

LESSON PLAN

SUBJECT : Science (Biology)
TOPIC : **HOW DO ORGANISMS REPRODUCE?**

Pre-content / Content / Post-content	Learning outcome / objectives	
	General	Specific
PRE-CONTENT: Definition of reproduction, asexual & sexual modes CONTENT: -Importance of variation. -Modes of reproduction used by single celled organisms (i) Fission (ii) Fragmentation (iii) Regeneration (iv) Budding (v) Vegetative propagation (vi) Spore formation -Sexual reproduction a) Why sexual mode of reproduction? b) Sexual reproduction in flowering plants. c) Reproduction in human beings. i) male reproductive system ii) female reproductive system. iii) reproductive health. POST-CONTENT: Students will be introduced with terms like Autogamy, Allogamy, Anemophily, Hydrophily and Zoophily	Students will be able to- -explore the significance of asexual and sexual modes of reproduction. -observe the different methods of vegetative propagation in our school garden demonstrated by the gardener. -know about the methods of population control and their importance. -justify the need of reproduction for the perpetuation and continuity of life. -explore that sex ratio needs to be maintained to balance the reproductive process and to spread awareness against female foeticide for a healthy society. -appreciate the creation of nature by watching flowers blooming, seeds sprouting, etc. -realize that the process of reproduction must continuously go on for any novel creation/evolution.	Students will be able to- -explore the replication and transfer of DNA to progeny from parent cells. -explain the significance of variation in the survival of species. - list the various modes of reproduction used by unicellular organisms. -observe the formation of two daughter cells from a single parent cell (through slide). -observe the small outgrowths developing from yeast cell. -draw and describe various types of asexual reproduction -observe the <i>Bryophyllum</i> leaves, sprouting seeds and explore the parts of plant which propagate vegetatively. -learn the concept of sexual reproduction. -draw labeled diagram to show the parts of a flower and learn the functions of each part. -explain the process of formation of diploid zygote by fertilization. -draw labeled diagram of male and female reproductive system. -analyse the need of reproductive health. -know about the various contraceptive measures & the need for using them.

HOME WORK / ASSIGNMENTS-

Worksheets and assignments , discussed in class, will be given as home work.
 NCERT Textbook questions.

AND PROGRESS

MONTH : AUGUST- SEPTEMBER

CLASS : X

Teacher's activity	Students' activity	Teacher's observations and remedial action taken
Teacher will: -explain the concept of DNA transfer- from one generation to another, and how variation takes place Annexure 8(A) - show permanent slides of <i>Amoeba</i>, yeast and <i>Rhizopus</i> showing binary fission, budding and spore formation respectively -show leaf of <i>Bryophyllum</i> / sprouting potato/ onion to explain vegetative propagation Annexure 8(B) - take to the field for flower study and will then instruct to perform the activity -tell students to bring sprouted seeds for experiment -explain male and female reproductive systems through ICR -explain menstrual cycle and what happens in case of fertilization -discuss the need, importance and types of contraceptive devices -discuss questions from NCERT Textbook with students.	Students will: -answer the questions based on the topic. Annexure 8(a) -perform the activity and answer the questions based on the topic. - observe growth of new plant- vegetative propagation through leaf/ stem and note down its advantages Annexure 8(b) -study the flower using forceps and hand lens and discuss the role of various parts -perform experiment and study parts of dicot seed -identify and name the parts of reproductive system and their functions -participate in classroom discussion, aided with the slides shown through ICR -answer related questions This will be followed by discussion on topics like 'Prenatal sex determination' and 'female foeticide'.	Teacher will write the observations after completion of the topic/s

Teaching aids: Internet, ICR,,Slides showing fission in amoeba and budding in yeast, seeds of legume, Hibiscus flower, *Bryophyllum* leaf, Stem cutting of rose, pictorial representation of male and female reproductive system. Microscope, hand lens.

Methodology / Innovative methods: Activity based collaborative learning (group discussion and presentation), question answer and discussion methods, audio visual (computer , smart board), experimentation, Lab Method, field trip

Inter-disciplinary links: Art – drawing skill developed, Language- group discussion.

HOD

Coordinator

Vice-Principal

Principal

Annexure 8(A),(a)

How are new organisms formed without fusion of gametes?

Subject	Science
Class	X
Chapter/Unit	How do organisms reproduce?
Topic	Modes of Asexual Reproduction
Time	40 min
Nature of Activity	Group of 3 students

What will I learn (Learning Outcome)?

Students will explore the methods of asexual reproduction-fission, budding and spore formation.

Skills: Analyzing and Creating

What I have to do? To observe the slides of fission, budding and spore formation and sequentially arrange the steps of these methods.

What do I require? Compound microscopes, permanent slides of binary fission in *Amoeba*, budding in yeast and spore formation in *Rhizopus* (6 each), 36 A4 sized sheets, Reading material

What do I need to know?

Asexual reproduction is a type of reproduction which does not involve the fusion of gametes or change in the number of chromosomes. The offspring that arise by asexual reproduction from a single cell or from a multicellular organism inherit the genes of that parent. There are various modes of asexual reproduction . Fission, budding and spore formation are examples of asexual reproduction methods.

➤ Teacher's Activity

Teacher will-

1. explain the process of asexual reproduction.
2. make 12 groups of 3 students each (in a class of 36 students)- Group A,B, C, D, E, F, G,H,I,J,K and L
3. provide slides of fission in *Amoeba*, budding in yeast and spore formation in *Rhizopus* to Groups A,B, C,D , E and F to focus and observe under the microscope.
4. provide reading material to Groups G, H, I, J ,K and L to comprehend the topic.

5. after 10 minutes, teacher will exchange the materials distributed among the first six and next six groups.
6. present the images of reproduction in organisms through PPT
7. distribute A4 sized sheets to all the students, give instructions to discuss and identify the organisms and note down the features in the sheets.

How will I proceed?

➤ Student's Activity

Students will

1. observe the slides and PPT and identify three modes of asexual reproduction and note down their observations.
2. read the material provided to them, discuss and note down the steps and draw diagrams of these methods.

What have I observed?

S.NO		Binary Fission	Budding	Spore formation
1.	Diagram as observed under microscope			
2.	Definition			
3.	Organism(s) in which it occurs			

What have I learnt?

1. In binary fission, after splitting ----- does not exist and two new ----- -- are formed
2. In budding, due to repeated ----- at specific sites, bud develops as an outgrowth.
3. Spore formation takes place *Rhizopus* commonly known as -----

What am I curious to learn?

Let us find out-

- How does binary fission take place in a definite orientation in *Leishmania*?
- How does multiple fission in plasmodium take place?

Let me evaluate myself

1. What is asexual reproduction ? What are its various modes?
2. How will an organism be benefitted if it reproduces through spores?
3. Name the type of asexual reproduction in which individuals are formed from a single parent and the parental identity is lost.
4. Fungus, Moss and Fern reproduce by a common method of asexual reproduction. Name the method and also draw a labeled diagram showing the same.
5. Draw labeled diagrams showing the steps of binary fission in *Amoeba* and budding in yeast.

Reading Material-

ASEXUAL REPRODUCTION

Asexual reproduction is a process in which new organism is produced from a single parent without the involvement of gametes or sex cells. Many unicellular and multicellular organisms reproduce asexually. In this process, parent organism either splits or a part of parent organism

separates to form a new organism. In this reproduction, certain cells of the parent undergo mitotic cell division so that two or more new organisms are formed.

There are six types of asexual reproduction. They are:

- 1) Fission
- 2) Budding
- 3) Spore formation
- 4) Regeneration
- 5) Fragmentation
- 6) Vegetative propagation

We are going to study about the first three types today.

Fission

In fission, unicellular organism splits to form new organisms. It is a process of reproduction in organisms such as protozoa and many bacteria.

Binary Fission

In binary fission, the parent cell divides into two after reaching a point where it has fully grown. In this process, after splitting parent cell do not exist and two new organisms are formed.

Examples of unicellular organisms that undergo binary fission are amoeba, paramecium, Leishmania etc.

Budding

The word bud means small outgrowth. In the process of budding, a small bud grows on the body of parent organism and when the time comes it detaches itself to form a new organism. Hydra and yeast undergoes the process of budding.

Spore formation

The method of spore formation occurs in both unicellular and multi-cellular organisms. This process takes place in plants. In spore formation, the parent plant produces hundreds of reproductive units called spores in its spore sac called sporangium. When this sporangium of the plant bursts, these spores travel in air and land on food or soil. Here they germinate and produce new plants.

Fungi like *Rhizopus*, *Mucor*, etc., are examples of spore formation.

Annexure 8(B),(b)

To identify different parts of a flower

Class-X

Duration-40mins

Nature of the Activity- Individual

Learning Outcome- The students will be able to identify and study the role of different parts of flower in sexual reproduction.

What do we have to do?

To study different parts of flower and their role in sexual reproduction.

What do we require?

Flowers of any plant like *Petunia*, *Ipomoea*, *Solanum*, *Datura*, *Mustard* etc, forceps, blotting paper, slides, cover slips, blade, and microscope

What do we need to know?

Sexual reproduction in angiosperms is performed by specially modified shoot called flower.

How will you proceed?

- **Teacher's activity-** Teacher will give the instructions along with the protocol(Student's activity)
Teacher will arrange for the materials
- **Student's activity**

1. Place a wet blotting paper (A4 size) on a board.
2. Separate different whorls of a flower with forceps.
3. Arrange the parts of flower on the wet blotting paper in a sequence, like calyx (group of sepals), corolla (group of petals), androecium (male reproductive part) and gynoecium (female reproductive part).
4. Label the parts separately.
5. Cut transverse sections of the ovary and mount in a drop of water. Observe under the microscope, and count the number of compartments (these are called locules) and ovules in a chamber.
6. Repeat the above activity with different flowers.

What do we observe?

	Number	Shape
Sepals		
Petals		
Stamens		
Pistil		

What have you learnt?

The number and shape of sepals, petals, stamens and carpels vary in different plants.

The pollen grains are present in anther lobes and ovules are located in the ovary.

What would I like to know ?

1 Female gamete is also known as

- A. Embryo Sac
- B. Egg
- C. Ovary
- D. Ovule

2. Reproductive part of flower which is bilobed is -

- A. Anther
- B. Stigma
- C. Stamen
- D. Carpel

3. Part of flower that protects flower in bud form is

- A. Sepals
- B. Petals
- C. Carpels
- D. Stamens

4. In order to attract insects for pollination,

- A. petals are brightly colored
- B. petals are protected by calyx

- C. Epicalyx is essential
 - D. sepals are green
5. Pollen grains are produced inside the
- A. stamen
 - B. stigma
 - C. anther
 - D. filament

Extended learning

1. Which of the following parts of plant take part in sexual reproduction-

- (i) Flower
- (ii) Seed
- (iii) Fruit
- (iv) Branch

Choose the correct answer from below-

- (a) (i) and (ii)
- (b) (i), (ii) and (iii)
- (c) (iii) and (iv)
- (d) (ii), (iii) and (iv)

2. What is triple fusion?

3. What is double fertilization?

4. Trace the events that would take place in flower from the time its pollen grains fall on stigma up to completion of fertilization.

5. Compare the structure and mode of reproduction and organs in incomplete unisexual flowers like cucurbits, castor etc

