

ACTIVITY NO. –15: Let's improve crop variety through hybridisation

Subject	Science
Class	IX
Chapter/Unit	Improvement of food resources
Topic	Hybridization
Time	40mins
Nature of Activity	Group

What will I learn (Learning Outcome)?

To explore the concept of hybridization.

Skills:Analyzing and Creating

What I have to do?

To remove the stamens before anthesis to obtain female parent and transfer pollen from the desired male parent on to its stigma.

What do I require?

Hibiscus or any other bisexual flower

Twizzers

Small sharp scissors

Brush

Alcohol

Rubber bands

Paper Bags

Paper clips and tags

What do I need to know?

Artificial hybridization is the process in which only desired pollen grains are used for pollination and fertilization

Pollination is the process of reproduction in plants in which plants transfer pollen grains from anther to stigma. Pollination can be of two types:

- Cross-pollination
- Self-pollination

For successful pollination to occur, pollen and stigma should be compatible. Incompatibility may lead to rejection of pollen grains. This situation is undesirable, especially in commercial crop production. Therefore, artificial hybridization was developed.

Emasculation is the process of removing anthers from bisexual flowers without affecting the female reproductive part (pistil), which is used in various plant hybridization techniques.

Emasculation ensures that the flower is pollinated by pollen grains obtained from desirable varieties only

➤ **Teacher's Activity**

Teacher will

- draw a diagram on the board for the students to comprehend the topic.
- provide material to students
- Divide students into groups of four
- provide instructions (student's activity) for the activity

How will I proceed?

➤ **Student's Activity**

Four students in each group will -

- Select a flower in bud condition where anthesis has not occurred. Open the bud carefully and remove the stamens. Mark this as female parent plant.- (Task for student 1)
- Cover the emasculated flower with a plastic bag to protect it from undesired pollen (Bagging). The bag should be held securely in place with a paper clip/ string/thread. Select the size of bag in accordance with the flower size. Bags must be transparent with minute pores.- (Task for student 2)
- Bring into physical contact anthers of a desired male plant containing mature pollen grains with the stigmatic surface of emasculated female flower. Use tweezers/brush if necessary to dust the stigmatic surface with pollen.- (Task for student 3)
- Cover the pollinated flower again with the bag immediately. For identification, label the female parent (Tagging). Each pollinated flower should bear a label containing the name of the seed parent, the letter X (to signify a cross), the name of the pollen parent, and the date on which the cross was effected.- (Task for student 4)

What have I observed?

As per your observations while performing the activity, draw diagrams in the following table-

S. No.	Steps performed	Diagram
1.	Emasculation	
2.	Bagging	

3.	Tagging	
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What have I learnt?

-is an important method for crop variety improvement.
- One way of incorporating desirable characters into crop varieties is by-----.
- Hybridisation refers to crossing between genetically -----plants.
- -----is the process of removing anthers from bisexual flowers without affecting the female reproductive part (pistil).
- ----- helps to prevent contamination of stigma with undesired pollens as well as ensure pollination with pollens from desired male parent during breeding programme.
- The----- should bear the information:
(a) Date of emasculation; (b) Date of pollination; (c) Names of female and male parents, consecutively in the cross.

What am I curious to learn?

- Another method for crop variety improvement is genetic engineering. Let us represent the stages of the process of GM crop production in the form of a flowchart.

Let me evaluate myself

1. Explain the concept of hybridization.
2. State the significance of artificial hybridization.
3. Pomato produced by a cross between potato and tomato is an example of inter-generic hybrid. Under which category would you place Atemoya formed by crossing *Annona squamosa* × *A. cherimola* .
4. Which traits do you think can be incorporated in plants by hybridization?
5. Is it advisable to store the seeds of a hybrid plant for future use? Explain giving reason.

