

- c. Reproduction in Pines: As indicated in the reading, **draw a simple pine life cycle** in the space on the next page. Be sure to include the terms egg, embryo, fertilization, megaspore, microscope, gametophyte, sporophyte, meiosis, mitosis, and pollen. Use this website to get you started:
<http://www.exploringnature.org/db/detail.php?dbID=32&detID=1895>

- d. Observe the pine cones on display. Are pine cones haploid or diploid?
- e. Are male or female pine cones larger?
- f. View the slide of the pollen (male) pine cone cross section.
- i. Can you find the microscopes on the slide?
 - ii. Are microscopes haploid or diploid?
 - iii. What process do microscopes undergo to form pollen grains?

- iv. Can you find pollen grains on the slide?

- v. Use the space below to draw what you observed under the microscope.

- g. View the slide of the seed (female) pine cone cross section.
 - i. Can you find the megaspores on the slide?

 - ii. Are megaspores haploid or diploid?

 - iii. What process do megaspores undergo to form the egg or ovule?

 - iv. Can you find the egg on the slide?

 - v. Is the tissue surrounding the egg haploid or diploid?

 - vi. Once the egg is fertilized what structure will form?

vii. Use the space below to draw what you observed under the microscope.

h. View the pine seeds on display

i. Are the seeds haploid or diploid?

ii. How will the seeds be dispersed through the environment?

iii. What cell division process will the seeds undergo to create a new pine tree?

3. Angiosperms

a. As indicated in the reading, **draw a simple angiosperm life cycle** in the space below. Be sure to include the terms egg, embryo, fertilization, megaspore, microscope, gametophyte, sporophyte, meiosis, mitosis, and pollen. Use this website to get you started:

<http://www.sumanasinc.com/webcontent/animations/content/angiosperm.html>

- b. Use the flower model to identify the different structures.
- i. Collectively, the male flower parts are called the _____.
 - ii. Collectively, the female flower parts are called the _____.
 - iii. Use the table below to describe the function of each flower part and if it is male, female, or neither.

Flower structure	Function	Male/Female/Neither
Anther		
Filament		
Stigma		
Style		
Ovary		
Petal		
Sepals		

- c. Dissect the live flower. Start with the outside (sepals, petals) and work your way in. Identify each structure as you dissect the flower.
- i. How many petals does the flower have?
 - ii. Is the flower a monocot or a eudicot? What characteristic did you use to determine?
 - iii. Once you dissect the flower, dispose of the flower parts. You do not have to cut into the ovary or the anther as indicated on the website.
- d. View the slide of the lily mature female gametophyte.
- i. Can you locate the egg?
 - ii. Is the egg haploid or diploid?
 - iii. What type of cell underwent mitosis to create the egg?

- f. View the slide of the lily pollen grains.
 - i. How many cells are held within a single pollen grain?
 - ii. Use the space below to draw what you observed under the microscope.

- g. Skip the slide of germinated pollen. That slide is not available in the lab.
- h. Skip the slide of the lily developing embryo. It is not available in the lab.
- i. Skip the slide of the *Capsella* embryo, both early and mature embryo. These slides are not available in the lab.
- j. Although there is not a live bean seed available, please view the preserved bean seed.
 - i. Is the seed haploid or diploid?

 - ii. How many cotyledons does the bean seed have?

 - iii. Is the bean a monocot or a eudicot?

- k. Although there is not a live corn seed available, please view the preserved corn seed.
 - i. How many cotyledons does the corn seed have?

 - ii. Is the corn a monocot or a eudicot?

iii. What is the function of the endosperm tissue?

- l. Skip over the recently germinated bean and corn plants.
- m. Fruits. There will be several fruit examples available in the lab. They may be different than the ones described on the website. Use the table below to discuss the fruits you view.

Name of fruit	Simple, Aggregate, or Multiple	Dry or fleshy

- 4. Answer the review questions below.
 - a. What does gymnosperm mean?
 - b. What group of gymnosperm plants is the largest?
 - c. What type of spore is used for male reproduction in seed plants?
 - d. Through mitosis, the male spore develops into what structure?
 - e. What type of spore is used for female reproduction in seed plants?
 - f. Through mitosis, the female spore develops into what structure?

- g. What does angiosperm mean?
- h. What structures of the flower are female?
- i. What structures of the flower are male?
- j. What is the function of the petals of the flower?
- k. The process of _____ occurs in the flower anther to create haploid _____ followed by mitosis to create _____.
- l. The process of _____ occurs in the flower ovary to create the haploid _____ followed by mitosis to create the _____ and the $n+n$ _____.
- m. State one difference between monocots and eudicots.
- n. Explain how angiosperms undergo a double fertilization.
- o. What part of the flower develops into a fruit?

- p. How is a simple fruit different from a complex fruit?

- q. Give an example of a fleshy fruit

- r. Give an example of a dry fruit.

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