

# Virtual lab as a teaching learning tool for Biology



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Resource Persons



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# Virtual Lab

## as a teaching learning tool for Biology

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# Biology Laboratory Learning Environment

## Testing theory and Concepts:

- o Facilitates experimentation and exploration

## Development of Scientific Temper:

- o Encourages critical thinking and inquiry

## Lab Skill Acquisition:

- o Hands-on experience with techniques and methodologies





# Virtual Labs: Revolutionizing the Learning Experience

Virtual labs are transforming education by providing immersive, interactive learning experiences that engage students and deepen their understanding of complex topics.



# Need of Virtual labs for teaching-learning Biology



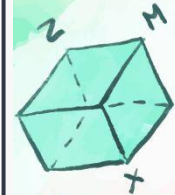
User friendly interface

Personalised learning

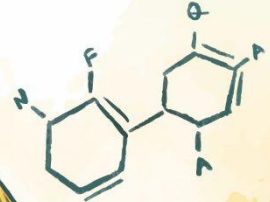
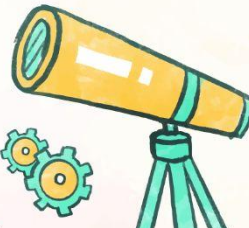
Accessibility

Cost effective

Equity & Inclusivity



$$E=MC^2$$



# Virtual labs enhance science process skills

- Observation
- Recording data
- Controlling variables
- Data analysis
- Interpretation
- Inference



# Virtual labs facilitate physical labs

## Pre-lab session

Provides Introduction to the following:

- lab activity
- Materials required
- Procedure

## Performance session

- Perform the procedure
- Make observations
- Record data

## Post-lab session

- Analyze the recorded data
- Interprets and draw conclusions
- Compare their result with theoretical expectations



# Pedagogical Use: Aligning Virtual Labs with Learning Objectives

## Identify Objectives

Start by clearly defining the learning objectives and outcomes to achieve through the virtual lab.

## Select Appropriate Labs

Choose virtual labs that directly align with learning objectives and complement curriculum.

## Integrate in lesson plans

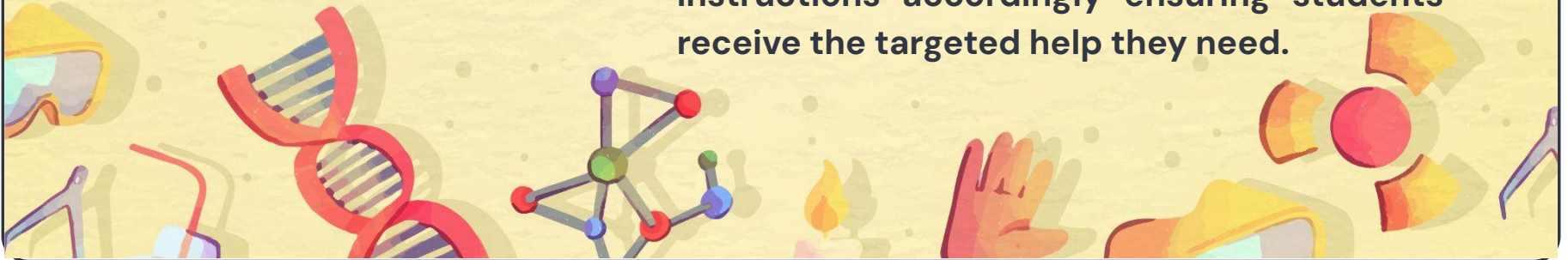
Incorporate virtual labs into lesson plans, ensuring they enhance and support instructional strategies.



# Virtual labs as a Diagnostic Assessment tool

A diagnostic assessment is a form of pre-assessment or a pre-test where teachers can assess students' strengths, weaknesses, knowledge and skills before their instruction.

Teachers can demonstrate an experiment on Virtual labs before beginning a topic to identify knowledge gaps and adjust instructions accordingly ensuring students receive the targeted help they need.



# Formative Assessment: Real-Time Feedback

## Interactive Simulations

It offers hands-on, interactive simulations that provide real-time feedback to students as they learn.

## Collaborative Opportunities

It enables peer collaboration, allowing them to learn from each other in real-time.



# Benefits for Learners

## Accelerated Learning

It allows learners to progress at their own pace.

## Conceptual Understanding

Hands-on experimentation and immediate feedback help learners to develop a more profound comprehension of concepts.

## Enhanced Engagement

It creates an immersive, interactive learning environment that captivates learners and enhances their motivation.





# ✦ ✦ Demonstration of Experiments



# Action of Salivary Amylase on Starch

Theory

Procedure

Animation

Simulator

Self Evaluation

Resources

Feedback

**Action of Salivary Amylase on Starch** HELP

Select the test:  
Temperature ▾  
Select the temperature:  
5°C ▾  
Select the pH:  
pH = 5 ▾  
Reset



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Class XI  
[Simulation Link](#)



# Parts of a flower (Distinguish between Unisexual and Bisexual flower)

Identify the Parts of a Flower and Distinguish between Unisexual and Bisexual Flowers

HELP

**Instructions**  
Click on a flower to select it

HIBISCUS PAPAYA BITTER GOURD  
CASSIA PETUNIA PUMPKIN

Reset

STAMEN


SEPAL

PETAL

OVARY

STIGMA

STYLE



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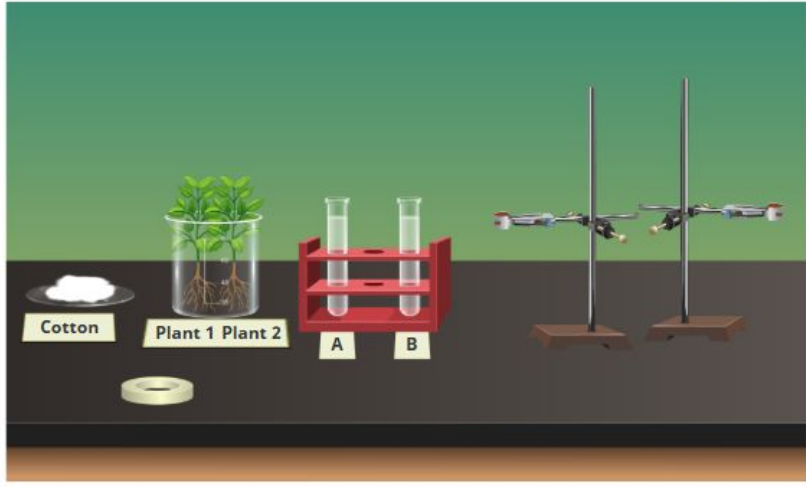
# Study of phototropism and geotropism in plants

## Study of Phototropism and Geotropism in Plants

HELP

**Instructions**

1. Drag and drop plant 1 into boiling tube A.
2. Drag and drop plant 2 into boiling tube B.
3. Drag and drop cotton swab at the top of boiling tube A.
4. Drag and drop adhesive tape onto the mouth of boiling tube A for sealing.
5. Drag and drop cotton swab at the top of boiling tube B.
6. Drag and drop adhesive tape onto the mouth of boiling tube B for sealing.
7. Secure/Fix boiling tubes A and B on the burette stand by dragging and dropping them.



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# Study of Pollutants in Air



**Study of Pollutants in Air** SAVE

Instructions

1. Note the weight displayed in the weighing machine and drag the leaf bundle to place it on the heavy, moderate or no vehicular traffic places.
2. Wait till the clock time completes and then drag the leaves to back the weighing machine and note the final weight.




**Very heavy vehicular traffic**



**Moderate vehicular traffic**      **No vehicular traffic**

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Thank You!

