Life Sciences 11 The Gymnosperms Name:

**Objectives -** By the end of the lesson you should be able to:

* Compare and contrast bryophytes, pteridophytes and gymnosperms
* Describe the lifecycle of a gymnosperm
* Give examples of gymnosperms



**Evolution of Seeded Vascular Plants**

* When the Mesozoic era got under way, it ushered in a time of geological and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ instability
* Continental drift formed the “super continent” called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* \_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ conditions put survival pressure on the \_\_\_\_\_\_\_\_\_\_ dependent non-seeded vascular plants
* The key to survival was surviving \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

In plants, this resulted in three significant advances:

* **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** reduced even more and becomes protected and completely dependent upon sporophyte
* **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** evolved into sexual pollen for air distribution of the gametes
* Development of an \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ protecting mechanism **(\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_)** that also could more effectively distribute their species

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: seeded vascular plants**

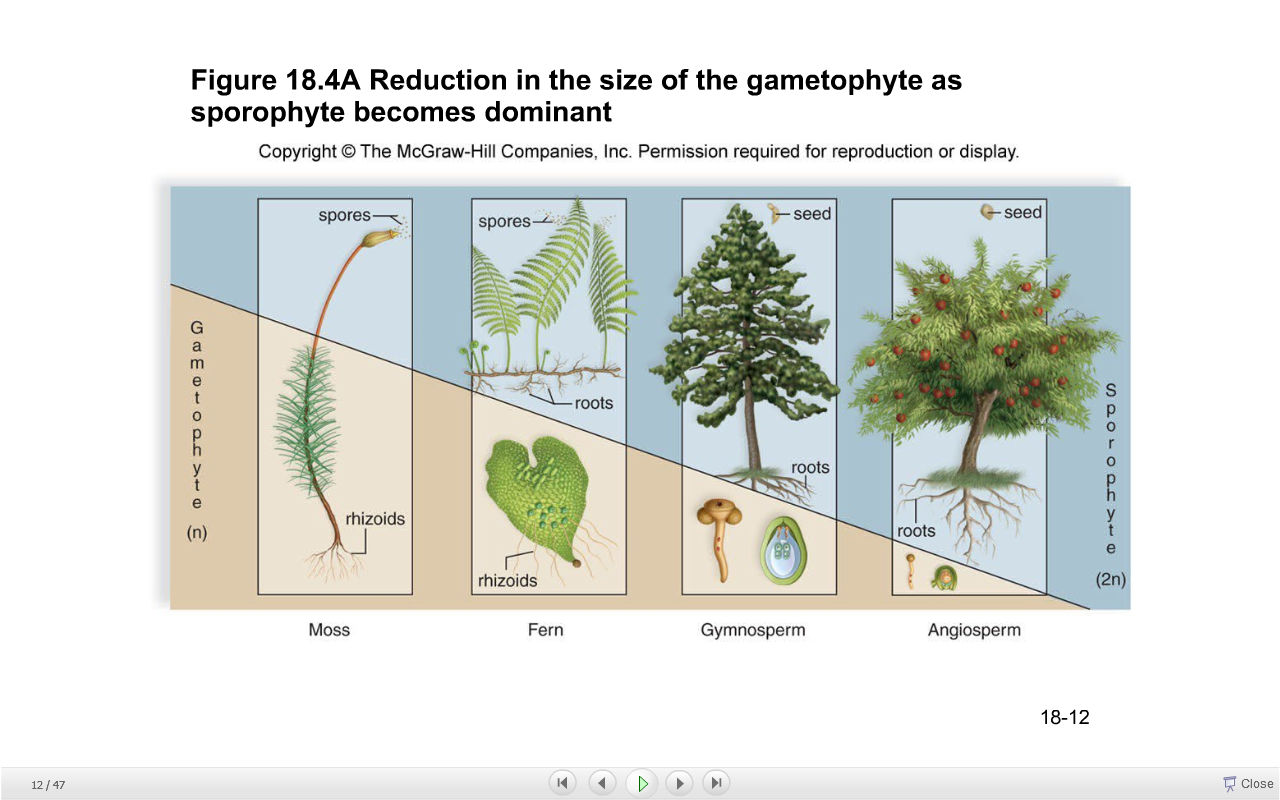
* First evolved in Paleozoic era.
* Changes in the Mesozoic made this their era
* Dominant during this time were the \_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Conifers**

* These are our familiar \_\_\_\_\_\_\_\_\_\_\_ trees and shrubs
* They lived in the \_\_\_\_\_\_\_\_\_\_\_\_ continental interiors
* When the climate changed at the end of the Mesozoic, the conifers were pre-adapted and flourished

Ex. Juniper, Pines etc…

**Gymnosperms - .**

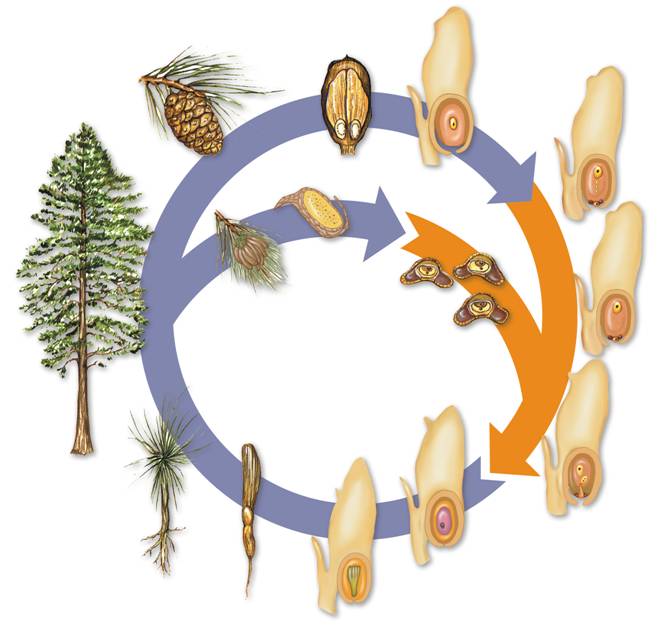
* They are still the dominant plant in the \_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_
* They are the dominant biome in Canada called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ or Taiga coniferous forests
* The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_has become very \_\_\_\_\_\_\_\_\_\_\_\_\_\_
* It is utilizing all of the advantages so far evolved

**Seeded Vascular Plants**

* + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
    - male vs. female gametophytes
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
    - naked seeds (no fruit)
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
    - contain male gametophyte
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
    - coniferous trees you are familiar with are diploid
    - reduced (microscopic) gametophyte
    - reduction of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ protects delicate egg & embryo in protective sporophyte
      * protected from \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ & \_\_\_\_\_\_\_\_\_ radiation

**Advances**

* \_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_ are seen for the first time which allows the gymnosperms to live in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ conditions
* They no longer need \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ for reproduction
* Leaves are modified into \_\_\_\_\_\_\_\_\_\_\_\_ (decrease water loss)
* The resins inside the needles act as a natural \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* As a result, they became (and are) the dominant tree of the north temperate zones

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**Life Cycle**



**Male Cones**

* The male gametophyte is the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ formed by meiosis inside the male cone
* The male cone is small and short lived, dropping off the tree after a few weeks

**Female Cone**

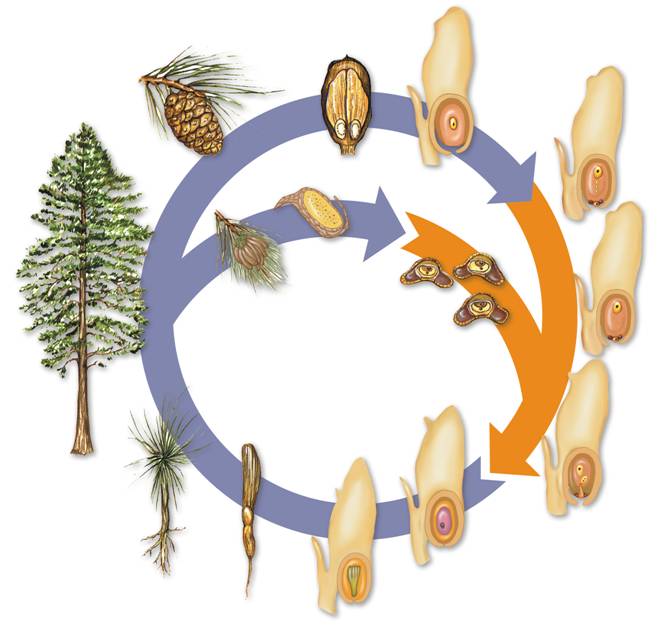
* The female gametophyte is the \_\_\_\_\_\_\_\_\_\_\_ formed by meiosis inside the female cone
* After \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the female cone houses the seeds until next spring
* The female cone is \_\_\_\_\_\_\_\_\_ and long \_\_\_\_\_\_\_\_\_, dropping off the tree after 2 years!

**Pollen**

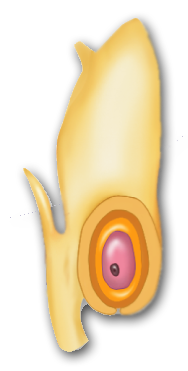
* Pollen eliminated the requirement for \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ for fertilization
  + spread by \_\_\_\_\_\_\_\_\_\_\_ & \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Pollination**

* The gymnosperm life cycle typically takes \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to complete.
* The cycle begins as male cones release pollen grains.
* Pollen grains are carried by the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and reach female cones.



* If pollen grains land on and enter an ovule, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ occurs.
* A **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** grows out of each pollen grain and releases sperm near an egg.



* Fertilization produces a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ which develops into a new

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ .

* This zygote grows into an \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and is encased within what will develop into a seed.



* The seed is then dispersed by wind.
* When conditions are favorable, the seed \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_and its embryo grows into a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**Can you …**

**… compare and contrast bryophytes, pteridophytes and gymnosperms?**

**… describe the lifecycle of a gymnosperm?**

**… give examples of gymnosperms?**