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DEPARTMENT OF EDUCATION

Science

Quarter 2- Module 6:
Alone or Together,
Let's Multiply for the Better

CO_Q2_Science 7_ Module 6

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ADM

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Development Team of the Module

Writers:	Glenn Frey L. Pepito, Leah Joy A. Desamparado
Editors:	Cynthia S. Bustillo, Miraflor O. Albios, Lenie G. Forro, Leoncio Tan
Reviewers:	Agabai S. Kabdalayang**,** Yusof A. Aliudin, Mary Joy D. Bautista, Mary Anne A. Barrientos, Marivic D. Devibar
Layout Artist:	Jaypee K. Balera, Erickson D. Bello, Glen D. Napoles, Mark Daryl T. Lazaro, Alex C. Macale, KryssMayven L. Fabrero, Sammie Per S. Montero, Jay Ar O. Espartero, Jerome B. Reynes
Management Team:	Allan G. Farnazo, Isagani S. Dela Cruz, Gilbert B. Barrera, Arturo D. Tingson, Jr., Peter Van C. Ang-ug, Elpidio B. Daquipil, Juvy B. Nitura, Lenie G. Forro

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Department of Education – Region XII
Office Address: Regional Center, Brgy. Carpenter Hill, City of Koronadal
Telefax: (083) 2281893
E-mail Address: region12@deped.gov.ph

Introductory Message

This Self-Learning Module (SLM) is prepared so that you, our dear learners, can continue your studies and learn while at home. Activities, questions, directions, exercises, and discussions are carefully stated for you to understand each lesson.

Each SLM is composed of different parts. Each part shall guide you step-by-step as you discover and understand the lesson prepared for you.

Pre-tests are provided to measure your prior knowledge on lessons in each SLM. This will tell you if you need to proceed on completing this module or if you need to ask your facilitator or your teacher's assistance for better understanding of the lesson. At the end of each module, you need to answer the post-test to self-check your learning. Answer keys are provided for each activity and test. We trust that you will be honest in using these.

In addition to the material in the main text, Notes to the Teacher are also provided to our facilitators and parents for strategies and reminders on how they can best help you on your home-based learning.

Please use this module with care. Do not put unnecessary marks on any part of this SLM. Use a separate sheet of paper in answering the exercises and tests. And read the instructions carefully before performing each task.

If you have any questions in using this SLM or any difficulty in answering the tasks in this module, do not hesitate to consult your teacher or facilitator.

Thank you.

What I Need to Know

Hello! How are you? Look around you. Have you ever wondered how organisms around you like bacteria, plants and animals reproduce? How do single bacteria become a colony after an hour or so? How do starfish reproduce? What could be the reason behind the formation of molds in bread left untouched on the table after a few days? Each has their own different way of reproducing. In this module, you will understand one type of reproduction which is the asexual reproduction.

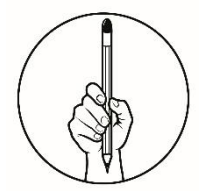
Most Essential Learning Competency:

Differentiate asexual from sexual reproduction in terms of:

1. Number of individuals involved; and
2. Similarities of offspring to parent.

After going through this module, you are expected to:

1. define asexual reproduction;
2. describe the different types of asexual reproductions;
3. classify organisms according to their methods of reproduction;
4. describe sexual reproduction;
5. label the male and female reproductive structures of a gumamela flower; and
6. distinguish asexual and sexual reproduction in terms of number of individuals involved and similarities of offspring to parents.



What I Know

Directions: Choose the best answer from the given choices. Write the letter of your choice on your activity notebook.

1. Which of the following statements is true about asexual reproduction?
   A. Only one parent is required.
   B. A kitten is produced through asexual reproduction.
   C. A mother and father are needed to produce offspring.
   D. The offspring that are produced are genetically unique.

2. Which of the following is **NOT** a form of asexual reproduction?
   A. Budding
   B. Regeneration
   C. Binary Fission
   D. Formation of zygote

3. Which of the following statements correctly describes binary fission?
   A. It grows from a part of an organism.
   B. It is the combination of two organisms.
   C. It produces daughter cells that are different from the parent.
   D. It is the splitting of an organism to produce two daughter cells.

4. Which of the following structures is **NOT** involved in asexual reproduction?
   A. Gametes
   B. Roots
   C. Stem
   D. Tuber

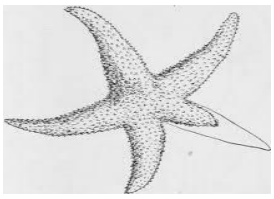
5. The table below shows organisms and some data on their characteristics. Based on the information in the table, which organism is likely to produce offspring that are all genetically uniform?

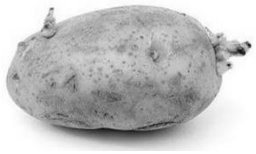
Organism	Kingdom	Mode of Reproduction	Mode of Feeding
Gumamela	Plantae	Sexual	Photosynthesis
Chicken	Animalia	Sexual	Consumer
Hydra	Animalia	Asexual	Consumer
Fish	Animalia	Sexual	Consumer

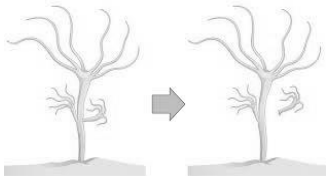
   A. Chicken
   B. Fish
   C. Gumamela
   D. Hydra

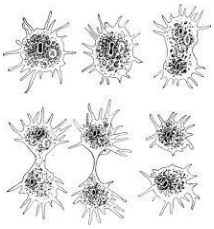
For items 6—10, determine what type of asexual reproduction does each picture represent. Choose from the choices given in the box below.

A. Binary Fission	D. Spore Formation
B. Budding	E. Vegetative Propagation
C. Regeneration	

6. 

7. 

8. 

9. 

10. 

11. Which of the following organisms reproduce through spore formation?

I. mold	II. mushroom	III. potato	IV. yeast

A. I only
B. II only
C. I and II only
D. I, II, III and IV

12. Edmar was asked by his teacher to give examples of organisms that reproduce through budding. He answered hydra and yeast. Do you think his answer is correct?

A. Yes, because both do not grow from seeds.
B. No, because yeast reproduce through spore formation.
C. Yes, because both formed as an outgrowth of the parent.
D. No, because hydra reproduce through vegetative propagation.

13. A farmer wants to propagate a good variety of a crop in a way which maintained all its desirable traits. Which of the following methods should be used?

A. Self-pollination
B. Vegetative propagation
C. Growing seeds produced from this variety
D. Cross-pollinating this crop with another good variety and growing the seeds resulting from the cross

14. Vegetative propagation is one type of asexual reproduction. Which of the following are advantages of vegetative propagation?

I. All plants are resistant to some diseases. II. Plants reach maturity faster than ones grown in seeds. III. If unfavorable condition occurs, the whole population will be wiped out. IV. Same good agricultural traits such as taste and yields will be maintained.

A. I, II and III only
B. I, II and IV only
C. II, III and IV only
D. I, II, III and IV

15. Ana's father, a farmer grew only one type of onion. She told her father that all of the onion plants will die from the same disease. Do you think Ana is correct?

A. Yes, because the onion plants were genetically identical.
B. No, because only a few plants were resistant to the disease.
C. Yes, because all of the onion plants were resistant to the disease.
D. No, because the onion plants were genetically different from each other.

Lesson 1 ASEXUAL REPRODUCTION A Tale of Awesome Single Parenting

What's In

Hello! Remember that in the previous module, you have explored the diversity of organisms. You also have discussed the different living things other than plants and animals. These organisms make sure to continue their own kind through reproduction whether sexually or asexually. In this lesson, we will know how organisms reproduce asexually. Although organisms have different methods of reproducing asexually, each method leads to the beginning of a new life for the continuity of their species.

What's New

Hello! Mr. Org of Asexualandia needs your help. The Queen of their land was kidnapped by Mr. Unknown. I know you are brave enough to help him release the Queen. Are you excited? Let's start reading the story below.

Mr. Org's Quest in Finding Queen Asexually

by: Leah Joy A. Desamparado

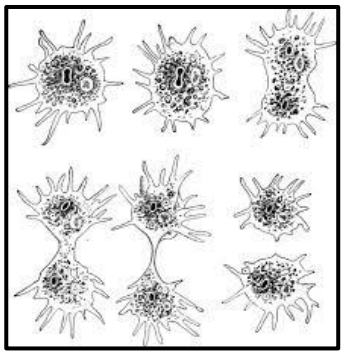
In a faraway place, there is a beautiful land named Asexualandia. This place is full of various organisms: plants and animals that are unique from each other. Each has their own distinct role to play to keep Asexualandia at peace and maintain its stability. In Asexualandia, organisms reproduce asexually where a single organism is the sole parent and the offspring is genetically identical to the parent.

All is well. Everything is in order until a horrible incident happened; Queen Asexually was kidnapped by a very forgetful Mr. Unknown. Mr. Unknown is someone who feels alone and not at home. He always feels like he is different from them for he doesn't even remember who his real family is. Because of this, he came up with an idea of kidnapping the Queen. He will only release the Queen if someone can help him remember where he came from.

Mr. Org, the knight of the Queen, the bravest of all in Asexualandia, set forth to a cave to start his quest in finding Queen Asexually.In his quest, questions will be posted and must be correctly answered.

Vegetative Reproduction

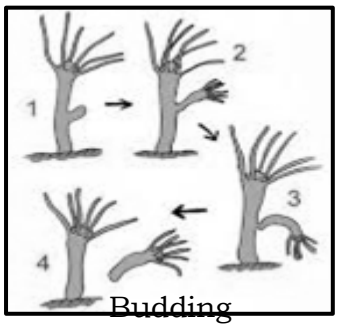
Asexualandia is divided into five important areas. First among the five is the land of vegetative propagation where plants reproduce through this type of asexual reproduction. Question: *Can you give plants that do not grow from seeds? "Potato, onion and ginger are just a few"*, named Mr. Org.



Binary Fission

Second area is the land of the bacteria where they reproduce through binary fission. Question: *Can one become two? Tell me more if this true.*Mr. Org answered with all his might, *"Yes! One can become two like how the bacteria do. With my microscope I had observed that each cell divides to form two daughters that are exactly alike."*

Third area is the land of Hydra. This organism reproduces asexually through budding. It is formed as an outgrowth of the parent then it will separate from the parent and becomes a new individual. Question: *What other organisms reproduce through budding? "Corals and yeast also reproduce same with hydra"*, Mr. Org said.



Budding

The fourth area is the land of spore formation. Question: *What happened to the bread inside your bag's pocket? It is not good for you to eat it but if you can explain what happen I will give you something else to eat.*Mr. Org then replied, *"Molds are now growing on my bread, they reproduce asexually through spore formation like what you said. Mushrooms also reproduce in the same manner."*

The last area is the land of Regeneration. In this area, some animals like starfish where an arm that breaks off from the body can develop into a new individual. Question: *Can you kill starfish by breaking it into two? "No, you are just reproducing them into two because starfish can restore their lost or damaged parts like you Mr. Unknown. You belong here in the land of regeneration"* Mr. Org responded. *"Is that so? That explains why I was able to grow my lost tail. Thank you so much Mr. Org"*Mr. Unknown said happily.

Regeneration

By that instant, Mr. Unknown releases the Queen for Mr. Org successfully helped him remember where he belongs to. And everything is back to normal.

Directions: Answer the following questions. Write your answer on your activity notebook.

A. What is asexual reproduction?

B. What are the five types of asexual reproduction mentioned in the story?

C. What organisms reproduced through vegetative propagation?

D. How do bacteria reproduce?

E. What happened to the lost arm of a starfish?

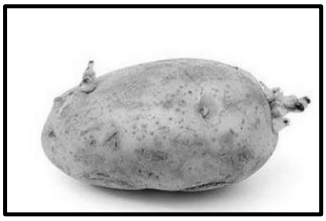
F. How will you describe asexual reproduction through budding?

What is It

Asexual Reproduction

In asexual reproduction, one individual (parent) produces offspring that is genetically identical to itself. It does not involve sex cells or gametes (produced through meiosis). Rather, it is reproduction by mitosis allowing a new, genetically identical individual to be produced. Asexual reproduction does not allow genetic variation, but guarantees reproduction (no dependence on others). It rapidly increases numbers of an organism and keeps its desired combination of traits. There are several types of asexual reproduction namely: vegetative propagation, binary fission, budding, spore formation and regeneration.

In **vegetative propagation**, new individuals are formed without the production of seeds and spores. From a) a single potato (stem tuber), several new potato plants can be produced through the "eyes" where shoots can grow from it. The formation of new plants out of rhizomes like b) ginger is another example. Others reproduce through their stolons, also called a runner such as in the c) strawberry plant, formation of bulbs for d) onions, and the growing of plantlets around the leaf margins of the e) Bryophyllum. Each example is shown in the pictures below.



a) potatoes

b) ginger

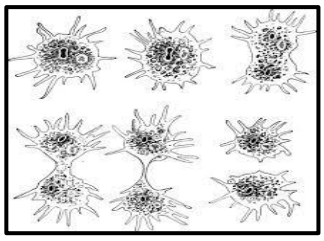
c) strawberry

d) Bryophyllum

e) onions

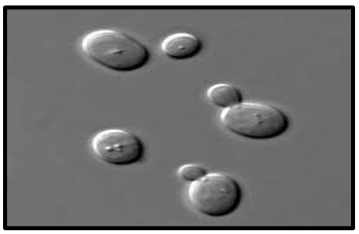
Why do we use vegetative propagation to grow plants? Vegetative propagation results in plants that reach maturity faster than plants grown form seeds. Another good thing about it is that the same good agricultural traits such as taste, yield and resistance to pests will be passed on from generation to generation. But one disadvantage is that the population might be wiped out if environmental conditions become unfavorable.

In **binary fission**, from the word binary which means "two" and fission which means "splitting", the cells divides or splits to form two identical daughter cells. Each daughter cell continues to grow until it becomes as large as the parent cell. This type of reproduction is common among single-celled organisms including bacteria.

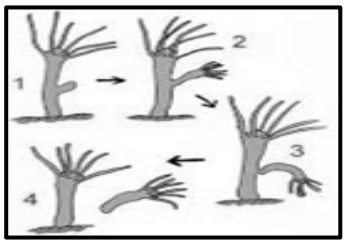


Binary Fission

Budding is another type of asexual reproduction. Yeast, hydra and sponges reproduced this way. The figure below shows how yeast, a microorganism used in baking, reproduces by budding. In budding, a new individual may form as an outgrowth of the parent. The outgrowth separates from the parent and becomes a new individual.



a) yeast



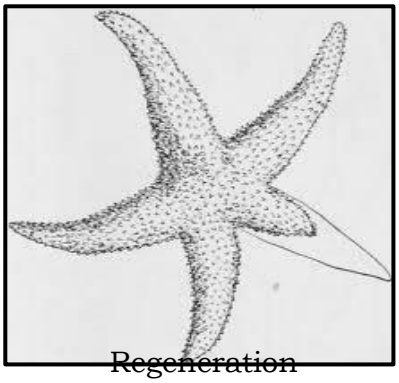
b) hydra

c) sponges

Formation of spore is another type of asexual reproduction common among molds or fungi. If you have observed a piece of bread with molds growing on it, the black, round structure at the tip of a stalk is called a *spore case* which contains the spores. When the spore case opens, the tiny spores are released and may be carried by wind or water. Once the spore lands on a favorable environment, it develops into a new organism. Under the microscope, a bread mold with a spore case looks like the one in the picture on the left.


Spore Formation

Fragmentation is the breaking of the body into two parts with subsequent regeneration. Regeneration is the process in which organisms replace or restore their lost or damaged body parts. If the animal is capable of fragmentation and the part is big enough, a separate individual will regrow.


Regeneration

Many sea stars reproduce asexually by fragmentation. For example, if the arm of an individual sea star is broken off it will regenerate a new sea star. Fishery workers have been known to try to kill the sea stars that eat their clam or oyster beds by cutting them in half and throw them back into the ocean. Unfortunately for the workers, the two parts can each regenerate a new half, resulting in twice as many sea stars to prey upon the oysters and clams. Fragmentation also occurs in annelid worms, turbellarians and poriferans.

What's More

Directions: Read and answer the question. Write you answer on your activity notebook.

Activity 1. Describe Me Asexually, Match the correct description...

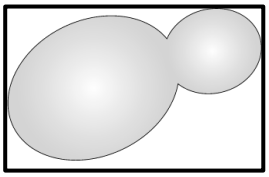
COLUMN A	COLUMN B
1. The release of spores to develop an organism.	a. Binary fission
2. A process in which organisms replace or restore their lost or damaged body parts	b. Budding
3. New individuals are formed without the production of seeds or spores	c. Regeneration
4. It results from the outgrowth of a part of a cell	d. Spore Formation
5. An individual splits off and forms two identical daughter cells.	e. Vegetative Propagation

Activity 2. How Do I Reproduce?

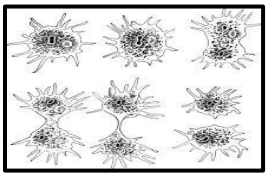
Directions: Classify the following organisms according to their method of reproduction. Choose from the choices in the box.

Binary fission	Budding	Fragmentation/ Regeneration
Spore Formation	Vegetative Propagation	

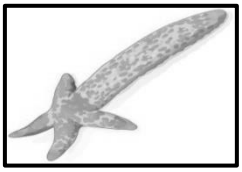
1. Sweet potato



2. Yeast



3. Amoeba



4. Star Fish

5. Molds

Questions to Ponder: Write your answer on a separate sheet of paper.

6. How many parent/s is/are involved in asexual reproduction?
7. Are the parents and the offspring identical or not? Explain your answer.
8. Draw your own conclusion

What I Have Learned

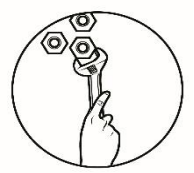
Directions: Read the paragraph carefully and identify the correct word in the box below. Write your answer on your activity notebook.

asexual	bacteria	budding	different
ginger	identical	molds	regeneration
reproduce	two	vegetative propagation	

In order for organisms to continue their own kind, they must (1) _____. Organisms may reproduce either asexually or sexually. In (2)_____ reproduction one parent is needed to produce offspring that is genetically (3) _____ to the parent. Modes of asexual reproduction include vegetative propagation, binary fission, budding, spore formation and regeneration.

In (4) _____, new plants are formed without seeds or spores. Few examples of these are (5) _____ and potatoes.

(6) _____ are single celled organisms that reproduce through binary fission. In this type of asexual reproduction, the cell divides into (7) _____ identical daughter cells. Another type is the formation of spores which is common among (8) _____ or fungi. Once the spore is released under favorable condition, it develops into a new organism. On the other hand, starfish reproduce through (9) _____. A starfish that is broken into two will regenerate the lost part of the body and become two new individual. Lastly, hydra and yeast reproduce through (10) _____.



What I Can Do

Congratulations! You just learned the different types of asexual reproduction. It is now your turn to list down an example of organismsunder each type of asexual reproduction. Use the table below as your guide. Write your answers on your activity notebook.

Types of Asexual Reproduction	**Example**
Vegetative Propagation	
Binary Fission	
Budding	
Formation of Spore	
Regeneration	

Assessment

Directions: Choose the best answer from the given choices. Write the letter of your choice on your activity notebook.

1. Which of the following statements correctly describes asexual reproduction?

> I. Offspring are genetically unique.
> II. Offspring are genetically identical to parent.
> III. A male and female is needed to produce offspring.
> IV. One parent is needed to reproduce.
> V. It only occurs in plants and bacteria.

A. I and III only
B. II and IV only
C. I, IV and V only
D. II, IV and V only

2. How many parents are needed in asexual reproduction?
A. 1
B. 2
C. 3
D. 4

3. How do bacteria make the next generation?
A. Budding
B. Sexually
C. Fragmentation
D. Binary Fission

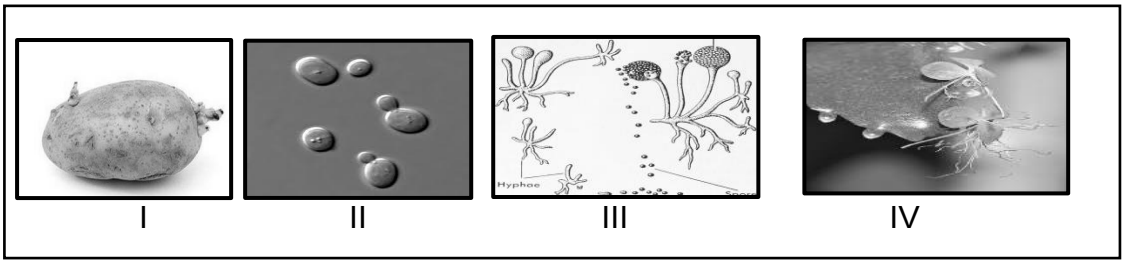
4. Which of the following is a **DISADVANTAGE** of asexual reproduction?
A. There is great variation among the offspring.
B. Offspring will get all good characteristics of parents.
C. Offspring have difficulty in adapting to new environment.
D. Adapting to the environment is always constant among the offspring.

5. If you cut a starfish into two pieces, each piece develops into anew starfish. What type of asexual reproduction is this?
A. Budding
B. Regeneration
C. Spore Formation
D. Vegetative Propagation

6. Which of the following is known as the horizontal runners in strawberries?

A. Buds
B. Clones
C. Roots
D. Stolons

7. The diagrams below represent various processes associated with reproduction. Which of the following represent asexual reproduction?



A. I and II only
B. II and III only
C. I, III and IV only
D. I, II, III and IV

8. Which of the following is the starting point of an offspring of a budding organism?

A. Colony of clones
B. Unfertilized egg cell
C. Cutting from the parent
D. Growth on the parent's body

9. Which of the following words is another term for regeneration?

A. Communication
B. Defense
C. Healing
D. Movement

10. Which of the following statements are **NOT** true about types of asexual reproduction?

I. Spore formation is the release of spores to develop an organism.
II. Regeneration is a process in which organisms replace their lost body parts.
III. In vegetative propagation new individuals are formed through the production of seeds or spores.
IV. Budding results from the outgrowth of a part of a cell.
V. Binary fission is the combination of two organisms to form a new individual.

A. II and III only
B. III and V only
C. I, II and III only
D. III, IV and V only

11. An offspring is produced through asexual reproduction. Which of the following best describes the offspring's genetic material?
    A. Completely unrelated to its parents.
    B. A copy of the genetic material of one parent.
    C. Identical to the genetic material of one parent.
    D. A combination of the genetic material of its parents.

12. Edmar was asked by his teacher to give an example of organisms that reproduce through binary fission. He answered bacteria. Do you think his answer is correct?
    A. No, because bacteria reproduce through budding.
    B. Yes, because bacteria reproduce by splitting into two.
    C. No, because bacteria reproduce through spore formation.
    D.Yes, because bacteria formed as an outgrowth of the parent.

13. A farmer wants to propagate a good variety of a crop in a way which maintained all its desirable traits. Which of the following methods should be used?
    A. Self-pollination
    B. Vegetative propagation
    C. Growing seeds produced from this variety
    D. Cross-pollinating this crop with another good variety and growing the seeds resulting from the cross

14. Vegetative propagation is one type of asexual reproduction. Which of the following are advantages of vegetative propagation?

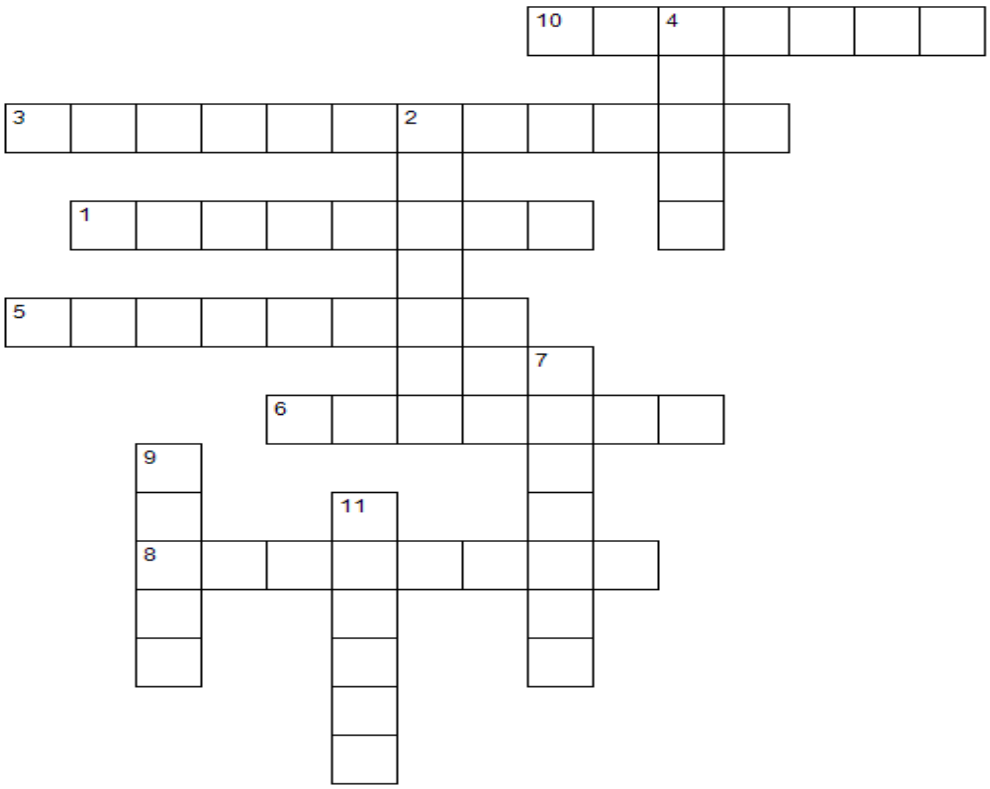
I. All plants are resistant to some diseases.
II. Plants reach maturity faster than ones grown in seeds.
III. If unfavorable condition occurs, the whole population will be wiped out.
IV. Same good agricultural traits such as taste and yields will be maintained.

    A. I, II and III only
    B. I, II and IV only
    C. II, III and IV only
    D. I, II, III and IV

15. John's father, a farmer grew only one type of onion. He told his father that all of the onion plants will die from the same disease. Do you think John is correct?
    A. Yes, because the onion plants were genetically identical.
    B. No, because only a few plants were resistant to the disease.
    C. Yes, because all of the onion plants were resistant to the disease.
    D. No, because the onion plants were genetically different from each other.

Additional Activities

Wow! That was a tough job. At last! You have finished studying the module. But, before you completely exit, try to answer this additional activity. Complete the crossword by identifying the words being described in each item below. Write your answer on your activity notebook.



Across:

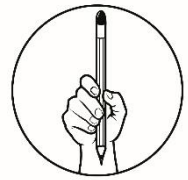
1. A sea creature that is capable of regenerating its lost arm; sea stars
3. A type of asexual reproduction in which organisms replace or restore their lost or damaged body parts.
5. Belongs to kingdom fungi and reproduce through spore formation
6. A type of reproduction where one parent is needed and the resulting offspring is identical to the parent
8. A single celled organism that reproduce through binary fission
9. It means to split or separate

Down:

2. An example of this is ginger where new plants are formed out of this
4. It is found in mushrooms and molds that help them reproduce
7. A type of asexual reproduction where it occurs as an outgrowth of the parent
9. One of its example is potato where a new plant emerge from its eyes
11. Also called as runners; it helps strawberries to propagate

Lesson 2

SEXUAL REPRODUCTION
When TWO Produces Differences



What I Know

Directions: Choose the best answer from the given choices. Write the letter of your choice in your activity notebook.

1. How many parent cell/s are required for sexual reproduction?
   A. 1
   B. 2
   C. 3
   D. 6

2. In what organ of the plant does the reproduction occurs?
   A. Flower
   B. Leaf
   C. Roots
   D. Stem

3. These part of a flower become the seeds when fertilized.
   A. Ovary
   B. Ovules
   C. Stigma
   D. Style

4. What do you call to the female reproductive part of a flower?
   A. Petal
   B. Pistil
   C. Sepal
   D. Stamen

5. Which of the following refers to the male reproductive part of a flower?
   A. Petal
   B. Pistil
   C. Sepal
   D. Stamen

6. Which of the following is **NOT** a part of the pistil?
   A. Anther
   B. Stigma
   C. Style
   D. Ovary

7. In what part of the flower are the pollen grains produced?
   A. Anther
   B. Filament
   C. Ovary
   D. Stigma

8. Which of the following organisms uses conjugation as its mode of sexual reproduction?
   A. Frog
   B. Papaya
   C. Spyrogyra
   D. Gumamela flower

9. Which species can produce offspring that are genetically different from their parents?
   A. A species that has few variations
   B. A species that reproduces sexually
   C. A species that reproduces asexually
   D. A species that competes with a similar species

10. Flowers are the reproductive organs of plants. How will you differentiate flowers from the reproductive organs of animals?
   A. Flowers need pollinators like bees to reproduce; animals do not.
   B. Flowers are shed from time to time; nothing is shed from animal.
   C. Flowers have male and female parts; animals have either male or female parts.
   D. There is no difference between flowers and the reproductive organs of animals.

11. How would you compare sexual reproduction and asexual reproduction?
   A. Asexual reproduction has many forms while sexual reproduction has only two.
   B. Asexual reproduction happens only in plants while sexual reproduction happens only in humans.
   C. Sexual reproduction requires two parent cells to form an offspring while asexual reproduction needs only one parent cell to produce offspring.
   D. Sexual reproduction produces offspring that are identical to the parent while asexual reproduction produces offspring that are not identical to the parent.

12. Which of the following is the result of sexual reproduction of organisms?
    A. rapid increase of organisms
    B. produces offspring with different traits as the parent
    C. maintains the traits of the parents
    D. produces identical/ the same offspring

13. Which of the following statement/s differentiate/s asexual from sexual reproduction?

I. In sexual reproduction, two parent cells are needed to produce new individual.
II. In asexual reproduction, only one parent cell is needed to produce new individual.
III. In sexual reproduction, only one parent cell involved, while in asexual reproduction, two parent cells are involved.

    A. I and II only
    B. II and III only
    C. I and III only
    D. I, II, and III only

14. Ethan plants a group of seeds that all came from the same flower. When seeds grow and bloom, the resulting flowers are different sizes and colors. What can Ethan conclude from his experiment?
    A. Ethan used soil that had other seeds in it.
    B. The species of plants must reproduce sexually.
    C. The species of plants must reproduce asexually.
    D. The flowers changed colors because of its environment.

15. Jeofrey was asked by his science teacher to give an example of an organism that can reproduce sexually. He answered starfish. Is Jeofrey correct about his answer?
    A. Yes, because starfish needs one parent cell to reproduce.
    B. No, because starfish needs two parent cells to reproduce.
    C. Yes, because starfish needs two parent cells to reproduce.
    D. No, because starfish needs one parent cell to reproduce.

What's In

Did you know that organisms reproduce sexually in a number of ways? Let us take a look at the different ways how representative microorganisms and plants reproduce sexually.

What's New

Hello there! I want you to label the parts of a gumamela flower. But before you do that, you need to read and understand the reproductive parts of plants.

Activity 1:The Reproductive Parts of Plants

Plant parts that are involved in sexual reproduction are called reproductive parts. These parts produce sex cells or gametes in the form of ovules and pollen grains. Since you have learned about the vegetative parts of plants, now is the right time to know the reproductive parts.

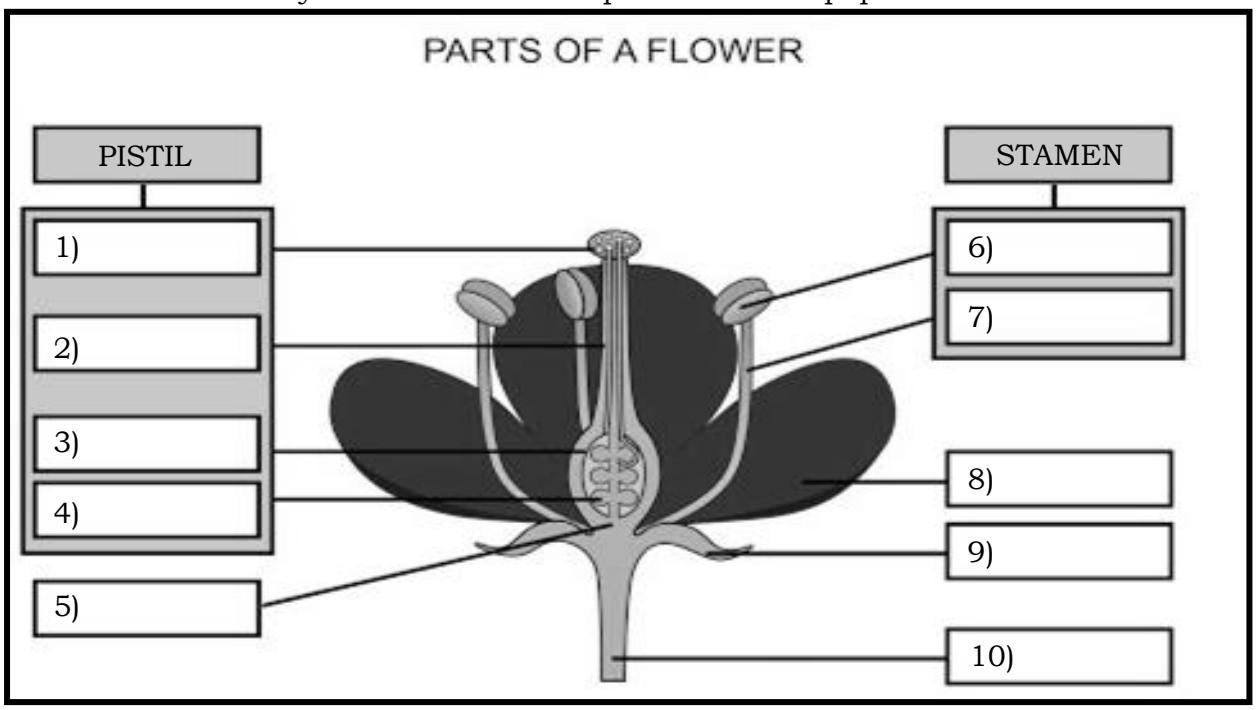
Have you try walking along the garden and observed the flowers? What is the most attractive part that you can see? Is it the petals or the other floral parts? Well, generally speaking, petals are the most attractive of all floral parts, purposely so to attract insects. The flower is the reproductive organ of a plant that produces the egg and sperm. Sex organs are formed during the reproductive stage of plant development. In flowering plants, sex cells are produced in certain floral organs. Look at the diagram on the next page and examine the floral parts.

The male reproductive organ is called the stamen. It is made up of two parts: the anther and filament. The anther produces the pollen, which contains the male sperm cells and the filament that holds or supports the anther up.

The female reproductive organ is the pistil. Starting from the top, it is composed of the following parts: stigma, style, ovary and the ovules. The ovules are equivalent to the pollen grains of the male reproductive organ. They are the sex cells produced in the ovary.

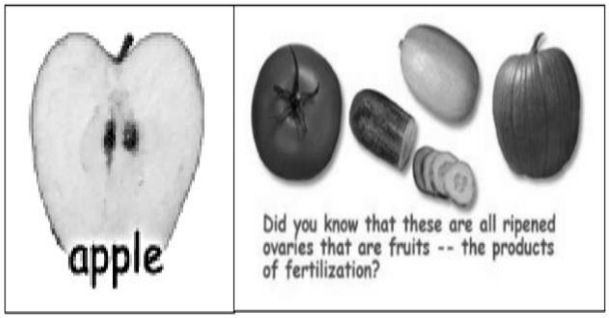
What is It

Did you understand the context? Label now the parts of a gumamela flower as shown below. Write your answers on a separate sheet of paper.



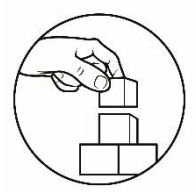
Do you notice the yellowish portion at the center? It is a group of anther that contains the pollen. The anther is held up by a structure known as the filament. Anther and filament comprise the stamen. Locate the pistil. It is composed of the stigma, ovary and style. The colored part at the center is the sticky stigma, which receives the pollen during pollination. It has a tube called the style and ends up in the ovary of the plant.

When pollen lands on the stigma during the process of fertilization, a tube grows down the style and enters the ovary. Male sperm cells travel down the tube and join with the ovule, fertilizing it. The fertilized ovule becomes the seed, and the ovary becomes the fruit.



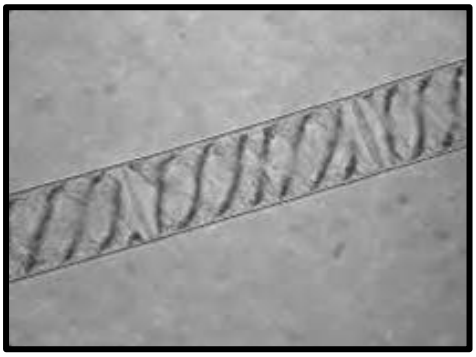
Have you tasted an apple? Tomato? Cucumber? What part of the plant are these? These organs are called fruits. A fruit is the ripened ovary of a plant containing the seeds. After fertilization, the ovary swells and becomes either fleshy or hard to protect the developing seeds. Most of the items prepared as vegetables are actually fruits such as tomato, cucumber, beans and squash.

Fruits have originated from the ovary of the flower, which means that they are products of sexual reproduction. Cut the fruit and check for some hard structures inside. How many do you find inside? These are the fertilized ovules or popularly referred to as seeds. Once seeds germinate, they are capable of growing into another young plant.



What's More

Some microorganisms undergo sexual reproduction by a process called **conjugation.** An example of a microorganism that reproduces by conjugation is *Spirogyra*, a green alga. Spirogyra can be found in freshwater habitats such as ponds and rivers.



During *conjugation*, a bridge forms between two cells of two Spirogyra filaments lying side by side. The contents of one cell pass into the other cell through the bridge, emptying the other cell. The contents of both cells combine in the other cell and form the zygote. This zygote is able to secrete a substance that forms a wall around itself for protection against unfavorable environmental conditions (e.g. when the pond dries up). When conditions become suitable for growth and development, the zygote grows into a new individual.

Sexual Reproduction in Humans

Humans (and all animals that reproduce sexually) have cells called gametes. Gametes are formed during meiosis and come in the form of sperm (produced by males) or eggs (produced by females).

When conditions are right, sperm and egg unite in a process known as fertilization. The resulting fertilized egg, or zygote, contains genes from both parents.

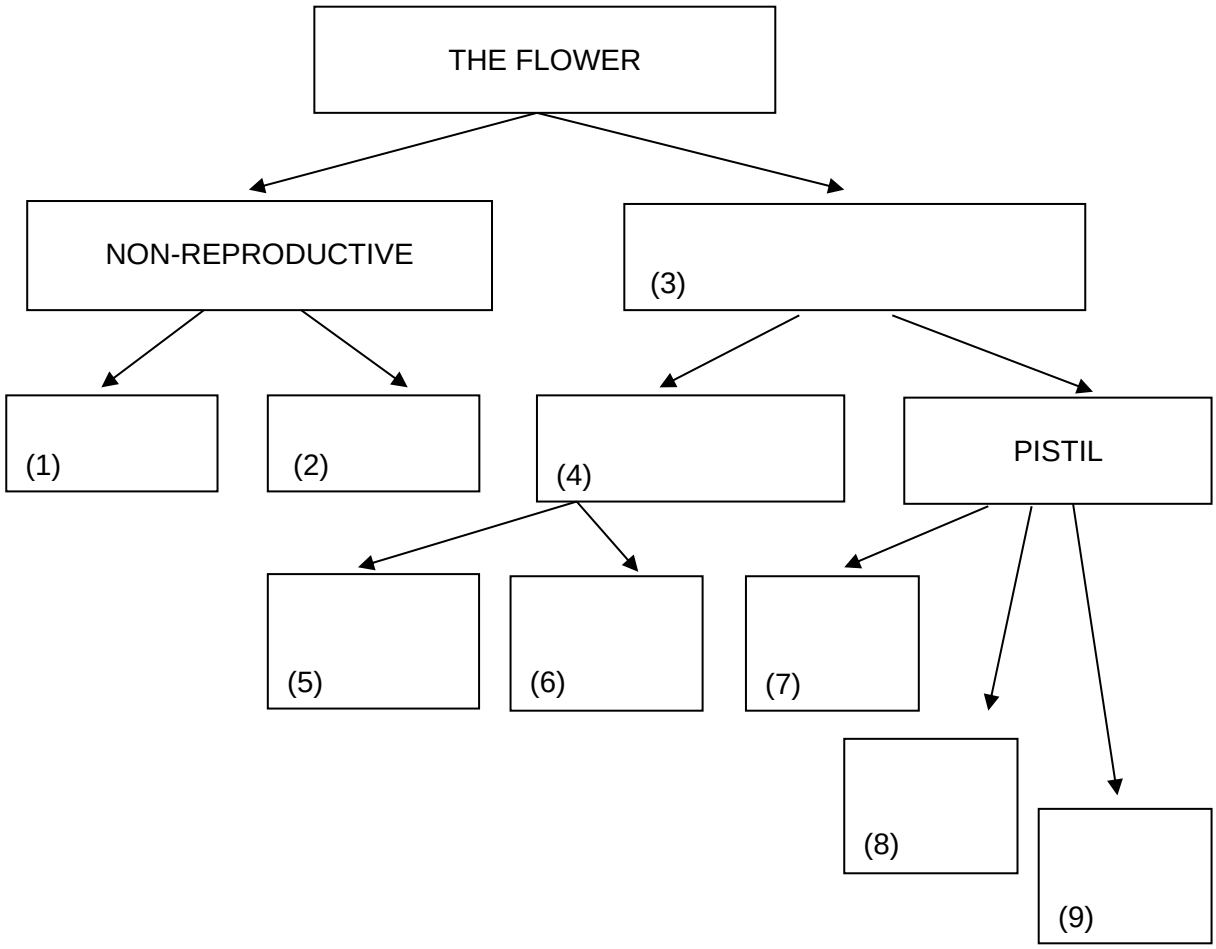
Questions to Ponder: Write your answers on a separate sheet of paper.

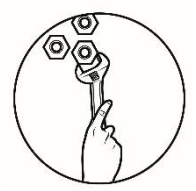
1. How many parent cell/s is/are involved in sexual reproduction?
2. Are the parents and the offspring identical or not? Explain your answer.
3. How are asexual and sexual reproductions similar? How do they differ?
4. Draw your own conclusion.

What I Have Learned

Directions: Fill up the concept map of the plant reproductive organ using the word pool below. Write your answers on your activity notebook.

REPRODUCTIVE	SEPALS	PETALS
STAMEN	STYLE	STIGMA
ANTHER (POLLEN)	FILAMENT	OVARY (OVUM)





What I Can Do

Directions: Using the ideas that you have learned in the previous activities and discussions, describe the sexual reproduction of flowering plants, like the gumamela flower, by creating your own story. Write your answers on a separate sheet of paper. Be creative and enjoy!

Story Making Rubric

Criteria	Distinguished (5 points)	Proficient (4 points)	Apprentice (3 points)	Novice (2 points)
1. Creativity and Originality	Writing had many creative details that made the reader want to learn more.	Writing had three or more examples of creative ideas.	Writing had one to two creative details.	Writing was not creative and did not show imagination.
2. Organization of Thoughts	Writing has a beginning, middle, and an end. Writing flows from one sentence to another.	Writing has a beginning, middle, and end.	Writing has at least a beginning, middle, or end.	Writing does not have a beginning, middle, or end.
3. Spelling and Grammar	Writer makes no spelling or capitalization errors. Writer always used the parts of speech correctly.	Writer makes less than five spelling and capitalization errors. Writer used the parts of speech correctly.	Writer makes less than ten spelling and capitalization errors. Writer sometimes used the parts of speech correctly.	Writer makes so spelling and capitalization errors work is hard to read.

(Source: Adapted from rubric-maker.com.ph)

Assessment

Directions: Choose the best answer. Write the letter of your choice on your activity notebook.

1. What part of the flower is the most attractive where it uses to attract insects?
   A. Ovary
   B. Petals
   C. Sepals
   D. Style

2. What do you call to the part of the flower that supports or holds the anther up?
   A. Filament
   B. Pollen
   C. Stamen
   D. Style

3. Which of the following parts of the flower refers to the sex cells produced by the ovary?
   A. Anther
   B. Ovules
   C. Style
   D. Pollen grains

4. Which of the following does **NOT** belong to the group??
   A. Filament
   B. Ovary
   C. Stigma
   D. Style

5. In what organ of the plant does the reproduction occurs?
   A. Flower
   B. Leaf
   C. Roots
   D. Stem

6. Which of the following organisms uses pollination as its mode of sexual reproduction?
   A. Frog
   B. Rabbit
   C. Spyrogyra
   D. Gumamela flower

7. Which of the following refers to the male reproductive part of a flower?
   A. Petal
   B. Pistil
   C. Sepal
   D. Stamen

8. Which species can produce offspring that are genetically different from their parents?
   A. A species that has few variations
   B. A species that reproduces sexually
   C. A species that reproduces asexually
   D. A species that competes with a similar species

9. In what part of the flower are the pollen grains produced?
   A. Anther
   B. Filament
   C. Ovary
   D. Stigma

10. Which of the following statement/s differentiate/s asexual from sexual reproduction?

I. In sexual reproduction, two parent cells are needed to produce new individual.
II. In asexual reproduction, only one parent cell is needed to produce new individual.
III. In sexual reproduction, only one parent cell involved, while in asexual reproduction, two parent cells are involved.

   A. I and II
   B. II and III
   C. I and III
   D. III only

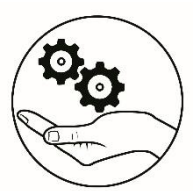
11. Alexander plants a group of seeds that all came from the same plants. When seeds grow and bloom, the resulting flowers are different sizes and colors. What can Alexander conclude from his experiment?
   A. Alexander used soil that had other seeds in it.
   B. The species of plants must reproduce sexually.
   C. The species of plants must reproduce asexually.
   D. The flowers changed colors because of its environment.

12. Flowers are the reproductive organs of plants. How will you differentiate flowers from the reproductive organs of animals?
   A. Flowers need pollinators like bees to reproduce; animals do not.
   B. Flowers are shed from time to time; nothing is shed from animal
   C. Flowers have male and female parts; animals have either male or female parts.
   D. There is no difference between flowers and the reproductive organs of animals.

13. Jhen was asked by her science teacher to give an example of an organism that can reproduce sexually. She answered yeast. Is Jhen correct about her answer?
    A. No, because yeast needs one parent cell to reproduce.
    B. Yes, because yeast needs one parent cell to reproduce.
    C. No, because yeast needs two parent cells to reproduce.
    D. Yes, because yeast needs two parent cells to reproduce.

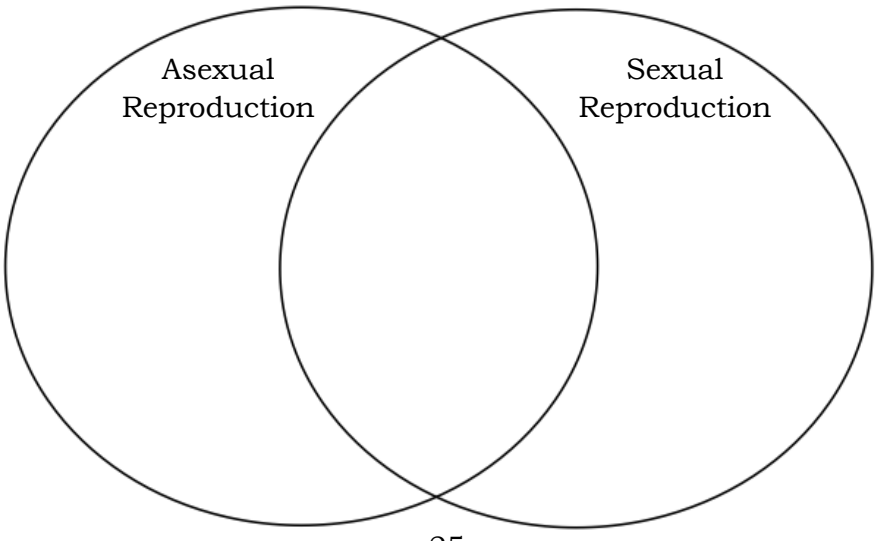
14. A sperm cell unites with an egg cell to form a zygote. Which process is taking place?
    A. Asexual reproduction
    B. Fertilization
    C. Pollination
    D. Vegetative propagation

15. How would you compare sexual reproduction and asexual reproduction?
    A. Asexual reproduction has many forms while sexual reproduction has only two.
    B. Sexual reproduction produces offspring that are identical to the parent while asexual reproduction produces offspring that are not identical to the parent.
    C. Asexual reproduction happens only in plants while sexual reproduction happens only in humans.
    D. Sexual reproduction requires two parent cells to form an offspring while asexual reproduction needs only one parent cell to produce offspring.



Additional Activities

Directions: Using what you have learned on the previous lesson on asexual reproduction, create a Venn Diagram on the differences and similarities of asexual and sexual reproduction. Write your answer on a separate sheet of paper.



Answer Key

Lesson 1

What's More Activity 1

1. D 2. C 3.E
4. B 5. A

What's More Activity 2

1. vegetative propagation
2. budding
3. binary fission
4. regeneration
5. spore formation

Questions to ponder:

6. There is only one parent involved in asexual reproduction.
7. Offspring are genetically identical to the parent.
8. *answers may vary*

What's New

A. Asexual reproduction is a type of reproduction where a single organism is the sole parent and the offspring is genetically identical to the parent.

B. The five types of asexual reproduction mentioned in the story are vegetative propagation, binary fission, budding, spore formation and regeneration.

C. Organisms reproduce through vegetative propagation are potato, onion and ginger.

D. Bacteria reproduce through binary fission.

E. Asexual reproduction through budding is where organism is formed as an outgrowth of the parent then it will separate from the parent and becomes a new individual.

What I Know

1. A
2. D
3. D
4. A
5. D
6. C
7. E
8. B
9. A
10. D
11. C
12. C
13. B
14. B
15. A

Additional Activities

Across

1. starfish
3. regeneration
5. mushroom
6. asexual
8. bacteria
10. fission

Down

2. rhizome
4. spore
7. budding
9. tuber
11. stolon

Assessment

1. B
2. A
3. D
4. C
5. B
6. D
7. D
8. D
9. C
10. B
11. C
12. B
13. B
14. B
15. A

What I Can Do

Learners may give different possible examples under each type of asexual reproduction.

What I Have Learned

1. reproduce
2. asexual
3. identical
4. vegetative propagation
5. ginger
6. bacteria
7. two
8. molds
9. regeneration
10. budding

Lesson 2

What's More

1. 2
2. The parents and the offspring under sexual reproduction are not identical to each other.
3. Sexual reproduction produces offspring that are not identical to each other while asexual reproduction produces offspring that are identical to each other.
4. Sexual reproduction involves two parent cells while asexual reproduction involves only one parent cell. Sexual reproduction produces variety forms of life while asexual reproduction maintains the traits of the parents to their offspring.

What It Is

1. Stigma
2. Style
3. Ovary
4. Ovules
5. Receptacle
6. Anther
7. Filament
8. Petal
9. Sepal
10. Stem

What I Know

1. B
2. A
3. B
4. B
5. D
6. A
7. A
8. C
9. B
10. A
11. C
12. B
13. A
14. B
15. D

What I Have Learned

1. Sepal
2. Petal
3. Reproductive
4. Stamen
5. Anther (Pollen) — *In any order*
6. Filament
7. Stigma — *In any order*
8. Style
9. Ovary

What I Can Do

- *Students' answer may vary*

Assessment

1. B
2. A
3. B
4. A
5. A
6. D
7. D
8. B
9. A
10. A
11. B
12. A
13. A
14. B
15. D

Additional Activities

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For inquiries or feedback, please write or call:

Department of Education - Bureau of Learning Resources (DepEd-BLR)

Ground Floor, Bonifacio Bldg., DepEd Complex
Meralco Avenue, Pasig City, Philippines 1600

Telefax: (632) 8634-1072; 8634-1054; 8631-4985

Email Address: blr.lrqad@deped.gov.ph *
blr.lrpd@deped.gov.ph