

## FLOWERS AS REPRODUCTIVE STRUCTURES

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### Lesson Description

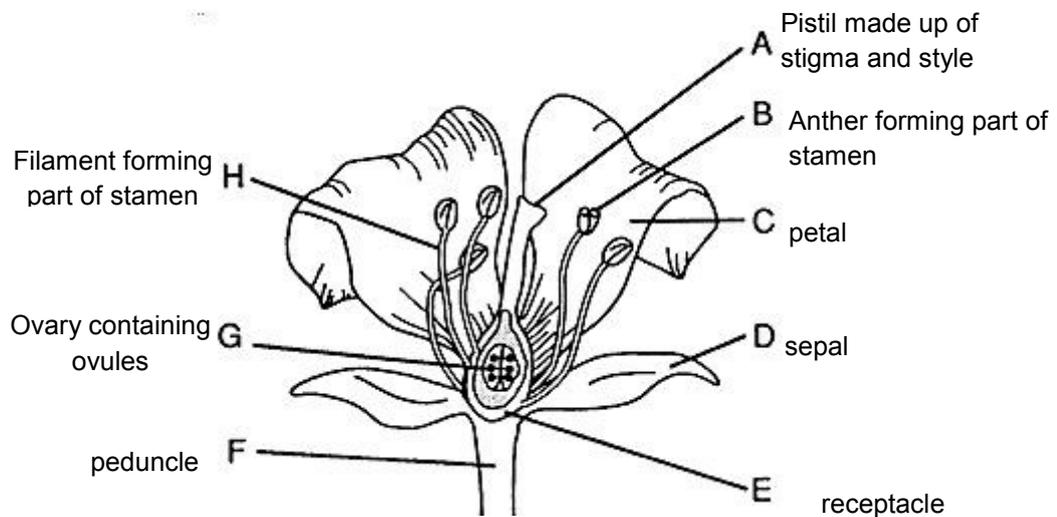
In this lesson, we will:

- Look at the structure of the flower
- Look at the adaptations for pollination
- Discuss the significance of seeds



### Summary

#### Structure of the Flower



- Parts of the flower arranged in **whorls**. The **whorls** are found on the **receptacle** which is the enlarged tip of the stalk (**peduncle**).
- The outermost whorl (C) protects the inner whorls and attracts pollinators.
- The two inner whorls (A and B) are the fertile parts of the flower.
- The stamen or male part (**androecium**) is made up of the **anther** and the **filament**. The **anther** produces the **spores** which in turn produce the **male gametes**
- The central whorl (**pistil**) is the **female** whorl and it is the most protected structure. It comprises the **stigma** and the **style** which lead down to the **ovary**

#### Adaptations for Pollination

Pollination is the process by which pollen is transferred in the reproduction of plants, thereby enabling fertilization and reproduction.

**Wind pollinated flowers** must produce large amounts pollen that can be transported great distances in air currents. Pollen is **smooth** and **light** and **not sticky**

- Wind pollinated flowers do not need to attract pollinators so the flowers are small, dull and not easily noticed.
- Stigmas are sticky and found below the stamens while the anthers are large to produced enormous numbers of pollen
- The flowers are most commonly **homosporous**

The animal pollinated flowers need to attract the pollinators to the flower.

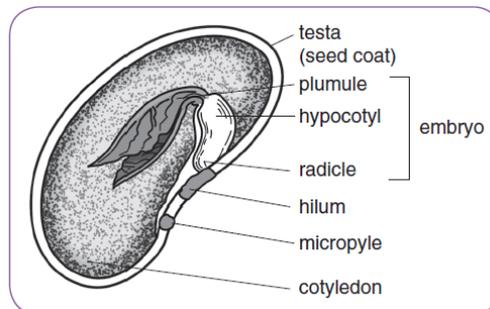
- The **petals** are **light in colour** (white, blue or yellow). The dark centre of the flower is what the insect aims for. **Nectar** is produced and flowers release **fragrances**.
- The flower has a landing area for the insect to land. The flowers can be broad or narrow depending on the pollinators and the anthers are arranged near the landing area so that when the insect lands, the **sticky pollen** sticks to the legs and body of the insect.
- Insect pollinated flowers are usually **heterosporous**.

**Birds** see the colour red and will feed off the nectar produced by the flowers so most flowers are red or shades of red and orange.

- The flowers have a **tube** shape for the beaks of the birds to fit into and the **anthers** of the flower extend beyond the petals so that the pollen will stick to the feathers.
- The **stigma** is sticky and is also beyond the petals to catch the pollen from the birds feathers

### Significance of Seeds

Spermatophytes produce seeds. The production of seeds has led to the success of the spermatophytes in nature. It is considered to be one of the most important events in nature.



(Solutions for all Life Sciences, Macmillan, p76)

- The seed is covered by a tough coat (**testa**). The testa protects the embryo from mechanical damage and from drying out. The seed has a food supply called the **cotyledon** which it relies on until the plant can photosynthesise for itself

### Germination of Seeds

- Seeds require a stimulus to germinate. E.g. Water, fire and stomach acids of animals



### Test Yourself

#### Question 1

A distinctive characteristic of the spermatophyte is that they have ...

- pollen
- sporangia
- archegonia
- sporophyte

**Question 2**

Each of the following is a characteristic of Angiosperms except that they all ...

- A. have two integuments surrounding the nucellus
- B. bear ovules in the ovary
- C. have a separate calyx and corolla
- D. have either one or two cotyledons

**Question 3**

The endosperm of the ovule in Angiosperms is the ...

- A. nutritive tissue of the embryo
- B. product of pollination
- C. haploid tissue of the ovule
- D. diploid product of fertilisation

**Question 4**

Double fertilisation in Angiosperms results in ...

- A. two cotyledons developing in the embryo
- B. a triploid zygote and diploid endosperm cell
- C. a diploid zygote and a triploid endosperm cell
- D. two zygotes each with a double set of chromosomes

**Question 5**

The four principal structural parts of most flowers are ...

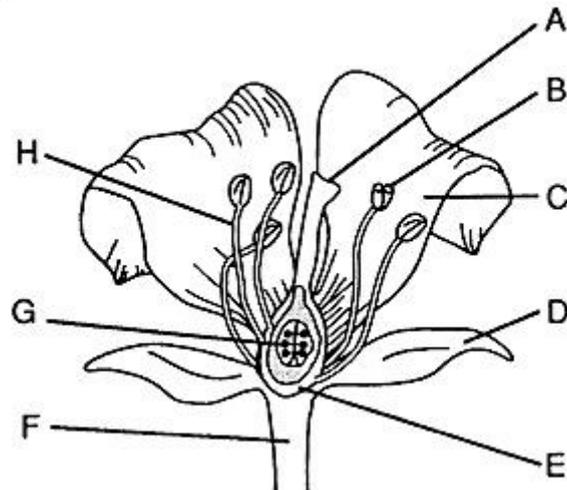
- A. calyx, corolla, ovules, pollen
- B. stamens, pistils, pollen, seeds
- C. petals, stamens, cotyledons, pistils
- D. petals, sepals, pistils, stamens

**Question 6**

What is the relationship between pollination and fertilisation in

- A. pollination is sexual and fertilisation is asexual
- B. pollination must occur before fertilisation can occur
- C. fertilisation and pollination are the same are the same activity
- D. fertilisation must occur before pollination can occur

notes for...



(<http://teachers.moed.bm/leone.samuels/Photosynthesis%20Diagrams/Forms/DispForm.aspx?ID=12>)

Use the diagram of a flower (above) to answer questions 7 and 8

**Question 7**

The reproductive parts of the flower are ...

- A. A, B and G
- B. B, D and G
- C. A and G
- D. A, B and E

**Question 8**

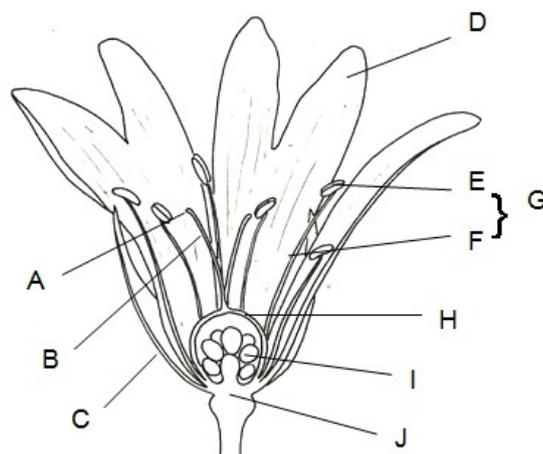
The names of the parts labelled A to E are respectively ...

- A. corolla, stamen, calyx, sepal, peduncle
- B. stigma, stamen, corolla, calyx, receptacle
- C. stamen, stigma, calyx, sepal, receptacle
- D. stamen, stigma, corolla, calyx, peduncle



**Improve your Skills**

**Question 1**



notes for...

- 1.1 Name the parts A to C on the diagram above. (3)
- 1.2 Where is
  - (a) the male gamete, and
  - (b) the female gamete found in a flowering plant? (2)
- 1.3 Are these structures haploid or diploid? Explain. (2)
- 1.4 Identify the part labelled D and state its function. (2)
- 1.5 Is this method of reproduction, represented in the flower, suitable for a successful survival on land? Explain (3)
- 1.6 There are no stomata on the gametophyte. Why is this not detrimental to this organism? (2)

**[13]**

**Question 2**

- 2.1 Explain the terms 'sexual' and 'asexual' in terms of reproduction (2)
- 2.2 State two advantages of asexual reproduction. (2)
- 2.3 What is pollination? (2)
- 2.4 Explain the term cross pollination. (2)
- 2.5 Why is it preferable for a plant to encourage cross-pollination rather than self-pollination? (2)
- 2.6. Complete the table below by describing how each part of the flower is adapted for wind or insect or bird pollination:

Flower part	Insect pollinated	Wind pollinated	Bird pollinated
<b>Petals</b>	Large and brightly coloured	2.6.1	Brightly coloured – mostly with shades of red
<b>Nectar</b>	2.6.2	No nectar	2.6.3
<b>Scent</b>	2.6.4	No scent	2.6.5
<b>Stigma</b>	2.6.6	2.6.7	Sticky and extends beyond petals
<b>Pollen</b>	2.6.8	Large amounts of light and smooth pollen produced	2.6.9
<b>Anther</b>	Anther firm and inside the flower	Loosely attached and dangle out	2.6.10

**Question 3**

Fill in the missing words in the paragraph below. Write only the number and correct word next to it.

The male part of the flower called the \_\_\_\_\_ 3.1 \_\_\_\_\_ consists of the \_\_\_\_\_ 3.2 \_\_\_\_\_ and \_\_\_\_\_ 3.3 \_\_\_\_\_. The female part of the flower is called the \_\_\_\_\_ 3.4 \_\_\_\_\_ and consists of the \_\_\_\_\_ 3.5 \_\_\_\_\_, \_\_\_\_\_ 3.6 \_\_\_\_\_ and \_\_\_\_\_ 3.7 \_\_\_\_\_. The male gamete is made in the \_\_\_\_\_ 3.8 \_\_\_\_\_ and is found inside the \_\_\_\_\_ 3.9 \_\_\_\_\_ grain. The female gamete is found in the \_\_\_\_\_ 3.10 \_\_\_\_\_ and is called an \_\_\_\_\_ 3.11 \_\_\_\_\_. (11)

notes for...



## Links

- <http://www.mindset.co.za/learn/xtra/live>
- [http://www.bbc.co.uk/bitesize/standard/biology/world\\_of\\_plants/growing\\_plants/revision/4/](http://www.bbc.co.uk/bitesize/standard/biology/world_of_plants/growing_plants/revision/4/)
- [http://koning.ecsu.ctstateu.edu/plants\\_human/pollenadapt.html](http://koning.ecsu.ctstateu.edu/plants_human/pollenadapt.html)
- [http://www.biologie.uni-hamburg.de/b-online/ibc99/koning/Schedule\\_W99.html](http://www.biologie.uni-hamburg.de/b-online/ibc99/koning/Schedule_W99.html)