



LEVEL 1 2 3 4 5

Signs for a Dark Night

THE LEARNING CONTEXT

The teacher's intended outcomes were for the students to:

- develop their investigative skills, particularly drawing a conclusion relevant to the question from their observations.

The intended outcomes were aligned to the following "big ideas":

- Scientists design ways to find answers to their questions.

To begin the unit, the students recorded their understanding of "how we see" (illustrated in the level 2 exemplar *How Do We See?* 2). Then they experienced a blacked-out room (see *Light and Colour*, Building Science Concepts, Book 10) and used a range of everyday materials to find the best reflectors for a darkened space.

In groups, they investigated how easy it was to see various colours in a darkened peep-box (see *Light and Colour*, page 14) and each group developed signs that could be seen in low-light conditions. They showed how they could "bounce light" around the classroom with mirrors and "shoot targets" with mirrors. Following these activities they had a class discussion on "how we see" and the students recorded their views.

The teacher planned further investigations and other activities on light and colour based on the results of these assessments (see *Light and Colour*, Book 10; *Seeing Colours*, Book 11; *Shadows*, Book 9; and *Making Better Sense of the Physical World*, pages 42-47).

Teacher-student conversation

Before the investigation:

- Teacher: Tell me about how you'll test which of these colours stand out best.
- Samuel: We'll put these [the cut-out initials] on different colours and look at them in a dark room.
- Teacher: How will you decide which ones are best?
- Samuel: The best ones will be the ones we can see in the dark.

WHERE TO NEXT?

To move Samuel towards the next learning step, the teacher could help him focus on:

- generating questions
- choosing questions to investigate
- using his own ideas to make predictions
- systematically planning and making observations (investigating in science).

The teacher could:

- ask the class to discuss the success of their investigations
- develop class criteria for "good investigating". These criteria could be used to plan and self-assess a future investigation on colour wheels (see *Making Better Sense of the Physical World*, page 51 or *Seeing Colours*, Book 11) (investigating in science).

CURRICULUM LINKS

Science in the New Zealand Curriculum

Achievement Objectives

Level 2: Making Sense of the Physical World

Students can investigate and describe their ideas about some everyday ideas of physical phenomena.

Science in the New Zealand Curriculum, page 74

http://www.tki.org.nz/r/science/curriculum/p74_75_e.php

Levels 1 and 2: Developing Scientific Skills and Attitudes

Processing and interpreting: Students can identify trends and relationships in recorded observations and measurements by suggesting links between these.

Science in the New Zealand Curriculum, page 46

http://www.tki.org.nz/r/science/curriculum/p44_51_e.php

Level 2: Making Sense of the Nature of Science and Its Relationship to Technology

Students can use a variety of methods to investigate different ideas about the same object or event.

Science in the New Zealand Curriculum, page 28

http://www.tki.org.nz/r/science/curriculum/p28_29_e.php

REFERENCES

- Ministry of Education (1993). *Science in the New Zealand Curriculum*. Wellington: Learning Media.
- Ministry of Education (1999). *Making Better Sense of the Physical World: Levels 1 to 4*. Wellington: Learning Media.
- Ministry of Education (2001). *Light and Colour: Our Vision of the World*. Building Science Concepts, Book 10. Wellington: Learning Media.
- Ministry of Education (2001). *Seeing Colour: The Spectrum, the Eye and the Brain*. Building Science Concepts, Book 11. Wellington: Learning Media.
- Ministry of Education (2001). *Shadows: Effects of the Absence of Light*. Building Science Concepts, Book 9. Wellington: Learning Media.

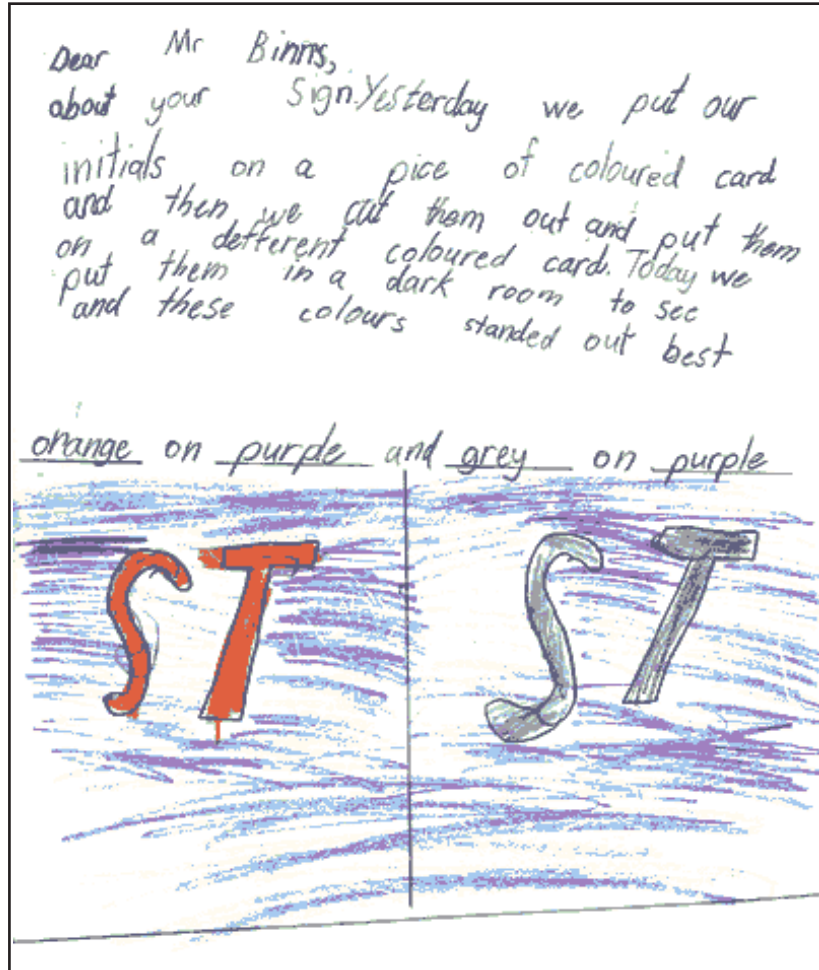


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Signs for a Dark Night

WHAT THE WORK SHOWS

Samuel explores how to make signs that are visible in the dark. His letter shows how he works out solutions to the challenge.



Samuel's letter describing his signs

Progress Indicator Investigating in Science

Exploring a situation

Samuel's letter shows he *makes observations and looks for patterns or relationships*.

Making predictions

Samuel actively contributes to the class discussion and *is able to predict possible outcomes for simple trials and give reasons* (see Teacher-student conversation).

Processing and interpreting

Samuel *reaches a conclusion to a simple investigation linked to his own understanding* when he writes about using different colours to make signs easy to read at night.

Reporting

His comments are brief but he *reports on some of his investigation in an organised way*.