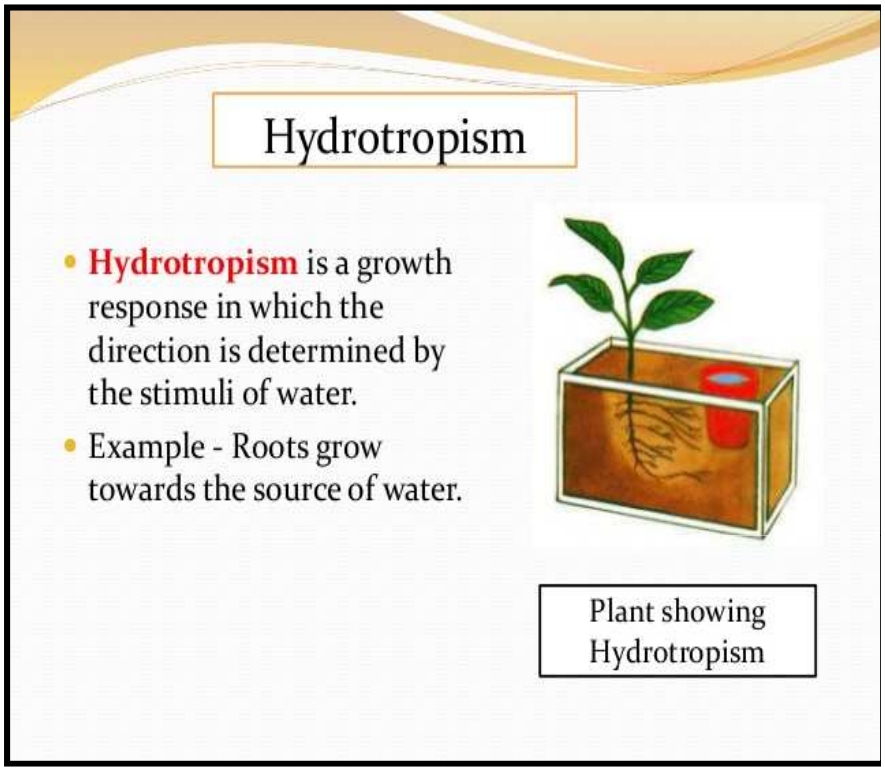
Describe an activity to demonstrate Geotropism

1. We require to keep a potted plant growing in a transparent jar.
2. We will observe that root grows straight in the downwards direction.
3. Now we require to keep this potted plant horizontally so that both root and stem parallel to the ground.
4. After a few days we will observe that the stems of the plants bend upwards away from the earth and the roots of the plants bends down towards the earth. This observation shows that the stem of the plants negative geotropism and roots of the plants shows positive geotropism.



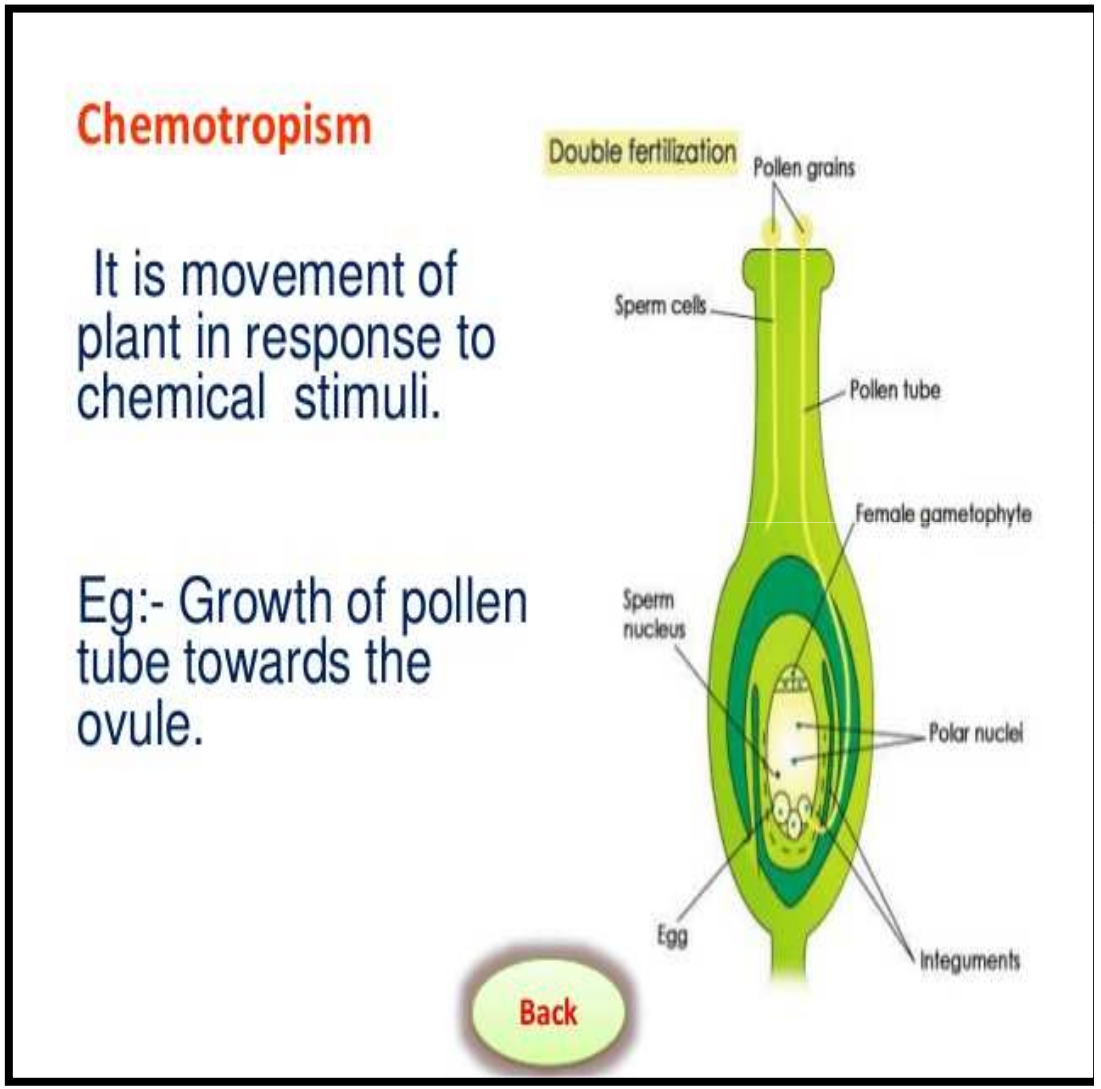
Describe an activity to demonstrate Hydrotropism

1. We will fit a porous pot in one corner of the square metal box filled with a soil.
2. On the other corner we will plant a seedling.
3. We will fill the pot with water.
4. We will make apparatus stand at room temperature for some time.
5. Then we need to observe the movement of the seedling root.
6. We will observe that root has started moving towards the porous water pot. Thus root shows positive hydrotropism and shoot show negative hydrotropism.



Describe an activity to demonstrate Chemotropism

1. The mature stigma secretes a sugary substance that acts as stimulus for pollen grains.
2. The pollen grains response to the stimulus by growing a pollen tube in the downward direction in the style of the carpel and then reach the ovule in the ovary of the flower.
3. Thus, growth of pollen tube thorough the style towards the embryo sac shows chemotropism.



Describe an activity to demonstrate Thigmotropism

1. Some plants like bitter gourd, bottle gourd, pea plant etc have weak stems and cannot stand upright on their own.
2. They posses climbing organs called tendrils.
3. The tendrils are thin thread like structure on the stem or leaves of the climbing plants.
4. This tendrils are sensitive to touch of other objects as they have sense cells.
5. As the tendrils come in contact with the support they being to circle around that object clings to it.
6. This winding movement of tendril of climbing plants shows thigmotropism.

NASTIC MOVEMENTS

- Nastic movements are paratonic curvature movements due to turgor movements in the cells which are elastic and paramanent .
- These movement are due to the stimulus of light, temperature and contact but the movement are not determined by the direction of stimuli.
- It affect all the plants equally from whichever direction the stimulus is applied.
- Nastic movements are mostly exhibited the flat organs of the plants such as leaves and petals of the flowers.

Nastic Movements are for two types

1. **Seismonastic Movement**
2. **Nyctinastic Movement**

1. Seismonastic Movement:

Leaf of touch-me-not plant droop rapidly when touched. It is due to turgidity of cells at the base. This movement takes place in response to touch. Here touch stimulus is diffused affecting the entire leaf.

2. Nyctinastic Movement

The diurnal movements of leaves and flowers of some species which take up sleeping position at night are called nyctinastic movement.

Depending upon the stimulus they may be

- **Photonastic**
- **Thermonastic**

➢ Photonastic:

When the movement is induced by the change in light intensity it is called photonastic.

Some flowers are open during the day and close at night

E.g.: Oxalis, Portulaca

Some flowers are close in day and open at night

E.g.: Nicotina, Oenothera

➢Thermonastic

The movement due to change in temperature is called thermonastic.

E.g.: Tulip and Crocus

NOTE: Tropism are growth movement but all Nastic movements are not growth movements