

Chapter 3: Light and Sound, Heat and Electricity

Lesson__ : Effects of Heat and Electricity.

Duration: 5 Days

I. **Objectives:** Infer how black and coloured objects affect the ability to absorb heat.

II. **A. Materials:**

- Curriculum Guide S5FE-IIIId-4
- Materials specified in the LM
- Learners' Materials
- manila paper
- marker

B. References:

Curriculum Guide, S5FE-IIIId-4, p. 31

Internet Sources:

<http://www.sciencekids.co.nz/experiments/lightcolorheat.html>

http://www.sciencebuddies.org/science-fair-projects/project_ideas/Phys_p030.shtml#background

<http://www.physicsclassroom.com/class/light/Lesson-2/Light-Absorption,-Reflection,-and-Transmission>

<http://antoine.frostburg.edu/chem/senese/101/features/color-complement.shtml>

<http://en.wikipedia.org/wiki/Color>

http://www.teachersdomain.org/asset/lsp07_int_heattransfe

C. Process Skills: observing, inferring

D. Value Integration:

1. Cooperation in doing the different activities.
2. Observing proper discipline in performing activities.
3. Observing honesty and accuracy in reporting results.

III. Learning Tasks:

Day 1

A. Engagement:

Why is it more comfortable to wear light-coloured clothes on a hot summer day?

B. Exploration

Routine Activities

Instruct the pupils to go to their designated group.

Check the materials brought by the members of the group.

Remind the pupils of the precautionary measures in performing the activity.

C. Explanation:

Background Information for Teachers:

Heat Absorption

As heat energy reaches an object it can be absorbed in a similar manner to the way sponges absorb water. Heat enters an object, warming it. The longer the object is exposed to the heat source, the more heat is absorbed. Different objects absorb heat at different rates. Some objects are excellent absorbers, while others are very poor absorbers. Generally, dark coloured objects absorb better than do lighter coloured objects.

Discussion on the results of the different activities.

Activity 1: Heat Absorption A

Day 2

A. Engagement:

Do the routine activities.

Recall of concepts learned from the previous activity.

Introduce the next activity.

B. Exploration:

1. Give specific instructions to pupils.
2. Monitor the pupils as they perform the activity to make sure that the instructions are followed well.
3. Wrap up the materials after the activity.
4. Organize the answers for the presentation of outputs.

C.Explanation:

Background Information for Teachers:

Colours are NOT all equally heat absorbent. When light interacts with an object, that light can be absorbed, reflected, or transmitted. Black objects **absorb** all wavelengths of light, while white objects **reflect** all visible wavelengths. They are complete opposites. Other colours absorb some wavelengths and reflect others, which is what makes them appear different to the human eye. Colour is a result of the wavelength of light reflected by that object. For example, an object that absorbs selectively yellow light will not look yellow; it would be a combination of every other colour besides yellow. The colour you observe is a complement to the colour the object absorbs.

Discussion on the results of the different activities.

Activity 2: Heat Absorption B

Day 3**A. Engagement:**

Do the routine activities.
Recall of concepts learned from the previous activity.
Introduce the next activity.

B.Exploration:

1. Give specific instructions to pupils.
2. Monitor the pupils as they perform the activity to make sure that the instructions are followed well.
3. Wrap up the materials after the activity.
4. Organize the answers for the presentation of outputs.

C.Explanation:

The sun emits energy in the form of electromagnetic waves. We see part of the electromagnetic wave as light and we feel part of it as warmth. Darker colors absorb more sunlight than lighter colors, which is why darker colors get warmer more quickly in the sunlight than lighter colors. The lighter colors reflect more of the sun's radiant energy, so they remain cooler to touch in the sunlight.

.Discussion on the results of the different activities.

Activity 3: Heat Absorption C

Ask: How these color characteristics help to melt the ice.

Day 4

D.Elaboration

Chain Note

Pass around a "Chain Note" worksheet. This is a strategy to determine learners' understanding. At the top of the worksheet is the question: *"How black and coloured objects affect the ability to absorb heat?"* The worksheet gets passed from pupil to pupil. Each pupil responds with one or two sentences related to the question and passes it on to the next pupil.

When pupil received the paper they must add a new thought or build on a prior statement. Chain notes provide an opportunity for pupil to examine others' ideas and compare them to their own thinking. Pupils can add facts, definitions, specific ideas, big ideas, analogies, illustrative examples, and evidence from their own or class experiences to contribute to building the chain.

When completed, the chain notes can be read aloud or projected, allowing for pupils to give feedback on the statements made by their peers. Pupils should discuss whether they agree or disagree with the statements and defend their reasoning. This will also help to determine what misconceptions are still occurring.

Day 5

I. Evaluation:

Directions: Decide whether the statement is true or false and explain/defend your selection. Use evidence from data, prior knowledge or other sources to analyze your selection.

Statement	True	False	Why I think so?
Colours are NOT all equally heat absorbent			
Black objects absorb all wavelengths of light, while white objects reflect all visible wavelengths. They are complete opposites			
Dark coloured objects NOT absorb better than do lighter colours objects.			
Darker colors absorb more sunlight than lighter colors, which is why darker colors get warmer more quickly in the sunlight			
The longer the color object is exposed to the heat source, the more heat is absorbed. Different objects absorb heat at different rates.			

IV. Assignment:

Search for the meaning of the following:

1. block
2. absorb
3. sound
4. light
5. transmission of light

