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Flower structure and reproduction worksheet pdf

Life cycle | Angiosperms | Flowers | Links Life Cycles | Back to Top Animal life cycles, meiosis has been followed immediately by gametogenesis. Gametes are produced directly by meiosis. Male germ cells are sperm. Female sex games are eggs or eggs. The life cycle of the plant has mitosis that occurs in spores, produced by meiosis, which germinate into the gametophyte phase. Gametophyte size ranges from three cells (in pollen) to several million (in a lower plant such as moss). Shifting of generations occurs in plants, where the sporophyte phase is succeeded by the gametophyte phase. The sporophyte phase produces spores through meiosis within a sporangium. The gametophyte phase produces gametes through mitosis within an antheridium (producing sperm) and/or archegonium (producing eggs). Within the plant kingdom the dominance of phases varies. Nonvascular plants, mosses and liverworts, the gametophyte phase has been dominant. Vascular plants show a progression of increasing sporophyte dominance from ferns and fern allies to angiosperms. The above image is reduced from gopher://wiscinfo.wisc.edu:2070/09/image/bot/130/Angiosperm/Angiosperm_Life_cycle. Follow that link to view a larger picture. A chart series is available by clicking the following links: Lifecycle 1 Lifecycle 2 Lifecycle 3. The life cycle of a flowering plant. Images from Purves et al., Life: The Science of Biology, 4th Edition, by Sinauer Associates (www.sinauer.com) and WH Freeman (www.whfreeman.com), are used with permission. Angiosperms | Back to Top Flowering Plants, angiosperms, were the last of the seed plant groups to develop, occurring over 100 million years ago during the middle of the Age of Dinosaurs (late Jurassic). All flowering plants produce flowers and if they are sexually reproductive, they produce a diploid zygote and triploid endosperm. Where did the angiosperms come? This was Darwin's heinous mystery. Clearly angiosperms originate from any group of Mesozoic-aged gymnosperm seed plant... but which one? Click here to view an online lab exercise in phylogeny and try to figure things out! The classic view of flowering plant development suggests early angiosperms were evergreen trees that produced large Magnolia-like flowers. Click here to view an illustration of proposed paths of floral evolution. Flowers | Back to Top Flowers, collections of reproductive and sterile tissue are arranged in a tight whorled array with very short internodes. Sterile parts of flowers are the sepals and petals. When these are similar in size and shape, they are named tepals. Reproductive parts of the flower are stamens (male, collectively called androecium) and carpel (often carpel called pistil, the female part collectively called gynoecium). A picture of a lily. The above image is reduced from Follow that link to see a bigger picture of this flower of *Lilium* (lily). Androecium The individual units of the androecium are the stamens, which consist of a filament supporting the anther. Anther contains four microsporangia within which microspores (pollen) are produced by meiosis. Anther cross section of a *Lilium* flower. The above image is cropped, reduced and noticeable from gopher://wiscinfo.wisc.edu:2070/09/image/bot/130/Angiosperm/Lilium/Adroeicum/Anther_tapetum. Follow the link to view a larger picture. The strain is thought to represent modified sporophylls (leaves with sporangia on their upper surface). Studies by James E. Canright in the 1950s suggested an evolutionary series from primitive angiosperms (like *Austrobaiyea*) who have leafy stamens to others with normal stamens (*Lilium*). Hypotheses evolutionary path for the development of anther. Image from Purves et al., Life: The Science of Biology, 4th Edition, by Sinauer Associates (www.sinauer.com) and WH Freeman (www.whfreeman.com), used with permission. Pollen Pollen grain (from the Greek polyphore for dust or pollen) contains the male gametophyte (microgametophyte) phase of the plant. Pollen grains are produced by meiosis of microspore mother cells located along the inner edge of anthers sacs (microsporangia). The outer part of the pollen is exine, which consists of a complex polysaccharide, sporanopollenin. Inside pollen are two (or no more than three) cells that make up the male gametophyte. The tube cell (also called the tube nucleus) develops into the pollen tube. The germ cell divides with mitosis to produce two sperm. Division of the germ cell may occur before or after pollination. Mature 2-cell stage of a pollen grain. Note the thick sculpted exine around the pollen grains of *Lilium*. The above image is cropped and reduced from gopher://wiscinfo.wisc.edu:2070/09/image/bot/130/Angiosperm/Lilium/Adroeicum/Mature_2-celled_pollen_grains. Gynoecium Gynoecium consists of stigmatization, style, and ovary containing one or more egg dishes. These three structures are often called a whip or carpel. In many plants, the pistillas will merge for all or part of their length. *Lilium* gynoeciology. The above image is reduced and remarked from gopher://wiscinfo.wisc.edu:2070/09/image/bot/130/Angiosperm/Lilium/Flower_dissection/Ovary. Like stamens, the carpel is believed to be a modified leaf. Work of I.W. Bailey and his students pointed to an evolutionary sequence from primitive angiosperms (like *Drimys*) to normal carpels like those of *Lilium*. Hypotheses rose in the development of carpel. Image from Purves et al., Life: The Science of Biology, 4th Edition, by Sinauer Associates (www.sinauer.com) and WH Freeman (www.whfreeman.com), used with permission. The stigma acts as a receptive surface on which pollen lands and its pollen tubes. Corn silk is part stigma, part style. The style serves to shift the stigma away from the ovary. This distance is species specific. The ovary contains one or more egg yolks, which in turn contain a female gametophyte, also called angiosperms like the embryo sac. Some plants, such as cherries, have only a single ovary that produces two ovaries. Only one egg yolk will develop into a seed. Links | Back to Top Text ©1992, 1994, 1997, 1999, 2000, 2001, by MJ Farabee, all rights reserved. Use for educational purposes is encouraged. Back to Table of Contents | FLOWERING PLANT REPRODUCTION: Fertilization and Fruits E-mail: Last modified: The URL of this page is: Flowers are important for the sexual reproduction of plants. They produce male germ cells and female germ cells. These must meet for reproduction to begin, a process called pollination. Name: _____. Angiosperms are types of plants that carry fruits and flowers. Flowers are usually both male and female, and are colorful for attracting insects to help them carry pollen used for sexual reproduction. Not all flowers are colorful, though. These flowers usually use the wind for pollination. Parts of the Flower Vessel are the part of the branch on which a flower is formed. Color vessel (B) brown. Sepals are leaves that surround and protect the flower before it blooms. Color sepals (C) green. Petals are the colorful part of the flower that attracts insects and also other small animals, such as mice, birds and bats. Color the petals (D) a bright color of your choice. All flowering plants have flowers, but some are not brightly colored. The petals of these flowers are reduced or absent and the plant is dependent on the wind or water for pollination. The flower has both male and female reproductive parts. The female reproductive structures are called carpels. In most flowers, carpels are fused together to form a pistil. The pistil has three parts, which can be seen, in the box marked pistade. The stigma at the top is often sticky and is where pollen attaches. Color the stigma (J) purple. The style is the long tube that attaches the stigma to the ovary. Sperm from pollen will travel down this tube to the yolks. The yolks, or eggs, are stored in the ovary until fertilized. Plants can only fertilize eggs of the same species. Specialty chemicals prevent sperm from fertilizing the eggs of flowers that are not the same kind. Color the style (K) red, and the ovary (L) pink. Dye the yolks (O) black. The male reproductive structures are called the stamens. Color the stamens (H) blue. Each balusters consist of an anther (A), which produces pollen, and a filament (F), which supports anther. In the box stamens color anther dark blue, and the filament light blue. Pollen produced by anther is carried by insects or other animals to the pedicel of another flower where it can fertilize the eggs. Plant reproduction Sexual reproduction in plants occurs when pollen from an anther is transferred to the stigma. Plants can fertilize themselves; called self-fertilization. Self-fertilization occurs when pollen from an anther fertilizes the eggs on the same flower. Cross-fertilization occurs when pollen is transferred to the stigmatization of a completely different plant. When the yolks are fertilized, they will develop into seeds. The flower petals of the flower fall off leaving only the ovary behind, which will develop into a fruit. There are many different kinds of fruits, including apples and oranges and peaches. A fruit is any structure that envelops and protects a seed, so fruits are also helicopters and acorns, and bean pods. When you eat a fruit, you are actually eating the ovary of the flower. Question 1. What is an angiosperm? 2. The flower attaches to which part of the plant? 3. Why are flowers brightly colored? 4. Name two mammals that can pollinate a plant. 5. If the petals of a flower are reduced or missing, how is the plant pollinated? 6. The female reproductive structures are called: 7. Name the three parts of the pistade: 8. Where are the yolks stored? 9. Name the two parts of the stamens: 10. Describe sexual reproduction in plants. 11. The ovary develops into what structure? 12. Define fruit. 13. Some flowers are not brightly colored at all, but have a very pungent smell that smells like rotting meat. How do you think these flowers are pollinated? 14. In many flowers, the pistils and stamens reach maturity at different times. Given what you know about pollination, why would this be an advantage for the plant? Plant?