CONCLUSIONS AND GENERALIZATIONS

The chapter is the total of the research done by the investigator. The hypotheses framed in the first chapter were statistically tested in previous chapter and hence the results were drawn accordingly. Following are the major findings of the present study.

CONCLUSIONS

In the present study, three methods of science teaching were compared after CAI. For this purpose students of class VII were taught by those methods separated. Achievements scores of the students before and after the treatment of these methods were measured. As the analyses done in chapter four group wise and topic wise separately, hence conclusions are also given below in the similar pattern that is group Wise and topic wise.

GROUP WISE CONCLUSION :-

- CAI followed by discussion method was separately found effective in all the three groups.

- CAI followed by demonstration method was also separately found effective in all the three groups.

- CAI followed by activity method was also separately found effective in all the three groups.
In all the three groups the effectiveness among the three methods was also found different.

Further it was found that in *group I*, the CAI followed by demonstration method was found least effective among all the three methods. The second place in effectiveness was found of CAI followed by discussion method and CAI followed by activity method was found most effective.

In *group II* also similarly, the CAI followed by demonstration method was found least effective among all the three methods. The second place in effectiveness was found of CAI followed by discussion method and CAI followed by activity method was found most effective.

But in *group III*, though CAI followed by activity method was found most effective, CAI followed by demonstration method and CAI followed by discussion method was found equally effective.

Thus, it can be concluded group wise that CAI followed by activity method was found most effective method for teaching science to secondary school students and CAI followed by discussion method was found less effective than CAI followed by activity method but, was found only little more effective than CAI followed by demonstration method.

**TOPIC WISE CONCLUSION:**

- In all the three groups the effectiveness among the three methods was also found different.
- Further it was found that in *group I*, the CAI followed by demonstration method was found least effective among all the three methods. The second place in effectiveness was found of CAI followed by discussion method and CAI followed by activity method was found most effective.
- In *group II* also similarly, the CAI followed by demonstration method was found least effective among all the three methods. The second place in effectiveness was found of CAI followed by discussion method and CAI followed by activity method was found most effective.
- But in *group III*, though CAI followed by activity method was found most effective, CAI followed by demonstration method and CAI followed by discussion method was found equally effective.

Thus, it can be concluded group wise that CAI followed by activity method was found most effective method for teaching science to secondary school students and CAI followed by discussion method was found less effective than CAI followed by activity method but, was found only little more effective than CAI followed by demonstration method.

**TOPIC WISE CONCLUSION:**

- In all the three groups the effectiveness among the three methods was also found different.
- Further it was found that in *group I*, the CAI followed by demonstration method was found least effective among all the three methods. The second place in effectiveness was found of CAI followed by discussion method and CAI followed by activity method was found most effective.
- In *group II* also similarly, the CAI followed by demonstration method was found least effective among all the three methods. The second place in effectiveness was found of CAI followed by discussion method and CAI followed by activity method was found most effective.
- But in *group III*, though CAI followed by activity method was found most effective, CAI followed by demonstration method and CAI followed by discussion method was found equally effective.

Thus, it can be concluded group wise that CAI followed by activity method was found most effective method for teaching science to secondary school students and CAI followed by discussion method was found less effective than CAI followed by activity method but, was found only little more effective than CAI followed by demonstration method.
In all the three topics the effectiveness of all the three methods were found effective different.

Further it was found that for topic A, CAI followed by discussion method was least effective than in second place of effectiveness comes CAI followed by demonstration method and CAI followed by activity method was found to be most effective method of teaching science for class VII.

For topic B also the order of effectiveness of all the three methods was found same as for topic A.

And also for topic C, the order of effectiveness of all the three methods was found same. i.e., CAI followed by demonstration method least effective, CAI followed by discussion method more effective and CAI followed by activity method the most effective method.

Thus it can be concluded topic wise that CAI followed by activity method was most effective method for teaching of science to class VII than other two methods. CAI followed by discussion method was also found more effective than CAI followed by demonstration method, which was found the least effective method for all the three topics of science.

GENDER DIFFERENCE

In gender difference, it was found that all the three teaching methods of the study were equally effective for teaching girls as well as boys of class VII students of public schools.
GENRELIZATIONS OF THE FINDINGS: On the bases of the findings of the present study out of the three teaching methods of science at secondary level that is CAI followed by discussion method, CAI followed by demonstration method and CAI followed by activity method. The most effective teaching method in class room setting is the CAI followed by activity method for both boys and girls.

EDUCATIONAL IMPLICATIONS OF THE STUDY

Any research study can never be called research study of the education if, it has not been generalized that is educational implications. Educational implication means, implications of research results in improving the education. The study in hand was undertaken with basic objective to study the effect of different teaching methods of science on the achievement of students.

Findings of the present study will be beneficial to school principals, policymakers, psychologists, teachers and research scholars of the education discipline.

- Findings of the present study will serve the research scholars of the area as base in advancing research studies related to the effectiveness of different teaching methods.

- This study provides knowledge about the suitability of different teaching methods used in science teaching.
This study may help the teacher educators in the observation and supervision of the lesson plans during teaching practice.

❯ This study also provides awareness of different teaching methods of science to the in-service teachers and they may utilize this knowledge to look into and modify their teaching methods.

The findings of this study may be utilized as a feedback to the teachers of science discipline.

❯ This study can provide the directions for developing different teaching models.

The findings of the present study may be considered to give support to the view that the achievement of students is related to the methods of teaching employed.

❯ The findings of the study also provide the base for effective teaching by using suitable teaching methods.

This study also directs the teacher, how by using different methods the teacher can guide the thinking of all the pupils into approximately the same channels. The problems may be raised and defined, solutions may be proposed and tested and conclusions may be drawn-all as a class.

❯ This study also make teacher aware to select such method of teaching which include more senses and active involvement of students.
In any further experiment along this line additional precision would be maintained by using different teaching methods and their combinations on different kinds of discipline.

LIMITATIONS OF THE STUDY

In considering the results emerging from the analyses of our data, it is important to mention that one is dealing with the inference from the empirical data and therefore, the generalization appropriate only when made to population which it seems reasonably similar to one employed in the study. All the inferences are approximate, as all inferences are based on empirical data which by their very nature are characterized by some degree of unreliability and depend upon probability of estimate; all such findings pertain to human behaviour. Greater confidence can be placed in the conclusion when they are applied to groups of higher secondary for science teaching. The findings are limited by and may be expected to vary with conditions such as those mentioned in the first chapter of the record.

SUGGESTIONS FOR FURTHER RESEARCH

From the present study conclusion can be drawn only for three teaching methods and which are followed after giving computer assisted instructions. As very few such studies are conducted in India so there is a vast scope of research in this field. So suggestions for further research are –
Effectiveness of different teaching methods can be studied at different levels such as primary level, higher secondary level etc.

- The teaching methods used in present study can be studied by comparing different types of schools

Such studies can also be conducted to study the effectiveness of teaching methods and gender differences.

- In place of CAI various other strategies such as video based instruction, use of ETV can also be involved.

The attitude of students and teachers can be studied regarding different teachings method.

- Study can be conducted on different subjects even rather than science.
SCIENCE ACHIEVEMENT TEST

Part - A
Class – VII

Supervisor: Prepared by:
Prof. I.S. Sindhu Shaifali
Sirohi HOD
Dept. Of Education
C.C.S. University Campus
Meerut

General Information about Student:-

Name : ______________________________
Class : ______________________________
Section : ____________________________
Age : _______________________________
Male/Female : _______________________

Note: This question paper carries three parts i.e. Part A, B and C. Part A is on topic Light, Part B on topic Heat and Part C on topic Flow of heat. Each part of 20 marks and for 20 minutes. Attempt this part- A as instructed by supervisor.
PART – A

LIGHT

M.M. – 20
Time: 20 min.

**Note: All questions are compulsory**

I- Answer in one word or one sentence (1 mark each)

Q1. State why a child looking at a light source through a bent pipe is not able to see the source?

Q2. What is the lighter part of shadow known as?

Q3. Are stars luminous or non-luminous?

Q4. Why a completely transparent object cannot cast a shadow?

Q5. Name the lens thin in the middle and thicker at the edge?

Q6. Name four man made sources of light?

II- Choose the correct answer (1 mark each)

1. The shape of a shadow depends on-
   a. The shape of object
   b. The position of the source of light
   c. The size of the source of light
   d. All the above

2. If the rays from a source of light go out in all directions they are said to be-
   a. convergent
   b. divergent
   c. parallel
   d. Any of these depending on how big the source is.

3. A mirror sources off light from its surface is known as which property of light-
   a. Reflection
   b. Rectilinear propagation
   c. Refraction
d. All of the above

4. A pinhole camera forms an image of a building on its screen-
   a. larger and inverted
   b. small and inverted
   c. larger and upright
   d. Small and upright

5. Which of these lenses converges a parallel beam of light-
   a. concave
   b. convex
   c. both
   d. none

III- Give diagrammatic presentation of the following (2 marks each)

   a. Parts of shadow
   b. Light travels in a straight line

IV- Fill in the blanks (1 mark each)

   i. A magnifying lens is a ......................... lens.

   ii. A source of light such as bulb or tube light is an ................. source.

   iii. A convex lens ................. a parallel beam of light incident on it.

   iv. The reflection of light by the smooth walls of your house is ............... (regular or irregular)

   v. If a cardboard with a pinhole is kept in front of a candle or a torch, the light ............... can be seen/ can’t be seen) from other side of hole.
SCIENCE ACHIEVEMENT TEST

Part – B
Class – VII

Supervisor:

Prepared by:

Prof. I.S. Sindhu
Sirohi
HOD
Dept. Of Education
C.C.S. University Campus
Meerut

General Information about Student:-

Name : ____________________________

Class : ____________________________

Section : ____________________________

Age : ____________________________

Male/Female : ____________________________

Note: This part is of 20 marks and for 20 minutes. Attempt this part- B as instructed by supervisor.
PART – B

HEAT

M.M. – 20
Time: 20 min.

Note: All questions are compulsory

I- Answer in one word or one sentence (1 mark each)

Q1. How can metal lids on the glass jar be loosened?
Q2. Name the following
   a. A substance that expands on heating
   b. Contracts on heating
Q3. When you touch a cold surface does energy travel from the surface to you hand, or does energy travel from your hand to the surface?
Q4. Why does a glass tumbler sometimes crack when hot water is suddenly poured into it?
Q5. Why does the mercury in thermometer rises up when touched to a hot object?
Q6. Arrange in order of increasing expansion on heating Liquid, Solids, Gases

II - Fill in the blanks (1 mark each)

1. Heat causes ................. in temperature.
2. The hotter a substance is, the ........... is its temperature.
3. Heat is a form of ................. .
4. Amount of expansion is ................. in different liquids for the same increase in temperature.
5. A ................. Is an instrument used to measure temperature.
6. The apparatus commonly used in the laboratory to show expansion on heating is the ring and ........... Apparatus.
III- Choose the most appropriate answer. (1 mark each)

1. Heat causes-
   a. Change of state
   b. Change of lens
   c. Expansion
   d. All of these

2. Heat causes expansion because-
   a. Heat occupies space
   b. Of increase of movement of molecule
   c. Matter tries to escape from the heat
   d. None of the above is true

3. Which of these will expand the most on heating-
   a. Gold
   b. Water
   c. Mercury
   d. Air

IV Diagrammatically show. (2 marks)

   a. Expansion of gases.
Appendix-III

SCIENCE ACHIEVEMENT TEST
Part -C
Class – VII

Supervisor:  Prepared by:
Prof. I.S. Sindhu  Shaifali
Sirohi
HOD
Deptt. Of Education
C.C.S. University Campus
Meerut

General Information about Students

Name : ___________________________

Class : __________________________

Section : _________________________
Note: This part of 20 marks and for 20 minutes. Attempt this paper as instructed by supervisor.

PART – C
FLOW OF HEAT

Note: All questions are compulsory

I Answer in one word or one sentence.

Q1. Name these different process through which heat get transferred?

Q2. Name the process of transfer of heat in which the heated molecules of liquid or gas themselves move?

Q3. See breezes are example of which process of heat transfer?

Q4. Nail sticked to a metal rod by wax starts falling when the rod is heated from one side why?

Q5. Name a liquid which is a good conductor of heat?

Q6. State two conditions for heat to be conducted?
Q7. Which is the good conductor of heat and which is the bad conductor of heat from the following—

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a) Aluminum
b) Wood
c) Thermocol
d) Iron

II choose the most appropriates answer (1 mark each)

1. Conduction takes palace in—
a. Solids only
b. Liquids only
c. Gases only
d. In solids, liquids & gases

2. In which method of transfer of heat do the molecules travel from the hot to the cold portion—
a. Conduction
b. Convection
c. Radiation
d. All the above

3. Handles of cooking utensils should to be make of a material that—
a. Conducts heat well
b. Does not conduct heat well
c. Radiate heat well
d. Does not radiate heat well

III Fill in the blanks (1 mark each)

1. Water is a ____ conductor of heat.

2. Different metal rods conduct heat with _____________speed.

3. Gases are bad conductors of heat. Heat travels in gases by _____________.

4. _____________ is a process of transfer of heat in which a material