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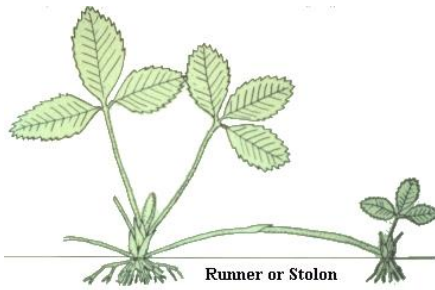
Plant Reproduction: Option 1

Although some plants can reproduce asexually, most plants reproduce sexually. This means two different gametes unite to form one offspring. Study the images below.

Below are some examples of asexual reproduction, producing clones of the parents:

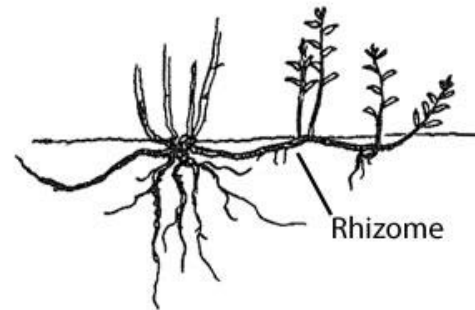
Runners (stolons):

stems which grow at the soil surface and forms adventitious roots and new plants from the buds



Rhizomes:

root-like stems that grow horizontally just under the soil surface

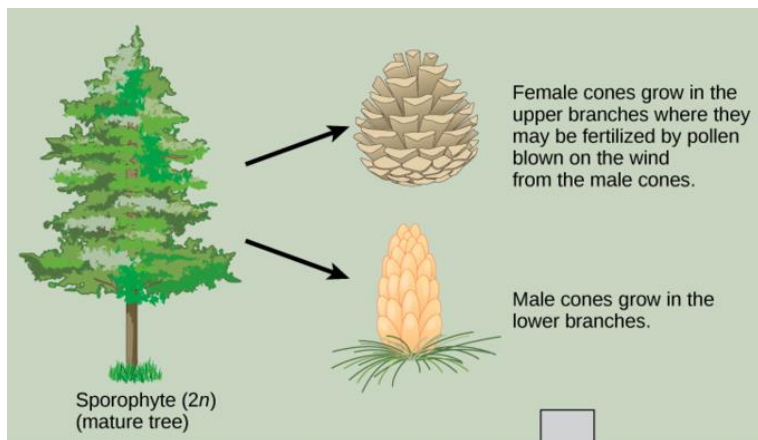


Regardless of being formed from stolons or rhizomes, the resulting offspring are genetically identical to the parent plant.

Below are two examples of sexual reproduction in plants, which leads to increased genetic diversity:

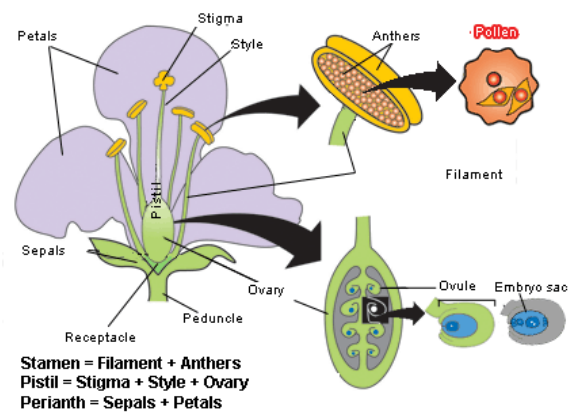
Gymnosperms (cone bearing trees) reproduce sexually:

Conifers (pine trees) produce both male and female cones. They are known as “naked seed plants” because they do not form nuts or fruit around the seeds.



Angiosperms (flower bearing plants) reproduce sexually:

Flowers have both male and female reproductive structures. Fertilized ovaries will go on to produce fruits and nuts.

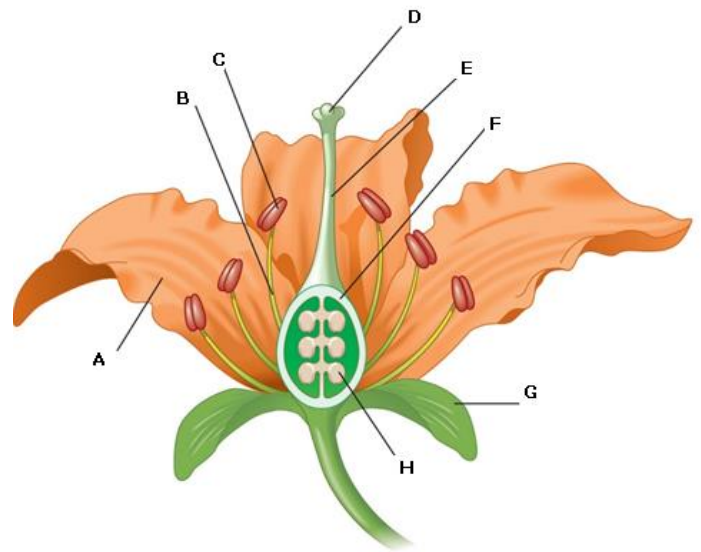


Sexual Reproduction in Flowering Plants

Flower structures can be divided into two groups: the essential organs and the accessory organs. The essential organs are the reproductive structures, which include the stamens (male) and the pistils (female). The accessory organs are the **sepals** and **petals**, which surround and protect the essential organs. The stamen is the male reproductive organ and consists of two parts: the anther and the filament. The **anther** is the enlarged structure at the top of the stamen. Inside the anther are pollen sacs. Special cells within the pollen sacs undergo meiosis to form pollen grains. When the pollen grains mature, the pollen sacs split open to release the dust-like pollen. The **filament** is a thin stalk that supports the anther. The pistil is the female reproductive organ and consists of three parts: the stigma, style, and ovary. The **stigma** is an enlarged portion at the top of the pistil that becomes moist and sticky when mature. The **style** is the middle portion of the pistil. It can be long and slender, short, or even absent, depending upon the species. The **ovary** is the enlarged structure at the bottom of the pistil. The ovary contains one or more **ovules**. Special cells within the ovule undergo meiosis to form ova (eggs).

Use the bolded terms above the label the flower structures below

1. Which structures make up the stamen and what gamete does it make?
2. Which structures make up the stigma and what gamete does it make?
3. Describe a plant gamete's chromosome number.
4. What is the primary function of a flower?
5. What are some adaptations of flower petals to help attract pollinators?
6. In which structure(s) does meiosis occur?
7. Describe where pollination and fertilization occur.
8. Explain the differences between pollination and fertilization.
9. In which part of the male reproductive organ are the pollen grain made?
10. In which part of the female reproductive organ are the egg cells made?
11. By which nuclear process are these gametes formed?
12. Which part of the flower becomes the seed?
13. Which part becomes the fruit?

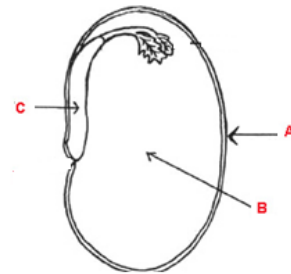


SEEDS

Seed development was a major factor in the success of angiosperms and gymnosperms. Seeds offer protection and nutrition for the embryo. A seed (mature ovule) is a miniature plant with a protective cover in a suspended state of development. Most seeds contain a built-in food supply called endosperm (orchid is an exception). The endosperm can be made up of proteins, carbohydrates or fats.

Label the seed coat, cotyledon and radicle on the seed diagram

- **Seed coat** – protective outer coating that surrounds the embryo
- **Embryo** – Immature plant
 - **Cotyledon** – Food storing seed leaf
 - **Radicle** – Root



Seed Dispersal

Before they can grow into new plants, seeds need to leave the seed pod. If all the seeds a plant produced landed just underneath the parent plant, they would be too crowded, and the established large plant might not leave them enough light or water for them all to develop properly. When you plant seeds too thickly in a pot, you can see that they grow tall and leggy, and each plant is weak and spindly. The various methods of seed dispersal are designed to ensure that as many seeds as possible have a good chance of growing up to produce seeds of their own.

Go to the link below to investigate the methods of seed dispersal. The link is also on www.biologybynapier.com on the plant personalized learning page.

<http://theseedsite.co.uk/dispersal.html>

When you have finished, look at the images of seeds provided and place each under the type of dispersal it uses by writing the letter on the image below the method used.

Dispersal Method	Explanation	Seed Matching (use diagrams)
Gravity		
Animals		
Force (Explosive)		
Wind		
Water		

Fruits versus Vegetables

Fruit and vegetable are nothing new, we all know the importance of fruits and vegetables and eat them on a daily basis to provide our body necessary vitamins and minerals to keep ourselves healthy and fit. But if one were to be asked the difference between a fruit and a vegetable, he would be in a fix and can at best cite examples of each. It is therefore necessary to know the basis of classification of fruits and vegetables as well as their nutritional differences since they matter so much to us.

What is Fruit

Fruit is sweet, fleshy part of a plant such as oranges, apples, plums, guava, grapes etc. Speaking in scientific terms, a fruit is a mature ovary of a flower that contains seeds. We eat the fleshy part of the ovary and leave the seeds. Nature has meant to use fruits for dissemination of seeds through animals and birds that eat a little fruit and carry seeds to far places where they grow into another plant.

What is Vegetable

Vegetable is an edible part of a plant. As there is no botanical definition of a vegetable, all parts of plants that are eaten by human beings are classified as vegetables such as stem, leaves (cabbage), tuber (potato), roots (carrots and beets), bulbs (garlic) or even seeds (Peas). There are some flowers of a plant that are termed as flower cluster vegetables such as broccoli.

Difference between Fruit and Vegetable

It is clear now that fruit is an ovary of a plant whereas all edible parts of a plant are vegetables. Since a fruit is also an edible part of a plant, it can be termed as a vegetable but the converse does not hold true. Another difference that is cited to differentiate between a fruit and a vegetable is that fruits contain large amounts of a sugar called fructose which is why they are sweet whereas vegetables contain fructose in traces only. This is this sweetness of fruits that attracts birds and animals thus serving the purpose of spreading the seeds of a plant.

There are many fruits that people consider and treat as vegetables such as tomatoes, cucumbers, peppers and pumpkins. Peas are seeds and as such should be categorized as fruits but are vegetables. There are many other fruits and vegetables that confuse people. However, the thing to remember is that whether fruits or vegetables, they are important sources of essential vitamins and minerals and we must include them in our daily diet.

Label the following as Fruits (F) or Vegetables (V)

- | | |
|--------------------|---------------------|
| _____ apple | _____ yellow squash |
| _____ orange | _____ carrot |
| _____ spinach | _____ pumpkin |
| _____ cucumber | _____ okra |
| _____ cabbage | _____ radish |
| _____ corn | _____ asparagus |
| _____ sweet potato | _____ celery |