DEVELOPING THE ACTIVITY BASED LEARNING IN SCIENCE CONCEPTS THROUGH EXPERIMENTS FOR UPPER PRIMARY STUDENTS.

ACTION RESEARCH REPORT

ACTION RESEARCH PRACTITIONER

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SUBMITTED TO

State Council of Educational Research and Training, Chennai-6

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Place: Signature of the Action Practitioner

Date:

DECLARATION

` I hereby declare that Action Research entitled **"DEVELOPING THE ACTIVITY BASED LEARNING IN SCIENCE CONCEPTS THROUGH THE EXPERIMENTS FOR UPPER PRIMARY STUDENTS",** is submitted by me to the SCERT Chennai in the year 2023-2024 is the result of our original and independent Action Research work carried out under the co-ordination of Dr.V.Hemalatha, Principal, DIET, Krishnagiri. This work has not submitted earlier for completing any Action Research work or other similar titles in this or any other institution.

Apirl -2024

Signature of the Action Practitioner

Dr.N.Nisha

Lecturer,

DIET, Krishnagiri.

CERTIFICATE

Dr.V.Hemalatha, Principal

DIET, Krishnagiri.

Certified that this Action Research work entitled **"DEVELOPING THE ACTIVITY BASED LEARNING IN SCIENCE CONCEPTS THROUGH THE EXPERIMENTS FOR UPPER PRIMARY STUDENTS",** is done by Mrs. Dr.N.Nisha, Lecturer, DIET, Krishnagiri, the report has been submitted to State Council of Educational Research and Training, Chennai-6.

Principal

DIET, Krishnagiri

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EXECUTIVE SUMMARY

INTRODUCTION:

Developing scientific attitude through science teaching has been a major dream of science teachers. Traditional classroom works more or less as an information exchange house where teacher is supposed to pass certain information to the students. This may not result in developing scientific attitude in the students. The student get a lot of information about the science knowledge in the class room. They also memorize them. In the examination, they can beautifully reproduce the memorized information.

They only provide a blueprint of how the activity has to be performed. Learners are expected to perform those activities and record their observations in the desired format. Active participation in the process of conducting the activity and recording their observations helps the learner in reflecting on the issues involved and thus the activity-based learning context is better understood which leads to better behaviour modification.

NEED AND SIGNIFICANCE OF THE PROBLEM:

During school visits, the practitioner found that the upper primary students felt difficulty to understand and learn the science concepts without experiments. Hence the topic has been chosen for the study by the practitioner.

STATEMENT OF THE PROBLEM:

The problem is stated as follow " DEVELOPING ACTIVITY-BASED LEARNING IN SCIENCE CONCEPTS THROUGH THE EXPERIMENTS FOR UPPER PRIMARY STUDENTS. "

LIMITATIONS OF THE STUDY:

- The geographical area of this study is limited to PUMS, Chinna Karapattu in Uthangarai Block.
- Activity-oriented science concepts were selected for this study.
- The physics and chemistry area has chosen to focus only on activity-based learning for their studies.
- The physics and chemistry area has selected only activity based learning for the study.
- The sample of study is restricted to 22 Students in VIII standard only.

OBJECTIVES OF THE STUDY:

- To ensure that the learning shifts away from the rote methods.
- To engage the students and enhance their scientific knowledge and skills through the activity based learning.
- To enrich the students' long term memory through the activity based learning.

ACTION HYPOTHESES OF THE STUDY:

- There is a significant mean difference between the scores of the pre-test and the post-test in developing the activity based learning of knowledge of science concepts through experiments among VIII Standard students
- There is a significant mean difference between the scores of the boys and the girls in developing activity based learning the knowledge of science concepts through experiments among VIII Standard students.

METHODOLOGY:

Research Design:

Single Group Experimental Design

Sample:

- The practitioner selected PUMS, Chinna Karapattu, Uthangarai block as the sample 22 students studying class VIII in that school 12 boys and 10 girls in that class. Pre test and Post test was conducted for all students.

Tool:

- Pre–test and Post –test questionnaire to explore the activity based learning concepts in science among the Upper primary students will be developed by the Action research practitioner.
- It consists of 15 items.

Intervention:

Science concepts are given various activities in activity based learning method.

DESIGN OF THE STUDY:

- Pre test was conducted to 22 students using the constructed tool. Activities was framed by the Practitioner and it was implemented in the class room environment. Treatment is given to the students by the concerned subject teacher.
- After the treatment post test was conducted using the same tool to study the effect of the treatment. Scores are analyzed statistically.

FINDINGS:

- The developing the knowledge of activity based learning in science concepts through experiment of the student is found to be high.
- There is significant mean difference between pre test and post test achievement score of the students studying in the VIII standard were 25.0 and 58.36 respectively.

- There is significant mean difference between Boys and and Girls achievement score of the students studying in the VIII standard were 60.92 and 54.66 respectively.
- All the experiments to enhance developing and understanding skill of the science concepts.
- Atmospheric pressure, pressure exerts liquid, force, acid and base with metal reaction experiment are very interesting and the student get the experiential learning from the experiments**.**

EDUCATIONAL IMPLICATIONS:

- The teachers may prepare their lesson plans incorporating experiments or activities so as to provide opportunities to learners through 'Activity based learning'.
- Both the teacher and the taught desire immense pleasure in activity based teaching-learning process.
- Activity based learning motivates the students and sustains the interest of the teachers in learning.
- Retention of what is learnt is enhanced to the appreciable extent. Hence the teachers should go in for 'Activity based teaching'.

SUGGESTION:

- This Activity based learning experiment through four steps methods is recommended for all upper primary classes.
- The Activity based learning maths experiment is also applicable for upper primary students.

CONCLUSION :

It provides a framework for the traditional concept of ‘learning by doing. Activity-based learning environment prepares learners to be autonomous, critical thinkers and knowledge constructors. There is also an evident enhancement of learners’ understanding of the content, interpersonal skills, aptitude to engage in group activities and capability to relate the topic to real-life situations. This learning approach also possesses the potential of developing the experience and confidence of teachers through a collaborative approach for building a positive teaching learning environment.

DEVELOPING THE ACTIVITY BASED LEARNING IN SCIENCE CONCEPTS THROUGH THE EXPERIMENTS FOR UPPER PRIMARY STUDENTS.

INTRODUCTION:

Developing scientific attitude through science teaching has been a major dream of science teachers. Traditional classroom works more or less as an information exchange house where teacher is supposed to pass certain information to the students. This may not result in developing scientific attitude in the students. The student get a lot of information about the science knowledge in the class room . They also memorize them. In the examination, they can beautifully reproduce the memorized information. In the activity-based learning, the learners either as an individual or as a group are engaged in performance of certain activities. These activities are basically planned action as per certain rules whose performance may help in better understanding of the matter leading to desired change in their behavior. Here teachers merely act as facilitators.

They only provide a blueprint of how the activity has to be performed. Learners are expected to perform those activities and record their observations in the desired format. Active participation in the process of conducting the activity and recording their observations helps the learner in reflecting on the issues involved and thus the activity-based learning context is better understood which leads to better behaviour modification.

ACTIVITY BASED LERANING IN SCIENCE:

Activity-Based Learning (ABL) mark a departure from traditional, emphasizing hands-on experiences and real-world problem-solving. These innovative approaches shift the focus from passive to interactive, learner-centered education, equipping students with essential skills for real-life challenges. This shift is crucial in a fast-evolving world, making the exploration of ABL, but about preparing learners for success beyond the classroom.

Activity Based Learning as the name suggests actively involves learners in the construction and reconstruction of knowledge based on her individual experiences. It is Known as learning by doing method.

It involves using specific activities as the primary vehicle for learning. This approach is particularly effective in teaching complex scientific concepts like photosynthesis. The hands-on, experimental nature of ABL activities helps students grasp the intricacies of the process through direct experience.

The four steps to practicing activity based learning are:

Planning:

It is important to identify the learning objectives that would be achieved through the planned activity.

- The teacher needs to make a list of and arrange for the various resources that may be required material, learning resources, etc.
- The plan for debriefing discussion after the activity should also be developed by the teacher. The teacher also requires to have an idea about assessing not only the learners, but also the effectiveness of the activity.

Conducting the activity:

while conducting the activity as a facilitator, the teacher needs to work in the following phase.

Initiate the activity:

Introduce the activity by inform the student about the purpose or objective of the activity, the role, the time, duration and evaluation.

Proceed with the activity:

After initiated the main role, the teacher has to ensure that the student can meaningfully do what they are expected to do. The teacher has to remember encouraging all the student to keep them motivated and involved.

End the activity:

This phase is important to consolidate the learnings. This may require that the student reflect on the experience and derive learnings relevant to the identified objective. If it is not done, sometimes the student are unable to relate the activity to essential learning.

The teacher can also conclude by suggesting their linkage of the activity to real life situation and further direction. This phase is crucial for establishing link between what student experience and what they read in the textbook.

Reflecting on the process:

This process is for the teacher to take her own notes and learning from the experience of conducting the activity. The teacher must spend some time reflecting on what worked well and what did not, and improve the design planning and conducting activity in the future.

Revising:

As a result of reflection, the teacher realizes the benefits and strength of conducting the activity. Analysis about the experience also reveals the scope for improving the same activity for the next time. Hence, the teacher has to conclude that activity-based learning means learning by doing.

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The problem is stated as follow : **" DEVELOPING ACTIVITY-BASED LEARNING IN SCIENCE CONCEPTS THROUGH THE EXPERIMENTS FOR UPPER PRIMARY STUDENTS. "**

LIMITATIONS OF THE STUDY:

- The Action Research Practitioner will restrict the students from the Upper Primary schools in Uthangarai Block.
- The Action Research Practitioner will focus only on activity oriented concepts in science.

OBJECTIVES:

- To ensure that the learning shifts away from the rote methods.
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- To enrich the students' long term memory through the activity based learning.

ACTION HYPOTHESES:

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- ❖ There is a significant mean difference between the scores of the boys and the girls in developing activity based learning the knowledge of science concepts through experiments among VIII Standard students.

METHODOLOGY:

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INTERVENTION:

ACTIVITY:1

Fix a matrix of sharp pins on a wooden board in rows and columns. Take a big blown up balloon. Place it gently over the pins and place a small book on the top of the balloon. Will the balloon burst? Will the pins prick the balloon?

Aim : To understand the effect of a force depends on the magnitude of the force and the area over which it acts.

Materials required : Sharp pins, wooden board, balloon.

Procedure :

(i) Fix a matrix of sharp pins on a wooden board in rows and columns.

(ii) Take a big blown up balloon.

(iii) Place it gently over the pins.

(iv) Place a small book on the top of the balloon.

(v) Observe what happens?

(vi) Will the balloon burst? Will the pins prick the balloon?

Inference :

(i) The balloon will not burst. If you prick the balloon with a single pin it will burst. But this did not happen even though many more pins were pricking the balloon.

(ii) A single pin produces a large pressure over a small area. But, when a large number of pins prick a body, each pin exerts very little pressure on the balloon, as the applied force gets distributed over a large surface of the body. So, the balloon will not burst.

Conclusion: We conclude that the effect of a force depends on the magnitude of the force and the area over which it acts.

Activity 2

Take a conical flask and a well boiled egg, after removing its shell. Place the egg on the mouth of the flask. It will not enter the flask. Now take a piece of paper. Burn it and drop it inside the flask. Wait for a few seconds to burn fully. Now, keep the egg on the mouth of the flask. Wait for a few minutes. What do you observe?

When the paper is burning in the flask, the oxygen present in the air inside the conical flask is used up for its combustion. This reduces the pressure of the air in the flask. The air in the atmosphere tends to occupy the low pressure region in the flask. So, it rushes through the mouth of the flask, thus pushing the egg into the flask.

Aim : To realise the atmospheric pressure.

Materials required: Conical flask, boiled egg, piece of paper.

Procedure:

(i) Take a conical flask.

(ii) Take a well boiled egg, after removing its shell.

(iii) Place the egg on the mouth of the flask.

(iv) It will not enter the flask.

(v) Take a piece of paper.

(vi) Burn it and drop it inside the flask.

(vii) Wait for a few seconds, let it burnt fully.

(viii) Now keep the egg on the mouth of the flask.

(ix) Wait for a few minutes.

Observation: The egg placed at the mouth of the flask gets compressed and it falls into the flask, due to the atmospheric pressure.

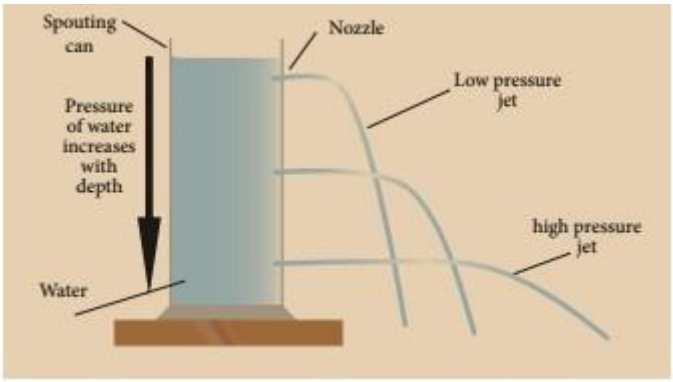
Inference:

(i) When the paper is burning in the flask, the oxygen present in the air inside the conical flask is used up for its combustion. This reduces the pressure of the air in the flask. The air in the atmosphere tends to occupy the low pressure region near the flask.

(ii) So, it rushes through the mouth of the flask, thus pushing the egg into the flask. Eventually, the egg falls down to the bottom of the flask.

Activity 3

Take a plastic bottle. Punch three holes on its side in the same direction, but at different heights. Now pour some water into it and let it flow through the holes. Observe the flow of water. Water from the lowest hole comes out with the greatest force and the water from the topmost hole comes out with the least force.



Aim : To understand that the pressure in a liquid varies with the depth of the point of observation in it.

Materials required : Plastic bottle, Water

(i) Plastic bottle

(ii) Water

Procedure :

(i) Take a plastic bottle.

(ii) Punch three holes on its sides in the same direction but at different heights.

(iii) Now pour some water into it and let it flow through the holes.

(iv) Observe the flow of water.

Observation:

i) The water comes out from all the holes with a different force and falls on the table at points that are at variable distances from the bottle.

(ii) Water from the lowest hole comes out with the greater force and falls at a point that is at the maximum distance from the bottle.

(iii) Water from the top most hole comes but with the least force and falls at the point that is at the minimum distance from the bottle.

Inference: This shows that the pressure is a liquid varies with the depth of the point of observation on it.

Answer 2 : Take a plastic bottle. Punch three holes on its side in the same direction, but at different heights. Now pour some water into it and let it flow through the holes. Observe the flow of water.

Inference : The water comes out from all the holes with a different force and falls on the table at points that are at variable distances from the bottle. Water from the lowest hole comes out with the greatest force and falls at a point that is at the maximum distance from the bottle. Water from the topmost hole comes out with the least force and falls at the point that is at the minimum distance from the bottle.

Reason: This activity confirms that the pressure in a liquid varies with the depth of the point of observation in it.

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Activity 4

Take a glass tube that is open at both ends. Fix a rubber balloon at the lower end of the tube. Pour some water into the tube and observe the balloon. Now, pour some more water into the balloon and again observe the balloon. The balloon starts bulging outwards.

Aim : To demonstrate that liquid exerts pressure at the bottom of its container depends on the height of the liquid column in it.

Materials required ; Transparent glass tube, balloon, water.

Procedure :

(i) Take a glass tube that is open at both ends.

(ii) Fix a rubber balloon at the lower end of the tube.

(iii) Put some water into the tube and observe the balloon.

(iv) Now, pour some more water into the balloon and again observe the balloon.

Observation : The balloon starts bulging outwards. The bulge increase with an increase in the height of the water column.

Inference: The pressure exerted by a liquid at the bottom of a container depends on the height of the liquid column in it.

Activity 5

Take a plastic bottle. Punch three holes on its sides at the same height from its base. Now, pour some water into it and let it flow through the holes. Observe the flow of the water. Water comes out from all the holes with the same force and falls on the ground/ table, at the same distance from the bottle.

Aim : To demonstrate that liquid exerts equal pressure at same depth.

Material required : Plastic bottle, water.

Procedure :

(i) Take a plastic bottle.

(ii) Punch three holes on its sides at the same height from its base.

(iii) Now, pour some water into it and let it flow through the holes.

(iv) Observe the flow of the water.

Observation : The water comes out from all the holes with the same force and falls on the ground / table, at the same distance from the bottle.

Inference : This activity confirms that liquids exert the same pressure in all directions at a given depth in their container.

Activity 6

Take a rubber ball and fill it with water. Make tiny holes on its surface with a pin at different points. Press anywhere on the ball. What do you observe?

Aim : To demonstrate pressure applied on one point of liquid transmits equally in all directions.

Materials required : Rubber ball, water, pin.

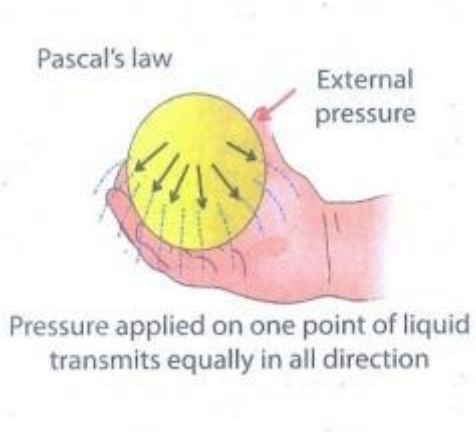
Procedure :

(i) Take a rubber ball. Fill it with water.

(ii) Then take tiny holes on it with a pin at different points on its surface.

(iii) Press anywhere on the ball.

(iv) What do you observe?



Observation : There are identical streams of water flowing in all directions from the holes.

Inference : This is due to the phenomenon that the pressure, which is applied on the liquid, is equally transmitted in all directions.

Activity 7

Take some water in a beaker and spread a tissue paper on the surface of the water. Gently place the paper clip on the tissue paper. Observe what happens to the paper pin after some time.

After a few moments the tissue paper will submerge and the paper clip will make a small depression on the surface of the water. It will instantly begin to float on the surface, even though it is denser than water.

Aim : To understand about surface tension property of liquid.

Materials required : Glass beaker, water, paper clip, tissue paper.

Procedure :

(i) Take a paper clip. Take a beaker of water.

(ii) Take a tissue paper and spread it on the surface of the water.

(iii) Gently, place the paper clip on the tissue paper.

(iv) Observe what happens to the paper pin after some time.

Observation : tAfter a few moments the tissue paper will submerge and the paper clip will make a small depression on the surface of the water. It will instantly begin to float on the surface, even though it is denser than water.

Inference : This is due to the water molecules on the surface, which tend to contract themselves like the molecules of an elastic membrane. A force exists on them, which tends to minimize the surface area of water. The paper clip is balanced by the molecules on the water surface that is now behaving like a stretched elastic membrane. So, it does not submerge.

Activity 8

Take a small quantity of different kinds of liquid like coconut oil, honey, water and ghee etc. , Place one drop of each liquid on a separate glass plate. Now gently raise one end of the glass plate, so as to allow the liquid to slide down the smooth surface of the plate. Observe the speed of each liquid.

Aim : To understand about the frictional force between the layers of liquid in motion.

Materials required : Different kinds of liquid (coconut oil, honey, water, ghee), glass plates - 4 nos.

Procedure :

(i) Take a small quantity of different kinds of liquid like coconut oil, honey, water and ghee etc., in a cup.

(ii) Place one drop of each liquid on a separate glass plate.

(iii) Next, gently raise one end of the glass plate, one by one, so as to allow the liquid to slide down the smooth surface of the plate.

(iv) Observe the speed of each liquid.

Observation : Each liquid moves with a different speed. Water flows faster than other liquids. Coconut oil flows with a moderate speed. Ghee flows very slowly.

Inference : Between the layers of each liquid, in motion, there is a frictional force parallel to the layers of the liquid. This frictional force opposes the motion of the liquid layers while they are in motion.

ACTIVITY:9

Aim To understand the effect of the force of friction, which increases as the roughness the surface increases.

Materials required : Paper, glass, cotton cloth, wood, table, books, newspaper, writing pad, glass marbles in a bouch.

Procedure :

(i) Arrange some notebooks one over the other to form a platform, on a table.

(ii) Keep a wide scale, as a slide, such that one of its ends rests on the pile of books.

(iii) Take different kinds of materials like cotton cloth, plastic paper, newspaper, writing pad etc.

(iv) Place some glass marbles in a bowl placed on the table.

Experiment : First, keep a rectangular piece of paper near the end of the scale, which is in contact with the table. Now, release a glass marble from the top end of the scale such that it rolls down the scale. Allow the marble to roll over the piece of paper and finally, come to rest. Replace the rolling surface by placing the plastic sheet, wooden plank, cotton cloth.

Observation: Measure the distance travelled by the marble over the different objects using the meter scale.

Inference: In different objects each trial measure the distance travelled by the glass marble is tabulated. Tabulate the distance covered by the marble over different surfaces is different.

(ii) The inner side of the spoon is referred to as the concave side whereas the back (outer) bulging side is referred to as the convex side.

(iii) You will observe that the image is (inside bowl) always real, inverted and formed on the same side of the object.

(iv) In outside bowl the image is diminished erect and virtual.

The relation between the incident ray, the reflected ray and the normal is given as the laws of reflection. The laws of reflection are as follows:

* The incident ray, the reflected ray and the normal at the point of incidence, all lie in the same plane.

* The angle of incidence (i) and the angle of reflection (r) are always equal.

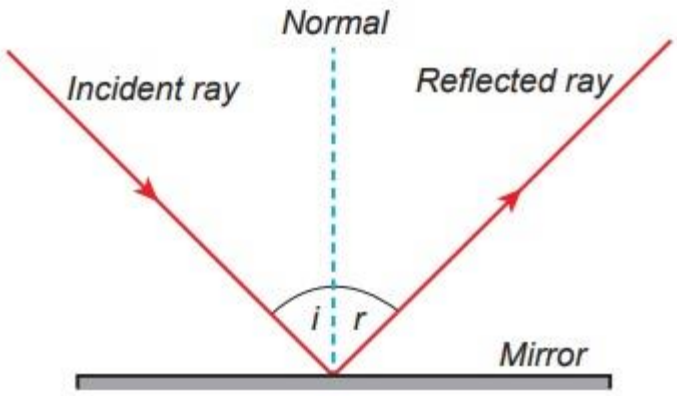


Figure 3.6 Reflection of light

Silver metal is the best reflector of light. That is why a thin layer of silver is deposited on the side of materials like plane glass sheets, to make mirrors.

Activity: 10

Take three equal sized plane mirror strips and arrange them in such a way that they form an equilateral triangle. Cover the sides of the mirrors with a chart paper. In the same manner cover the bottom of the mirrors also. Put some coloured things such as pieces of bangles and beads inside it. Now, cover the top portion with the chart paper and make a hole in it to see. You can wrap the entire piece with coloured papers to make it attractive. Now, rotate it and see through its opening. You can see the beautiful patterns.

Caution: Be careful while handling the glass pieces. Do this under the supervision of your teacher.

Aim : To construct kaleidoscope and to produce numerous patterns of images.

Materials required : Three equal sized plane mirrors, chart paper, pieces of bangles and beads, coloured papers.

Procedure :

(i) Take three equal sized plane mirror strips and arrange them in such a way that they form an equilateral triangle.

(ii) Cover the sides of the mirrors with a chart paper.

(iii) With the help of a chart paper cover the bottom of the mirrors also.

(iv) Put some coloured things such as pieces of bangles and beads inside it.

(v) Now, cover the top portion with the chart paper and make a hole in it to see.

(vi) You can wrap the entire piece with coloured papers to make it attractive.

(vii) Now, rotate it and see through its opening. You can see the beautiful patterns.

Observation : We can see the beautiful image patterns.

Inference : Kaleidoscope is a device, which functions on the principle of multiple reflection of light to produce numerous patterns of images.

Activity:11

Take a curved silver spoon and see the image formed by it. Now, turn it and find the image formed. Do you find any difference? Find out the reason.

Reason :

(i) The curved surface of the spoon acts as a reflecting surface. But this reflecting surface is not flat like that of a plane mirror. Thus the spoon behaves as a curved mirror.

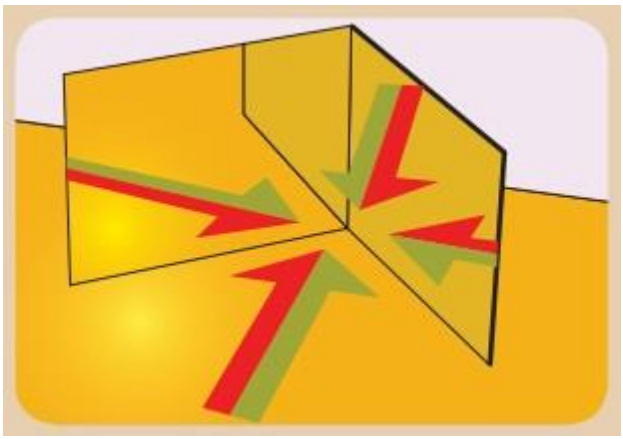
(ii) The inner side of the spoon is referred to as the concave side whereas the back (outer) bulging side is referred to as the convex side.

(iii) You will observe that the image is (inside bowl) always real, inverted and formed on the same side of the object.

(iv) In outside bowl the image is diminished erect and virtual.

Activity: 12

Take two plane mirrors and keep them perpendicular to each other. Place an object between them. You can see the images of the object. How many images do you see in the mirrors? You can see three images. How is it possible to have three images with two mirrors?



Answer:

Aim : To understand the concept multiple reflection.

Materials required : Two plane mirrors, an object.

Procedure :

(i) Take two plane mirrors and keep them perpendicular to each other.

(ii) Place an object between them.

Observation : We can see three images of the object.

Inference :

(i) When a body kept in between two plane mirrors, which were inclined to each other. You could see many images. This is because, the image formed by one mirror acts as an object for the other mirror.

(ii) The image formed by the first mirror acts as an object for the second mirror and the image formed by the second mirror acts as an object for the first mirror.

(iii) Thus we have three images of a single body. This is known as multiple reflection.

In the activity given above, you observed that for an object kept in between two plane mirrors, which were inclined to each other, you could see many images. This is because, the ‘image’ formed by one mirror acts as an ‘object’ for the other mirror. The image formed by the first mirror acts as an object for the second mirror and the image formed by the second mirror acts as an object for the first mirror. Thus, we have three images of a single body. This is known as multiple reflection. This type of reflections can be seen in show rooms and saloons.

Activity 13

Take a glass beaker, fill it with water and place a pencil in it. Now, look at the pencil through the beaker. Does it appear straight? No. It will appear to be bent at the surface of the water. Why?

Answer:

Aim : To understand refraction of light.

Materials required : Glass beaker, water, pencil.

Procedure :

(i) Take a glass beaker.

(ii) Fill it with water

(iii) Place a pencil in it.

(iv) Now look at the pencil through the glass beaker.

(v) Does it appear straight?

Observation : It will appear to be bent at the surface of the water.

Inference :

The light rays actually travel from the water (a denser medium) into the air (a rarer medium).

(ii) When a light ray travels from a denser medium to a rarer medium, it is deviated from its straight line path.

(iii) So, the pencil appears to be bent when you see it through the glass of water.

(iv) Thus; the bending of light rays when it travels from one medium to another medium is called refraction.

In this activity, the light rays actually travel from the water (a denser medium) into the air (a rarer medium). As you saw earlier, when a light ray travels from a denser medium to a rarer medium, it is deviated from its straight line path. So, the pencil appears to be bent when you see it through the glass of water.

Activity 14

Place a prism on a table and keep a white screen near it. Now, with the help of a torch, allow white light to pass through the prism. What do you see? You can observe that white light splits into seven colored light rays namely, violet, indigo, blue, green, yellow, orange and red (VIBGYOR) on the screen. Now, place another prism in its inverted position, between the first prism and the screen. Now, what do you observe on the screen? You can observe that white light is coming out of the second prism.

Answer:

Aim : To understand about dispersion of light.

Materials required : Prism - 2, white screen, torch light.

Procedure :

(i) Place a prism on a table and keep a white screen near it.

(ii) Now with the help of a torch, allow white light to pass through the prism. What do you see?

(Hi) Now, place another prism in its inverted position, between the first prism and the screen. What do you observe on the screen?

Observation I : We can observe that white light splits into seven coloured light rays namely, violet, indigo, blue, green, yellow, orange and red (VIBGYOR) on the screen.

Observation II : (After placing second prism)

(i) We can observe that white light is coming out of the second prism.

(ii) The first prism splits the white light into seven coloured light rays and the second prism recombines them into white light again.

Inference : It is clear that white light consists of seven colours.

Conclusion : Splitting of white light into its seven constituent colour, on passing through a transparent medium is known as dispersion of light.

Activity 15

Take a clean test tube with holder and pour some dilute hydrochloric acid. Add few pieces of magnesium ribbon slowly. What do you observe? Now show a burning match stick near the mouth of the test tube. Do you hear any sound? The gas burns with a pop sound. From this it is observed that hydrogen gas is formed due to the reaction between acid and metal (Do it under the supervision of the teacher).

Copper or brass cooking vessels are coated with tin metal (eyam). If it is not coated the organic acids present in the food materials will react with copper and make the

food poisonous. The tin isolates the vessel from the action of acids and prevents food poisoning.

Answer: The gas burns with a pop sound. From this it is observed that hydrogen gas has been formed due to the reaction between acid and metal.

Activity :16

Take some lemon juice in a tumbler and add baking soda slowly. What do you see? What do you infer from this?

Answer:

Inference : When lemon juice is mixed with baking soda, the new product CO_2 is formed with water and salt.

Activity :17

Classify the following substances. Sodium oxide, Potassium hydroxide, Calcium oxide, Copper oxide, Calcium hydroxide, Ammonium hydroxide, Ferric hydroxide, Zinc oxide

BASE	**ALKALI**	**OXIDE**
Calcium Oxide	Potassium Hydroxide	Zinc Oxide
Sodium Oxide	Calcium Hydroxide	
Copper Oxide	Ammonium Hydroxide	
Ferric Hyroxide	Potassium Hydroxide	

Activity 15

Take a white cloth with turmeric powder stain. Wash the cloth with washing soap. Do you observe any change in the colour? Why?

Answer: Yes, the colour changes from yellow to red, because soapy solution is a base.

Activity 16

Take a small beet root vegetable and cut it into pieces. Boil them in hot water and filter the extract. Take two test tubes. Take sodium hydroxide solution in one test tube and vinegar or lemon juice in another test tube. Add beet root extract slowly. Observe the colour change. What do you infer?

Answer:

(i**) Observation** : When beetroot juice is added with sodium hydroxide solution it turns into greenish yellow shows that NaOH - is a base.

(ii) When it is added with lemon juice, the colour of beetroot juice remains same shows that lemon juice is acidic.

DATA ANALYSIS:

Pre test and post test answer scripts were valued using the scoring key. Total marks were converted to 100 from 25. Mean, S.D, and 't' values were calculated to find the effect of activity based learning in science concepts through experiments to enhance the level of achievement in chemistry.

TABLE:1

SIGNIFICANCE DIFFERENCE BETWEEN THE PRE TEST AND POST TEST SCORES OF TOTAL SAMPLE

CATEGORY	N	MEAN	S.D	T- TEST		REMARKS
				Calculated value	Table value	
Pre test	**22**	**25.09**	**10.59**	**12.09**	**2.08**	***Significant 0.05 level**
Post test	**22**	**58.36**	**10.20**			

From the above table it is observed that the calculated 't' value 12.09 which is evident that the ‘t’ value is significant at 2.08 level. There is significance difference between pre test and post test scores. Hence the hypothesis is accepted. Thus the action of hypothesis **Significance difference between the Pre test and Post test scores by using Activity based learning to Developing the concepts understanding skill in science concept was accepted.**

TABLE:2

SIGNIFICANCE DIFFERENCE BETWEEN THE BOYS AND GIRLSACHIEVEMENT SCORES

CATEGORY	N	MEAN	S.D	T- TEST		REMARKS
				Calculated Value	Table value	
BOYS	13	60.92	9.43	1.48	2.08	*Significant 0.05 level
GIRLS	9	54.66	10.15			

From the above table it is observed that the calculated 't' value 1.48 which is evident that the ‘t’ value is significant at 2.08 level. There is significance difference between pre test and post test scores. Hence the hypothesis is accepted. Thus the action of hypothesis **Significance difference between the Boys and Girls scores by using Activity based learning to Developing the concepts understanding skill in science concept was accepted.**

FINDINGS

- The developing the knowledge of activity based learning in science concepts through experiment of the student is found to be high.
- There is significant mean difference between pre test and post test achievement score of the students studying in the VIII standard were 25.09 58.36 respectively.

- There is significant mean difference between Boys and and Girls achievement score of the students studying in the VIII standard were 60.92 54.66 respectively.
- All the experiments to enhance developing and understanding skill of the science concepts.
- Atmospheric pressure, pressure exerts liquid, force, acid and base with metal reaction experiment are very interesting and the student get the experiential learning from the experiments.

EDUCATIONAL IMPLICATIONS:

- The teachers may prepare their lesson plans incorporating experiments or activities so as to provide opportunities to learners through 'Activity based learning'.
- Both the teacher and the taught desire immense pleasure in activity based teaching-learning process.
- Activity based learning motivates the students and sustains the interest of the teachers in learning.

- ❖ Retention of what is learnt is enhanced to the appreciable extent. Hence the teachers should go in for ‘Activity based teaching’.

SUGGESTION:

- ❖ This Activity based learning experiment through four steps methods is recommended for all upper primary classes.
- ❖ The Activity based learning maths and Biological science experiment is also applicable for upper primary students.

CONCLUSION:

It provides a framework for the traditional concept of ‘learning by doing’. Activity-based learning environment prepares learners to be autonomous, critical thinkers and knowledge constructors. There is also an evident enhancement of learners’ understanding of the content, interpersonal skills, aptitude to engage in group activities and capability to relate the topic to real-life situations. This learning approach also possesses the potential of developing the experience and confidence of teachers through a collaborative approach for building a positive teaching learning environment.

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மாவட்டஆசிரியர் கல்வி மற்றும் பயற்சிநிறுவனம்,

கிருஷ்ணகிரி

செயலாராச்சி முன்தேர்வு/பின்தேர்வு

மாணவர் பெயர்:

வகுப்பு:

பாடம்:

பள்ளியின் பெயர் மற்றும் முகவரி:

நேரம்:40 நிமிடங்கள் மதிப்பெண்:20

I.சரியானவிடையைதேர்ந்தெடுத்துஎழுதுக 1x20 =20

1.எதிரொளிப்பு விதியில், படுகோணமும், எதிரொளிப்புகோணமும் எவ்வாறு அமையும்?

அ.படுகோணம் = எதிரொளிப்புகோணம்

ஆ.படுகோணம் < எதிரொளிப்புகோணம்.

இ.படுகோணம் > எதிரொளிப்புகோணம்.

ஈ. படுகோணம் ‡ எதிரொளிப்புகோணம்

2.ஒருமுப்படகத்தின் வழியே டார்ச் கொண்டு ஒளியை அனுப்பினால், அது ஏழு வண்ணகளாக பிரிகைஅடையும் நிகழ்வு

அ.ஒளிவிலகல். ஆ.ஒளிஎதிரொளிதல்

இ.நிறப்பிரிகை ஈ.ஒளிவிலகல் எண்

3. ஒரு ஊடகத்தில் இருந்து மற்றொரு ஊடகத்திற்கு செல்லும் போது ஒளி தனது நேர் வழியில் சிறிது விலகி செல்லும் நிகழ்வு

அ.ஒளி எதிரொளித்தல் இ. நிறப்பிரிகை
ஈ.விளிம்புவிளைவு ஆ,ஒளிவிலகல்

4. விக்ரம் அவனுடைய நண்பன் ஆதித்யவுடன் பலூனை கொண்டு விளையாடிகொண்டு இருக்கின்றனர். இதில் விக்ரம் பலூனுடன் குண்டூசியை குத்தும்போது வெடித்து விடுகிறது. ஆனால் ஆதித்யா விளையாடும்போது பலூன்வுடன் நிறைய குண்டூசியை குத்தி விளையாடும்போது பலூன் வெடிக்கவில்லை ஏன்?
அ.ஆதித்யா பலூன் மீது செலுத்திய விசை அதிகமாக இருந்ததால்.
ஆ.ஆதித்யா பலூன் மீது செலுத்திய விசை குறைவாக இருந்ததால்.
இ.ஆதித்யா பலூன் மீது செலுத்திய விசை சமமாக இருந்ததால்
ஈ.ஆதித்யா பலூன் மீது செலுத்திய விசை மிக அதிகமாக இருந்ததால்.

5.கொடுக்கப்பட்ட படத்தில் ஒரு பாத்திரத்தில் தண்ணீர் நிரப்பட்டுஉள்ளது. இதில் பாத்திரத்தில் தண்ணீர் வெவ்வேறு நிலைகளில் வெளியேறுகிறது. கீழே கொடுக்கப்படுள்ள நிரின் அழுத்தம் பற்றிய கூற்றுகளில் எது சரியானது? கண்டுபிடி.

அ.A-யில் அழுத்தம் > B-யில் அழுத்தம் > C-யில்அழுத்தம்
ஆ.A- யில் அழுத்தம் = B-யில் அழுத்தம் = C-யில்அழுத்தம்
இ.A-யில் அழுத்தம் < B-யில் அழுத்தம் > C-யில்அழுத்தம்
ஈ.A-யில் அழுத்தம் < B-யில் அழுத்தம் < C-யில்அழுத்தம்

6.கீழே கொடுக்கப்பட்டுள்ள எந்த எடுத்துக்காட்டு விசையினால் ஒரு பொருளின் வடிவத்தையும், அதன் அளவையும் மாற்ற முடியும் என்பதற்கு பொருத்தமானது?

அ.கேரம் விளையாட்டில் நாணயங்களின்மீது செலுத்தப்படும் விசை

ஆ.கிரிக்கெட் பந்தின் மீது செலுத்தப்படும் விசை

இ.கதவைத் திறக்க செலுத்தப்படும் விசை

ஈ.ஊதப்பட்ட பலூன் மீது செலுத்தப்படும் விசை

7.திரவத்தின் ஒரு புள்ளியில் செலுத்தப்படும் அழுத்தம் அனைத்து திசைகளிலும் சமமாக பரவுவது

அ.நியூட்டன் விதி ஆ.விசை

இ.பாஸ்கல் விதி ஈ.பரப்பு இழுவிசை

8. மழைதுளிகள் இயற்கையாகவே கோள வடிவத்தை பெற்று இருப்பதற்கு காரணம் ஏன்?

அ. அடர்த்தி ஆ.பரப்பு இழுவிசை

இ. மிதப்பு விசை ஈ. அழுத்தம்

9.கொடுக்கப்படுள்ளவற்றில் அதிக பாகுநிலை பெற்று இருக்கும் திரவம் எது?

அ.தேங்காய்எண்ணெய் ஆ.நீர்

இ. தேன் ஈ நெய்

10.கூற்று: நீர்சிலந்தி தண்ணீரின் மேற்பரப்பில் எளிதாக நகர்ந்து செல்கிறது.

காரணம்: நீர்சிலந்தி குறைவான மிதப்பு விசையை உணர்கிறது.

அ.கூற்று மற்றும் காரணம் இரண்டும் சரி. காரணம் கூற்றுக்கு சரியான விளக்கம் ஆகும்.

ஆ. கூற்று மற்றும் காரணம் இரண்டும் சரி.ஆனால் காரணம் கூற்றுக்கு சரியான விளக்கம் அல்ல

இ.கூற்று சரி. ஆனால் காரணம் தவறு

ஈ.கூற்று மற்றும் காரணம் இரண்டும் தவறு.

11.ஒரு சோதனை குழாயை எடுத்து கொண்டு அதில் சிறிதளவு ஹைட்ரோகுளோரிக் அமிலத்தையும், மெக்னீசியம் நாடத்துண்டுகளை சேர்த்தவுடன் அதில் எரியும் தீக்குச்சியினை காட்டும்போது 'பாப்' என்ற சத்தத்துடன் வெளிவரும் வாயு எது?

அ.ஹைட்ரஜன் ஆ.நைட்ரஜன்

இ. ஆக்ஸிஜன் ஈ. கார்பன் டை ஆக்ஸைடு

12.பொருத்துக.

1.காரம்- பொட்டசியம் ஹைட்ராக்சைடு

2.அல்கலி- ஹைட்ரோ குளோரிக் அமிலம்

3.ஆக்ஸைடு-ஜிங்க் ஆக்ஸைடு

4 .அமிலம்- சோடியம் கார்பனேட்

அ. 1 2 3 4

ஆ.1 4 3 2

இ. 2 1 3 4

ஈ. 3 2 1 4

13. உன்னுடைய வெள்ளை துணியில் மஞ்சள் தூள் பட்டு விடுகிறது.நீ துணிசோப்பு கொண்டு துவைக்குபோது மஞ்சள் நிறம் சிவப்பு நிறமாக மாறுகிறது. இதற்கு காரணம்,

அ. துணிசோப்பு ஒரு அமிலம்

ஆ. துணிசோப்பு ஒரு காரம்

இ. துணிசோப்பு ஒரு உப்பு

ஈ.மேற்கண்ட ஏதுமில்லை

14.ஒரு சோதனைகுழாயில் எலுமிச்சை சாறு எடுத்து கொண்டு சமையல்சோடா சேர்க்கும் போது நுரைத்து பொங்குகிறது. அந்த வாயுவின் பெயர் என்ன?

அ.ஹைட்ரஜன் ஆ.நைட்ரஜன்

இ. ஆக்ஸிஜன் ஈ. கார்பன் டை ஆக்ஸைடு

15. ஒரு முகவையில் பீட்ருட் சாற்றினை எடுத்து கொண்டு, A என்ற சோதனை குழாயில் எலுமிச்சை சாற்றையும், B என்ற சோதனைக்குழாயில் சோடியம் ஹைட்ராக்சைடு கரைசலையும் ஊற்ற வேண்டும். A மற்றும் B இரண்டு சோதனைக்குழாயில் பீட்ருட் சாற்றினை ஊற்றவேண்டும். இதில் எது அமிலம் மற்றும் காரம் என்பதை கூறுக.

அ.A- அமிலம், B- காரம்

ஆ.A- காரம்-, B- அமிலம்

இ.A & B அமிலம்

ஈ A & B- காரம்

16. வளிமண்டல அழுத்தத்தின் மதிப்பு

அ. 76 செ.மீ பாதரசத் தம்பம்

ஆ. 760 செ.மீ பாதரசத் தம்பம்

இ. 176 செ.மீ பாதரசத் தம்பம்

ஈ. 7.6 செ.மீ பாதரசத் தம்பம்

17.கூம்புக்குடுவையின் வாய்ப்பகுதியில் வைக்கப்பட்ட முட்டையானது, கூம்புக்குடுவைக்குள் விழக்காரணம் என்ன?

அ.கூம்புக்குடுவையின் வெளிப்புற வளிமண்டல அழுத்தைவிட உட்புற அழுத்தம் அதிகம்.

ஆ.கூம்புக்குடுவையின் வெளிப்புற வளிமண்டல அழுத்தைவிட உட்புற அழுத்தம் குறைவு.

இ.கூம்புக்குடுவையின் உட்புற அழுத்தை விட வெளிப்புற வளிமண்டல அழுத்தம் அதிகம்.

ஈ.கூம்புக்குடுவையின் உட்புற அழுத்தை விட வெளிப்புற வளிமண்டல அழுத்தம் குறைவு

18.ஒருபொருள் இயங்கும் திசைக்கு எதிரான திசையில் விசையைச் செலுத்தினால் அப்பொருளின் இயக்கமானது

அ. நின்று விடும்

ஆ. அதிக வேகத்தில் இயங்கும்

இ. குறைந்த வேகத்தில் இயங்கும்

ஈ. வேறு திசையில் இயங்கும்

19. உயரமான மலைப்பகுதிகளில் சமையல் செய்வது கடினம். ஏன்?

அ.வளிமண்டல அழுத்தம் அதிகமாக இருப்பதால்

ஆ.வளிமண்டல அழுத்தம் குறைவாக இருப்பதால்

இ. வளிமண்டல அழுத்தம் மிக அதிகமாக இருப்பதால்

ஈ வளிமண்டல அழுத்தம் மிக குறைவாக இருப்பதால்

20. உட்புறமாக எதிரொளிக்கும் பரப்பை உடைய வளைவு ஆடி

அ) குவி ஆடி

ஆ) குழி ஆடி

இ) வளைவு ஆடி

ஈ) சாதாரண ஆடிகள்

PHOTO GALLERY

The Action Researcher discussed with the teacher to identify the hotspots in science lessons in the class of VIII std.

The Action Researcher assessed the students to asking the science questions to know their knowledge in the science Lessons.

The Action Researcher conducted the pre test to the students.

The Action Researcher demonstrated the light Reflection experiment to the student.

The students were engaged to the Light Reflection Experiment.

The students practiced the Experiment about the Effect of force.

The Action Researcher demonstrated and lectured about the Effect of force.

The Action Researcher was demonstrated with lectured about the Light Reflection Experiment.

The student were Practicing the Light Reflection Experiment.

The student were Practicing the Experiment Light Reflection in Learning by doing method.

The Action Researcher was explained about the Pascal law.

The Action Researcher was demonstrated about the atmospheric pressure Experiment.

The Action Researcher demonstrated the surface Tension Experiment to the students.

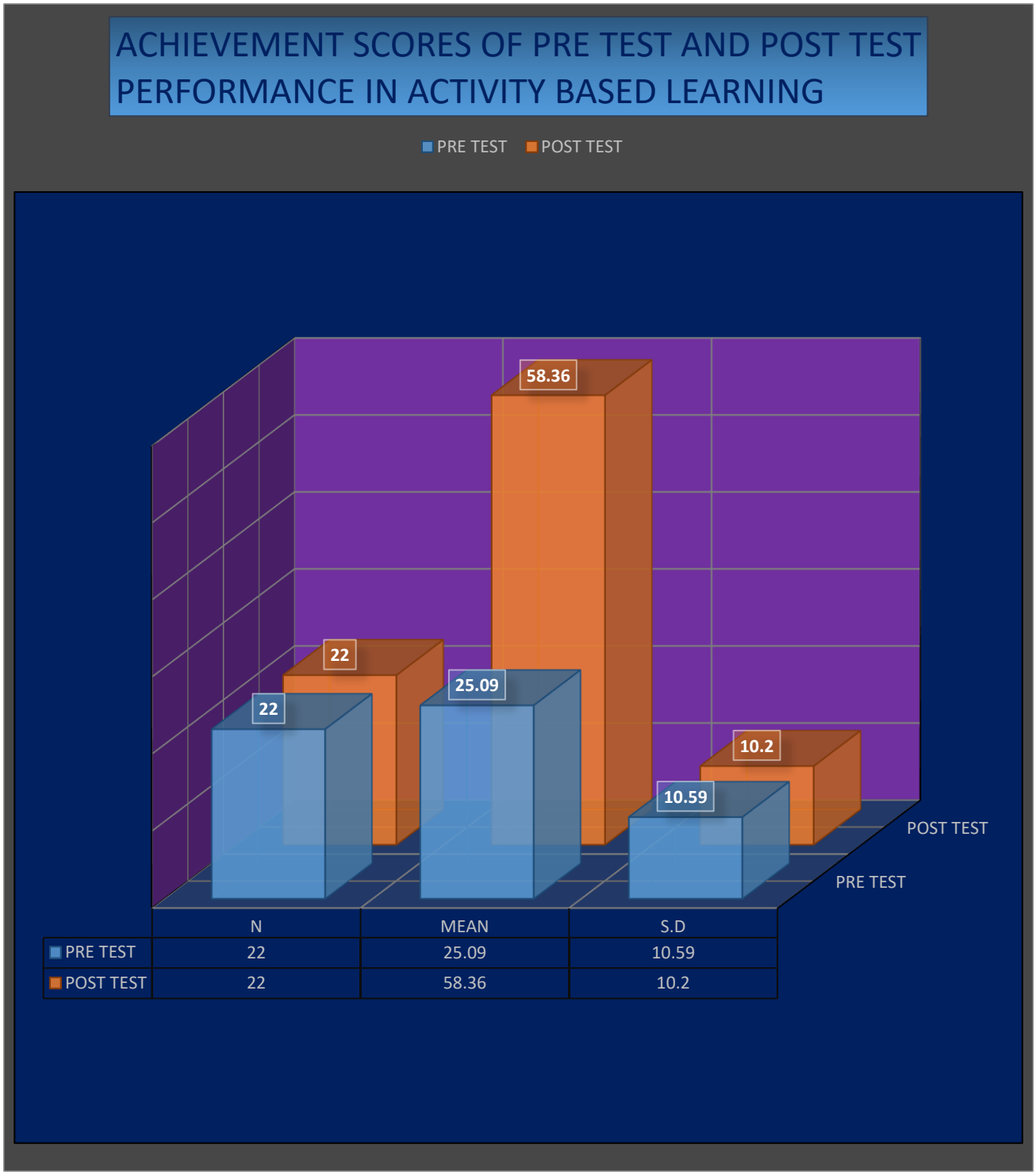
The Action Researcher demonstrated the various viscosity of the liquid Experiment to the students.

The Action Researcher demonstrated the acid with metal chemical reaction Experiment to the students.

The Action Researcher illustrated the difference between Concave lens and Convex lens with their uses to the students.

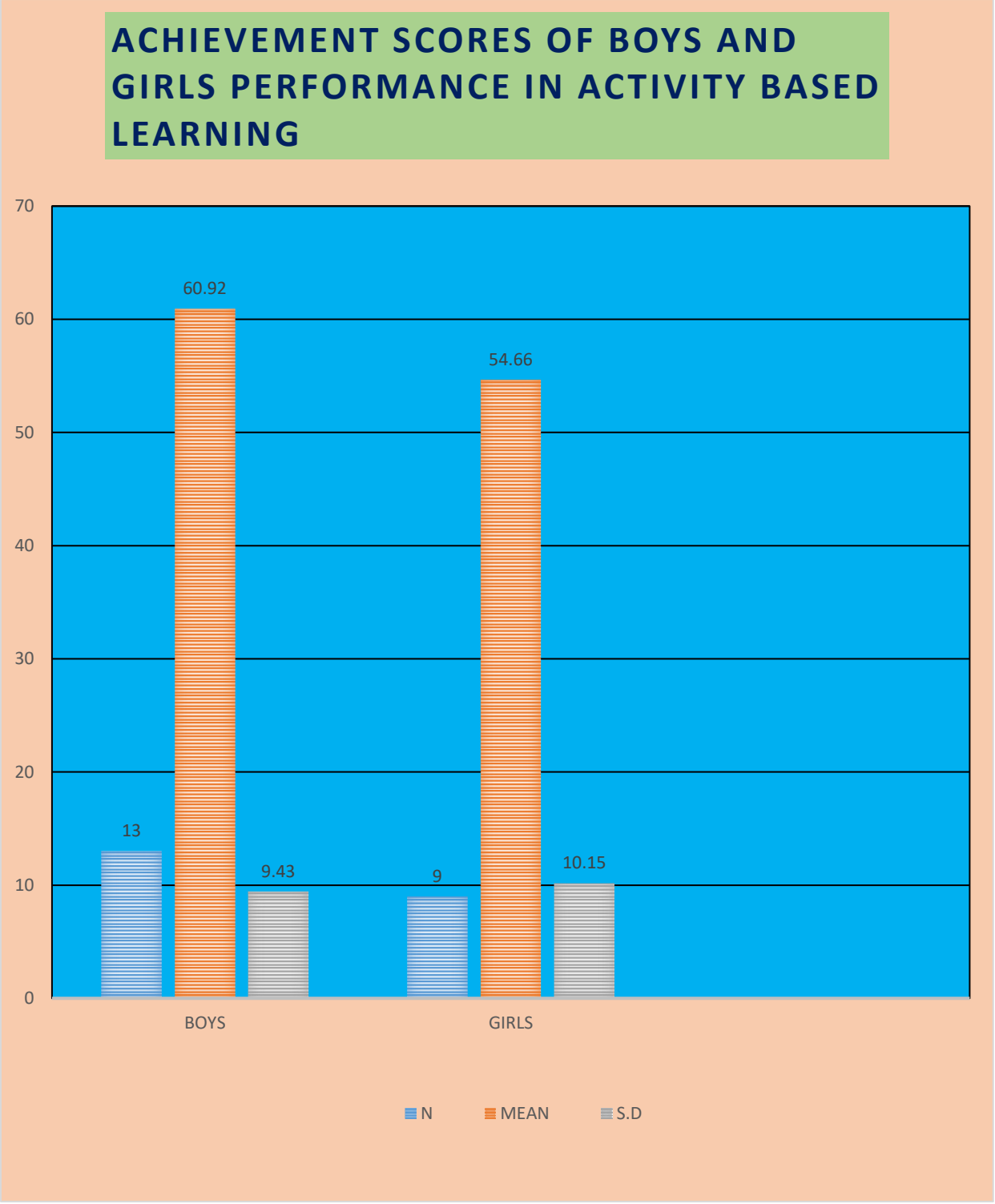
ACHIEVEMENT SCORES OF PRE TEST AND POST TEST

S.No	STUDENT NAME	PRETEST SCORE	Percentage	POST TEST SCORE	Percentage
1.	S.ABITH	9	36	19	76
2	V.AJITH	4	16	17	68
3	S.BALAKRISHNAN	4	16	16	64
4	G.HARI	10	40	19	76
5	M.KAPILAN	5	20	15	60
6	P.KATHIRVEL	1	4	12	48
7	M.MANIKANDAN	8	32	12	48
8	V.MEYARASAN	5	20	16	64
9	V.RITHESH	8	32	16	64
10	N.SABARI	7	28	13	52
11	S.SARATHI	5	20	17	68
12	A.SRIKANTH	13	52	13	52
13	S.VIGENESH	5	20	13	52
14	M.AMUDHA	5	20	12	48
15	A.DEEPA	4	16	13	52
16	K.DEEPIKA	4	16	9	36
17	P.INDHU	5	20	16	64
18	M.KIRUTHIKA	6	24	16	64
19	G.MEGAPRIYA	9	36	18	72
20	S.MONISHA	8	32	13	52
21	P.SANDTHIYA	4	16	14	56
22	K.PRIYA	9	36	12	48



GRAPH:1

Graph showing the significance difference between Pre test and Post test score



GRAPH:2

Graph showing the significance difference between Boys and Girls Score.