**Topic 9.4: Reproduction in Plants**

**Essential Idea: Reproduction in flowering plants is influenced by the biotic and abiotic environments.**

**Statements & Objectives:**

**9.4.U1 Flowering involves a change in gene expression in the shoot apex.​**

Compare the vegetative and reproductive phases of the angiospermatophyta life cycle.

(**Compare** Give an account of the similarities and differences between two (or more) items or situations, referring to both (all) of them throughout.)

State that flowers are produced from a shoot apical meristem.

(**State** Give a specific name, value or other brief answer without explanation or calculation.)

State two abiotic factors that may trigger flowering.

(**State** Give a specific name, value or other brief answer without explanation or calculation.)

Compare the timing of flowering in short-day plants and long-day plants.

(**Compare** Give an account of the similarities and differences between two (or more) items or situations, referring to both (all) of them throughout.)

Outline the process by which changes in gene expression trigger flowering.

(**Outline** Give a brief account or summary.)

**9.4.U2 The switch to flowering is a response to the length of light and dark periods in many plants.​**

State the role of the pigment phytochrome.

(**State** Give a specific name, value or other brief answer without explanation or calculation.)

Describe the conversions between the two forms of phytochrome.

(**Describe** Give a detailed account or picture of a situation, event, pattern or process.)

Describe role of phytochrome in controlling flowering in long and short day plants.

(**Describe** Give a detailed account or picture of a situation, event, pattern or process.)

**9.4.U3 Success in plant reproduction depends on pollination, fertilization and seed dispersal.**

​Define pollination, fertilization and seed dispersal.

(**Define** Give the precise meaning of a word, phrase, concept or physical quantity.)

State the changes to the ovule and ovary that result from fertilization.

(**State** Give a specific name, value or other brief answer without explanation or calculation.)

List mechanisms of seed dispersal.

(**List** Give a sequence of brief answers with no explanation)

**9.4.U4 Most flowering plants use mutualistic relationships with pollinators in sexual reproduction.​**

Define mutualism.​

(**Define** Give the precise meaning of a word, phrase, concept or physical quantity.)

Explain an example of mutualism between a flowering plant and its pollinator.

(**Explain** Give a detailed account including reasons or causes.)

**9.4.A1 Methods used to induce short-day plants to flower out of season.**

State how plants can be manipulated to force flowering out of season.

(**State** Give a specific name, value or other brief answer without explanation or calculation.)

**​9.4.S1 Drawing internal structure of seeds.**

Draw and label the structure of seeds, including:

* Embryo root
* Embryo shoot
* Cotyledons
* Testa
* Micropyle
* Hilum

**(Draw**: Represent by means of a labeled, accurate diagram or graph, using a pencil. A ruler (straight edge) should be used for straight lines. Diagrams should be drawn to scale. Graphs should have points correctly plotted(if appropriate) and joined in a smooth curve. )

**(Label** Add title, labels or brief explanation(s) to a diagram or graph.)

State the function of the different parts of the seed. ​

(**State** Give a specific name, value or other brief answer without explanation or calculation.)

**9.4.S2 Drawing of half-views of animal-pollinated flowers.**

Draw and label an animal pollinated flower, including:

* Nectar-secreting glands
* Petals
* Sepals
* Anthers
* Filaments
* Carpel
* Stigma
* Style
* Ovary
* Ovule

**(Draw**: Represent by means of a labeled, accurate diagram or graph, using a pencil. A ruler (straight edge) should be used for straight lines. Diagrams should be drawn to scale. Graphs should have points correctly plotted (if appropriate) and joined in a smooth curve. )

**(Label** Add title, labels or brief explanation(s) to a diagram or graph.)

State the function of the different parts of the animal-pollinated flower. ​

(**State** Give a specific name, value or other brief answer without explanation or calculation.)

**9.4.S3 Design of experiments to test hypothesis about factors affecting germination.​**

Define germination.

(**Define** Give the precise meaning of a word, phrase, concept or physical quantity.)

Outline why water, oxygen and warmth are required for germination.

(**Outline** Give a brief account or summary.)

Outline the role of gibberellin during germination.

(**Outline** Give a brief account or summary.)

Write five example problem questions for experiments that could test factors affecting germination.

**9.4.NOS Paradigm shift-more than 85% of the world’s 250,000 species of flowering plant depend on pollinators for reproduction. This knowledge has led to protecting entire ecosystems rather than individual species.**

Contrast traditional conservation efforts with newer strategies of conservation.

(**Contrast** Give an account of the differences between two (or more) items or situations, referring to both (all) of them throughout)

**Key Terms**

Meristem

​secondary growth

​hormones

​receptors

​indeterminate growth

gravitropism

​microarrays

​IAA

​in vitro

apical bud

​terminal bud

​auxin

​nastic responses

​apical meristem

​PIN-transport proteins

undifferentiated

​gibberellin

​genomics

lateral bud

​micropropagation

​phototropism

​efflux pumps

​lateral meristems

​cytokinin

​dicotyledonous

​positive tropism

cambium

​growth regulators

​tropism

totipotent

​mitosis​

explant tissue​

​leaf primordial

​negative tropism

abscission

ethylene

expansin