

# **TEACHER'S MANUAL**

## **UNDERSTANDING THE IMPORTANCE OF THE USE OF VISUAL AIDS IN THE CLASSROOM**



BY :- Aarav Prakash  
The Doon School

Date :- 4<sup>th</sup> July 2023 – 25<sup>th</sup> July 2023

# Introduction

The advancement of human civilization is significantly influenced by Education. The way that people learn has changed significantly over time and continues to evolve as a result of developing technology. Humans tend to remember things we have been taught visually for a longer period of time. Skills and knowledge learnt through visually stimulating materials tend to last in our memories for a long time. This is why visual learning is considered one of the most effective teaching tools today. Now let's talk about why schools need to invest in this particular learning style.

Research of Cuban (2001) indicated the psychology of visual aids as under:-

- 1% of what is learned is from the sense of TASTE.
- 1.5% of what is learned is from the sense of TOUCH.
- 3.5% of what is learned is from the logic of SMELL.
- 11% of what is educated is from the logic of HEARING.
- 83% of what is learned is from the sense of SIGHT.

Also people generally remember, 10% of what they READ, 20% of what they HEAR, 30% of what they SEE, 50% of what they HEAR and SEE, 70% of what they SAY and 90% of what they SAY as they DO a thing.

## What is visual learning?

Visual learning involves learning about a topic by seeing the information through visual aids. It helps students capture images based on colour, brightness, and spatial awareness and therefore remember what they have learnt in the classroom for a longer time. This is why teachers today are adapting visual teaching methods like handouts, whiteboards, presentations, and images for effective learning. Additionally, it has been studied that in students visual learning also helps boost performance and confidence in school.

# Visual aids and why they are the most effective teaching tool today.

Majority of students learn better through pictorial or video representation. This is because visuals have more appeal when compared to plain texts, especially for intuitive and curious young minds. Several studies have proved the power and effectiveness of visual learning.

Let's find out why:

## **1. Makes processing of information easier**

One of the greatest benefits of visual learning is how it makes processing information easier and thereby makes the entire learning experience simplified. Students can learn even the most complex topics quickly and easily by looking at visual information. These visual learning elements can include charts, images, and graphs that are easily accessible.

## **2. Helps store information for a longer period**

Images and videos are said to be directly processed by our long-term memory. This is why visual learning increases our retention power by 29-42% thereby improving our learning process. Hence children tend to understand and learn a topic better when it is explained with images, graphics, and visuals.

## **3. Helps garner interest**

Most students tend to struggle with at least one subject because it doesn't interest them and therefore they do not find the motivation to put in the effort. Visual learning in such a scenario is the best bet. Interesting infographics, engaging videos, and captivating images help motivate students while fighting away boredom.

## **4. Stimulates imagination and aids better understanding**

Visuals allow students to understand concepts easily by affecting and stimulating their cognitive capabilities and imagination. Visuals are also known to expand "human bandwidth," making it easier to analyse, comprehend, and absorb new information.

## 5. Makes learning interesting

Students nowadays have an attention span of about 8 seconds. That's why it is important for teachers to keep them engaged by making the topic as visually appealing as possible. Given this short attention span, educators need to modify the teaching methods to not only keep students interested in the subject but also to ensure better understanding.

## 6. Creates strong impressions and memories

Visual images or content are known to create strong impressions which ultimately create long-lasting memories. The reason behind this is visual images are connected to our emotions, and in our brains, these emotions are referred to as memories.

## 7. And lastly, makes learning fun

Students tend to get bored easily especially if they are being taught through texts and lectures. Visual learning is known to engage and help students in learning faster while also improving their concentration levels.

Studies have shown that visuals improve our learning by up to 400%. And the reason behind this is simply that children of our generation of change and technology are visual learners.

They learn information best by seeing it in videos, graphs, maps, and pictures. That being said, visual learning hasn't been developed in most school systems in our country but it can be a very beneficial tool if used strategically.

## Lack of resources in classrooms

The lack of resources in the classroom can cause extreme distress, as students are unable to learn to their fullest potential because they are not receiving proper resources. According to the most recent **UNESCO Study**, a lack of infrastructure and resources is having an impact on the growth of artificial intelligence (AI) in India's education sector. The UNESCO report provides a view of the different dimensions and proposals for potential uses of AI in the educational context in India, if continued, adding that the NEP emphasizes the integration of AI in education and encourages quality and skill-based education.

# Lung Function Demonstration Model (13 Inch - Rubber & Plastic)

Shows Lung & Diaphragm Air Flow & Muscle Function



- LUNG FUNCTION - Lung demonstration model provides a first-hand view of how the lungs work and how other structures play into the function of the lungs.
- SIMPLE YET EFFECTIVE - A simple, yet effective, apparatus that consists of two sacs, which represent the lungs, a rubber membrane, which serves as the diaphragm, and a clear plastic enclosure, which models the chest cavity.
- HOW TO - Simply pull onto the bottom rubber section to simulate the diaphragm relaxing and contracting and show how the lungs are emptied and filled with air with each breath.
- DURABLE & STURDY - Made of high quality rubber and plastic designed for many uses.
- FOR ALL AGES - Simplicity of model allows demonstration to multi ages - Elementary school students will enjoy the visualization of breath while model can also be used to teach more advanced functions and systems in a university setting.

# Human Torso Model with Head



- This version of a torso model is a great economical study tool for anatomy and physiology. Sexless torso is dissectible into 11 parts, including head, brain, heart, lungs, liver, stomach and intestines.
- The heart splits in half to reveal the inner anatomy of the organ.
- The intestines have a small cover at one section that can be removed to reveal the inner anatomy of the organ.
- The top of the urinary bladder can be removed to reveal the internal organs.

The model of the human torso is a quality example of the organs in the midsection of the human body along with the head. The vasculature and organs are vibrantly painted with detail. Furthermore, the lungs, heart, stomach, intestines, and top of the urinary bladder can be removed - this allows one to observe detailed images of the organs and vasculature found deep in the torso and also allows one to gain a closer inspection of the organs themselves. The left thigh has a portion cut away to reveal the lymphatic and blood vasculature found in this location as well. This sturdy model with vibrant colours and crisp details provides an excellent and effective way to study the anatomy of the midsection of a human body in a visually and kinaesthetically effective way.

# Life Sized Human Skeleton Model, with Articulated Joints



- The life-size model of a human skeleton provides an incredibly high amount of realism and detail for students examining the human skeleton.
- Pinned joints allow for the demonstration of limb movements to showcase how the skeletal system interacts during motion.
- The skeleton is made of a fibrous material, finished in natural colours.
- Skull opens for detailed structural analysis.







# Testing Basic and Acidic Solutions

## Objective:

To determine whether a given set of solutions are basic or acidic.

## Materials:

Provided:

- Blue litmus paper
- Red litmus paper
- Beakers

Not provided in kit:

Various solutions of unknown pH (e.g., vinegar, lemon juice, baking soda solution, distilled water)

## Procedure:

- Label the beakers with the names of the solutions you will be testing.
- Pour a small amount (approximately 5-10 mL) of each unknown solution into its respective labelled container.
- Obtain blue and red litmus paper strips.
- Use one blue strip and dip in solution.
- Observe any colour changes on the blue litmus paper. If it turns red, it indicates acidity.
- Repeat steps for each of the other solutions, using a fresh blue litmus paper strip for each solution.
- Use one red strip and dip in solution.
- Observe any colour changes on the red litmus paper. If it turns blue, it indicates alkalinity (basic).
- Repeat steps for each of the other solutions, using a fresh red litmus paper strip for each solution.

## Results and Analysis:

Based on the colour changes observed on the litmus paper strips, you can categorize the solutions as follows:

- Blue Litmus Turns Red: Acidic solution
- Red Litmus Turns Blue: Basic (alkaline) solution
- No Colour Change: Neutral solution

Draw a conclusion based on the litmus paper results for each solution tested. Discuss any observations or trends you noticed during the experiment.

# Mirror Experiments

## Objective:

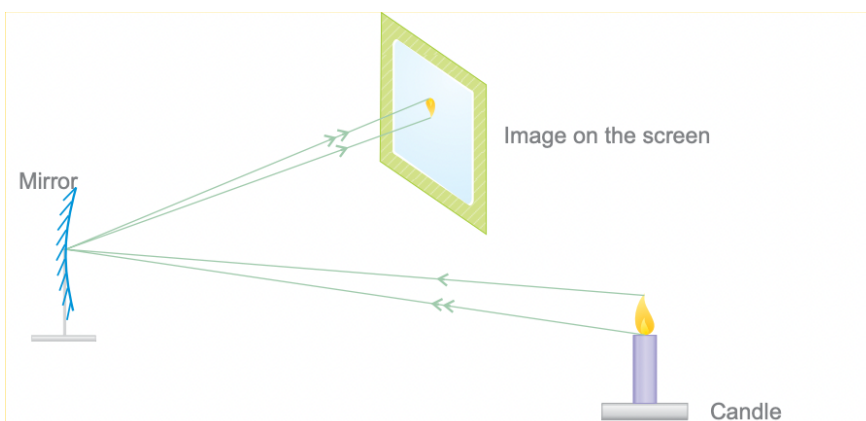
To observe the image of a candle flame formed by a concave mirror when the candle is placed at different distances from the mirror.

## Materials:

- a mirror stand
- a concave mirror (focal length about 15-20 cm)
- a screen with a stand (about 20 cm × 15 cm)
- a candle
- a match box
- a scale for measuring distances

## Procedure:

1. Find the approximate focal length of the concave mirror by focussing sun light on a sheet of paper.
2. Fix the concave mirror on the stand and place it on a table.
3. Keep a lighted candle on the table at a distance of about thrice the focal length of the mirror (say at about 60 cm in front of the mirror if the mirror is of 20 cm focal length).
4. Also, keep the screen on the table. Ensure that the screen does not obstruct the light from the candle falling on the mirror.
5. Try to obtain the image of the flame on the screen. For this move the screen forward, backward and sideways till a sharp image of the flame is obtained.



## Result and Analysis:

1. We conclude that the image formed by a concave mirror can be smaller or larger in size than the object.
2. As the object is moved towards the mirror. The image moves away from the mirror.
3. We also see that when the candle flame is too close to the mirror (at distances lesser than the focal length) its image is erect and larger in size than the candle flame itself. This image is however not formed on a screen. It is a virtual image. We therefore conclude that the image formed by a concave mirror may be real or virtual.

# Lens Experiments

## Objective:

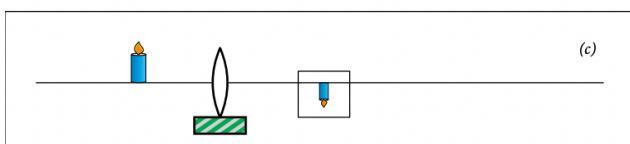
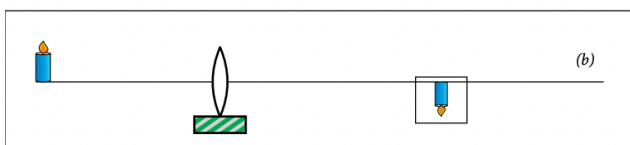
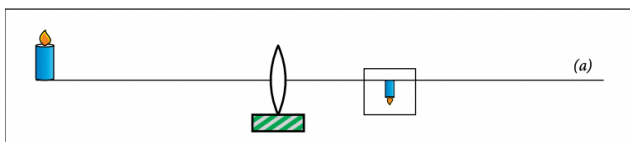
Observe the image of a candle flame formed by a convex lens when the candle is placed at different distances from the lens.

## Materials:

- a lens stand
- a convex lens (focal length of about 15-20 cm)
- a screen with a stand (about 20 cm ×15 cm)
- a candle
- a match box
- a scale for measuring distances

## Procedure:

1. Find the approximate focal length of the convex lens by focusing sun light on a sheet of paper.
2. Fix the convex lens on a stand and place it on a table.
3. Keep a lighted candle on the table at a distance of about thrice the focal length of the lens (say at about 60 cm in front of the lens if the lens is of 20 cm focal length).
4. Try to obtain the image of the candle flame on the screen placed on the other side of the lens. For this move the screen forward, backward or sideways till a sharp image of the flame is obtained.
5. Measure the distances of the candle flame and its image from the lens.
6. Now move the candle towards the lens and place it at different distances. In each case try to obtain the image of the candle flame on the screen. For this change the position of screen as necessary.



## Results and Analysis:

1. As the object moves towards the lens the image moves away from the lens.
2. The image formed by a convex lens can be smaller or larger in size than the object.
3. We also see that when the candle flame is too close to the lens (say at distances lesser than the focal length) its image is erect and larger in size than the candle flame itself. It is a virtual image. So, we conclude that the image formed by a convex lens may be real or virtual.

# Test the presence of Carbohydrates in food items

## Objective:

To test the presence of carbohydrates in food items.

## Materials:

- Bread slice
- Potato slice
- Soaked chickpea seeds
- Petri plates
- 3% iodine solution
- Dropper

## Procedure:

1. Place a bread slice, a potato slice and a few chickpea seeds (with seed coat removed) in separate and clean Petri plates.
2. With the help of a dropper, place 2-3 drops of iodine solution on each item.
3. Note the change in colour and record your observations.



## Result and Analysis:

1. Blue-black colour appears on the bread slice and potato slice, whereas, chickpea seeds do not show any change in colour.
2. Bread and potato contain starch which gives blue-black in colour on addition of iodine solution.
3. Whereas, chickpea seeds do not contain starch and thus do not show any change in colour.

# Test the presence of Proteins in food items

## Objective:

To test the presence of proteins in food items.

## Materials:

Gram or pea seeds  
1 banana  
Test tubes  
Water  
Copper Sulphate solution  
Caustic Soda  
Dropper

## Procedure:

1. Grind 10-15 seeds of gram or pea into powder form; and mash a piece of banana separately to form a paste.
2. Take a small quantity of these food items in the separate test tubes and label them 'A' and 'B'.
3. Add 10-15 drops of water to each test tube.
4. With the help of droppers, add 2-3 drops of copper sulphate solution and 10 drops of caustic soda to each test tube.
5. Shake well and keep the test tubes aside for a few minutes.
6. Note the change in colour and record your observations.



## Result and Analysis:

1. Contents of test tube 'A' containing powdered seeds of gram or pea turn violet in colour.
2. Test tube 'B' containing mashed banana does not show colour change.
3. Appearance of violet colour in test tube 'A' confirms that gram or pea seeds contain proteins.
4. As banana does not contain proteins, the test tube 'B' does not show violet colour.

# Significance of using visual aids in classrooms

Visual aids are the devices that help the teacher to clarify, establish, and correlate and coordinate precise conceptions, understandings and appreciations and support him to make learning more actual, active, motivating, encouraging, significant and glowing.

As per the Visual Teaching Alliance –

- Of all the information transmitted to brain, 90% is visual.
- As opposed to text, visuals are processed 60,000x faster.
- Humans are capable of getting the sense of a visual scene in less than 1/10th of a second.
- 40% of nerve fibres are linked to the retina.
- Our brain can see images that last for only 13 milliseconds.
- Human eye can register 36,000 visual messages every hour.