Plant Responses

6.L.2.2 Explain how plants respond to external stimuli (including dormancy and forms of tropism) to enhance survival in an environment.

What are plant responses?

A _____ is anything in the environment that causes a response in an organism.

A stimulus may come from outside (external) or inside (internal) the organism.

All living organisms, including plants, respond to _____.

Tropisms

Plants can change their growth in response to their environment. These changes are called _____.

Positive tropism – a plant growing _____ a stimulus.

Negative tropism – a plant growing _____ from a stimulus.

Plants can exhibit the following kinds of tropisms:

- Phototropism - the way a plant grows or bends in response to _____.
- Geotropism - the way a plant grows or bends in response to _____.
- Hydrotropism - the way a plant grows or bends in response to _____.
- Thigmotropism - the way a plant grows or bends in response to _____.

Phototropism

_____ phototropism - a plant growing or bending toward the light.

When a plant responds to light, the cells on the side of the plant opposite the light get longer than the cells facing the light. Because of this uneven growth, the plant bends toward the light.

Geotropism

The downward growth of plant roots is a positive response to _____ or positive geotropism.

A stem growing upward is a negative response to gravity or negative geotropism.

Hydrotropism

Hydrotropism Turning or bending towards _____, as roots.

The most common example is that of plant roots growing in humid air bending toward a higher relative humidity level.

Thigmotropism

Thigmotropism - is the directional response of a plant organ to _____ or physical contact with a solid object.

The plant's stem bends and twists around any object it touches.

Plant Hormones

_____ control the changes in growth that result from tropisms and affect other plant growth.

Ethylene:

Many plants produce the hormone _____ gas and release it into the air around them. Ethylene is produced in cells of ripening fruit, which stimulates the ripening process.

Auxin:

A plant growth-regulating substance found in plants that stimulates cell elongation in plant tissues. It promotes _____ formation and bud growth. It also causes plant leaves and stems to exhibit positive phototropisms.

Gibberellins:

_____ are plant growth substances involved in promotion of stem elongation, mobilization of food reserves in seeds and other processes. Its absence results in the dwarfism of some plant varieties.

Cytokinins:

_____ are a class of plant growth substances (plant hormones) active in promoting cell division, and are also involved in cell growth.

Abscisic Acid:

The substance that keeps seeds from _____ and buds from developing during the winter. It also causes the stomata to close and helps plants respond to water loss on hot summer days.

Photoperiods

Some plant species produce flowers at specific times during the year. Ex.) Sunflowers bloom in the summer, and cherry trees flower in the spring.

Photoperiodism is the effect of _____ and _____ length on plant flowering. Some plants are long day, requiring 14 - 16 hours of sunlight per day to flower. Others are short day requiring only 8 - 9 hours. Others are day neutral and unaffected by day length.

Darkness and Flowers

_____**-day plant** is a plant that generally requires short nights—less than 10 to 12 hours of darkness—to begin the flowering process.
Ex.) Spinach, lettuce, and beets

_____**-day plant** is a plant that generally requires long nights—12 or more hours of darkness—to begin the flowering process.
Ex.) Poinsettias, strawberries, and ragweed

Day-Neutral Plants

_____**-Neutral Plant** is a plant that doesn't require a specific photoperiod and can begin the flowering process over a range of night lengths.