Visible Light: Opaque, Transparent and Translucent

Overview:
The student will show that s/he is able to investigate and understand the basic characteristics of visible light and how it behaves while focusing on opaque, transparent, and translucent.

Procedure:
1. To instruct the student on information regarding this topic, the teacher will use the +MIND notes Light for the student to be able to take notes by writing in information or using the cut and paste option. Although these notes encompass all of the bullets for the ASOL, this allows students to learn the basic characteristics of visible light.
2. Using the Other Sources of Light Waves (supplied) have the student investigate new information that s/he might not have been taught. Provide the student with numerous opportunities to show how s/he investigated, such as:
   a. Student will investigate by going to the library and finding facts in books.
      i. Write the facts learned.
      ii. Type two new facts with or without the support of Co:Writer or ReadandWrite.
      iii. Video tape themselves doing the investigation and record new facts learned while investigating.
         1. Make sure if this is being used for ASOL documentation that a dialogue of the video is written out and submitted with the video.
   b. Using the Internet, the student will investigate by finding videos, games, and other interactive Web pages to learn new information.
      i. The student can take images of the new facts and embed them into a SMARTnotebook file.
   c. Find 5 videos on YouTube that other students could watch to learn more about visible, opaque, transparent, or translucent light.
   d. Watch Discovery Education Videos and take down new facts learned.
   e. Explore with prisms, opaque, transparent, and translucent objects to learn common items that fit into these categories.
3. Once the student has shown the basic understanding of visible light, have the student do the practice questions.
4. Student makes
   a. Foldable for opaque, transparent, and translucent in a group or independently.
   b. Visible Spectrum.
5. When the student is ready to be assessed, s/he can complete the following:
   a. Quiz - Vocab - opaque, transparent, and translucent
      i. This assessment show only knowledge of the stem of the ASOL.
   b. Test - Light
      i. This assessment tests for understand basic characteristics of visible light and how it behaves along with opaque, transparent, and translucent

ASOL Covered:
5S-FME 4c (SOL 5.3) The student will investigate and understand basic characteristics of visible light and how it behaves. Key concepts include:
   c) opaque, transparent, and translucent

5S-SI 1b (SOL 4.1) The student will demonstrate an understanding of scientific reasoning, logic, and the nature of science by planning and conducting investigations in which objects or events are classified or arranged according to characteristics or properties.

5S-SI 2i (SOL 5.1) The student will demonstrate an understanding of scientific reasoning, logic, and the nature of science by planning and conducting investigations in which inferences are made and conclusions are drawn.

8S-SI 3l (SOL PS.1) The student will demonstrate an understanding of scientific reasoning, logic, and the nature of science by planning and conducting investigations in which experimental results are presented in appropriate written form.

Materials Needed: MIND Notes - Light, Other Sources for Light Waves, Foldable - Vocab - opaque, transparent, and translucent, Make your own visible spectrum, Quiz - Vocab - opaque, transparent, and translucent, Test - Light, glue, scissors, crayons, pencil/markers, sentence strip or long piece of paper, computer/iPad for Discovery Education Videos and Tar Heel Reader books, iPad (if using the video component), camera (if wanting to video or take pictures during the investigation), Co:Writer (if using for writing)

Instructional Setting: The instruction setting could be in a resource setting, general education setting, or self-contained. This scientific investigation ASOL is in line with the SOL 5.3, therefore the parts of this unit are appropriate activities for any 5th grade student.

Community Connections and/or Peer Interaction: With the 5S-FME 4c ASOL being a 5.3 SOL, this could be an opportunity to include students in the general education setting or to provide specialized instruction in a small group setting. *If this ASOL is being used as an assessment for the VAAP portfolio, the student will need to complete the activity independently.

Functional Activity/Routine:
Some skills that are incorporated into this activity/routine:
1. For the investigation piece, the student can use technology to enhance the investigation part.
2. Student is learning to plan and gather materials for a desired activity.
3. Student is working on skills that promote independence.
4. Following along and taking notes is a lifelong skill whether the student is typing or physically writing notes.
5. This ASOL is one that could be embedded into the general education setting. Having the students to be with their peers and function with same age peers allows for social skills to be addressed.
Strategies to Collect Evidence:

- Ways to show investigation:
  - Investigate by going to the library and finding facts in books.
    - Write the facts they learn.
    - Type two new facts with or without the support of Co:Writer or ReadandWrite.
    - Videotape them doing the investigation and record new facts that they learn while investigating.
  - Make sure if this is being used for ASOL documentation that a dialogue of the video is written out and submitted with the video.
  - Using the Internet, the student will investigate by finding videos, games, and other interactive Web pages to learn new information.
    - The student can take images of the new facts and embed them into a SMARTnotebook file.
  - Find 5 videos on YouTube that other students could watch to learn more about visible, opaque, transparent, or translucent light.
  - Watch Discovery Education Videos and take down new facts learned.
  - Explore with prisms, opaque, transparent, and translucent objects to learn common items that fit into these categories.

- Ways to show basic understanding of visible light and how it behaves including the key concepts of opaque, transparent, and translucent
  - Quiz - Vocab - opaque, transparent, and translucent
    - This assessment show only knowledge of the stem of the ASOL.
  - Test - Light
    - This assessment tests for understand basic characteristics of visible light and how it behaves along with opaque, transparent, and translucent

Specific Options for Differentiating this Activity:

- Provide the vocabulary words on cards and give the student two choices allowing for selection to be made using eye gaze or pointing.
- Provide limited choices of vocabulary on a voice output device such as a switch or GoTalk.
- Only complete the stem and focus on the vocabulary opaque, transparent, and translucent.

*MIND notes* are used in Augusta County Schools in the general education setting. When creating the MIND notes for this topic, the *Light MIND notes* were a guide to allowing the student to be able to take notes as the other students, but in a modified format.
SOL Study Book
Fifth Grade

Light
(SOL 5.3)

Adapted by Lorna M.B. Frizzelle from MIND Notes
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White Light

White light is made up of many different wavelengths traveling together. Sir Isaac Newton discovered that white light goes through a prism and makes a spectrum of colors.

The prism spreads colors out by refracting the colors at different angles.
A ________ occurs from light going through water droplets.

The drops bend rays of sunlight at different angles, causing the colors to spread out. The drop is like a _____________.

The colors we see in the spectrum are red, orange, yellow, green, blue, indigo, violet.

Color the circles to make the spectrum.

Red Orange Yellow Green Blue Indigo Violet

ROYGBIV
Light waves are characterized by their ________________.

Red has the longest wavelength.

Violet has the shortest wavelength.
Light travels in wavelengths that have a crest and trough.

Light waves travel much faster than ________________.

Light travels in straight paths called ________________.
Light rays from the sun travel to Earth.

__________ minutes to travel!

Light travels in straight paths until it hits an object where it may be...
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Lenses are pieces of clear material with curved surfaces. They refract or bend light to make things look bigger or smaller.
Common lenses that you might see are:

The lenses and mirrors in these things ________________.

______________, and ________________ light to make something clearer.

Light is very important because it helps us
Light passes through some objects but is blocked by others.

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<thead>
<tr>
<th>Vocabulary</th>
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<tbody>
<tr>
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<td></td>
<td>door</td>
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<tr>
<td>transparent</td>
<td></td>
<td>sunglasses</td>
</tr>
<tr>
<td>translucent</td>
<td></td>
<td>tissue paper</td>
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</table>
Inventors and scientists have used properties of lenses and mirrors to create tools that have led to many discoveries.

Mark the items that have lenses or mirrors.

- camera
- crayons
- Notebook Paper
- video camera
- telescope

Sir Isaac Newton

He discovered and named the ________________.
1. What is the tool used to separate white light into a spectrum?
   - prism
   - telescope
   - microscope

2. When the white light passes through the prism, you can tell:
   - there is no color in light
   - white light is really colors
   - blue light is brighter than white

3. What wavelength is the longest?
   - red
   - yellow
   - violet

4. What wavelength is the shortest?
   - red
   - yellow
   - violet
5. The rays from the sun take 8 1/2 days to get to Earth.

6. Which of the following materials is transparent?
   - sunglasses
   - door
   - desk

7. Refracting means to
   - transmit
   - reflect
   - bend

8. The person who discovered and named the visible spectrum is
   - George Mason
   - Christopher Columbus
   - Sir Isaac Newton
these go with page 1 notes

white light  rainbow
Sir Isaac Newton  prism
spectrum  wavelength
prism  Colors
bending  middle
refracting  shortest
longest
reflected

refracted

transmitted

absorbed

bounced off

hot

cut

8 1/2

10 1/2

rays

taken in as heat

disastrous

sound

crest

football

wavelength

trough
see
take pictures
see stars

see birds in trees
keep the sun out of our eyes

reflect
refract

light passes through

transmit
clearly; may have color

concave

convex

complete blocks light

part of light

passes through

from passing through

sunglasses
flashlight
binoculars
telecope
microscope
Fold on the solid line. Cut on the dashed line. Paste according to directions.
Cut out the colors and labels to make your own spectrum on a new piece of paper.

Make your own visible spectrum - created and designed by Lorna M.B. Frizzelle
spectrum
5.3 Vocabulary Quiz

1. When light passes through clearly; may have color tent

   - transparent
   - translucent
   - reflected
   - opaque

2. When light is completely blocked out

   - opaque
   - translucent
   - reflected
   - transparent

3. When part of the light passes through

   - translucent
   - reflected
   - transparent
   - opaque
Match the vocabulary with the correct definition.

- **Transparent**
  - Light passes through clearly; may have color

- **Translucent**
  - Light passes through from passing through

- **Opaque**
  - Part of light passes through
Match the example of what the light wave is doing with the vocabulary word.

- translucent
- opaque
- transparent
- door
- sunglasses
- tissue paper