



Part B: *Changing Gear: Technology*

Road Safety Objectives

- Students can identify road hazards and respond to them in sensible, safe ways.

Links with the New Zealand Curriculum

Essential Learning Areas

Changing Gear will help teachers and students meet requirements of **Technology in the New Zealand Curriculum**. Detail of these links are given on page 11.

Essential Skills

(see Appendix page 18-20)

Changing Gear will enable students to further develop the following essential skills.

Communication 1,2,

Numeracy 3,5,6

Information 1,2,3,4,

Problem-solving 1,2,3,4,5,6,7,8,9,10

Self-management and Competitive 2,3,4

Social and Co-operative 1,2,3,7,

Physical 2,5

Work and Study 1,2

Using this Resource

- The unit is designed as a self-contained unit of work, that could be incorporated into an existing school technology programme.
- Though the underlying message is one of safe road use, the intention is to deliver this message as secondary to the immediate learning of the class. Thus the class will cover a technology unit but there is a road safety emphasis which makes the technology more relevant.



Unit: *Handling Hazards*

Focusing Question

What can be done to help road users negotiate road hazards safely?

Explanation

In this unit of work students identify road hazards in their local area and observe what is being done to warn road users about these, or to protect road users from them. They check the effectiveness of these strategies. They identify road users who are most likely to be affected.

They then brainstorm ideas for overcoming or lessening the impact of the specified hazard – that is possible solutions -and test out the feasibility of these. The preferred solution is taken through to final design, which is then evaluated.

In the unit the traditional graphic design process has been presented in the format of the new technology curriculum.

That is:

Investigation



Ideas



Concepts



Development



Final Design



Evaluation

Levels

This unit is designed for students working at Levels 3-5.

Links with the Curriculum

This unit fits within *Technology and the New Zealand Curriculum*.

Strands

Strand A: Technological Knowledge and Understanding 2a and b

- describing their observations of road hazards
- understanding the use and operation of road signage and markings
- using correct technological terminology for road signage and markings

Strand B: Technological Capability 5, 6

- identifying needs of road users
- finding solutions to identified road hazards in a specific location
- presenting a final design of solution using formal techniques
- evaluating solutions

Strand C: Technology and Society 8

- understanding the impact their solution to a road hazard will have on different road users.

Technological Area

Information and Communication technology

- presenting information graphically

Materials technology

- investigation and use of appropriate materials and specifications to find solutions to road hazards

Context

- Community- traffic hazards
- Personal – as a road user
- School – road use near the school



Learning Outcomes

At the end of this unit students will be able to:

- Identify and assess technologies used in warning of, and protection against, road hazards in the local area.
- Identify needs of road users in the local area.
- Design and evaluate solutions for a road hazard in the local area.

Resources

Copysheet 1 **Hazards Checklist** page 16

Copysheet 2 **Hazards in the School Environs** page 17

Specifications for Road Markings and Signs – a sample of specifications for road hazard warnings. From **Manual of Traffic Signs and Markings Part 1 1994 and Part 2 1998:** Transit New Zealand and Land Transport Safety Authority

Teaching

1 Investigation

Identify road hazard/s for chosen road user in specified area, and attempts being made to overcome these hazards.

- Explain to students that they are going to be thinking about road hazards and how these affect road users. Hand out Copysheet 1. Brainstorm with the class all the different road users. These should be recorded in the left hand column of Copysheet 1. The list should include categories such as:

Pedestrians–teenagers, younger children, parents with prams, pre-schoolers, older people...

Cyclists

Skateboarders

Drivers

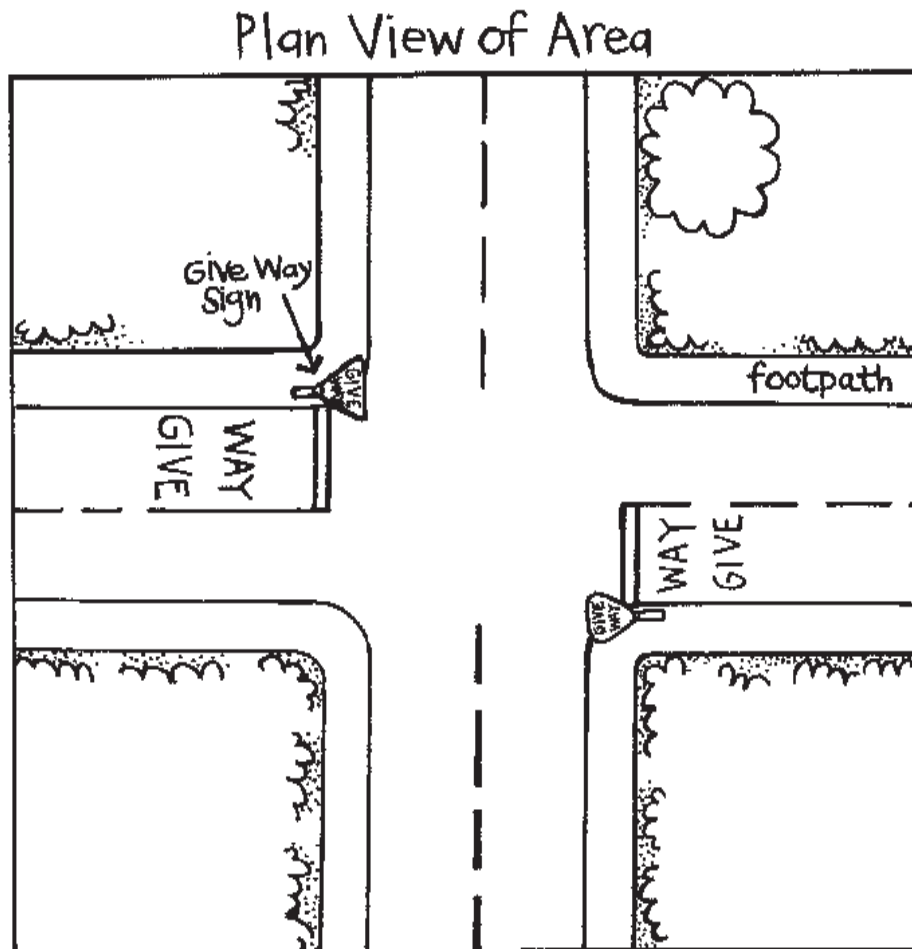
Scooter riders

- Brainstorm with the class possible permanent or temporary road hazards, such as road works, gravel on the road, poorly marked roundabout, potholes, lack of pedestrian crossing. Record these in the right hand column of Copysheet 1. Put a 'P' beside those that are permanent and a 'T' beside those that are temporary. Talk about how a hazard may be different for different people, depending on such things as age, size, disability and physical fitness.

Ask them to consider how each hazard on their list would affect each road user. They should draw lines between each road user and the hazards that would be particularly hazardous to them.

- Put students into working groups. Give each group Copysheet 2. Explain that they are now going to identify traffic hazards in the area around the school. Remind them of basic road safety behaviour. Take them out to walk around the immediate environs of the school. Each group should:

- Identify hazards in the local area. Record these on Copysheet 2.
- For each identified hazard, note down attempts that have been made to overcome the hazard, such as warning signs or road markings. Indicate how effective these solutions are.
- Choose one location with a hazard or hazards that they think have not been satisfactorily handled and on which they would like to concentrate their study. Decide which road user will be most affected by this. Photograph, or draw a sketch in plan view of the chosen area, showing existing signage and road markings. An example is given below.



- Back in class, the group tidies up their sketch work. Lead a discussion about the effectiveness of road signage and markings that they saw. Some of the following could be discussed:
 - changes in signage due to changes in society (eg skateboard use)
 - types of paint and colour used on road markings
 - types of plastic used for cones, caution tape
 - type and size of markings
 - suitability of markings and signage for different road users, such as the very young or elderly.

- Each group collates all the information they have gathered about hazards, the attempts to overcome these, and the effect on road users, and summarises this in point form.

Homework

Each student carries out an observation of the roads close to their home, making note of hazards and attempts to overcome these. They should record their findings to report back to their working group.

2 Write a Design Brief

Explore a range of possible solutions to an identified road hazard and select and develop one of these.

Ideas

Identify the location, road user and hazard to be investigated. (See copysheet 2)

Brainstorm solutions to the identified hazard, for the chosen road user. Use words and graphics. Investigate current solutions to similar problems, considering materials being used and how they were processed, for example paint, material strips, barriers, signs.

Concepts

The group produces sketches of a range of concepts, showing a variety of graphic skills and annotations. Methods used could be 3D and colour. These should be linked to:

Typeface

Colour

Materials

Visibility

Size

Durability

Sturdiness

Ease of interpretation

Impact

Use at day and night

Portability

Evaluate the Concepts

Identify good and bad points for each concept. This could be done by:

- personal assessment
- checking out with road users
- checking with expert such as police education officer or roading engineer

Development

Each group selects a solution, refines it, considering form, shape, assembly details, design elements. Any alterations should be justified in light of the brief and points identified in the investigation.

3 Final Design

Create a signage, road marking or other solution to resolve a permanent or temporary road hazard in a specific location for a specified road user.

The group comes up with the final design, using formal techniques. This should include:

- A justification of the final solution in response to the brief and investigation.
- An explanation of any variation from the original brief.
- Identification of materials to be used (eg paint specifications).
- A sketch of the environment where the solution will be situated.
- A 3D view of the solution on its own

Or

- A photograph of the area with the solution scanned and imposed on it.

4 Final Evaluation

Evaluate final solution against design brief.

Evaluate:

- The design against the design brief
- The performance of the group

The final design could be checked and commented on by someone in authority, such as the principal or Board of Trustees (if it is a road hazard within the school's jurisdiction) or council member, police education officer, or roading engineer.

Assessment

The teacher should assess the students against the achievement objectives, to determine at which Level (3-5) they are operating.



Hazards Checklist

Instructions

- 1** Record a list of road users in the left hand column.
- 2** Record a list of temporary and permanent road hazards in the right hand column. Put a **T** beside those which are Temporary and a **P** beside those which are permanent.
- 3** Consider how each hazard would affect each road user.
- 4** Draw lines between each road user and hazards that would be particularly hazardous for them.

Road Users	Temporary and Permanent Hazards

Hazards in the School Environs

Instructions

- 1** Record all the temporary and permanent traffic hazards you have observed in the area around your school. Record these in the left hand column.
- 2** Beside each hazard make notes and/or sketches about attempts to overcome this hazard, such as warning signs or road markings.
- 3** Choose one location that you would like to study further. Record this at the bottom of the page.
- 4** Describe the hazard/hazards for your chosen area and list those in the box at the bottom of the page.
- 5** Decide which road user you think would be most affected by the hazard/hazards. Record at the bottom of the page.

Temporary and Permanent Traffic Hazards	Attempts to Overcome these Hazards	Comments

Location Selected for Study:

Hazard/Hazards at Location:

Chosen Road User: