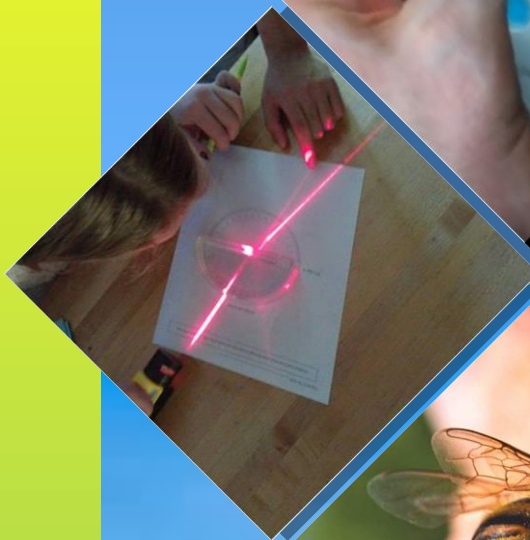
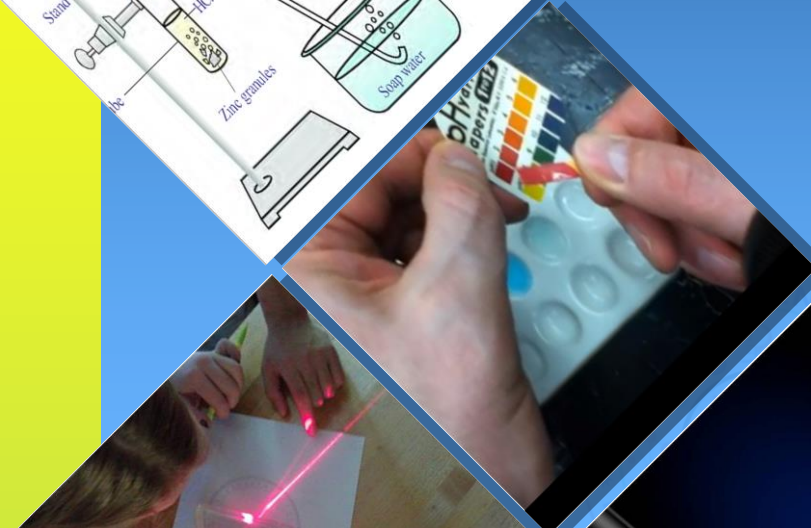
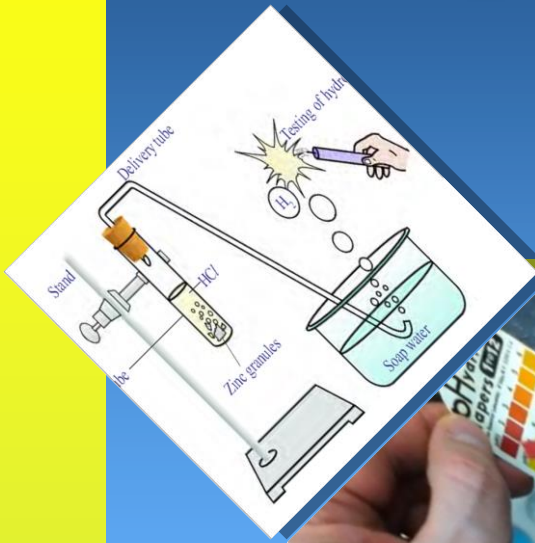


# PHYSICAL SCIENCE

*A Complete Book Of*  
**FORMATIVE ASSESSMENT - 2**  
*For Class X (E.M)*

*Lab Activities*  
*Project Works*  
*Slip Tests*



# ***ALL IN ONE***

## ***A Complete Book of Formative Assessment - 2***

***10th Class  
Physical Science***

***FA Info  
Lab Activities  
Project Works  
Slip Tests***

***By  
KVRAMANA & GVRAMA PRASAD***

**Preface**

**1. Syllabus for FA 2.**

**2. Lab Activities for 10 marks.**

- 1) Classify the liquids as acids, bases and neutral solutions.
- 2) Identify the acid and base by olfactory indicators.
- 3) Reaction of acids with metals.
- 4) Testing substances by pH paper.
- 5) Acids produce Hydrogen ions in solutions.
- 6) Relation between angle of incidence and angle of refraction.

**3. Project works 10 marks.**

- 1) Collect information about acid and base indicators.
- 2) Make an indicator using Hibiscus petals.
- 3) Common acids and bases used in our daily life.
- 4) Importance of pH in everyday life.
- 5) Uses of plaster of Paris.
- 6) Hazards of Plaster of Paris.
- 7) Collect information of refractive indices of some material.
- 8) Applications of total internal reflection.

**4. Written Works - Note books for 10 marks.**

- 1) How to allot marks for written works - note books.

**5. Slip test for 20 marks.**

- 1) Formative Assessment 2 Model Paper

**PREFACE**

We decided to prepare **ALL IN ONE, A Complete Book of Formative Assessment** for the help of all Physical Science 4 Ever blog users. As a part, we prepared this for "**ALL IN ONE, Formative Assessment 2**" book.

Working towards improving the children's learning through observing and recording their performance, while they are participating in teaching learning processes like project works, lab activities, slip tests, etc., is called **Formative Assessment**.

It is used by the teacher to continuously observe children's progress in a non-formal way and in supportive environment. It gives regular descriptive feedback, rather than marks and grades, which give a chance for the students to reflect on their performance, take advice and improve upon it. For class 10 formative assessments have to evaluate through four measures.

- 1) Lab Activities (10 marks)
- 2) Written works (10 marks)
- 3) Project works (10 marks)
- 4) Slip test (20 marks)

We very much thankful to all the viewers of our physicalscience4ever blog for giving this opportunity to help you in the view PHYSICAL SCIENCE, what we like. This book is only for the private use. No one should use this for commercial purposes.

Yours,

K V RAMANA & G V RAMA PRASAD,  
Srikakulam District.

8008423323 & 7799884688.



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## 1. Syllabus for FA 2

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10<sup>th</sup> Class Formative Assessment: 2 Syllabus

- 1) Acids, Bases and Salts – Unit: 4
- 2) Reflection of Light at Plane Surfaces – Unit: 5

Students should read thoroughly Acids, Bases and Salts (Unit: 4) and Reflection of Light at Plane mirrors (Unit: 5). They must read the complete lesson and try to understand deeply, the concepts in each lesson. They observe the figures given in the text book and ask himself some questions about figures for easy answering CCE model questions.

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## 2. Lab Activities for 10 marks

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In Formative Assessment Lab Activity is an important tool. Student should participate in lab activity to perform activities which are mentioned in the text book under the title of Lab Activity. Teacher should assess student in Participate in Lab Activities (Experiments) and Lab Record. Teacher should observe students when they are working individually, in groups, how they select and arrange apparatus, observations and recordings. Student should write their lab record. Lab record is 200 pages notebook and is helpful for the student to observe how they did the experiment. 6 marks are awarded for this lab record and 4 marks for performance.

### **Items in Lab Record:**

**Aim** : It explains why we perform the experiment.

**Apparatus** : Here we should mention required apparatus and materials, chemicals.

**Precautions** : We should mention the precautions that must follow while performing experiment.

**Procedures** : Here we should write the process.

**Reporting** : We should report our observations in the form of table, flowchart etc.

**Result analysis:** Analyze the above data.

**Generalization:** We come to certain conclusion based on the experiments.

## EXPT 1: CLASSIFY THE LIQUIDS AS ACIDS, BASES AND NEUTRAL SOLUTIONS.

**Aim:** Identify the liquids as acids, bases and neutral solutions.

**Apparatus/chemicals:** Watch glasses -5, Hydrochloric acid (HCl), Acetic acid(CH<sub>3</sub>COOH), Sodium hydroxide (NaOH), Magnesium hydroxide [Mg (OH)<sub>2</sub>], Sodium bicarbonate (NaHCO<sub>3</sub>), water (H<sub>2</sub>O), blue litmus papers, red litmus papers, phenolphthalein and Methyl orange.

### **Procedure:**

- 1) Clean the watch glasses very well to ensure that solutions do not become contaminated.
- 2) Take four watch glasses and put one drop of the first solution in each one of them and test the solution as follows.
  - a) Dip the blue litmus paper in the first watch glass.
  - b) Dip the red litmus in the second watch glass.
  - c) Add a drop of methyl orange to the third watch glass. and
  - d) Add a drop of phenolphthalein to the fourth watch glass.
- 3) Observe the respective colour changes and note down in the table.
- 4) Do the same with all the solutions and note the colour changes in the table.

### **Observations:**

Sl. No.	Sample Solution	Colour of Blue litmus	Colour of Red litmus	Colour of phenolphthalein	Colour of methyl orange	Result
1	HCl	red	Red	clear	red	Acid
2	CH <sub>3</sub> COOH	red	Red	clear	red	Acid
3	NaOH	blue	Blue	pink	yellow	Base
4	Mg (OH) <sub>2</sub>	blue	Blue	pink	yellow	Base
5	NaHCO <sub>3</sub>	blue	Blue	pink	yellow	Base
6	H <sub>2</sub> O	blue	Red	clear	orange	Neutral

### **Result analysis:**

1. Blue litmus paper turns red when dipped in an acid solution.
2. Red litmus paper turns blue when dipped in a basic solution.
3. In a neutral solution each paper retains its original color.
4. Phenolphthalein indicator solution turns pink color in a basic solution but remains colorless in an acidic or neutral solution.
5. Methyl orange indicator solution turns yellow color in a basic solution, turns red colour in an acidic orange colour in neutral solution.

**Generalization:** An indicator is a chemical compound, either on a test paper or in a solution that changes color depending on the acidity or basicity of a solution and, thus, is used to test for the presence of acids or bases.

**Precautions:** All of the acids and bases used in this lab are very corrosive to eyes, skin, and other body tissues. They are toxic by ingestion. Avoid all body tissue contact. Acetic acid, hydrochloric acid and ammonium hydroxide are also toxic by inhalation. Avoid breathing the vapors. Wear chemical splash goggles and wash hands thoroughly with soap and water before leaving the laboratory.

## EXPERIMENT 2: IDENTIFY THE ACID AND BASE BY OLFACTORY INDICATORS.

**Aim:** Identify the acid and base by olfactory indicators.

**Apparatus/chemicals:** Hydrochloric acid (HCl), Sodium Hydroxide (NaOH), Onion, Vanilla, Clove oil, clean cloths, plastic bag, two test tubes, glass rod.

### **Procedure:**

- 1) Put some finely chopped onions in a plastic bag along with some clean cloth.
- 2) Tie up the bag tightly and keep it overnight in fridge.
- 3) The cloth strips can now be used to test for acid or base.
- 4) Check the odour of the cloth strips. The cloth is in onion odour. Keep tow strips on a clean surface and put a few drops of dilute HCl on one strip and few drops of dilute NaOH on the other.

- Rinse both the strips separately with distilled water and again check their odour and note the observations.
- Take some dilute HCl in one test tube and dilute NaOH in another test tube.
- Add a drop of dilute vanilla essence to both test tubes and stir well with glass rod. Check the odour and record the observations.
- Test the change of odour with clove oil using dilute HCl and dilute NaOH and record the observations.



Onion



Clove oil



Vanilla essence

### Observations:

Sl. NO	Indicator	HCl	NaOH
1	Onion	Does not change odour	Losses its smell
2	Vanilla	Smell doesn't vanishes	Smell vanishes
3	Clove oil	Smell does not change	Smell cannot be detected

### Result Analysis:

- Onions, Vanilla and Clove oil contain some types of acids. When the acids react with bases they neutralized. So the smell vanishes in the presence of base.

**Generalization:** An Olfactory indicator is defined as a substance whose smell varies when it is mixed with an acidic or basic solution. Such substances can be used in the laboratory to test whether a solution is a base or an acid, and this process is called olfactory titration.

**Precautions:** Avoid breathing the vapors of HCl and NaOH. Wear chemical splash goggles and wash hands thoroughly with soap and water before leaving the laboratory.

### EXPERIMENT 3: REACTION OF ACIDS WITH METALS.

**Aim:** To show the reaction of acids with metals.

**Material required:** test tube, delivery tube, glass trough, candle, soap water, dil. HCl, and zinc granules.

#### Procedure:

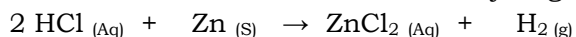
- Arrange the apparatus as shown in the figure.
- Take about 10 ml of dilute HCl in a test tube and add a few zinc granules to it.
- We can see the gas bubbles coming out from the solution.
- Pass the gas being evolved through the soap water.
- Bring a burning candle near the gas filled bubble.

#### Observations:

- The gas evolved burns with a pop sound indicating Hydrogen (H<sub>2</sub>).

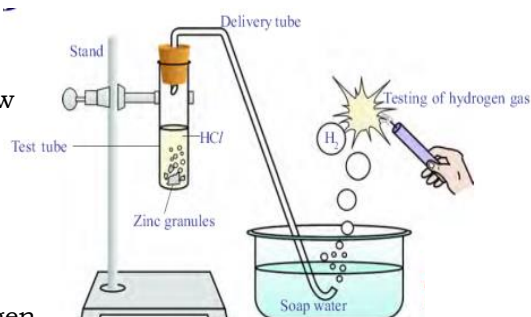
#### Chemical equation:

Acid + Metal → Salt + Hydrogen



**Result:** From the experiment we can conclude that H<sub>2</sub> gas is evolved when acid reacts with metal.

**Precautions:** Avoid breathing the vapors of HCl. The reaction is an exothermic reaction – heat will be given off by this reaction. So we don't touch the test tube after reaction. Take care of the testing of hydrogen by burning candle.



#### EXPERIMENT 4: TESTING SUBSTANCES BY pH PAPER.

**Aim:** Testing pH of the substances by pH paper.

**Material required:** Sodium Hydroxide (NaOH), Hydrochloric acid (HCl), Vinegar (CH<sub>3</sub>COOH), Baking soda, lemon juice, window cleaner, Drano (drain cleaner), detergent, empty tablet foil pack and pH papers.

**Procedure:**

- 1) Take an empty tablet foil pack and clean it with water.
- 2) Take some samples of chemicals like NaOH, HCl, vinegar, baking soda, lemon juice, window cleaner; drain cleaner and detergent in the empty spaces of the tablets in the foil.
- 3) Take the pH papers and test the solutions with the papers.
- 4) Check the changing colour of the pH paper with the colour chart.
- 5) Note the pH values of the chemicals in the table.

**Observations:**

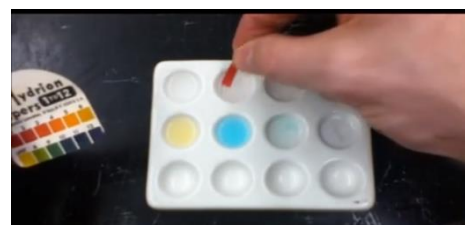
Sl. No	Solution	Colour of the ph paper after testing	pH value	Acid/ base
1	Sodium Hydroxide	Navy blue	12	Base
2	Hydrochloric Acid	Red	1	Acid
3	Vinegar	Orange	3	Acid
4	Baking soda	Green	8	Base
5	Lemon juice	Orange	3.5	Acid
6	Window cleaner	Light green	7.5	Basic
7	Drain cleaner	Drano	12	Basic
8	Detergent	Blue	9.5	Basic

**Result:** We can find the pH values of the solutions with the help of ph colour chart.

**Precautions:** The empty tablet foil pack must be clean and dry. Take care of the chemicals do not mix to each other.



8 sample solutions



Testing of HCl with pH paper



Identifying the pH value with chart



PH paper chart

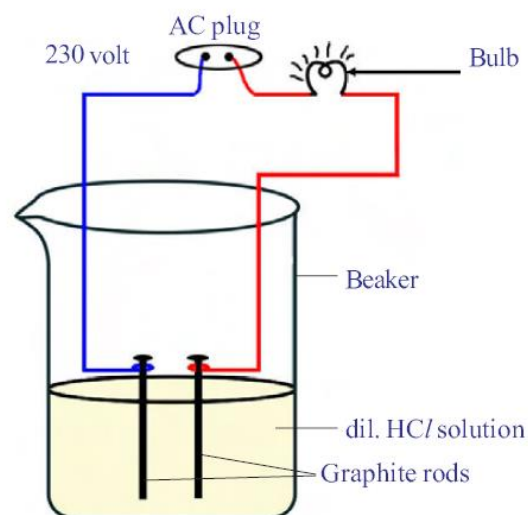
#### EXPERIMENT 5: ACIDS PRODUCE HYDROGEN IONS IN SOLUTIONS.

**Aim:** Acids produce hydrogen ions (H<sup>+</sup>) in solutions:

**Material required:** Beaker, AC plug, bulb, graphite rods, glucose, alcohol, Hydrochloric acid, sulphuric acid.

**Procedure:**

- 1) Prepare solutions of glucose, alcohol, Hydrochloric acid and sulphuric acid.
- 2) Connect two different coloured electrical wires to graphite rods separately in a 100 ml beaker as shown in figure.
- 3) Connect free ends of the wire to 230 volts AC plug and complete the circuit as shown in the figure by connecting a bulb to one of the wires.
- 4) Now pour some dilute HCl in the beaker and switch on the current.
- 5) Repeat activity with dilute sulphuric acid and glucose and alcohol solutions separately.





**Observations:**

- 1) We will notice that the bulb glows only in acidic solutions.
- 2) Glowing bulb indicates that there is flow of electric current through the solution.

**Analysis:**

- 1) The positive ion (cation) presenting in HCl solution is  $H^+$ . This suggests that acid produce hydrogen ions  $H^+$  in solution, which are responsible for their acidic properties.
- 2) In glucose and alcohol solution the bulb did not glow indicating the absence of  $H^+$  ions in these solutions.

**Result:**

- 1) The acidity of acids is attributed to the  $H^+$  ions produced by them in solutions.

**Precautions:**

- (1) Take care of AC current while doing the experiment.
- (2) Clean the beaker neatly in each case of experiment with different solutions.
- (3) Take care with acids while doing the experiment.

**EXPERIMENT 6: RELATION BETWEEN ANGLE OF INCIDENCE AND ANGLE OF REFRACTION.**

**Aim:** Obtaining a relation between angle of incidence and angle of refraction.

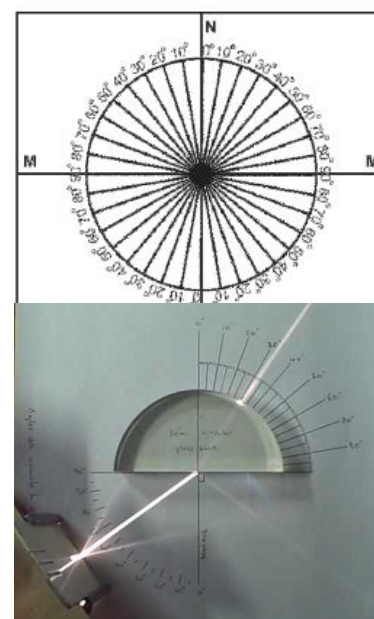
**Materials required:** A plank, white chart, protractor, scale, small black painted plank, a semi circular glass disc of thickness nearly 2 cm, pencil and laser light.

**Procedure:**

Take wooden plank which is covered with white chart. Draw two perpendicular lines, passing through the middle of the paper as shown in the figure. Let the point of intersection be O. Mark one line as NN which is normal to the other line marked as MM. Here MM represents the line drawn along the interface of two media and NN represents the normal drawn to this line at 'O'.

Take a protractor and place it along NN in such way that its center coincides with "O" as shown in the figure. Repeat the same on the other side of the line NN. The angles should be indicated on the curved line.

Now place a semi-circular glass disc so that its diameter coincides with the interface line (MM) and its center coincides with the point "O". Point a laser light along NN in such a way that the light propagates from air to glass through the interface at point O and observe the path of laser light coming from other side of disc as shown in figure.



Send Laser light along a line which makes  $15^\circ$  (angle of incidence) with NN and see that passes through point O. Measure its corresponding angle of refraction, by observing laser light coming from the other side of the glass slab. Note these values in table. Do the same for the angles of incidence such as  $20^\circ$ ,  $30^\circ$ ,  $40^\circ$ ,  $50^\circ$  and  $60^\circ$  and note the corresponding angle of refraction.

**Observations:**

Sl. No	Angle of incidence (i)	Angle of refraction (r)	Sin i	Sin r	Sin i/sin r
1	$15^\circ$	11.2	0.2588	0.1942	1.33
2	$20^\circ$	14.9	0.3420	0.2571	1.33
3	$30^\circ$	22.1	0.5000	0.3762	1.329
4	$40^\circ$	28.9	0.6427	0.4832	1.33
5	$50^\circ$	35.2	0.7660	0.5764	1.328
6	$60^\circ$	40.6	0.8660	0.6507	1.33

**Conclusion:**

From the above table we will get the ratio  $\sin i/\sin r$  is a constant. This is Snell's law.



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### 3. Project works 10 marks

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In Formative Assessment project work is another tool which contains 10 marks. There are different types of projects in every lesson under the academic standards information skills and projects. So teachers select any type of project from improve your learning or from content. Based on the resources teachers has a choice to select any other topics which is related to content. Projects are different types. Based on members, project nature and procedure. (By interview, by collecting information, by observing nature)

#### **Steps in Project:**

- 1. Name of the project:** Write the name of the project which you select to do.
- 2. Objectives:** Write what you learnt after completion of the project.
- 3. Tool:** Required materials are written in this field.
- 4. Procedures:** Write step by step procedure.
- 5. Table:** Draw a table if the project has.

**6. Conclusion:** Write what you know from this project.

**7. Resources:** From where you get the relevant material.

**8. Thanks giving:** Give thanks for supporters.

#### **Project Assessment:**

Preparation, conducting project - 3 marks

Project report - 5 marks

Discussion on project - 2 marks



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### **Project Work 1: COLLECT INFORMATION AND PREPARE A REPORT ON ACID BASE INDICATORS**

**Title of the Project:** Acid and base indicators

**Purpose of the project:** To test the acids and bases with indicators in our daily life.

**Hypothesis:** Indicators are substances whose solutions change colour due to changes in pH. These are called acid-base indicators. They are usually weak acids or bases, but their conjugate base or acid forms have different colours due to differences in their absorption spectra.

**Tools:** observation and experimentation.

**Materials:** lemon juice, orange juice, vinegar, curd, salt, baking soda, grape juice, hibiscus flower, turmeric water, Hydrochloric acid, Sodium Hydroxide, soap water, baking powder and tomato juice.

#### **Procedure:**

We collect information about acid-base

indicators from internet. We tested the various solutions whether it is base or acid in our school laboratory. We collected the natural indicators which we use in our daily life. We tested the acid and base with the help of the natural indicators.

**Introduction:** we used many substances in our daily life. With the help of some substances we will test the nature of acids and bases. The natural and synthetic indicators are very useful to detect the nature of the acid and base.

**Process:** We collected some substances and detect them as acids or bases with the help of "taste test". We collect information about the properties of acids and bases from internet and text book. With the help of natural indicators we classified the substances as acids and bases.

We detect acids and bases of some substances in our laboratory with the help of indicators.



Lemon



curd



baking soda

### 1) Detect Acids and Bases by their taste:

We collected some substances like lemon juice, orange juice, vinegar, curd, salt, baking soda and grape juice. By the taste of the substance we tabulated the data and observe whether it is acid or base.

substance	taste (sour/bitter/others)	Nature
Lemon juice	sour	Acid
Orange juice	sour	Acid
vinegar	sour	Acid
curd	sour	Acid
salt	others	salt
Baking soda	bitter	Base

#### Observation:

- The taste of curd, lemon juice, orange juice and vinegar is sour. These substances are acids.
- The taste of baking soda is bitter. It has basic property.
- Salt is neither sour nor bitter. So it is neither an acid nor a base. It is neutral.

**Result:** The taste of acid is sour and the base is bitter.

### 2) Detect the acids and bases in some substances:

With the help of our teachers and internet we collect data about the sources of acids and bases in substances which we are used in our daily life.

Name of the acid	sources
Acetic acid	Vinegar
Formic acid	ants
Citric acid	Orange or lemon
Lactic acid	Curd
Oxalic Acid	Spinach
Tartaric Acid	Tamarind, grapes

Name of the base	Sources
Calcium Hydroxide	Lime water
Ammonium hydroxide	Window cleaner
Sodium Hydroxide/ Potassium Hydroxide	Soap
Magnesium Hydroxide	Milk of magnesia



Formic acid in ant



tartaric acid in tamarind



NaOH in soap

### 3) Indicators:

Indicators are substances whose solutions change colour due to changes in pH. These are called acid-base indicators. They are usually weak acids or bases, but their conjugate base or acid forms have different colours due to differences in their absorption spectra.

#### ❖ Natural indicators:

There are many natural materials like litmus, extract of red cabbage, turmeric solution and extracts of coloured petals of some flowers contain dye molecules which are weak acids or bases. These can be used as acid base indicators to detect the nature of the solution for acidity or basicity



Litmus paper



red cabbage



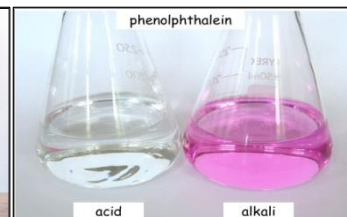
china rose

#### ❖ Synthetic indicators:

There are some synthetic indicators such as methyl orange and phenolphthalein that can be used to test for acids and bases.



Methyl orange changes the base as yellow and acid as red



phenolphthalein changes the base as pink and in acid doesn't change

#### 4) Detect the nature of the substances with the indicators :

We collected some substances like hydrochloric acid, sodium hydroxide, soap solution, baking powder, lemon juice, tomato juice and vinegar. With the help of indicators like China rose solution indicator, turmeric solution, blue litmus, red litmus and methyl orange, we detect the acidity and basicity of the solutions.

solution	China rose indicator	Turmeric indicator	Litmus solution blue/red	Methyl orange
Hydrochloric acid	red	Does not change	Blue to red	red
Sodium Hydroxide	green	Red	Red to blue	yellow
Soap solution	green	Red	Red to blue	yellow
Baking powder	green	Red	Red to blue	yellow
Lemon juice	red	Does not change	Blue to red	red
Tomato juice	red	Does not change	Blue to red	red
Vinegar	red	Does not change	Blue to red	red
sucrose	Does not change	Does not change	Does not change	Does not change

#### Observations:

- China rose solution changes the acids as red and bases as green.
- Turmeric solution changes the acids as red. it does not change the alkali solutions.
- Acids change the blue litmus as red and bases changes red litmus as blue.
- Methyl orange changes the acids red. It changes the base as yellow.

#### Interpretation of the student:

We detected the various solutions as acids and

bases. Chin rose solution converts acids to red colour. We surprised the changes of colours in acids and basis when adding indicators.

#### Precautions:

- We will take care with concentration acids.
- We don't taste some solutions in our laboratory to detect acids and bases.

#### Conclusion:

In this project we understand the acid base indicators in our daily life. We observed the nature of acid and base by taste. We detected the acidity and basicity of some substances in our laboratory with some indicators. In these experiments our teachers guided us. We understand the natural and synthetic indicators in our daily life.

**References:** Internet, Britannica encyclopedia, physical science text books, laboratory

#### PROJECT REPORT

**Title of the project** : Acid and base indicators

**Class** : 10th

**Subject** : Chemistry

**School** : Z.P.H.School, Thogaram, Amadalavalasa mandal

**Time frame** : 5 days

**Tools/references** : internet, science magazines, text book, some substances and chemicals.

**Details of procedure:** We collect information about acid base indication from internet. We tested the various solutions whether it is base or acid in our school laboratory. We collected the natural indicators which we use in our daily life. We tested the acid and base with the help of the natural indicators.

#### Observations:

- The taste of acid is sour and the base is bitter.
- China rose solution changes the acids as red and bases as green.
- Turmeric solution changes the acids as red. it does not change the alkali solutions.
- Acids change the blue litmus as red and bases changes red litmus as blue.
- Methyl orange changes the acids red. It changes the base as yellow.



**Project outcome:**

In this project we understand the acid base indicators in our daily life. We observed the nature of acid and base by taste. We detected the acidity and basicity of some substances in our laboratory with some indicators. In these experiments our teachers guided us. We understand the natural and synthetic indicators in our daily life.

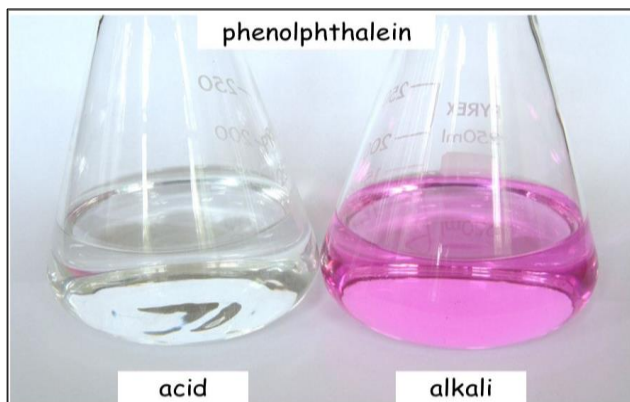
**Names of the group members and work allotment:**

Sl. No.	Name of the group member	Work allotment
1		
2		
3		
4		
5		

Date of submission:

signatures

**PROJECT PICTURES**



## **Project Work 2: MAKE AN INDICATOR USING HIBISCUS PETALS.**

**Title of the Project:** Make an indicator using hibiscus petals.

**Purpose of the project:** To make an indicator with natural resources to test acid and bases.

**Hypothesis:** Indicators are substances whose solutions change colour due to changes in pH. These are called acid-base indicators. Some petals of the flowers contain dye molecules which are weak acids and bases. These can be used as acid-base indicators.

**Materials:** hibiscus flowers, container, surgical spirit, mortar, pestle, hydrochloric acid, sodium hydroxide.

### **Procedure:**

- 1) Cut approximately 10 mature hibiscus flowers.



- 2) Remove the stigma, and detach the leaves, so as to have only the red petals remaining.



- 3) Put them in a container, and pour approximately 6ml of ethanol or surgical spirit; the latter works best.



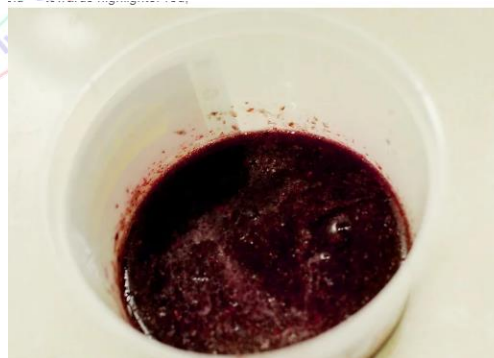
- 4) Crush the petals using an appropriate implement, such as a mortar and pestle. Crush until all of the liquid has been extracted from the petals.



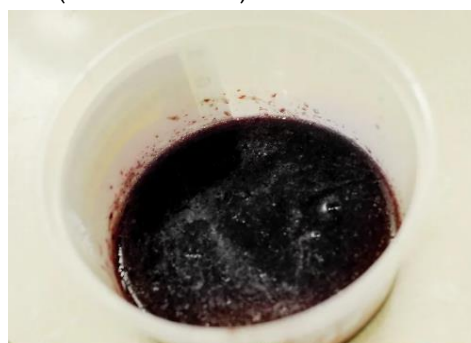
- 5) Filter the solution, and you have the reddish indicator ready.



- 6) Take hydrochloric acid in a beaker and add the hibiscus indicator. it turns in to highlighted red colour.



- 7) Take Sodium hydroxide in a beaker and add the hibiscus indicator. It turns in to dark green (almost black) colour.



**Learning outcome:** we prepare the natural indicator with hibiscus flowers to know the acidity and basicity of the solutions.

**Precautions:** Take care with hydrochloric acid while doing the testing of acidic property.

**Interpretation of the student:** After completion of the project we know the acidic and basic properties of the solutions with the help of indicators.

**Conclusion:** After completion of this project we conclude that indicators are substances whose solutions change colour due to changes in pH. These are called acid-base indicators. Some petals of the flowers contain dye molecules which are weak acids and bases. These can be used as acid-base indicators.

acid as red colour and base as green colour.

**c. Conclusion:** After completion of this project we conclude that indicators are substances whose solutions change colour due to changes in pH. Some petals of the flowers contain dye molecules which are weak acids and bases. These can be used as acid-base indicators.

**Experiences of the student:** While doing the experiment we tested the various solutions which we used in our daily life. we categorized the solutions as acids and bases. this is very interesting experiment.

**Doubts/Questions:**

- Why the colour of the solutions changed while we add the indicator?
- All the petals of the flowers act like indicators?

**Acknowledgement:**

1. Our science teachers.
2. <http://www.wikihow.com/Make-an-indicator-Using-Hibiscus-Petals>.

**Learning outcome:** we prepare the natural indicator with hibiscus flowers to know the acidic and basic property of the solutions.

**Names of the group members and work allotment:**

Sl.no.	Name of the group member	Work allotment
1		
2		
3		
4		
5		

Date of submission: \_\_\_\_\_ signatures \_\_\_\_\_

### PROJECT REPORT

**Title of the project:** Make an indicator using hibiscus petals.

**Objectives of the project:** To make an indicator with natural resources to test acid and bases.

**Tools:** Experimentation.

Material/Sources required: hibiscus flowers, container, surgical spirit, mortar, pestle, hydrochloric acid, sodium hydroxide.

Procedure:

**a. Process:** Take the petals of the hibiscus flower and add some spirit. crust the petals and filter it. The hibiscus solution is ready. we use the indicator to know the acidic and basic properties of solutions.

**b. Analysis:** The hibiscus solution turns the

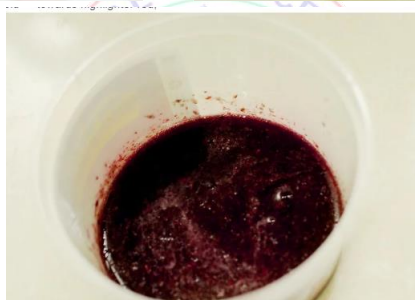
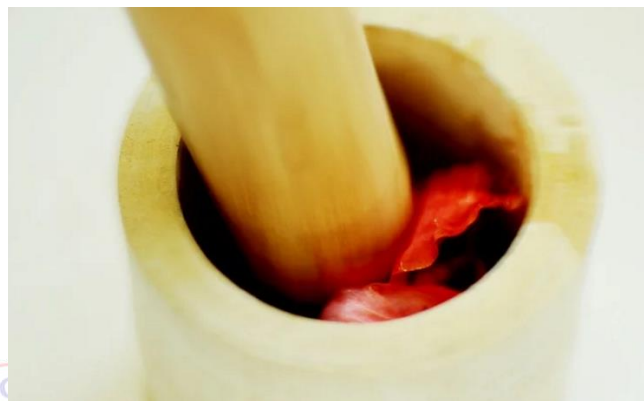
Dear student,

Try to make various indicators with red cabbage water, red onion water, turmeric water, carrot juice, beet root juice, grape juice etc., with the help of the above model project. Prepare Olfactory indicators with chopped onion, clove oil and vanilla essence and write the project report as above.

Yours,  
K.V.R & G.V.R



## PROJECT PICTURES



Indicator	Colour in acid (pH < 7)	Colour at pH = 7	Colour in base (pH > 7)
Red cabbage water	red, pink	purple	blue, green, yellow
Red onion water	red	violet	green
Turmeric water	yellow	yellow	red
Phenolphthalein	colourless	colourless	pink, red
Bromothymol blue	yellow	green	blue
Red litmus	red	red	blue
Blue litmus	red	blue	blue

### Project Work 3: COMMON ACIDS AND BASES USED IN OUR DAILY LIFE

**Title of the Project:** Collect information of common acids and bases used in our daily life.

**Purpose of the project:** To understand the acids and bases which we used in our daily life.

**Hypothesis:** We use many substances in our kitchen. We use many solutions in various situations in our daily life. In those some are neutral solutions. Some solutions are either acidic or basic.

**Materials:** Vinegar, soft drink, lemon juice, baking soda, tamarind juice, detergents etc.,

**Procedure:** We collect the data of uses of acids and bases in internet.

#### Introduction:

Acids and bases are very useful in our daily lives. Let's start with acids. Without acids, we won't have Vitamin C (ascorbic acid); your car won't start (sulphuric acid in car batteries) or even accelerated rotting of your food (food preservative in the form of citric acid). Similarly, imagine a world without bases. Without bases, stubborn stains on your clothing won't come off (sodium hypochlorite in bleach), you'll have dirty mirrors (ammonium hydroxide used in glass cleaners) and even having bowel problems as laxatives can be made from magnesium hydroxide.

#### Uses of Acids:

Acid	Use of the acid
<b>Benzoic acid</b>	Its salt are used to preserve food
<b>Carbonic acid</b>	To make carbonated drinks
<b>Ethanoic acid</b>	A main compound of vinegar
<b>Hydrochloric acid</b>	To clean metals before electroplating / household cleaning / leather processing / swimming pool maintenance
<b>Nitric acid</b>	Production of fertilisers, explosives, etching and dissolution of metals (purification and extraction of gold)
<b>Sulphuric acid</b>	To make detergent, polymer and fertilisers.
<b>Tartaric acid</b>	Manufacturing of soft drinks, provide tartness to food, as an emetic (a substance to induce vomiting)

#### Uses of bases

Base	Use of base
<b>Ammonia</b>	Production of fertilisers (ammonium and nitrate salts), used in the manufacture of nitric acid, neutralise the acid (in the petroleum industry) and prevent premature coagulation in natural / synthetic latex.
<b>Aluminium hydroxide</b>	Manufacture other aluminium compound and to make gastric medicine (antacid)
<b>Calcium hydroxide</b>	To make cement, limewater, neutralise the acidity of soil and application of sewage treatment.
<b>Sodium hydroxide</b>	Used in the manufacturing of soaps, detergents, and cleaners.
<b>Magnesium hydroxide</b>	Suspension of magnesium hydroxide in water is used as an antacid, used as an antiperspirant armpit deodorant and as a non-hazardous alkali to neutralise acidic wastewater.

#### Some Common Acids and Bases

The tables below list a few well-known acids and bases, along with their formulas and a few applications

##### Common Acids

- Acetic acid ( $\text{CH}_3\text{COOH}$ ) : vinegar, acetate
- Acetylsalicylic acid ( $\text{HOOC}_6\text{H}_4\text{OOCCH}_3$ ) : aspirin
- Ascorbic acid ( $\text{H}_2\text{C}_6\text{H}_6\text{O}_6$ ): vitamin C
- Carbonic acid ( $\text{H}_2\text{CO}_3$ ): soft drinks, Seltzer water
- Citric acid ( $\text{C}_6\text{H}_8\text{O}_7$ ): citrus fruits, artificial flavorings
- Hydrochloric acid (HCl): stomach acid
- Nitric acid ( $\text{HNO}_3$ ): fertilizer, explosives
- Sulfuric acid ( $\text{H}_2\text{SO}_4$ ): car batteries





vinegar



soft drinks



Citrus fruits



car batteries



Glass cleaner



Antacids

### Common Bases

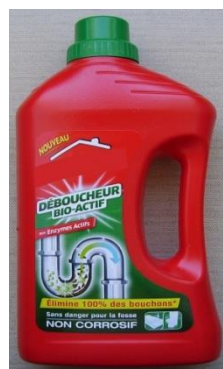
- Aluminum hydroxide ( $\text{Al}[\text{OH}]_3$ ): antacids, deodorants
- Ammonium hydroxide ( $\text{NH}_4 \text{OH}$ ): glass cleaner
- Calcium hydroxide ( $\text{Ca}[\text{OH}]_2$ ): caustic lime, mortar, plaster
- Magnesium hydroxide ( $\text{Mg}[\text{OH}]_2$ ): laxatives, antacids
- Sodium bicarbonate/sodium hydrogen carbonate ( $\text{NaHCO}_3$ ): baking soda
- Sodium carbonate ( $\text{Na}_2 \text{CO}_3$ ): dish detergent
- Sodium hydroxide ( $\text{NaOH}$ ): lye, oven and drain cleaner
- Sodium hypochlorite ( $\text{NaClO}$ ): bleach



Baking soda



Deodorant



Drain cleaner



Bleach



**Learning outcome:** We use many solutions in our daily life. The solutions have acidic, basic and neutral property.

**Precautions:** Take care with substances which have acidic or basic property while using. Don't use tiles cleaning acid directly with our hands while using in our bath rooms.

**Interpretation of the student:** After completion of the collection of data about acidic and basic substances we know that which is acidic or basic. By this information we take care while using the substances.

**Conclusion:** After completion of this project we conclude that many substances which we use in our daily life have either acidic or basic property. In our kitchen we use many acids and bases in cooking.

classify the acidic and basic property. we collect information about some acidic and basic properties of chemicals from internet. We collect pictures from internet.

**b. Analysis:** We use many acidic substances while cooking and foot items. We use some basic substances while cleaning the cloths, drains and windows.

**c. Conclusion:** After completion of this project we conclude that Acids and bases are very useful in our daily lives.

**d. Experiences of the student:** While doing the project we tested the substance by litmus paper. We use internet to collect other information.

**Acknowledgement:**

1. Our science teachers.
2. Internet articles.

**Learning outcome:** We use many solutions in our daily life. The solutions have acidic, basic and neutral property.

**Names of the group members and work allotment:**

Sl.no.	Name of the group member	Work allotment
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**PROJECT REPORT**

**Title of the project:** Collect information of common acids and bases used in our daily life.

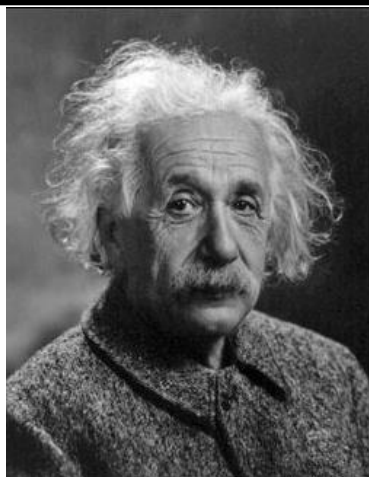
**Objectives of the project:** To understand the acids and bases which we used in our daily life

**Tools:** Data collection in internet.

**Material/Sources required:** Vinegar, soft drink, lemon juice, baking soda, tamarind juice, detergents etc., and internet.

**Procedure:**

**a. Process:** We collect information about the substances which we use in our kitchen. We test the substances with litmus paper to



I never teach my pupils. I only attempt to provide the conditions in which they can learn.

(Albert Einstein)

# PROJECT PICTURES





## Project Work 4: IMPORTANCE OF pH IN EVERYDAY LIFE

**Title of the Project:** Importance of pH in everyday life.

**Purpose of the project:** To know the role of pH in our daily life.

**Hypothesis:** pH plays an important role in our daily life

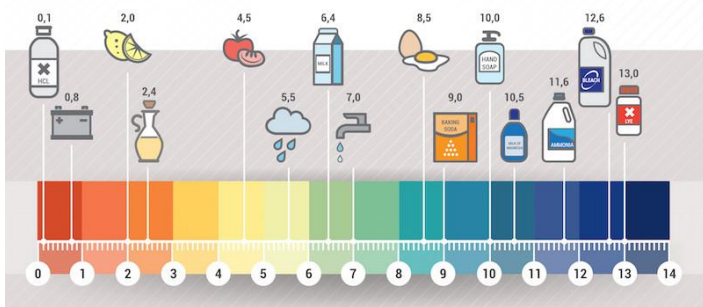
**Materials:** 10<sup>th</sup> class Physical science text book, internet

### Procedure:

pH is a measure of the hydrogen ion concentration of a solution. Solutions with a high concentration of hydrogen ions have a low pH and solutions with low concentrations of H<sup>+</sup> ions have a high pH. The equation that defines pH is given as follows:

$$\text{pH} = -\log [\text{H}^+]$$

The pH of neutral solutions is 7. Values less than 7 in the pH scale represent an acidic solution. pH value of a solution above '7' represents the basic solution.



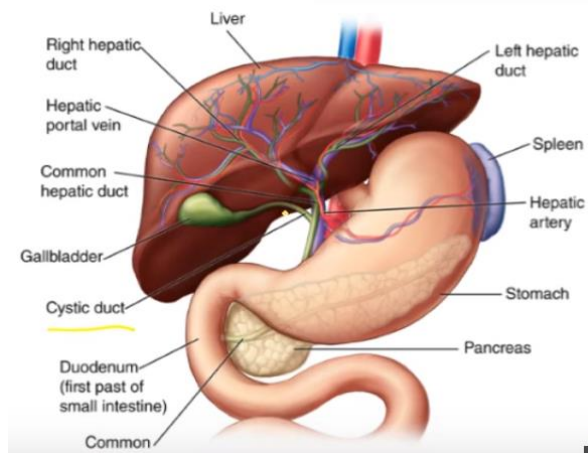
Acidic ——— Neutral ——— Alkaline

### Importance of pH in everyday life:

#### 1) In our digestive system:

Our stomach produces hydrochloric acid. This dilute hydrochloric acid helps in digesting our food without harming the stomach. Sometimes excess of acid is produced in the stomach. The excess acid in the stomach causes indigestion which produces pain and irritation. In order to cure indigestion, we can take bases called antacids. Being basic in

nature, antacid react with excess acid in the stomach and neutralises it. The two common antacids are Milk of Magnesia (Magnesium Hydroxide) and Sodium Bicarbonate (Baking soda)



### Gastric juice produced in stomach



### Antacid tablets to reduce acidity

#### 2) pH change as the cause of tooth decay

When we eat food containing sugar, then the bacteria present in our mouth break down the sugar to form acids. This acid lowers the pH in the mouth. Tooth decay starts when the pH of acid formed in the mouth falls below 5.5. This is because then the acid becomes strong enough to attack the enamel of our teeth and corrode it. This sets in tooth decay. The best way to prevent tooth decay is to clean the mouth thoroughly after eating food.





**Tooth decay**



Clean the mouth thoroughly after eating food

### **3) Plants and animals are sensitive to pH change**

Soil pH and plant growth: Most of the plants grow best when the pH of the soil is close to 7. If the soil is too acidic or basic, the plants grow badly or do not grow at all. The soil pH is also affected by the use of chemical fertilisers in the field. Chemicals can be added to soil to adjust its pH and make it suitable for growing plants.

If the soil is too acidic then it is treated with materials like quicklime or slaked lime. If the soil is too alkaline then alkalinity can be reduced by adding decaying organic matter.



**Spreading of lime powder in fields to reduce acidic property of the soil**

### **4) Some animals and plants contain acids:**

Honey bee injects an acid through its stings which causes pain and irritation. Hence, a mild base like baking soda is applied to treat the wound. Similarly, nettle leaves, which have stinging hairs, when touched inject formic acid in our body. This causes a burning pain. As remedy, the affected area is rubbed with the dock plant. The dock plant is alkaline which neutralizes the effect of acid.



**Honey bee injects acid**



**Nettle plant injects formic acid**



**Dock plant has alkaline property**

**5) The brilliance of a tarnished copper vessel can be restored by using acid:**

Lemon juice contains an acid. In order to clean a copper vessel, we rub it with the piece of lemon. The tarnish on the vessel is caused by the formation of a layer of basic copper oxide. Since lemon juice contains citric acid, it reacts with the copper oxide to form copper citrate and is washed away. The vessel then regains its shining appearance.



**Learning outcome:** We know the properties of acids. We know the applications of acids in our daily life. we know the how to neutralise the acidic property in different methods.

**Precautions:**

- 1) Clean the mouth thoroughly after eating the food.
- 2) If Honey bee injects acid in our body, we use any basic solution to neutralise.

**Interpretation of the student:** After completion of the collection of data about the applications of pH we understand the role of pH in our daily life. We know how to neutralise the acidic property in different methods.

**Conclusion:** After completion of this project we conclude that Most of the plants grow best when the pH of the soil is close to 7.If the soil is too acidic or basic; the plants grow badly or do not grow at all. We know the different methods to neutralise the acidic property in our daily life situations.

**PROJECT REPORT**

**Title of the project:** Importance of pH in everyday life.

**Objectives of the project:** To know the role of pH in our daily life.

**Tools:** Data collection in internet.

**Material/Sources required:** Internet, text books

**Procedure:**

**a. Process:** We collect information about the applications of pH in our daily life from text books, internet articles and daily life situations. We collect pictures from internet. We know that how to reduce tooth decay, how to reduce the acidic property of soil, how to control the pain of stinging of honey bee and nettle plant.

**b. Analysis:** We use alkaline solution like baking powder to relief the pain of stinging honey bee. we use dock plant to relief the pain of stinging nettle plant. We use antacid tablets to relief from acidity.

**c. Conclusion:** After completion of this project we conclude that the role of ph in our daily life. We know that how to increase and decrease the pH in various methods.

**d. Experiences of the student:** While doing the experiment we use baking powder on the affected area to relief from the pain by stinging of ants.

**Acknowledgement:**

1. Our science teachers.
2. Internet articles.

**Learning outcome:** We know the properties of acids. We know the applications of acids in our daily life. We know the how to neutralise the acidic property in different methods.

**Names of the group members and work allotment:**

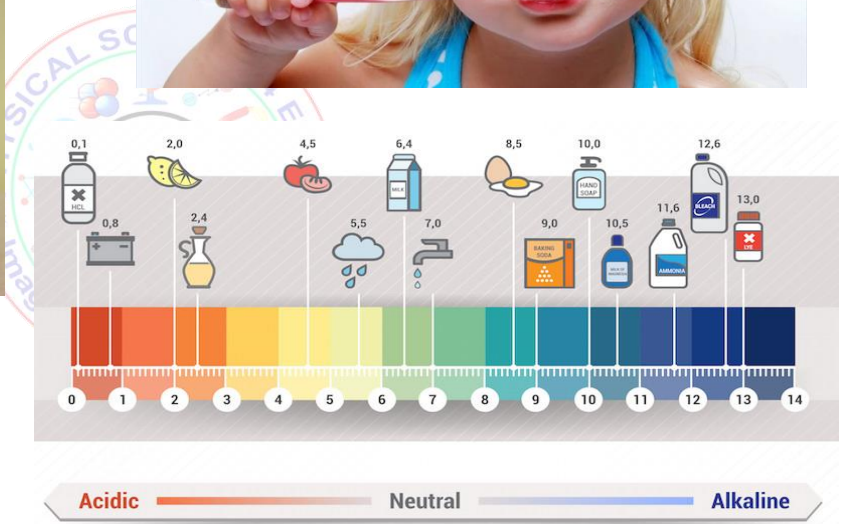
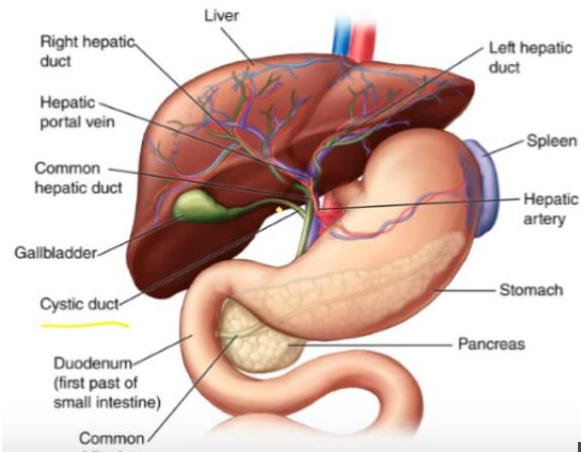
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Date of submission:

signatures



## PROJECT PICTURES





## PROJECT WORK 5: USES OF PLASTER OF PARIS

**Title of the Project:** Uses of plaster of paris

**Purpose of the project:** To know the uses of plaster of paris in our daily life.

**Hypothesis:** Plaster Paris is known as calcium sulphate hemi hydrate. When it mixing with water, it sets into hard solid mass due to the formation of gypsum.

**Materials:** 10<sup>th</sup> class Physical science text book, Science magazines, internet articles.

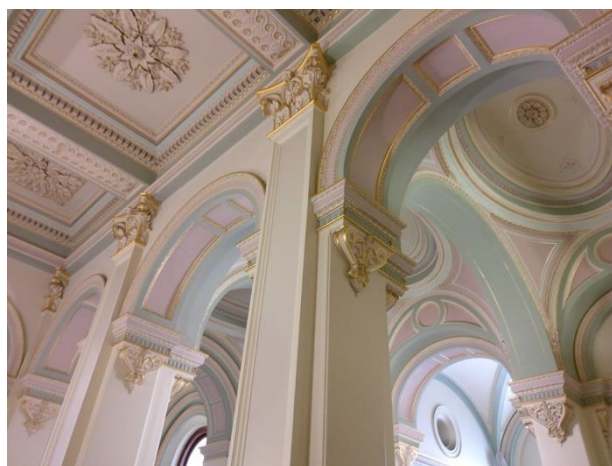
### Procedure:

Preparation:

- 1) Plaster of paris is also called as calcium sulphate hemi hydrate.
- 2) It is manufactured from Gypsum ( $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$ )
- 3) Large deposits of gypsum ( $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$ ) at 373 K losses water molecules partially and produce a king of plaster paris ( $\text{CaSO}_4 \cdot \frac{1}{2}\text{H}_2\text{O}$ )

### Uses of plaster of paris:

- 1) **Architecture:** Plaster may also be used to create complex detailing for use in room interiors. In modern days this material is also used for False Ceiling. In this, the powder form is converted in a sheet form and the sheet is then attached to the basic ceiling with the help of fasteners. It is done in various designs containing various combinations of lights and colors. The common use of this plaster can be seen in the construction of houses.



- 2) **ART:** Plaster sets quickly and hence it becomes an ideal choice for sculptors. Many great European Frescoes and Murals are a work of Plaster of Paris. Michelangelo's Sistine Chapel ceiling is a work of Plaster of Paris.



**3) Medicine:** Plaster is widely used as a support for broken bones; a bandage impregnated with plaster is moistened and then wrapped around the damaged limb, setting into a close-fitting yet easily removed tube, known as an orthopedic cast. Plaster is also used in preparation for radiotherapy when fabricating individualized immobilization shells for patients.



**4) Fire protection:** Plasters have been in use in passive fire protection, as fireproofing products, for many decades. POP releases heat when it sets, this in turn releases vapor. This property makes it good for insulation. It can retard fire for an hour or two. It prevents heat flow and protects steel and other structural elements from collapsing in a fire.

**5) 3D painting:** “Powder bed and inkjet head 3D printing” is commonly based on the reaction of gypsum plaster with water, where the water is selectively applied by the inkjet head.

**Learning outcome:** We know the uses of plaster of paris in various fields.

**Precautions:**

1) Don't touch the plaster of paris while mixed with water. It is exothermic reaction.

**Conclusion:** Plaster of paris used in making toys and decoration. It is also used in the

field of medicine for orthopedics. It is used to create ceilings of buildings.



**PROJECT REPORT**

**Title of the project:** Uses of Plaster of Paris.

**Objectives of the project:** To know the uses of plaster of paris.

**Tools:** Data collection in internet.

**Material/Sources required:** Internet, text books

**Class:** X

**Subject:** Physical Science

**School:**

**Time frame:** 5 days.

**Details of the procedure followed:** We collect the information about the uses of plaster of paris from various books and internet.

**Findings & Observations:** We know about the uses of plaster of paris in our daily life.

**Experiences faced:** This concept is so exciting to do this project. We are enjoying to done this project work.

**Project Outcome:** We know the uses of plaster of paris in various fields.

**Conclusion:** Plaster of paris used in making toys and decoration. It is also used in the field of medicine for orthopedics. It is used to create ceilings of buildings.

**Acknowledgement:**

1. Our science teachers.
2. Internet articles.

**Names of the group members and work allotment:**

Sl.no.	Name of the group member	Work allotment
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Date of submission:

signatures



## PROJECT PICTURES





## **PROJECT 6: HAZARDS OF PLASTER OF PARIS**

**Title of the Project:** Hazards of plaster of paris

**Purpose of the project:** To know the Hazards of plaster of paris in our daily life.

**Hypothesis:** Plaster Paris is known as calcium sulphate hemi hydrate. When it mixing with water, it sets into hard solid mass due to the formation of gypsum.

**Materials:** 10<sup>th</sup> class Physical science text book, Science magazines, internet articles.

### **Procedure:**

Preparation:

- 1) Plaster of paris is also called as calcium sulphate hemi hydrate.
- 2) It is manufactured from Gypsum ( $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$ )
- 3) Large deposits of gypsum ( $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$ ) at 373 K losses water molecules partially and produce a kind of plaster paris ( $\text{CaSO}_4 \cdot \frac{1}{2}\text{H}_2\text{O}$ )
- 4) Plaster of Paris is used in the fields of Architecture, art, Medicine and 3D painting.

### **Hazards of plaster of paris:**

**Irritation:** A few suppliers classify plaster of Paris as irritating to eyes, respiratory system and skin but most do not. Even so, prolonged or repeated direct skin contact may cause irritation and attempts at removal may cause abrasion.

**Burns:** When plaster of Paris is mixed with water, the material slowly becomes hot. The temperature may approach 60 °C after an hour, with the highest temperatures being reached with the largest volumes. Temperatures above 45 °C can cause skin damage, the extent of damage depending on the contact time.

The combination of the hot water and the heat from the plaster's crystallization resulted in this

soft tissue injury, which required several plastic surgery procedures for coverage



**Trapping:** When plaster of Paris is mixed with water, the material hardens and expands slightly. This can trap, for example, hands which then suffer burns as the temperature slowly rises. Physical damage may also result from attempts to remove the hardening plaster using chisels, hammers, saws, etc. Trapping is possible only if the hand or other part of the body is surrounded by the plaster/water mix as it starts to harden.

**User injury:** When mixing plaster, using moulds or clearing away plaster of Paris, particles or fragments can injure the eyes.

### **POP is harmful to the environment:**

There have been efforts to ban sale of plaster of Paris (PoP) idols for Ganesh Chaturthi festival in the past, but these have proved futile. Studies on the impact of idol immersions carried out in places like Bhopal, Jabalpur and Bengaluru show several significant impacts like steep rise in concentration of heavy metals, dissolved solids, and acid content, and a drop in dissolved oxygen.

After 48 hours of immersion in lab condition the PoP idol does not dissolved and remains as it was before immersion. The color of the idol also remains as bright as it was before start of

the test. The clay idols were dissolved completely after 48 hours of immersion resulting in the increase of solids in the immersion water. It could be assumed that the PoP idols after immersion in the natural water bodies remain as it is causing problem of sedimentation and slow pollution in the water bodies for long duration of time in comparison of Clay idols.

The immersion of PoP made idols should not be allowed in the natural water bodies since it remains insoluble in water for long time causing problem of sedimentation and slow impact on water body for long duration of time.



**Learning outcome:** We know the hazards of plaster of paris in our daily life. We know the pollution effects due to plaster of paris idols nimajjanam in water.

**Precautions:**

- 1) Don't touch the plaster of paris while mixed with water. It is exothermic reaction. It caused to damage our fingers.

**Conclusion:** Plaster of paris is useful to us. But it is harmful to the environment. So We doesn't use plaster of paris idols in Ganesh chaturthi. We use only clay idols in ganesh chaturthi festival.

**PROJECT REPORT**

**Title of the project:** Hazards of Plaster of Paris.

**Objectives of the project:** To know the hazards of plaster of paris.

**Tools:** Data collection in internet.

**Material/Sources required:** Internet, text books

**Class:** X

**Subject:** Physical Science

**School:**

**Time frame:** 5 days.

**Details of the procedure followed:** We collect the information about the hazards of plaster of paris from various books and internet.

**Findings & Observations:** We know about the hazards of plaster of paris in our daily life. It is very harmful to environment.

**Experiences faced:** This concept is so exciting to do this project. We are enjoying to done this project work.

**Project Outcome:** We know the hazards of plaster of paris in various fields.

**Conclusion:** We know the hazards of plaster of paris in our daily life. We know the pollution effects due to plaster of paris idols nimajjanam in water.

**Acknowledgement:**

1. Our science teachers.
2. Internet articles.

**Names of the group members and work allotment:**

Sl.no.	Name of the group member	Work allotment
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## PROJECT 7: COLLECT THE VALUES OF REFRACTIVE INDICES OF SOME MATERIAL

**Title of the Project:** Collect the values of refractive indices of some material.

**Purpose of the project:** To know the various refractive indices of some material.

**Hypothesis:** The refractive index “n” means that the speed of light in that medium is nth part of speed of light in vacuum. Refractive index depends on the nature of material and wave length of light used.

**Materials:** 10<sup>th</sup> class Physical science text book, Science magazines, internet articles.

**Procedure:** We collect data of refractive indices of various material from 10<sup>th</sup> Class text book and internet.

### **Refractive indices of some material media**

Material medium	Refractive index
Air	1.0003
Ice	1.31
Water	1.33
Kerosene	1.44
Fused quartz	1.46
Turpentine oil	1.47
Crown glass	1.52
Benzene	1.50
Canada balsam	1.53
Rock salt	1.54
Carbon Diasulphide	1.63
Dense flint glass	1.65
Ruby	1.71
Sapphire	1.77
Diamond	2.42

**Analysis:** We know that an optically denser medium may not possess greater mass density. For example, kerosene with high refractive index is optically denser than water although its mass density is less than water.

**Project outcome:** We collected refractive index values of some material from 10<sup>th</sup> class P.S text book and prepared a report.

### PROJECT REPORT

**Title of the project:** Collect the values of refractive indices of some material.

**Objectives of the project:** To know the various refractive indices of some material.

**Tools:** Data collection in internet and 10<sup>th</sup> class physical science text book..

**Material/Sources required:** Internet, text books

**Class:** X

**Subject:** Physical Science

**School:**

**Time frame:** 5 days.

**Details of the procedure followed:** We collect the information about the refractive indices values from 10<sup>th</sup> class physical science text book.

**Findings & Observations:** we know that optically denser medium may not possess greater mass density. Ex: optical density of kerosene is greater than water.

**Experiences faced:** This concept is so exciting to do this project. We are enjoying to do this project work.

**Project Outcome:** We know the refractive indices of various material.

**Conclusion:** We know the values of various refractive indices of some material. We also know that the optical density of the material is different from mass density.

### **Acknowledgement:**

1. Our science teachers.
2. Internet articles.

### **Names of the group members and work allotment:**

Sl.no.	Name of the group member	Work allotment
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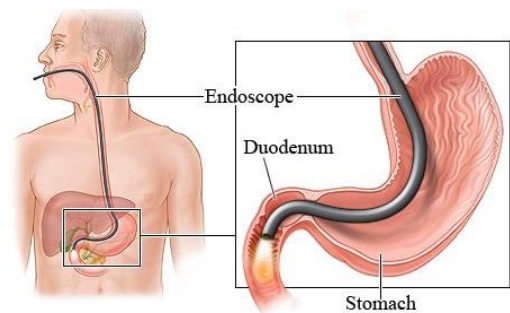
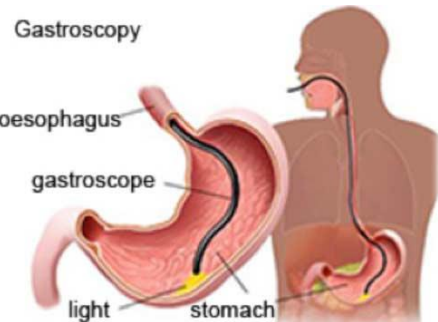
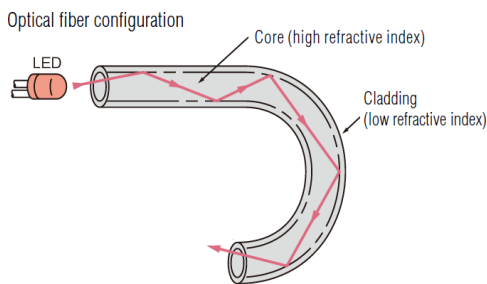
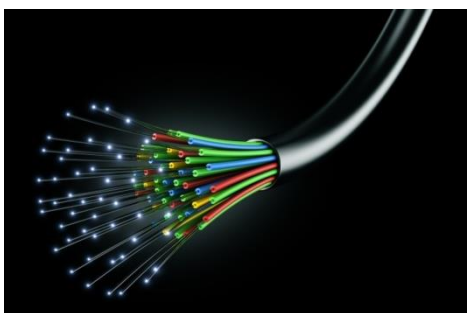
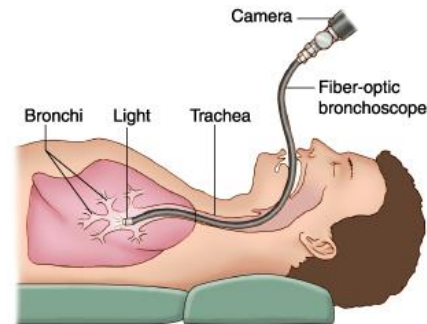
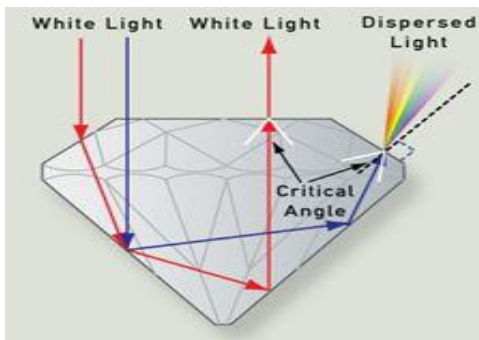
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**PROJECT - 6 : PICTURES**



**PROJECT - 8 : PICTURES**



## PROJECT 8: APPLICATIONS OF TOTAL INTERNAL REFLECTION

**Title of the Project:** Collect the information about the applications of total internal reflection.

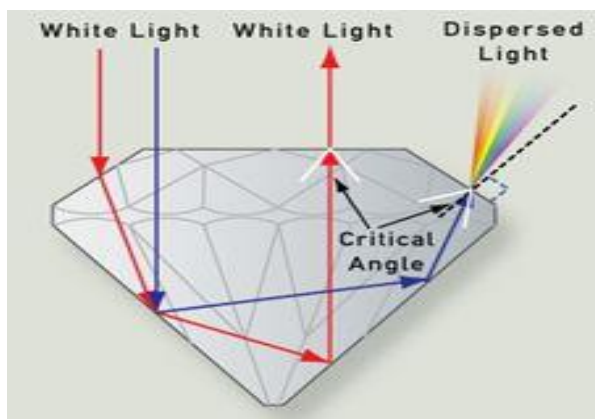
**Purpose of the project:** To know the applications of total internal reflection in our daily life.

**Hypothesis:** When the angle of the incidence is greater than critical angle, the light ray gets reflected into the denser medium at the interface. This phenomenon is called total internal reflection. This is very useful in our daily life situations.

**Materials:** 10<sup>th</sup> class Physical science text book, Science magazines, internet articles.

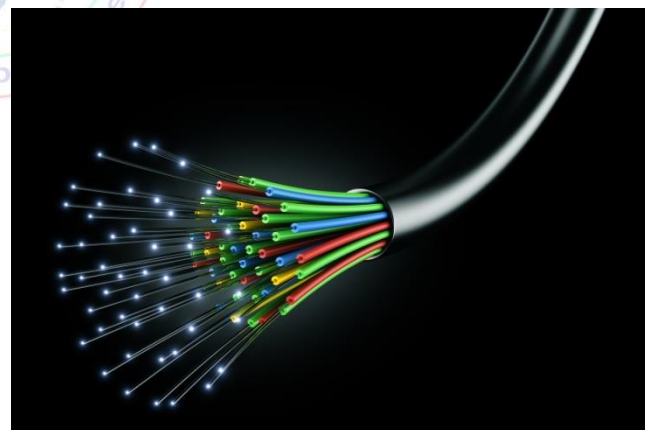
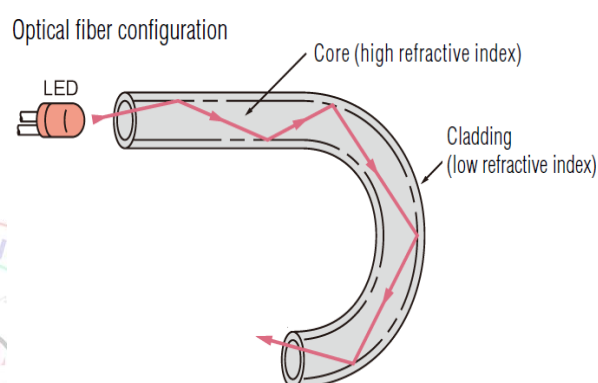
**Procedure:** We collect data of applications of total internal reflection in internet.

**1) Brilliance of Diamonds:** The critical angle of diamond is very low ( $24.8^\circ$ ). So if a light ray enters a diamond it is very likely to undergo total internal reflection which makes the diamond shine.



**2) OPTICAL FIBRES:** Total internal reflection is the basic principle behind working of optical fibre. An optical fibre is very thin fibre made of glass or plastic having a radius about a micrometer. A bunch of such thin fibres form a light pipe.

Light going in to the fibre makes a nearly glancing incidence of the wall. The angle of incidence is greater than the critical angle and hence total internal reflection takes place. The light is thus transmitted along the fibre.

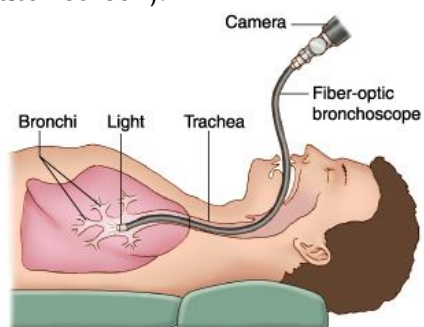


**3) Optical fibres are used in endoscopy to see the internal organs of our body.**

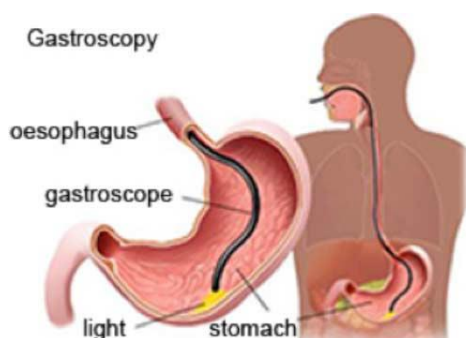
All organs of the human body are not accessible to the naked eye of the doctor. The doctor inserts an optical fiber pipe into the stomach through the mouth. Light is sent down through one set of fibres in the pipe. This illuminates the inside of the stomach. The light from the inside travels back through another



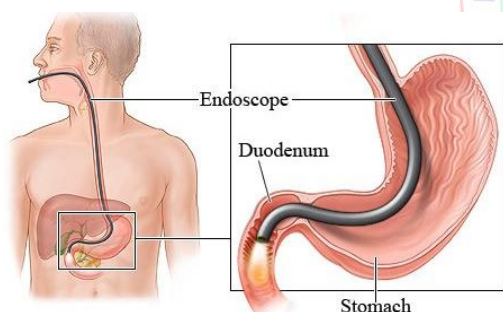
set of fibres in the pipe and the views gets the image at the outer end (generally fed to the computer screen).



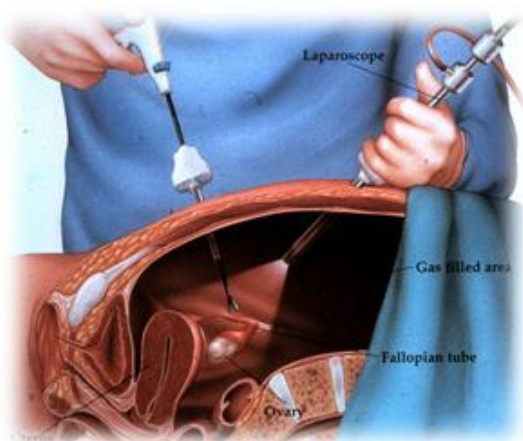
**Bronchoscopy (Lungs)**



**Gastroscopy (stomach)**



**Endoscopy**



**Laparoscopy (Abdomen)**

3) Optical fibres are used in transmitting communication signals through light pipes.

4) Optical fibres are used in international telephone cables laid under the sea, in large computer network etc.,



5) Optical fibres are used in photometric sensors to measuring blood flow in the heart.



**Photometric sensor**

**Project outcome:**

- ❖ The total internal reflection makes the diamond shine.
- ❖ Light pipes are used in laparoscopy and endoscopy if medical field.
- ❖ Optical fibres are also used in science and technology.

**Reference:** 10<sup>th</sup> class physical science text book, internet articles, etc.,

**Acknowledgements:** Our teachers, parents and friends.



## PROJECT REPORT

**Title of the project:** Collect information about the applications of Total internal reflection.

**Objectives of the project:** To know the applications of total internal reflection in our daily life.

**Tools:** Data collection in internet and 10<sup>th</sup> class physical science text book..

**Material/Sources required:** Internet, text books

**Class:** X

**Subject:** Physical Science

**School:**

**Time frame:** 5 days.

**Details of the procedure followed:** We collect the information about the total internal reflection and applications of total internal reflection from internet and 10<sup>th</sup> class text book.

**Findings & Observations:** We know the applications of total internal reflection in various fields in our daily life. It is used in medical field. It is used in science and technology.

**Experiences faced:** This concept is so exciting to do this project. We are enjoying to done this project work.

**Project Outcome:**

- ❖ The total internal reflection makes the diamond shine.
- ❖ Light pipes are used in laparoscopy and endoscopy if medical field.
- ❖ Optical fibres are also used in science and technology.

**Conclusion:** We know the applications of total internal reflection in different fields in our daily life.

**Acknowledgement:**

1. Our science teachers.
2. Internet articles.

**Names of the group members and work allotment:**

Sl.no.	Name of the group member	Work allotment
1		
2		
3		
4		
5		

Date of submission : \_\_\_\_\_ signatures

### **4. Written Works - Note books for 10 marks**

For every student writing skill is very important to express what he has understood in his own words. For these notebooks helps a lot, because of this creativity, writing by thinking on their own they develop their scientific knowledge. They have to work on writing with their own vocabulary, by using their experiences of what they learnt. After classroom discussions ask them to write explanation for those words according to their understanding. It helps to content understanding and after that to write the answers on their own. Ask them to write answers on their own for the questions under let's improve learning for every unit.

**How to evaluate the written work?**

There are 10 marks for written work in constructive evaluation. Written work should not be the copy from the book but it should be on his/her own. Draw the diagrams wherever necessary. Words, sentences should be meaningful without mistakes.

### **5. Slip test for 20 marks**

As a part of constructive evaluation teacher should estimate the student's understanding after teaching every lesson. Testing the student's understanding at anytime but not in a specified time and making the students that they are writing an exam is said to be a slip test. It is not like a unit test.

**How to conduct the slip test?**

Conduct the test without prior declaration after teaching the lesson. 20 marks for slip test. As part of constructive evaluation at FA times slip should be conducted in any period of 45 minutes duration. Questions in the slip test should some of the academic standards and they should write answers on their own. Keep 200 page long notebook for slip tests. Four formative slip tests in an academic year should be written in this text book only. Basing on the answers, discuss with the children how they are in each academic standard. This is the key issue in constructive evaluation and compulsory one too. Enroll the slip tests grades in the register.

**FORMATIVE ASSESSMENT-2**

**PHYSICAL SCIENCES**

**10th Class- CCE Model**

**Time: 45 min.**

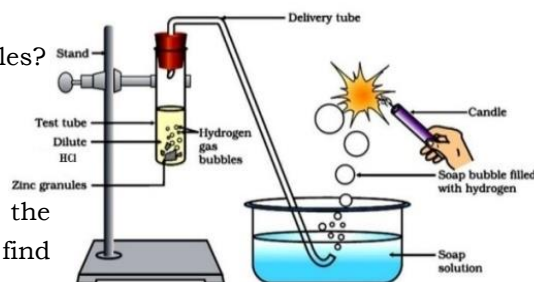
**Max Marks: 20**

Name: ..... Class : 10 EM Roll No..... School.....

**I. Answer the following questions.**

**2 X 4 = 8**

- 1) Observe the following figure and answer the questions.
  - a) What happens when Zinc powder is used instead of Zinc granules?
  - b) Which gas is liberated in this activity?
  - c) How can you test the evolved gas?
  - d) What conclusion you got by this activity?
- 2) Your friend gave a glass slab to you and asks to find out the refractive index of the material of the glass slab. How can you find it? Explain with an activity.



**II. Answer the following Short answer type questions.**

**2 X 2 = 4**

- 3) While diluting an acid, why is it recommended that the acid should be added to water and not water to the acid?
- 4) You are given kerosene, turpentine and water. In which of these does the light travel fastest? Which is more optically denser? Use the information given in Table?

Solution	Refractive index
Kerosene	1.44
Turpentine	1.47
Water	1.33

**III. Answer the following Very Short answer type questions.**

**2 X 1 = 2**

- 5) Why does dry HCl gas not change the colour of the dry litmus paper?
- 6) Can you take a photo of a mirage?

**IV. Choose the correct answer of the following.**

**6 X 1 = 6**

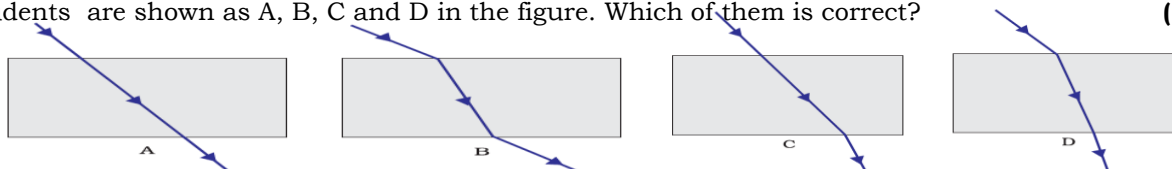
- 7) What happens when a solution of an acid is mixed with a solution of a base in a test tube? ( )
  - (i) The temperature of the solution increases.
  - (ii) Neutralization takes place.
  - (iii) Salt formation takes place.
  - (iv) Water formation takes place.
  - (a) Only (i)
  - (b) (i) and (ii)
  - (c) (i), (ii) and (iii)
  - (d) (i), (ii), (iii) and (iv)
- 8) To protect tooth decay we are advised to brush our teeth regularly. The nature of the tooth paste commonly used as ( )
  - (a) acidic
  - (b) neutral
  - (c) basic
  - (d) corrosive
- 9) Match the Chemical substances given in Column I with their appropriate application given in Column II. ( )

Column I	Column II
A. Bleaching Powder	1. $\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$
B. Baking Soda	2. NaCl
C. Washing soda	3. $\text{CaOCl}_2$
D. Sodium Chloride	4. $\text{NaHCO}_3$

**CODES**

	A	B	C	D		A	B	C	D
a)	2	1	4	3	b)	3	2	4	1
c)	3	4	1	2	d)	2	4	1	3

- 10) The path of a ray of light coming from air passing through a rectangular glass slab traced by four students are shown as A, B, C and D in the figure. Which of them is correct? ( )



- (a) A
  - (b) B
  - (c) C
  - (d) D
- 11) Which statement of the following is/are correct in the mirage concept? ( )
    - (i) Mirage is an optical illusion.
    - (ii) We see a mirage as a flowing water.
    - (iii) The formation of mirage due to the refractive index of a medium varies throughout the medium.
    - (iv) We can take a photograph of a mirage.
    - (a) (i) and (iii)
    - (b) (iii) and (iv)
    - (c) (i), (ii) and (iii)
    - (d) (i), (ii), (iii) and (iv)
  - 12) Which is not the Snell's law? ( )
    - (a)  $n_1 \sin i = n_2 \sin r$
    - (b)  $v_1 \sin i = v_2 \sin r$
    - (c)  $v_2 \sin i = v_1 \sin r$
    - (d)  $\sin i / \sin r = \text{Constant}$

## About This Book

This book provides you all information for Formative Assessment 1 for Class X. We think this book helps to all the physical science learners. We request to all the students try to write some more other Lab Activities and Projects in the FA 1 syllabus.

## About Us



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**G V RAMA PRASAD,**  
PGT, PHYSICAL SCIENCE, CRT,  
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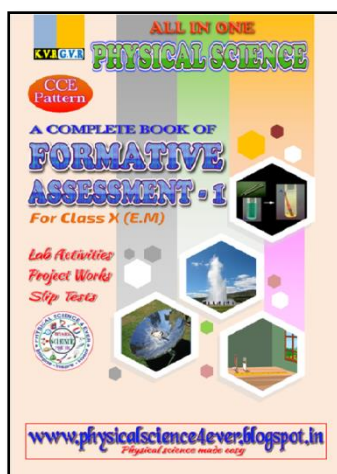
These books are meant for class X students in AP & TS.

In this we have given **CCE Notes** with full explanations of questions given in the lesson. They are very useful to understand clear concept. We also give all type of examples and applications at related topics so as to learn crystal clearly about that concept.

We give one **Project** and one **Lab Activity** in the given syllabus, explain a **DIY project/experiment** for doing the students at their home to enjoy the learning, include some **CCE Model Questions, CCE Bits** that are given previously in examinations for understanding the question pattern.

Please give your review on this book by SMS/watts app to our numbers. Your suggestions and advises are important to our development.

**ALL THE BEST TO THE STUDENTS**



A Complete book of  
Formative  
Assessment-1



Bit paper analysis of  
Pre-Public  
examinations



Previous Question  
paper analysis  
A.P & T.S

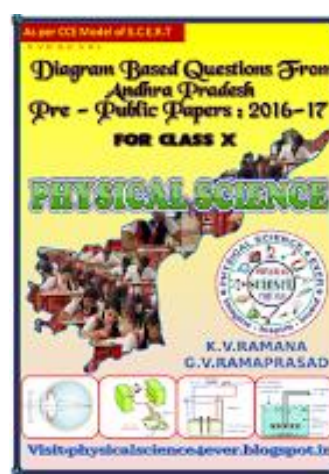


Diagram based  
questions from pre-  
public exams in A.P