

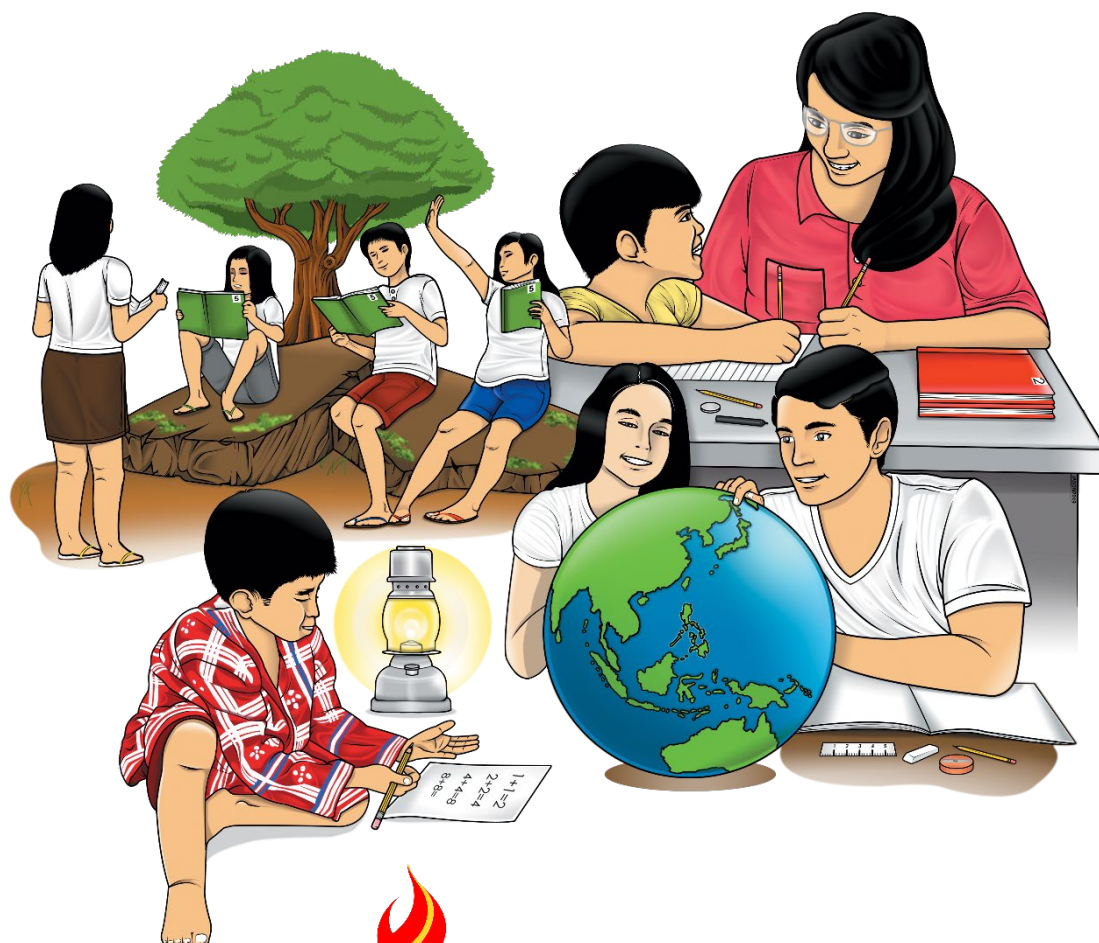
Senior High School



Earth and Life Science

Quarter 2 – Module 3:

Perpetuation of Life



**Earth and Life Science
Alternative Delivery Mode
Quarter 2 – Module 3: Perpetuation of Life
First Edition, 2021**

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Senior High School

Earth and Life Science

Quarter 2 – Module 2:

Perpetuation of Life

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

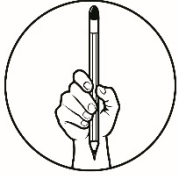
This module was designed and written with you in mind. It is here to help you master the nature of Biology. The scope of this module permits it to be used in many different learning situations. The language used recognizes the diverse vocabulary level of students. The lessons are arranged to follow the standard sequence of the course. But the order in which you read them can be changed to correspond with the textbook you are now using.

The module covers:

- Lesson 1 – Perpetuation of Life

After going through this module, you are expected to:

1. identify the type of asexual and sexual reproduction in animals;
2. describe the different ways of how representative animals reproduce; and
3. realize the importance of reproduction to maintain the continuity of life.



What I Know

Directions. Choose the letter of the best answer. Write the chosen letter on a separate sheet of paper.

1. A term used to describe morphologically and genetically similar individuals.
 - A. clone
 - B. similar
 - C. identical
 - D. vegetative
2. This refers to a type of asexual reproduction where the organism divides into two, leaving one piece headless and the other tailless, and each piece grows the missing body parts.
 - A. binary fission
 - B. binary fusion
 - C. transverse fission
 - D. transverse fusion
3. This refers to reproduction in animals that involves production of new living organism through combining two gametes from different organism, one male producing motile gamete that must fused with the egg cell from female organism.
 - A. asexual
 - B. sexual
 - C. both and b
 - D. none of a and b
4. Refers to largest cell in the female body waiting for a motile gamete to be fused with.
 - A. egg
 - B. sperm
 - C. zygote
 - D. morula
5. Live bearing are animals which give birth to live offspring.
 - A. oviparous
 - B. viviparous
 - C. both a and b
 - D. none of a and b
6. In sexual reproduction, what are the gametes involved?
 - A. egg cell
 - B. sperm cell
 - C. both a and b
 - D. none of a and b
7. It is characterized as having two reproductive system in one organism.
 - A. hermaphroditism
 - B. sequential hermaphroditism
 - C. both a and b
 - D. none of a and b

8. Choose the statement that is TRUE about sexual reproduction:
 - A. Gametes has diploid cells.
 - B. Occur with only one parent involve.
 - C. Produce genetically different offspring as compared to parents.
 - D. Involves less time as compared to asexual reproduction process.
9. It is the term called for organism that shifts from male to female like clown fish.
 - A. protandrous
 - B. protogynous
 - C. both a and b
 - D. none of a and b
10. Monkeys and other four-legged animals are classified as:
 - A. oviparous
 - B. viviparous
 - C. both a and b
 - D. none of a and b
11. The Philippine eagle is an example of
 - A. oviparous
 - B. viviparous
 - C. both a and b
 - D. none of a and b
12. A new organism develops from an outgrowth or bud due to cell division at one particular site is called
 - A. budding
 - B. fragmentation
 - C. parthenogenesis
 - D. transverse fission
13. Process in which an organism divides into two and grows into a new organism.
 - A. Budding
 - B. Fragmentation
 - C. Parthenogenesis
 - D. transverse fission

For numbers 14-15, refer to the following choices below.

- A. Statement I is correct
 - B. Statement II is correct.
 - C. Statement I and II are both correct.
 - D. Statement I and II are both incorrect.
14. I. Aphids can reproduce sexually when conditions are stable and favorable during springs.
 II. Aphids can reproduce asexually when conditions are stable and favorable during springs.
 15. I. Sexual reproduction involves the union of gametes and it does not change the number of chromosomes present.
 II. Asexual reproduction involves the union of gametes and it does not change the number of chromosomes present.

Lesson

1

Perpetuation of Life

There are varieties of organism in animal kingdom that means they possess different modes of reproduction depending on the complexity of their morphology and physiology. Simple organisms reproduce through asexual reproduction – offspring come from a single parent and has the exact copy of the genes hence referred as “clone”. Sexual reproduction in animals is the production of new living organism by combining two gametes from different organism, one male producing motile gamete that must fused with the egg cell from female organism. Through this process similarity is preserve with respect to the transfer of genes from the parts to offspring and individuality that explains the individual characteristics possessed by an organism different from their parents nor siblings.



What's In

Activity 1: It's a Review!

Directions. Write TRUE on the space provided if the statement supports the unifying themes in the study of life and FALSE if it doesn't. Write the correct answer on the separate sheet of paper.

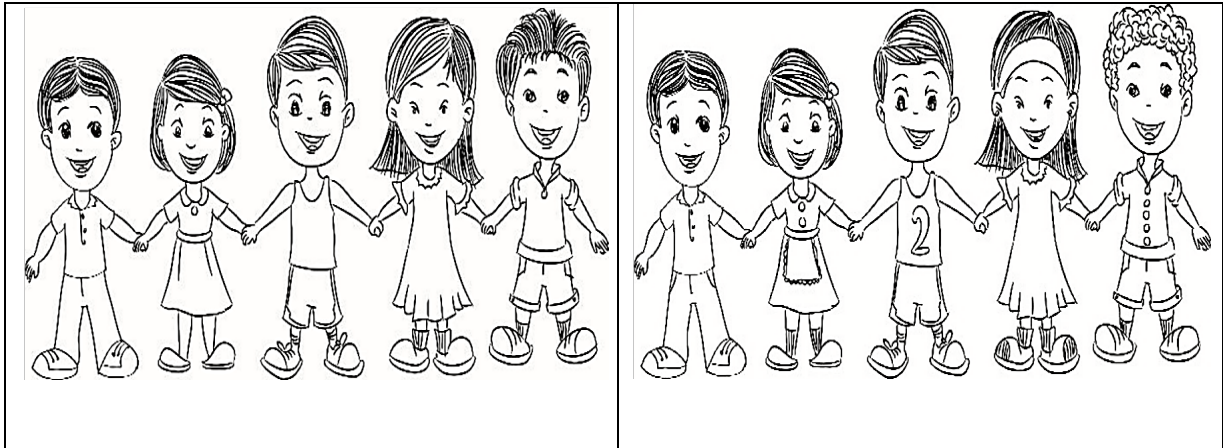
- ___ 1. Biological system can be applied to all levels of life starting to the molecules of our cells all the way up to the whole biosphere.
- ___ 2. All organisms are made up of similar and one kind of cell.
- ___ 3. The coordination of the form and function of parts (form-fit-function theme) strengthens the structure of life.
- ___ 4. An organism can be completely isolated from its surrounding.
- ___ 5. Energy can be obtained in chemical form in all the food we are taking in the body.
- ___ 6. The flower is a plant's reproductive organ.
- ___ 7. The mature ovule of the flower is called fruit.
- ___ 8. The seed is the matured ovary of the flower after fertilization.
- ___ 9. Seeds of plants can be dispersed through water, wind and animals.
- ___ 10. The brightly-colored part of the flower that attract pollinators are the petals.



What's New

Directions. Activity 2: Spot the difference

Directions. Observe the two pictures below and answer the following questions carefully.



Guide questions.

1. Do you see any similarities and differences in the pictures?

2. If yes, can you describe how the first picture is similar to the other image?

3. If no, can you describe how the first picture is different to the other image?



What Is It

Asexual Reproduction

Asexual reproduction is defined as the formation of new individuals from the cells of a single parent. This is very common in plants and is less common in animals. Asexual reproduction does not involve the union of gametes (sperm cell and egg cell) and it does not change the number of chromosomes present. The resulting offspring is similar or identical to the parent and without the need for a mate, they are able to reproduce. There are different types of asexual reproduction in animals.

Activity 3: Reveal me!

Directions. Reveal the terms in grid by replacing the number with a vowel. Write your answer in a separate sheet of paper.

A(1) E(2) I(3) O(4) U(5)

1.

1	S	2	X	5	1	L

- Single individual produces offspring

2.

F	R	1	G	M	2	N	T	1	T	3	4	N

- Pieces of the parent breaks off and develops into a new animal

3.

B	3	N	1	R	Y

- Process in which an organism divides into two and grow into a new organism

4.

B	5	D	D	3	N	G

- Process outgrowth or callus projecting from the parent and eventually buds off

5.

P	1	R	T	H	2	N	4	G	2	N	2	S	3	S

- Mechanism of asexual reproduction in which female offspring develops from unfertilized eggs

6.

T	R	1	N	S	V	3	R	S	3

- Fission that involves direct reproduction in which each portion regenerates missing parts to become a complete new animal depending on the axis of separation


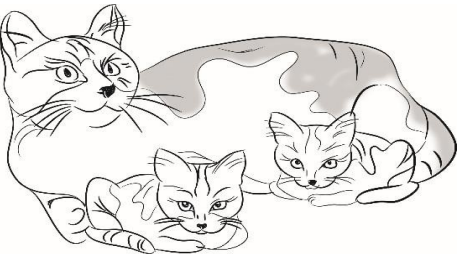
Sexual Reproduction

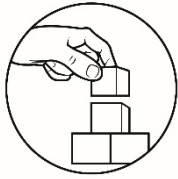
Sexual reproduction is the perpetuation of a new organism from two organisms with the use of gametes. In this process, male gametes which is the sperm cell fuses with a female gamete known as the egg cell to form a diploid cell called zygote containing two sets of chromosomes. During sexual reproduction, the genetic material contained in their chromosomes combine to produce genetically diverse offspring that are different from both parents. Most mammals and amphibians reproduce through the method of sexual reproduction.

Activity 4: Fill In

Directions. Complete the description of the illustration in the left column by choosing the terms in the grid. Write your answer in a separate sheet of paper.

INSIDE	EGG	PARENT	YOUNG
--------	-----	--------	-------

	<p>OVIPAROUS ANIMALS that lay their _____, with little or no other embryonic development within the _____.</p>
	<p>VIVIPAROUS ANIMALS bringing forth live _____ that have developed _____ the body of the parent.</p>



What's More

Types and Examples of Asexual Reproduction in Animals

Activity 5: Asexual Reproduction in Animals

Directions. Match animals to the type of asexual reproduction and their descriptions. Write the type of asexual reproduction and the letter of the description in each column. Write your answer in a separate sheet of paper.

Type of asexual reproduction:

PARTHENOGENESIS
TRANSVERSE FISSION

BINARY FISSION
BUDDING

FRAGMENTATION

Descriptions:

- A. The organism split into two separate organisms.
- B. A new individual grows on the body of its parent.
- C. Multiple pieces of the parent break off and develop into a new organism.
- D. The organism divides into two, leaving one piece headless and the other tailless each piece grows the missing body parts.
- E. Female eggs develop into a new organism without being fertilized by a sperm cell.

ANIMALS	DESCRIPTION	TYPES
1. honey bee (<i>Apis mellifera</i>)		
2. hydra (<i>Hydra oligactis</i>)		
3. amoeba (<i>Amoeba proteus</i>)		
4. star fish (<i>Asteroidea</i>)		
5. flat worms (<i>plathelminthes</i>)		
6. aphids (<i>Myzus persicae</i>)		
7. bluegreen algae (<i>cyanobacterium</i>)		
8. blackworm (<i>Lumbriculus variegatus</i>)		
9. yeast (<i>Saccharomyces cerevisiae</i>)		
10. paramecium (<i>Pamecium caudatum</i>)		

Activity 6: Fit me

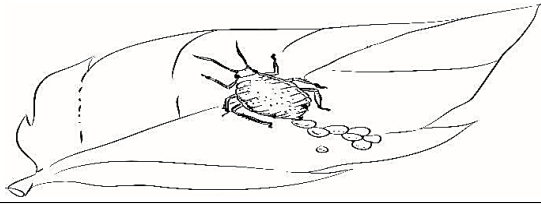
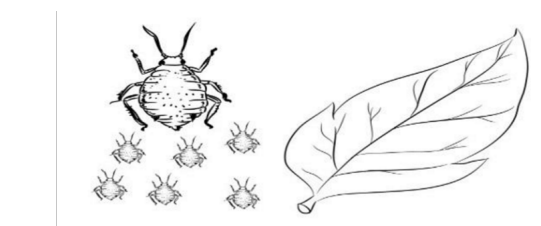
Directions. Complete each statement by choosing the terms in the grid below. Write your answer in a separate sheet of paper.

PARTHENOGENESIS	BUDDING	CLONE
FRAGMENTATION	TRANSVERSE FISSION	BINARY FISSION

1. is a term used to described morphologically and genetically similar individuals through asexual reproduction.
2. An asexual reproduction in which a new organism develops from an outgrowth or bud due to cell division at one particular site is called .
3. In multicellular organisms it is a form of asexual reproduction in which an organism split into fragments where each of these fragments develop into matured, fully grown individuals that are identical to their parents .
4. is a fission that involves direct reproduction in which each portion regenerates missing parts to become a complete new animal depending on the axis of separation.
5. a reproductive strategy that involves development of a female (rarely a male) gamete (sex cell) without fertilization.

Activity 7: Aphids Reproduction

Direction: Using the diagram, complete the statement below. Choose from the correct answer inside the parenthesis. Write your answer in a separate sheet of paper.

Condition A	
	Aphids can reproduce asexually when condition are stable and favorable during early springs, they can produce clones through _____.
With source of food	(parthenogenesis; budding)
Condition B	
	In autumn, plants prepare for dormancy, food becomes scarce then aphids switch to reproductive modes to produce by _____ means.
Scarcity of food	(sexual, asexual)

Examples of Sexual Reproduction in Animals


Activity 8: Sexual Reproduction in Animals


Directions. Classify the following animals as viviparous or oviparous. Write on the space given. Write your answer in a separate sheet of paper.


ANIMALS	CLASSIFICATION
1. turtle (<i>Eretmochelys imbricate</i>)	
2. eagle (<i>Pithecophaga jefferyi</i>)	
3. giraffe (<i>Giraffa camelopardis</i>)	
4. salmon (<i>Salmo salar</i>)	
5. monkeys (<i>Macaca fascicularis</i>)	
6. human (<i>Homo sapiens</i>)	
7. frogs (<i>Ran pipens</i>)	
8. baboon (<i>Pan paniscus</i>)	
9. clownfish (<i>Amphiprion ephippium</i>)	
10. cattle (<i>Bos taurus</i>)	


Activity 9: Guess Me!

Directions. Complete the statements below by naming the given illustration. Write your answer on each blank opposite the number. Use the answer sheet in answering.

During sexual reproduction, a haploid 1.  unites with a haploid

2.  cell to form a diploid. In human the chromosomes of the sperm cell have $n=23$ and the egg cell $n= 23$. After fertilization the combined egg cell and

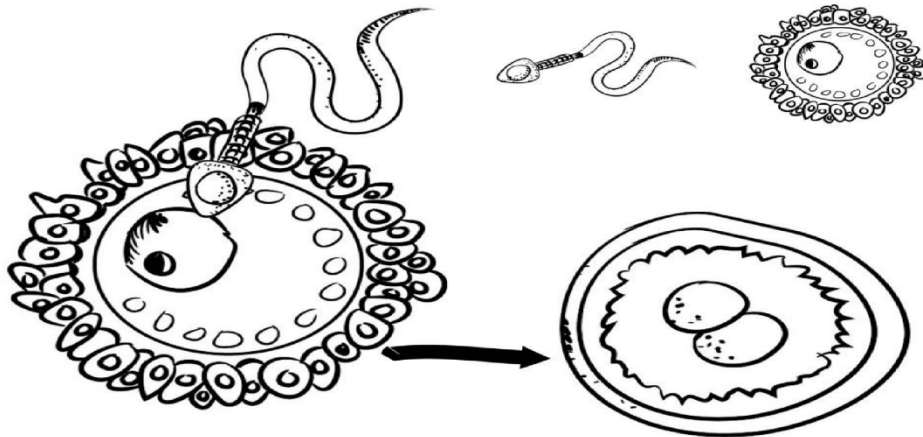
sperm cell known as 3.  contain two set of chromosomes $2n=46$. It later

grows and develops to be 4. 

1. _____	2. _____
3. _____	4. _____

Activity 10: Sexual Reproduction

Directions. Using the diagram below classify if the statement is correct or not as related to the descriptions of sexual reproduction in animals. Write **True** if it is correct and **False** if incorrect on the space given. Write your answer in a separate sheet of paper.



- ___ 1. Offspring are different from the parent organism.
- ___ 2. This process creates a variety of genetic make-up which is the driving force behind evolution.
- ___ 3. Sexual reproduction requires three parents.
- ___ 4. Asexual reproduction produces a greater chance of variation within a species than sexual reproduction would.
- ___ 5. This variation improves the chances that a species will adapt to his environment and survive.
- ___ 6. Only one sperm can fertilize an egg cell.
- ___ 7. Egg cell in human has 46 chromosomes.
- ___ 8. Sperm cell in human has 23 chromosomes.
- ___ 9. In sexual reproduction, not only do you need two gametes for fertilization, one has to be male, the other female.
- ___ 10. Genetic “errors” happen more frequently because meiosis is more complex than mitosis and diploid organisms have more chromosomes to double.

Activity 11: (Provide title)

Directions. Arrange the jumbled words and complete the description in the next column. Use the words in the box. Write your answer in a separate sheet of paper.

HERMAPHRODITISM SEQUENTIAL HERMAPHRODITISM	TWO; MONOECIOUS FEMALE; MALE
---	---------------------------------

A.

M	S	I	T	I	D	O	R	H	P	A	M	R	E	H

- _____ are individuals that possess
- _____ reproductive systems and referred to as 3. _____. May self-fertilize or may mate with another specie fertilizing each other to produce offspring. (earthworms, slugs, tapeworms and snails)

B.

S	Q	E	L	I	A	T	N	U	E

M	S	I	T	I	D	O	R	H	P	A	M	R	E	H

- _____ occurs when an organism changes its sex. The types are: Protogynous
- _____ converting to male) (Wrasse or reef fish) and Protandrous
- _____ converting to female) (Clown fish)



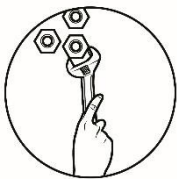
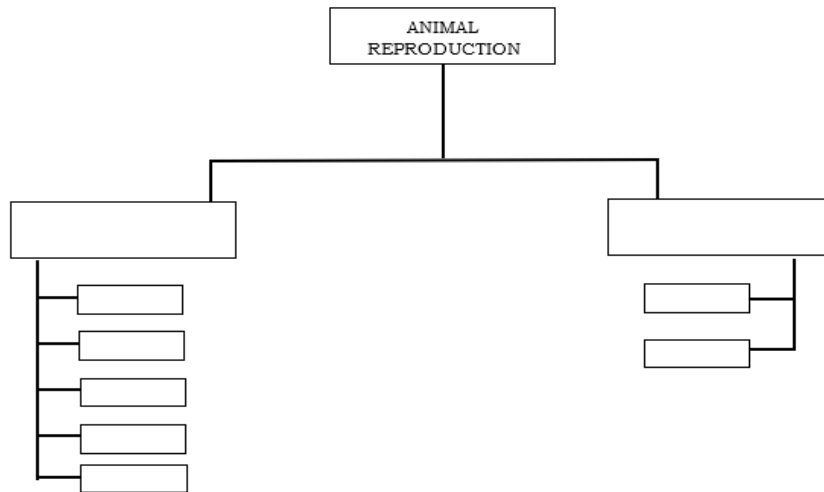
What I Have Learned

- Animals can reproduce through asexual and sexual means.
- Asexual reproduction in animals have different types such as : Binary fission where organism split into two separate organism; Budding is when new individual grows on the body of its parent; Fragmentation happens when multiple pieces of the parent breaks off and develops into a new organism; Transverse fission occur when an organism divides into two, leaving one piece headless and the other tailless each piece grows the missing body parts and Parthenogenesis when females egg develop into a new organism without being fertilized by a sperm cell.
- Sexual reproduction in animals/ organism is when two organisms reproduce using their gametes the sperm and egg cell both have a haploid number of chromosomes.
- Oviparous animals lay their eggs, with little or no other embryonic development within the parent.

5. Viviparous animals bring forth live young that have developed inside the body of the parent.
6. Asexual reproduction requires only one parent while sexual reproduction requires two parents.

Activity 12: (Provide Title)

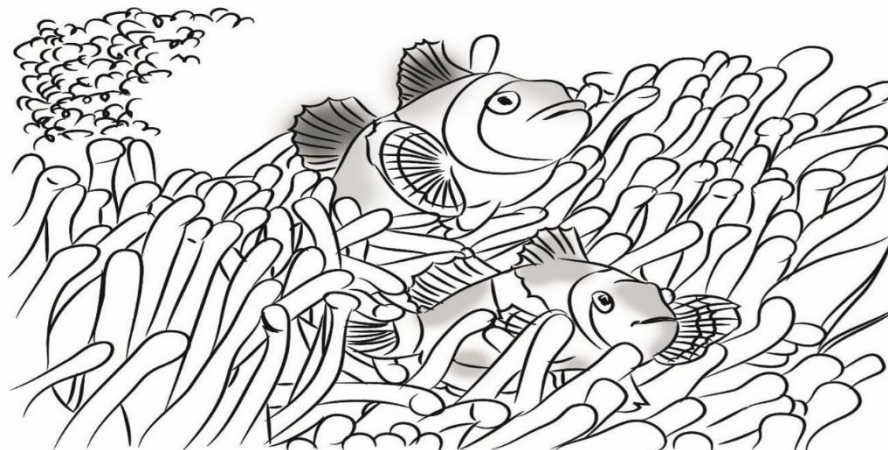
Directions. Fill up the conceptual diagram about animal reproduction. Write your answer in a separate sheet of paper.



What I Can Do

Activity 13: The Life Cycle of a Clown Fish

Directions. Using the diagram arrange the events occurring in the life of a clown fish. Write your answer on the space before the number. Use letter A-G. Write your answer in a separate sheet of paper.



- ___1. Adult clown fish either remains male or become female.
- ___2. Fertilized eggs are laid on a piece of coral near the anemone where they live.
- ___3. Mating dance occur where clown fish chase each other to where the eggs will be laid and repeat the process.
- ___4. The newly hatched clown fish started its life as male and it is called fry.
- ___5. The biggest clownfish will always become female.
- ___6. The fry catches their own food and become darker in shade as they age.
- ___7. The male clown fish attracts the female clown fish through courting that involves pulling and biting of fins.



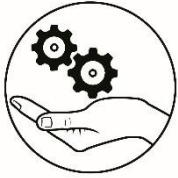
Assessment

Multiple Choice. Read and analyze the following statements. Write the chosen letter on a separate sheet of paper.

1. The asexual reproduction where the organism splits into two separate organisms like in bacteria.
 - A. budding
 - B. binary fission
 - C. fragmentation
 - D. parthenogenesis
2. Flat worms (planarians) divides into two, leaving one piece headless and the other tailless each piece grows the missing body parts.
 - A. budding
 - B. binary fission
 - A. fragmentation
 - B. parthenogenesis
3. A new individual grows on the body of its parent like hydra and yeast.
 - A. budding
 - B. binary fission
 - A. fragmentation
 - B. parthenogenesis
4. Reproduction in animals that involves production of new living organism by combining two gametes from different organisms, one male producing motile gamete that must fuse with the egg cell from female organism.
 - A. sexual
 - B. asexual
 - C. both a and b
 - D. none of a and b
5. This is when an organism possesses two reproductive systems and are referred to as *monoecious*.
 - A. budding
 - B. hermaphroditism
 - C. transverse fusion
 - D. transverse fission

6. Sperm cell and egg cell are used in sexual reproduction among animals. This refers to the collective term for sperm and egg cells.
 - A. gametes
 - B. body cells
 - C. both a and b
 - D. none of a and b
 7. Hermaphroditism is also termed as _____.
 - A. monoecious
 - B. dioecious
 - C. both a and b
 - D. none of a and b
 8. Choose the statement that is TRUE about asexual reproduction in animals.
 - A. Utilize gametes of the body.
 - B. Variety of genetic make-up is produced.
 - C. Involves more amount of time in the process.
 - D. Produce offspring which are identical with the parents.
 9. It is the term called for an organism that shifts from female to male like reel fish.
 - A. protandrous
 - B. protogynous
 - C. both a and b
 - D. none of a and b
 10. Giraffe and lion are examples of
 - A. oviparous
 - B. viviparous
 - C. both a and b
 - D. none of a and b
 11. Salmon and other bony fish are examples of
 - A. oviparous
 - B. viviparous
 - C. both a and b
 - D. none of a and b
 12. This refers to the mechanism of asexual reproduction in which female offspring develops from unfertilized eggs
 - A. budding
 - B. fragmentation
 - C. parthenogenesis
 - D. transverse fission
 13. It involves direct reproduction in which each portion regenerates missing parts to become a complete new animal depending on the axis of separation
 - A. budding
 - B. fragmentation
 - C. parthenogenesis
 - D. transverse fission
- For numbers 14-15, refer to the following choices below.
- A. Statement I is correct.
 - B. Statement II is correct.
 - C. Statement I and II are both correct.
 - D. Statement I and II are both incorrect.
14. I. The male clown fish attracts the female clown fish through courting such as pulling and biting of fins.
 II. The biggest clownfish will always become female.

15. I. Sexual reproduction involves the union of gametes and it does not change the number of chromosomes present.
- II. Asexual reproduction involves the union of gametes and it does not change the number of chromosomes present.

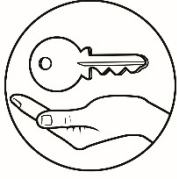


Additional Activities

Make a 300-word essay answering one of the questions below. Upload the essay using your name as saved file in the class shared drive. Accomplish using legal size paper, single spaces, normal margin and Century Gothic 11.

1. How will the offspring be affected if one of the gametes or one of the parents carry an impaired number of haploid chromosomes? Cite an example to justify your answer. Answer in 10 maximum sentences only.
2. How would you explain the relationship of life perpetuation to the evolution of life?

RUBRICS	Above Expectation	Meets Expectation	Below expectation
ANALYSIS	Response provided an in-depth analysis of the question given. Show an understanding of the lesson. Examples were given to explain the concept.	Response provided an in-depth analysis of the question given. Show little understanding of the lesson. Examples were given to explain the concept.	Response do not provide an in-depth analysis of the question given. Show an understanding of the lesson. Examples were not given to explain the concept.
CLARITY	The thoughts were clearly expressed and the organization of the words were exemplified.	The thoughts were slightly expressed and the organization of the words were exemplified.	The thoughts were unexpressed and there is no organization of the words in the sentence.
WRITING SKILL	Clear writing complete sentence, no errors in grammar and spelling.	Clear writing with errors in grammar and spelling.	Unclear writing complete sentence, all errors in grammar and spelling.



Answer Key

What's More Activity 10

- True
- True
- False
- False
- True
- True
- True
- True
- True
- True

Activity 11

- Hermaphroditism
- Sperm cell
- Fertilization
- Sequential Hermaphroditism
- Oviparous

What I can Do Activity 13

- D
- A
- G
- B
- E
- C
- F

Assessment

- A
- A
- B
- B
- B
- B
- B
- D
- B
- B
- A
- A
10. B
11. A
12. D
13. C
14. C
15. B

What's More Activity 5

- E, Parthenogenesis
- B, Budding
- A, Binary Fission
- C, Fragmentation
- D, Fragmentation
- E, Parthenogenesis
- A, Binary Fission
- C, Fragmentation
- B, Budding
- A, Binary Fission

Activity 6

- Clone
- Budding
- Fragmentation
- Transverse fission
- Parthenogenesis

Activity 7

- Parthenogenesis
- Sexual

What's More Activity 8

- Oviparous
- Oviparous
- Oviparous
- Oviparous
- Oviparous
- Oviparous
- Oviparous
- Oviparous
- Oviparous
- Oviparous

Activity 9

- sperm
- egg
- zygote
- offspring/child

What's I Know

- A
- C
- B
- A
- B
- C
- A
- C
- A
- B
- A
- B
- A
- A
- B
- A
- B
- A
- B
- A

What's In Activity 1

- True
- False
- True
- True
- False
- True
- False
- True
- False
- True
- True
- True
- True
- True
- True
- True
- True
- True
- True
- True

What's New Activity 2

Answer may vary among Students' perceptions.

What's It Activity 3

- Asexual
- Fragmentation
- Binary fission
- Budding
- Parthenogenesis
- Transverse

Activity 4

- Egg; parent
- Young, inside

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