**Vascular Plants (vs. Non-Vascular)**

**Non-vascular Plants**

* Cannot transport foot or water between plant parts
* Transport of fluid is through simple absorption or osmosis
* Must live in moist environments; need water for reproduction
* Typically very short and low to the ground for constant water supply

**Vascular Plants**

* Contain a vascular system allowing for transportation of nutrients / water throughout the plant, similar to blood vessels
* Typically grow taller than non-vascular plants (complete with stems, larger leaves) because water and nutrients can be conducted upwards

**Vascular Tissues in Plants**

* Instead of arteries, veins and capillaries, plants have two types of vascular tissue in stems:
  + **Xylem** 🡪 transports water and dissolved minerals
  + **Phloem** 🡪 transports sugars and proteins (food!) through stem
* **Vascular Cambium** 🡪 layers of cells between xylem and phloem that are able to divide
* Vascular cambium forms a continuous cylindrical layer inside the stem that can reproduce
* Vascular cambium cells divide to form new xylem cells towards the inside of the stem and new phloem toward the outside of the stem
* Form tree rings

**Structure of a Flower (in Angiosperms)**

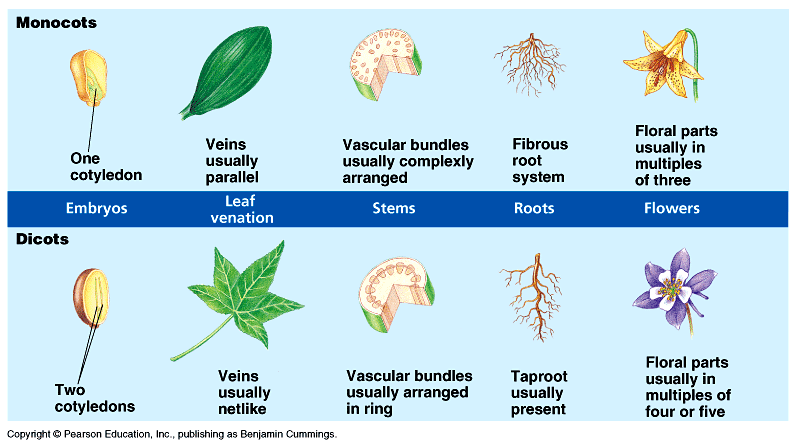
1. **Pistil**: female reproductive structure
   1. **Stigma**: sticky tip; traps pollen
   2. **Style**: slender tube; transports pollen from stigma to ovary
   3. **Ovary**: contains ovules; ovary develops into fruit
   4. **Ovule**: contains egg cell which develops into a seed when fertilized
2. **Stamen**: male reproductive structure
   1. **Filament**: thin stalk; supports anther
   2. **Anther**: knob-like structure; produces pollen
   3. **Pollen**: contains microscopic cells that become sperm cells
3. **Sepals**: encloses & protects flower before it blooms
4. **Petals**: usually colorful & scented; attracts pollinators

**Cross-Pollination**

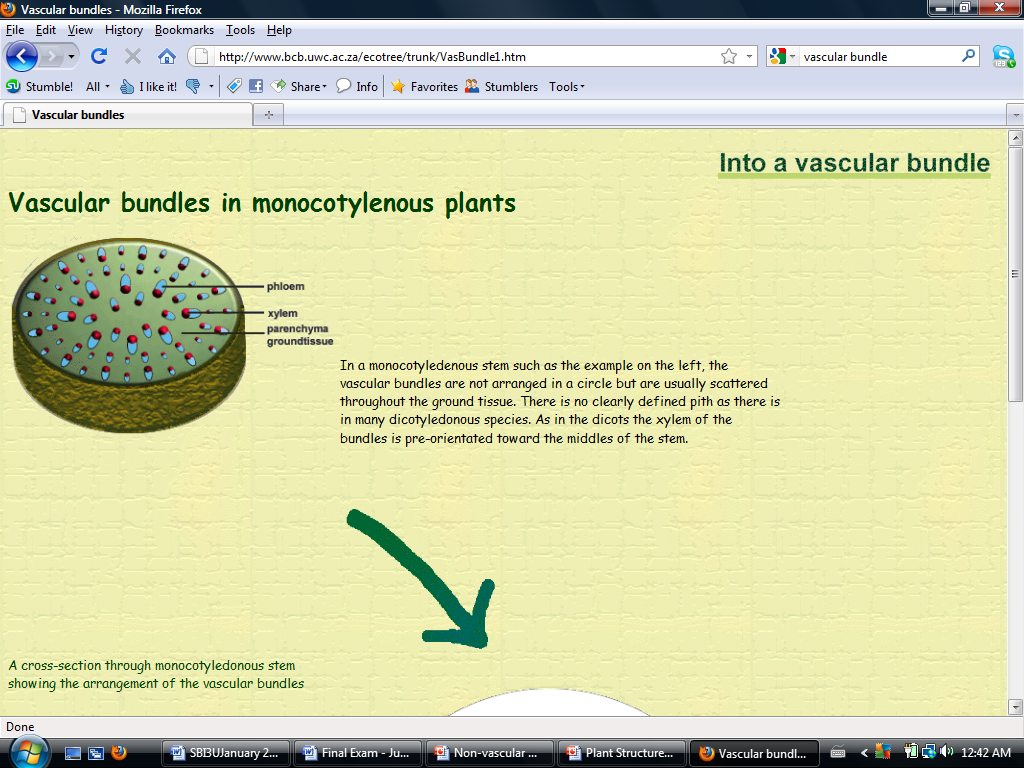
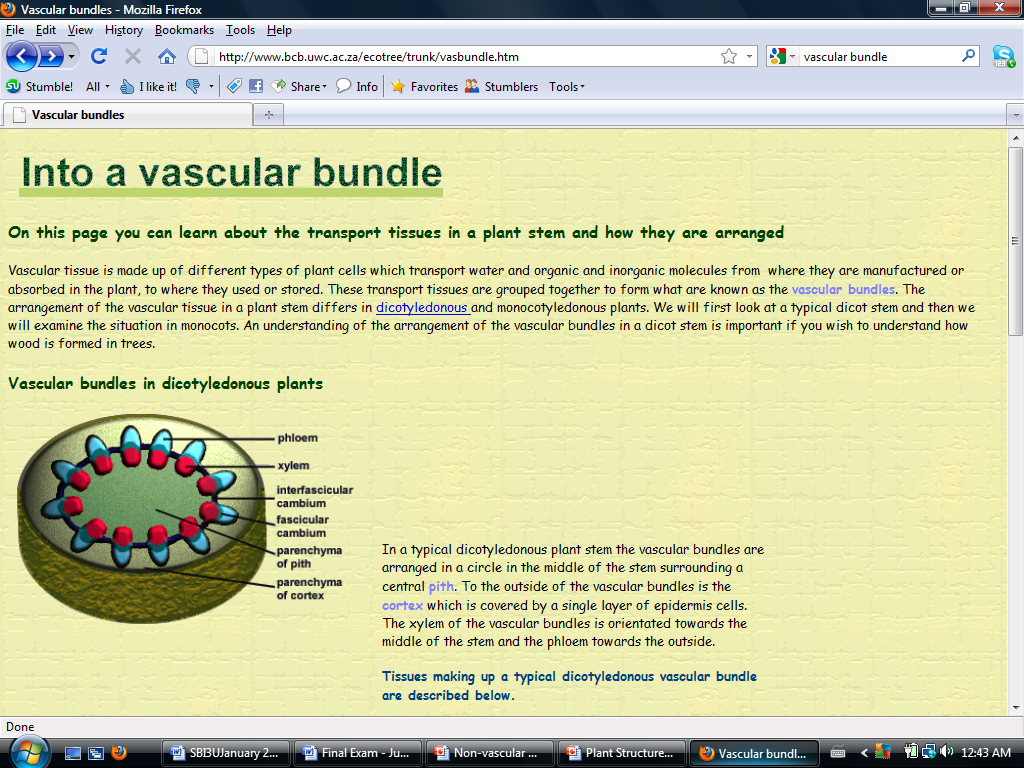
* How does **pollination** happen?
  + Pollen from an anther is caught by the stigma, travels through style to the ovules in the ovary.
* What is the result of pollination?
  + A Fruit: An ovary containing seeds.

**Breaking it Down Further**

**Monocots vs. Dicots**



|  |  |
| --- | --- |
| **Monocot** | **Dicot** |
| * Vascular bundles are not arranged in a circle, but are usually scattered throughout the ground tissue. There is no clearly defined pith as there is in many dicot species. * The xylem orientated towards the middle of the stem and the phloem towards the outside. | * Vascular bundles are arranged in a circle in the middle of the stem surrounding a central **pith**. To the outside of the vascular bundles is the **cortex** which is covered by a single layer of epidermis cells. * The xylem orientated towards the middle of the stem and the phloem towards the outside. |

**Plant Hormones**

* Plant cells can produce **hormones**: which are chemical messengers that travel throughout the plant causing other cells called **target cells** to respond.
* In plants, hormones control:
* Plant growth & development
  1. When trees to drop their leaves.
  2. When to start new growth.
  3. When to cause fruit to ripen.
  4. When to cause flowers to bloom.
  5. When to cause seeds to sprout.
* Plant responses to environment

**Tropisms**

**Tropism**: the way a plant grows in response to stimuli in the environment.

* + **Phototropism**: growth response to light

**Positive**: Plants bend towards light **Negative**: Plants bend away from light

* + **Thigmotropism**: growth response to touch
  + Ex. vines grow up around trees, ticklish plant closes when leaves are touched

**Key Words: Vascular Plants (vs. Non-vascular)**

* Non-vascular tissue
* Vascular tissue
* Xylem
* Phloem
* Vascular cambium
* Monocot
* Dicot
* Pistil
* Stigma
* Style
* Ovary
* Ovule
* Stamen
* Filament
* Anther
* Pollen
* Sepal
* Petal
* Pollination
* Cotyledon
* Hormones
* Target cells
* Tropism
* Phototropism (positive and negative)
* Thigmotropism