



Illustration of lesson planning in science using inquiry approach

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Abstract

A lesson plan is a guide map, a blue print or plan of action in the near future. Inquiry processes can be described as methods with the help of which learners try to find out something which was unknown to them earlier. The need of 21st century science teaching is to plan lessons using inquiry approach so that students develop process skills in science. Objective of the study is to illustrate lesson planning in science at secondary school level using Inquiry approach. The study explains the step by step lesson planning for the use of inquiry approach for teaching the topic 'Conduction' in science at secondary school level.

Keywords: Lesson plan, Inquiry approach, Science, investigation, teaching method

Introduction

Lesson plan: Meaning and significance

A lesson plan is a guide map, a blue print or plan of action in the near future. The teaching acts are planned, organized and then carried out in a logical sequence, as per the lesson plan.

Lesson Planning is advantageous in the following manner:

- It helps the teacher to teach in accordance with the instructional objectives and achieve the desired objectives within the given time.
- It helps the teacher to select and check the previous knowledge of the students and give an appropriate introduction. This creates a mental readiness in students to receive the content.
- It helps the teacher to select and use the appropriate teaching methods and aids.
- It helps in presenting the content in a logical, systematic and effective way.
- The teacher can plan the teaching learning activities in accordance with the mental level, interest, aptitude and background of the learners

Inquiry approach

Inquiry processes can be described as methods with the help of which learners try to find out something which was unknown to them earlier. It is used to discover new knowledge through experimentation, problem solving and project work. It involves students' active participation as they identify problems, develop hypothesis and conduct experiments. They gather data, draw inferences and generalize. It requires the students to work with an open mind and engage in creative thinking. A science teacher should motivate students to ask questions, facilitate their investigation and incite curiosity. The need of 21st century science teaching is to plan lessons using inquiry approach so that students develop process skills in science.

Objective of The Study

To illustrate lesson planning in science at secondary school level using Inquiry approach

Lesson planning using inquiry approach

Subject: Science Date:
Duration: 40 mins Period:
Topic: Conduction School:

Instructional objectives

Specific objectives

When the lesson is over, students will be able to:

Knowledge

1. Define conduction
2. List examples of good conductors and poor conductors

Understanding

3. Distinguish between conductors and insulators.
4. Explain the process of conduction of heat.

Application

5. State the use of conductors and insulators in daily life.

Skills

6. Demonstrate the conduction of heat in different materials through activities.

Teaching aids

Spirit lamp, aluminum strip, iron strip, metal sleeve, stand, nails, cooking pan with wooden handle, woolen scarf, thermometer, hot water, glass, chart.

Method of teaching

Demonstration method, activity method, inquiry method

Testing of previous knowledge

Q 1. When you stand in sunshine, do you feel warm?

Q 2. Why do you feel warm?

Introduction

The teacher conducts an activity. A student is called and asked to touch left end of iron strip. The teacher asks, "How does it feel?" The students will reply, "Cold".

Now the teacher heats the right end of the iron strip for 20 seconds. He then asks the students to touch the left end of the rod. The teacher again asks, "How does it feel now?" The students reply, "Hot".

The teacher asks the whole class, "How did the iron strip become hot even though the left end was not heated?" Students may reply, "This is due to transfer of heat from one end to another."

Teacher asks, "How does heat get transferred from right end of iron strip to the left end?" Students may not be able to

reply this. The teacher explains that heat gets transferred in solids (like iron strip) from one end to another by the process of conduction.

Statement of the topic

Then the teacher states, “Today we will study about conduction”

Table 1: Presentation

Teaching points	Teacher’s Activity	Students activity
<p>Activity (1) to show the process of conduction</p> <p>Heat gets transferred along the length of the material</p>	<p>The teacher conducts an activity and also involves some students for help. Activity: The teacher fixes some iron nails on an aluminum rod with some wax. The strip is clamped to a stand. The free end of the strip is heated with a spirit lamp.</p> <p>Q1) What do you observe?</p> <p>Q2) Why do the nails fall?</p> <p>Q3) Which nails fall first?</p> <p>Q4) Why?</p> <p>Q5) Which nail falls off at the end?</p> <p>Q6) Why?</p> <p>Q7) What can we conclude about the direction of transfer of heat?</p>	<p>Some students help the teacher in setting up the materials for the activity.</p> <p>A1) The nails start falling one by one. A2) The nails fall as heat is transferred from the heated end to the other side A3) The nails closer to the heated end fall first.</p> <p>A4) Students may reply the part of the strip near the flame gets heated up first.</p> <p>A5) The nails farthest away from the flame fall off last.</p> <p>A6) It receives heat at the end. A7) Heat gets transferred from the flame along the length of the strip towards the other end.</p>
<p>Activity (2) to show that ability to conduct heat varies from substance to substance</p> <p>Aluminum conducts heat faster than iron</p> <p>Activity (3) to distinguish good conductors and bad conductors of heat</p> <p>Good conductors conduct heat quickly & poor conductors conduct little heat</p> <p>Silver, aluminum and copper are good conductors. Wool, wood, thermocole and cork are poor conductors.</p> <p>Activity (4) to show that paper is a poor conductor</p>	<p>Activity: Teacher sets up apparatus for another activity with the help of students. He takes an iron rod and an aluminum rod of equal length and thickness. These are joined at the middle with a metallic sleeve. Nails are fixed to both the rods. The metal sleeve is heated using a burner</p> <p>Q8) From which rod do the nails drop first?</p> <p>Q9) Which rod is conducting the heat faster? This means that aluminum is a better conductor.</p> <p>Activity: Teacher heats one end of a wooden rod and asks a student to hold the other end.</p> <p>Q10) Is the other end hot?</p> <p>Q11) Why is the heat not transferred? Teacher explains that wood is a poor conductor of heat.</p> <p>Q12) So what do you conclude? Do all substances have some ability to conduct heat or they vary in their ability to conduct heat?</p> <p>Yes, some substances conduct heat quickly and are called good conductors of heat while others conduct little heat and are called poor conductors of heat.</p> <p>Q13) List an example of a good conductor of heat</p> <p>Q14) List an example of a poor conductor of heat</p> <p>Metals are good conductors. Teacher lists other examples- Silver is the best conductor, copper is next followed by aluminum and iron. Wool, wood, cork and thermocole are poor conductors.</p> <p>Activity: Teacher burns a newspaper from one end and holds the other end.</p> <p>Q15) Is heat conducted to our hands?</p>	<p>Students help the teacher to set up the apparatus for the activity.</p> <p>A8) Nails drop earlier from aluminum rod than those stuck to the iron strip. A9) Aluminum rod.</p> <p>A10) No</p> <p>11) No satisfactory reply</p> <p>A12) Substances vary in their ability to conduct heat.</p> <p>A13) Aluminum</p> <p>A14) Wood</p>

<p>Utensils with wooden handles are easy to hold</p>	<p>Teacher explains that although the burning end is at a very high temperature, little heat is conducted to her hands. That is why he/she is able to hold the paper.</p> <p>Q16) Is paper a good conductor or poor conductor?</p> <p>Q17) At home we use utensils with a wooden handle. Why? Teacher adds that heat will not be transmitted and holding the wooden handle will not burn the hands.</p> <p>Q18) Will we able to hold the utensil if it has metal handle?</p> <p>Q19) Why?</p> <p>Teacher completes the answer saying that fingers may get burnt.</p>	<p>A15) Some students say 'yes', some others say 'no'</p> <p>A16) Poor conductor</p> <p>A17) Wood is a poor conductor.</p> <p>A18) No</p> <p>A19) Metals will conduct heat</p>
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Blackboard summary

- Objects become warm due to transfer of heat from another object.
- Molecules of the object transfer energy to other molecules.
- Conduction- Transfer of energy between different bodies / body parts.
- Ability to conduct heat varies from substance to substance.
- Good conductors conduct heat rapidly. Examples- iron, aluminum, silver
- Bad conductors conduct very little heat. Examples- wood, paper.
- Conductors have application in daily life

Recapitulation

Teacher asks following questions to review the content taught:

- How do objects become hot?
- What is conduction?
- What is the difference between good conductors and bad conductors?

Home assignment

- How does heat get transferred from one part of the body to another?
- Why do woolen clothes keep us warm during winters?
- Explore and list some applications of conductors in daily life.

Conclusion

Inquiry approach increases reasoning and thinking skills of the learner. Since the learner uses higher order mental processes, he grows intellectually. It creates motivation in the learner to discover and investigate. On achieving success he gets further motivation. By using this method, students learn to structure problems and focus on the key variables. They also learn to organize and conduct investigation. Teachers' should plan lessons in science in such a manner as to encourage students to ask and answer questions. They should encourage interaction and discussion among students and give them freedom to explore their ideas in laboratory

books and resource kits if they so desire. Then only the true objectives of science can be achieved.

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