

Module 2: Light Reflection and Colour

Lesson 1: Discovery and Experience

Class Level: 1st and 2nd class	
Strands: 1. Materials 2. Living things 3. Energy and forces 4. Environmental Awareness and Care	Strand Units: 1.1 Properties 2.1 myself – eyes 2.2 plants and animals 3.1 Light 4.1 caring for my locality

Safety: All material should be safe and found in your classroom or at home. Avoid selecting sharp items.

Background

In this lesson students will explore the relationship between low light levels (lowlight) and being able to see colour. Students are introduced to animals that are nocturnal (active during the night) and diurnal (active during the day). Additionally, students will investigate reflective and non-reflective material.

Key Learning

We do not see colour at night. Nocturnal animals have reflective material in their eyes to see better at night.

Resources

- Heavy blankets or other materials to make a darkened space (dim lit area)
- A selection of material that is reflective and nonreflective (reflective materials such as; aluminium foil, mirror, CD/DVD, metal (spoon, ruler, coins etc), hard plastic such as a phone screen, non-reflective material; cling film, different coloured cloth, leather, paper.
- Torches
- Board to pin the wheel to (must be able to be moved to low light space)
- Pushpin to pin the wheel to the board such that it can rotate
- Blue tac to 'pin' to the wheel when students are matching colours

SunPilot Resources

- Reflective and nonreflective material template
- Images scenes nighttime and daytime
- Spinning wheel template (you will need a colour printer)

Key Vocabulary

- *reflective*
- *light-absorbent*
- *non-reflective*
- *nocturnal*
- *diurnal*

Learning Objectives/Outcomes		
Science	Literacy	Other
<p>1.1.1 group materials according to their properties</p> <p>2.1.1 name and identify external parts of the male and female body and their associated functions or senses</p> <p>2.1.2 become aware of the role of each sense in detecting information about the environment and in protecting the body</p> <p>2.2.1 group and sort living things into sets according to certain characteristics (day/night i.e. nocturnal/diurnal)</p> <p>3.1.1 recognise that light is needed in order to see</p> <p>4.1.1 observe similarities and differences among plants and animals in different local habitats</p>	<p>Oral language</p> <ul style="list-style-type: none"> - express personal opinions, ask and answer questions to get information, develop understanding and to clarify and extend thinking in relation to the effect of light on colour and reflective/non-reflective materials -name, describe and categorise animals and materials -use sophisticated oral vocabulary (subject specific) -describe, predict & reflect on events and processes relating to reflective materials/animals <p>Reading</p> <ul style="list-style-type: none"> -recognise and manipulate syllables in new vocabulary words 	<p>Numeracy: Number. Count the number of objects in a set. Data. classify and sort.</p>

Pose the question, 'Can we see colour in low light?', not 'Can we see in the dark?' (the answer to the second question is of course – no we can't see in the dark because we need light to see).

Step 1: In your normally-lit classroom, fix the colour wheel to a moveable board. Invite the students to come up and select the colour that you specify e.g. "Stick the blue tac to the red coloured section" repeat with different children selecting different sections, including the greys. Spin the wheel each time so that the colours are not always in the same place. Ask the students to describe how challenging they found this task.

Step 2: Now place the colour wheel into the very low light space you have created in the classroom. Assign children a colour so that they become a team. Have children from each team view their wheel in a dark area, one at a time, and stick a piece of the blue tack onto their coloured triangle. After each team has completed their turn, ask them to bring their wheel into the light, and see how well they did.

Ask them, was it easy to pick out the colours in dim light?

Why not?

What do you think is going on?

Ask them to think back on their vote, what do the results of this investigation suggest?



Whole class discussion: Consider night-time.

Slide 6

What do we do when it is night-time? We go to sleep.

We sleep but there are other animals that are awake at night, these animals are called **nocturnal**.

Do you know any animals that are awake at night?

Slide 7

Activity 2: Find the animals in the pictures

Slides 8 - 11



Use the images on the powerpoint or print off pictures for the students to review. Have them find the animals listed in each picture. (note the bees are not visible in the night scene as they are tucked away in their hive, diurnal animals highlighted in yellow, nocturnal in purple).



Butterfly
Bee
Fox
Owl
Robin
Bat
Moth
Hedgehog

Who is sleeping?

Who is awake?



Butterfly
Bee – no bees can be seen
Fox
Owl
Robin
Bat
Moth
Hedgehog

Who is sleeping?

Who is awake?



Activity 3: Group discussion: What differences do you notice in each of these pictures?

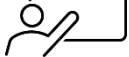
Side-by-side comparison

Slide 12 – 15

Beside the observation that some of the animals are sleeping in the day and others are sleeping at night, note that the white flowers have also closed up for the night.

Everything is grey at night except where there is a lamp which gives enough light to see the colours. Refer back to activity 1 to explain this. This is how it looks for you since you can't see colour at night.

Slide 13 and 14 are day and night scenes, you can toggle back and forth between these two slides in presentation mode by clicking on the red circle (on either side). Use the mouse wheel or arrows on the keyboard to move past these slides.



Animal eyes at night.

Slide 16

We don't need to see very well at night because we are sleeping, but what about nocturnal animals, animals like the fox or owl? Do they need to see well in the night?

Have you seen the eyes of your dog or cat, or another animal, glow when a light shines on them at night? This is because they have a reflective material at the back of the eye so even in very low light they can see better.



Activity 4. Groups of 2 – 4

Slide 17, 18

Animals have reflective material in their eyes – what type of material is reflective?

Light investigation: look at reflective versus non-reflective material. Give the groups a variety of materials. Have the students sort the material into what they think will be reflective and non-reflective (prediction). Give each group a torch.

Ask them how they will know if a material is reflective. If they can get the light to 'bounce' off material and shine on a wall – it is definitely reflective, if they can see the light shine back at them it is reflective.

Demonstrate testing for reflectivity.

Have the students shine a torch on the different materials and decide if their predictions were correct (test).

Have them re-sort the material and fill in the reflection template.

Have each group explain what they thought would happen and what did happen. Was anything a surprise? Did they move anything into a different category once they tested the material?

Activity 5. Optional. Groups of 2 – 4. Will they be able to see these materials in the dark area without a torch? With a torch? Have them predict which material they will be able to see best in the dark area. Let them test this out and report back to the class.



Wrap up (whole class discussion)

Slide 19

Recap key learning.

- We do not see colour at night.
- Nocturnal animals have reflective material in their eyes to see better at night.

Ask your students to think about how animals might use the idea of reflective material, light and colour depending on whether they are daytime or night-time animals.

You will explore this idea in the next lesson.

Modification

- This could be an extension of day/night taught in infant classes.

Extension Activities

- Research the different types of animals introduced in this lesson; habitat, behaviour, etc.
- Investigations into nocturnal animals. Find other nocturnal animals and see what they have in common.
- 3rd and 4th class investigate the properties of light in more detail including refraction – this lesson could be extended into that area. Investigations with prisms, blending colour using light instead of pigment.
- Making art with light
- Explore different materials with regard to light absorption.

Assessment

- Teacher observation regarding how the students sort and test the material.
- Reflective template and student feedback.
- Traffic light self-assessment (end of lesson).

Resources

Activity 4: Reflection template

Name: _____

<p>Reflective</p>  <p>Write the name or draw the material you think is reflective.</p>	<p>Non-reflective</p>  <p>Write the name or draw the material you think is NOT reflective.</p>

How many items in each box?

Number of reflective objects is: _____

Number of non-reflective items is: _____

Activity 1: Colour Wheel

Print this off and pin on a board so it can be spun

