

FLOWER: INTRODUCTORY VERSION

(NARRATION).	P A R T 1 INTRO D U C T I O N (IMAGES)	(REELS)
1. For most of us, flowers are a source of pleasure, with their variety of shapes and vast range of colours.	FLOWER VARIETY Pan along flower bed outside the Wintergarden .	Reel 20:14:48 Marigolds, spider plants, cocks combs, loosestrife
2. They are used to brighten our homes and gardens. Their blooms bring colour to our city streets.	<u>Around the home:</u> Dale Harvey Home. <u>In the city:</u> median planter Birkenhead shops: red petunias	Reel 20:06:05 or 06:28 Reel 20:10:07 to 25
3. But flowers are also the reproductive organs of the plant. It is for this reason that scientists work with flowers to breed new, better and more valuable varieties of plants.	FLOWER FUNCTION Honey bee in blue Salvia Keith Hammett With head band magnifiers on removing stamens. Adding purple pollen	Reel 20:07:13 to 21 Reel 20:02:24 20:00:55 to 01:10 20:02:43 to 02:54
4. A flower is therefore not just decorative, but plays an important part in plant reproduction.	FLOWER PARTS Rengarenga under dissecting scope.	07:08:43

5. There are many types of lilies, some are cultivated in our gardens and others are found growing in the wild. 5a. The parts of lily flowers are large and easy to see and can be used to illustrate the structure and function of the flower.	
6. Taking a closer look we see that...	
7. ...each flower has three sepals which overlap with three petals.	ANIMATION BEGINS: FLOWER Lily/rengarenga flower to show sepals
8. To the inside, there are six delicate stamens. Their function is to produce male cells.	STAMENS
9. Each stamen is attached to the flower by a slender stalk.	FILAMENTS Lily/rengarenga flower Model of stamen: filament

10. The tip of the stamen is enlarged. .	ANTHER Model of stamen: anther, external
11.	
12. Inside, there are four spore cases.	ANTHER: INTERNAL
13. Each spore case is covered by a delicate layer of cells that nourish it.	
14. Each case contains numerous, fertile cells.	SPOROCYTE CELLS
15. . A coating of wall material is formed on the outside of each cell.	SPOROCYTE: CALLOSE
16. Inside each, the nucleus divides twice, forming four spore cells.	SPOROCYTE: MEIOSIS
17. The surrounding coating is now removed, releasing the four spores.	ADHERING MICROSPORES
18. The surface of each spore now becomes covered with a tough, protective coating.	MICROSPORES: SPOROPOLLENIN
19. At the same time, the nucleus divides, forming two male cells.	MICROSPORES: DIVISION
20. This male tissue with its surrounding wall is now called a pollen grain	MICROSPORE DIVISION
21. Nutrients now accumulate inside the pollen grain	POLLEN: ADDITION OF NUTRIENTS.
22. Finally, most of the water is removed and the pollen grain enters into a resting state.	POLLEN: LOSS OF WATER
22a. During this time, the outer cells of the stamen thicken.	OPTIONAL: ENDOTHECIUM
23. When the pollen and stamen dry out, this thickened tissue shrinks. This tears open the stamen, exposing the pollen grains inside.	ANTHER DEHISCENCE INTERIOR OF POLLEN GRAIN
24..	FLOWER Fly out to flower
25. At the centre of the flower there are three large chambers called carpels. Their function is to produce female tissue.	FLOWER MODEL Fade away all parts, leaving the compound gynoecium. Pull apart to show one carpel.
26..At the base of each there is an enlarged ovary.	OVARY enlarged basal portion is highlighted.

27. A slender stalk extends from the ovary.....	STYLE Pull back to view the style
28.and is slightly enlarged at its tip. All three chambers are joined together to form a central canal that leads into each ovary.	STIGMAS Zoom in on the stigma. Now put carpels back together. Move down
29. Small spore cases form on the wall of the young ovary.	YOUNG OVARY: MEGAS;ORANGIUM
30.	
31.A protective jacket soon covers each spore case, leaving a small pore at one end.. This entire structure is known as an ovule.	INTEGUMENTS FORMING
32. Inside each ovule there is a single, fertile cell.	SPOROCYTE
33. This divides twice to form four spore cells.	MEIOSIS: SPOROCYTE
34	
35. Three of these soon die.	MEGASPORE DEGENERATION
36. However, the remaining spore enlarges while its nucleus divides many times.	MEGASPORE DIVISION
37. Several cells now form.	NUCLEAR MOVEMENT, WALL FORM.
38. Three of these lie at one end of the ovule. One of these is the fertile egg cell.	EGG CELL
39. A second fertile cell containing two nuclei, is located in the centre of the ovule.	CENTRAL CELL
40.At the far end of the ovule, there are three sterile cells.	ANTIPODAL CELLS
41. These seven cells are the female tissue of the ovule.	NORMAL FEMALE GAMETOPHYTE
42. This female tissue is contained within the spore case.....	
43.....which is covered by the protective jacket of the ovule.	
44.The ovule, in turn, is inside the chamber or carpel.	

<p>46. The transfer of pollen to the tip of the carpel is called pollination.</p> <p>This happens by various means such as wind , insects or other animals</p>	<p>ANIMATION: LILY/RENGARENGA FLOWER Entire flower, then fly in through the stamens.</p>
<p>47</p>	<p>STIGMAS: Move in close to stigmas Pollen grains sitting on the stigma.</p>
<p>48. Once on the carpel, the pollen grain absorbs water and begins to swell.</p> <p>A pollen tube, containing two male cells, soon forms.</p>	<p>STIGMA: POLLEN TUBE Stigma surface with bulging, finger like cells, moist at their surfaces.</p>
<p>49.</p>	<p>POLLEN TUBE</p>
<p>50. One male cell divides to form two sperm cells.</p>	<p>POLLEN TUBE: SPERM CELLS Interior: Generative cell moves into pollen tube and then divides. Show two sperm cells in contact.</p>
<p>***** 50a. In order to reach the ovaries, the pollen tube must now carry the sperm down the full length of the canal.</p>	<p>Wide shot of the canal cut away</p>
<p>51. It does this by first growing through the tip of the carpels to reach the canal directly below. *****</p>	<p>POLLEN TUBE IN STIGMA Up close: growth of tube in between stigma cells</p>
<p>52. Here, the tube grows along the moist surface towards the ovaries.</p>	<p>POLLEN TUBE IN STYLE Close up: tube finding canal and beginning to grow along its moist surface. Pull back to show stigma and style. Show the tube progressing along the style.</p>
<p>54a. When the pollen tube reaches the base of the canal, it enters one of the ovaries</p>	
<p>55. Here, it locates the rows of ovules.</p>	<p>POLLEN TUBE AT OVARY Pull back to show style and ovary with pollen tube growing into ovary, along its placental tissue, and up a funiculus.</p>
<p>56. Approaching an ovule, the pollen tube grows into the pore.</p>	<p>POLLEN TUBE INTO MICROPYLE Tube grows over surface of ovule and locates the micropyle.</p>
<p>57. It then penetrates the female tissue and releases both sperm cells</p>	<p>POLLEN TUBE INTO EMBRYO SAC Pollen tube at base of micropyle, growing into the embryo sac.</p>
<p>58.</p>	<p>RELEASE OF MALE CELLS Tube tip rupturing to release the tube nucleus and two sperm cells.</p>

59. One sperm fertilises the egg cell.	FIRST FERTILISATION One sperm moving across to the egg cell and the two nuclei fusing.
60. The second sperm fertilises the central cell.	SECOND FERTILISATION The remaining sperm moves into the central cell, with its nucleus joining the two nuclei already there.
61. Both of these cells will play a role in the formation of a seed.	DOUBLE FERTILISATION REVIEW Pull back and show entire embryo sac with both cells receiving nuclei at the same time.
62.a. Each ovary contains hundreds of ovules that need to be fertilised.	INSIDE OVARY WITH ROWS OF OVULES.
***** 62b. To accomplish this the canal supports the growth of a large number of pollen tubes.... These grow down the canal and enter the each of the three ovaries. *****	STYLE WITH POLLEN TUBES CHARGING DOWN
62c. When the pollen tubes enter an ovary, each one locates an ovule and fertilises it.	INSIDE OVARY; TUBES LOCATING MICROPYLES
62d.	POLLEN TUBES MOVING ALONG ROW OF OVULES
62. After the ovules are fertilised, the flower undergoes several changes.	REAL FLOWER: RENGARENGA
63. Many parts begin to wither.....	ANIMATION BEGINS
64. Eventually these are shed.	RENGARENGA: EXTERNAL
65. Only the ovary remains healthy and firmly attached to the stem.	OVARY: EXTERNAL
***** 66. Inside the ovary, the ovules are now about to undergo many changes. The nucleus of the fertilised central cell begins to divide. *****	OVULE: SECTIONAL VIEW Primary endosperm nucleus dividing to form many nuclei within the embryo sac
67. This stimulates the fertilised egg cell to divide . As a result, a chain of cells is formed that pushes a small growing embryo deep inside the ovule..	SUSPENSOR AND PROEMBRYO Zygote enlarges into a chain-like
68.	SMALL EMBRYO Formation of a single cotyledon. Just the early stages.

***** 68d. As it enlarges, the embryo receives nutrients from the surrounding tissue	
68b. In lilies, the embryo forms a single seed leaf or cotyledon. *****	COTYLEDONS FORMS, GROWS
68c. .	
68e.	
69. A tiny shoot forms on one side of the embryo.	APPEARANCE OF SHOOT TIP Appearance of the small shoot tip.
70. Below this there is a stem.....and a root,covered by a root cap	HYPOCOTYL Cotyledon enlarging a little. A stem axis appearing below it.
71.	ROOT AND ROOT CAP Show the root tip and then cover this with the root cap.
75. With the completion of embryo growth, nutrients are now stored in the surrounding tissue.	NUTRIENTS ACCUMULATE
76. Water is then removed and the embryo enters into a resting or dormancy stage.	WATER REMOVAL Show water leaving seed
77. As these events take place, the ovule jacket develops into a tough, protective seed coat. The ovule is now called a seed..	OVULE: EXTERNAL
78. At the same time that the ovule is growing into a seed, hormones are released by the developing embryo.	YOUNG FRUIT: EXTERNAL
79. These stimulate the ovary to expand and make room for the enlarging ovules.	ENLARGING FRUIT
***** 80. In this way, the ovary wall enlarges and is changed into a fruit. *****	LARGE, BROWN FRUIT
79. In most lilies, the fruit dries out and tears open to release the seeds. The seeds are soon dispersed and will germinate to form new plants, thus completing the life cycle.	OPENING FRUIT

GRAND (NARRATION)	FINALE (IMAGE)	(REEL)
1. We have seen that flowers capture pollen and ensure the success of fertilisation and seed formation.. In the plant world reproduction by flowers is the most efficient.	HARVEY'S GARDEN Garden, then zoom in to bee in purple <i>Salvia</i> flower	<u>Reel 20</u> :07:08 to 07:22
2. It is therefore not surprising that a great variety of flowering plants dominate the landscape.	BOTANIC GARDENS Flowers with bee, then pull back to lake and trees etc.	<u>Reel 21</u> 01:35:14 to 25
3. Many of these attain a great size. But others are tiny and almost microscopic.	VARIETY of FORMS Palm tree Duckweed	<u>Reel21</u> 01:38:58 19:14:33
4. Some flourish in places where water is scarce;	CACTI dramatic shot of large, erect cacti	20:34:24
5. Others thrive in ponds and lakes.	WATER LILIES	20:26:24 distance 20:27:57 Up close, pan back 20:31:12 Waterfall, pan out to lake
6. And from this vast variety we have, by careful selection, developed all those plants which provide us with food, including many types of fruits..	CROPS Vineyard shots Bunches of grapes to pair of apples.	20:17:47 20:22:52-56 20:21:38
7. With the great variety of flowering plants, the world in which we live is indeed a very colourful place!	PLANTS & PEOPLE <u>Albert Park</u> : Flowers, students	<u>Reel21</u> ,01: 37:21-33