

Maths Week Unit Plan

Prior Knowledge:	Level:	Values:	Key Competencies:	Integration Suggestions:
<p>Before starting the unit ascertain students understanding of the following concepts:</p> <p>What do the following words mean?</p> <ul style="list-style-type: none"> • Transport • Active • Sustainable 	<p>Level 1</p> <p>Level 2</p> <p>Level 3</p> <p>Level 4</p>	<p>Excellence</p> <p>Innovation</p> <p>Diversity</p> <p>Equity</p> <p>Community and participation</p> <p>Ecological sustainability</p> <p>Integrity</p> <p>Respect</p>	<p>Thinking</p> <p>Managing Self</p> <p>Participating and contributing</p> <p>Relating to others</p> <p>Using language, symbols and texts</p>	<p>ICT</p> <p>English – Persuasive writing, report writing, reading about transport and the environment</p> <p>Social Sciences – Impact of transport on society</p> <p>Science – Impact of transport on the environment</p> <p>Technology – How transport works. Innovation in transport.</p> <p>Arts – Creating the perfect vehicle (creative focus rather than technology focused)</p> <p>Inquiry e.g. Modes and purposes of transport used over time</p>
Level 1 Prior Knowledge:			Skills:	
<ul style="list-style-type: none"> • Count forwards to 100 • Skip count forwards in 10s 			<ul style="list-style-type: none"> • Estimation • Creating and interpreting graphs 	

Achievement Objectives:	Learning Intentions: Level 1	Learning Experiences:						
<p>Mathematics & Statistics</p> <p>Measurement</p> <p>Order and compare objects or events by length, area, volume and capacity, weight (mass), turn (angle), temperature, and time by direct comparison and/or counting whole numbers of units.</p>	<p>WALT: (Level 1)</p> <ul style="list-style-type: none"> Estimate and count our steps to a chosen destination Order numbers from lowest to highest 	<p>How Many Steps?</p> <ol style="list-style-type: none"> Start the lesson off with a discussion about estimation. What is estimation? How do we estimate? What is it used for? Ask students to estimate and record how many steps they will need to take to reach different places in the classroom/school. Take into account how high the students can count. For students who cannot count to a high number, the objects need to be closer together or they need to be paired with another student or adult. <p>See template below for example of table.</p> <table border="1" data-bbox="1357 560 2110 651"> <thead> <tr> <th>Steps</th> <th>Estimate</th> <th>Actual</th> </tr> </thead> <tbody> <tr> <td>From desk to door</td> <td>35</td> <td>51</td> </tr> </tbody> </table> <p><i>Please note that every child has a different foot size and consequently will take a different number of steps. This is a great springboard for further discussion on measuring and measurement.</i></p> <ol style="list-style-type: none"> Ask students to order the distance from closest to furthest. Which journey took the least number of steps? Which journey took the most? <p>Extension:</p> <p>Take 10 steps and use that as a measuring gauge and then use that to estimate how far places are around the school. They can use their skip counting in tens to help them do this.</p>	Steps	Estimate	Actual	From desk to door	35	51
Steps	Estimate	Actual						
From desk to door	35	51						
<p>AO: Statistical investigation (Level 1)-</p> <ul style="list-style-type: none"> Conduct investigations using the statistical enquiry cycle: <ul style="list-style-type: none"> - posing and answering questions - gathering, sorting and counting, and displaying category data; - discussing the results 	<p>WALT: (Level 1)</p> <ul style="list-style-type: none"> Sort objects into categories for display Make a display of the data collected (pictograph) Make statements about data displays 	<p>How We Come To School:</p> <p>Equipment:</p> <ul style="list-style-type: none"> Pictures of cars, buses, bikes, boys/girls, people walking, taxis, trains and ferries (if any student comes by these modes of transport). Large pieces of paper and glue to stick the pictographs on. Pre-prepared A2 pictograph with labelled axes (no. of students, mode of transport) 						

		<ol style="list-style-type: none"> 1. Get students to first brainstorm all the ways they could come to school. 2. Then at the beginning of the week start by talking about how each child got to school. Ask the children to select the picture that matches how they came to school. 3. Children are then to group all the pictures that are the same together. 4. Make a class pictograph (if students know how to make a pictograph they could each stick their picture down, otherwise the teacher is to oversee this process). 5. Ask children to make statements about what they can see and write these down around the graph (encourage them to talk about most and least, and the number in each category). <p>How We Would Like to Come to School:</p> <p>Equipment</p> <ul style="list-style-type: none"> • Pictures of cars, buses, bikes, boys/girls, people walking, taxis, trains and ferries (if any student comes by these modes of transport). • Large pieces of paper and glue to stick the pictographs on. • Pre-prepared A3/A2 pictograph with labelled axis (no. of students, mode of transport) <ol style="list-style-type: none"> 1. Remind students of all the ways they came up with to come to school in the previous lesson. Say Today we are going to make a graph of how we would like to come to school. 2. Create a tally chart of how students would like to come to school. Teacher to record on board. 3. Get students into groups of 3-5 and ask them to collect the right number of pictures of cars/buses/bikes etc. to match the tally chart. Students then make their own group pictograph. Teacher to support groups as needed. 4. Once students have finished making their pictographs, record their statements about their graphs.
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<p>AO: Statistical investigation (Level 1)- Measurement</p> <ul style="list-style-type: none"> • Conduct investigations using the statistical enquiry cycle: <ul style="list-style-type: none"> - posing and answering questions - gathering, sorting and counting, and displaying category data; - discussing the results 	<p>WALT: (Level 1)</p> <ul style="list-style-type: none"> • Make a statement about a data display • Decide if a statement about a data display is true or false • Match a statement to the appropriate graph 	<p>Transport:</p> <p>Equipment:</p> <ul style="list-style-type: none"> • Use the graph provided (How Many People Does Each Mode of Transport Carry?) • A range of simple graphs and statements (that can be easily interpreted) <ol style="list-style-type: none"> 1. Explain a key and how to read a pictograph. Students that can count in 10s will be able to work out the missing answers. 2. Make statements about the modes of transport (which vehicle can take the most passengers, least etc.). 3. Which mode of transport would be most efficient for: <ul style="list-style-type: none"> - A family - A class - Someone going to work (There is no right or wrong answer for this. Discuss the benefits and drawbacks of each option. Discuss when destination and length of journey may affect the choice). 4. Ask students to get into pairs/groups. Give each pair/group a graph and a set of statements. Students are to match the statements to their graphs. Some of the statements provided will be incorrect. It is up to the students to decide which statements are true.
<p>Level 2 Prior Knowledge:</p>		<p>Skills:</p>
<ul style="list-style-type: none"> • Counting to 100 • Measuring height in cm and length in km 		<ul style="list-style-type: none"> • Using tally marks • Creating and interpreting graphs • Measuring
<p>Achievement Objectives:</p>	<p>Learning Intentions: Level 2</p>	<p>Learning Experiences:</p>
<p>AO: Statistical investigation (Level 2)</p> <ul style="list-style-type: none"> • Conduct investigations using the statistical enquiry cycle: <ul style="list-style-type: none"> - posing and answering questions; - gathering, sorting, and displaying category data 	<p>WALT: (Level 2)</p> <ul style="list-style-type: none"> • Collect information using a systematic method • Display information using a bar graph • Answer questions by sorting, organising and arranging information • Make sensible statements about the graphs 	<p>Cars Outside the School Gate</p> <p>(This could be done over 2-5 lessons)</p> <ol style="list-style-type: none"> 1. Ask some questions like: What is your favourite food, drink, colour, sport, TV programme etc... 2. Ask the children to vote and record their vote on the board. Show the children how tally marks work and ask them to convert the numbers into tally marks.

		<ol style="list-style-type: none"> Now ask the students to go around the room and ask each other 'What colour cars do you like best?' Ask them to give their classmates 5 options to choose from and record the answers as tally marks. Go out to the road. Make sure students stay on the footpath and keep away from driveways. Divide students into two groups; Group one uses a tally chart to record the number of vehicles going by for half an hour in the morning and half an hour in the afternoon. Group two uses a tally chart to record how many occupants are in each vehicle. Display results using bar graphs. Demonstrate how to draw a bar graph using the data collected. Teachers need to ensure that they highlight important features such as; title, X and Y axes, scale and labels on the axes, and accurately plotted bars. Students could draw their own versions as a practice exercise. Discuss results. How many less cars would there be on the road if there were 2 people per car, 3 people, 4? Do the students think that some people are going to the same place? Is there any way they could carpool to school to reduce traffic on the road? <p>Extension: Students could then go out at a different time or on a different day to see if the results vary. Do they vary? Why/Why not?</p>																		
<p>AO: Statistical investigation (Level 2)</p> <p>Conduct investigations using the statistical enquiry cycle:</p> <ul style="list-style-type: none"> – posing and answering questions; – gathering, sorting, and displaying category and whole-number data; – communicating findings based on the data. 	<p>WALT: (Level 2)</p> <ul style="list-style-type: none"> • Collect information using a systematic method • Display the information using a bar graph • Answer questions by comparing information collected • Make sensible statements about the information 	<p>How Many People Have Wheels?</p> <ol style="list-style-type: none"> Get students to ask their classmates if they own a scooter or bike and record as a tally chart: <table border="1" data-bbox="1355 976 2107 1114"> <thead> <tr> <th></th> <th>Scooter</th> <th>Bike</th> <th>None</th> </tr> </thead> <tbody> <tr> <th>Number of people</th> <td></td> <td></td> <td></td> </tr> </tbody> </table> <p>They can put a tally mark in scooter and bike if they have both.</p> <ol style="list-style-type: none"> Repeat the chart with who came to school using a scooter, bike, walking or other. <table border="1" data-bbox="1355 1241 2134 1378"> <thead> <tr> <th></th> <th>Scooter</th> <th>Bike</th> <th>Walk</th> <th>Other</th> </tr> </thead> <tbody> <tr> <th>Number of people</th> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>		Scooter	Bike	None	Number of people					Scooter	Bike	Walk	Other	Number of people				
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		<p>3. Students then compare the two charts. Does everyone who owns a scooter use it to come to school? If they are not, why not? (<i>Too far away, not safe, not allowed</i>).</p> <p>4. Students discuss how they can improve the number of students actively coming to school (<i>walk, bike scooter</i>) and brainstorm solutions. (<i>Those students who can't actively come should be encouraged to park further away and walk, or carpool.</i>)</p> <p>5. The following day the same chart will be repeated (or another agreed day in the week):</p> <table border="1" data-bbox="1305 454 2085 588"> <thead> <tr> <th></th> <th>Scooter</th> <th>Bike</th> <th>Walk</th> <th>Other</th> </tr> </thead> <tbody> <tr> <td>Number of people</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> <p>Create a bar graph to compare how many students actively came to school in the first lesson and how many actively came to school the next day (step 5). (<i>Teacher to demonstrate how to make a bar graph if necessary. It could be made in Excel (or another office suite) or drawn onto graph paper/maths books.</i>)</p> <p>6. Did the students manage to make any changes? If so, are these changes sustainable? The students are to record their ideas.</p>		Scooter	Bike	Walk	Other	Number of people				
	Scooter	Bike	Walk	Other								
Number of people												
<p>AO: Statistical investigation (Level 2)</p> <ul style="list-style-type: none"> Conduct investigations using the statistical enquiry cycle: <ul style="list-style-type: none"> – posing and answering questions; – gathering, sorting, and displaying category and whole-number data; – communicating findings based on the data 	<p>WALT (Level 2):</p> <ul style="list-style-type: none"> Write questions for investigation Collect information Sort information into categories Display information to answer questions or find out things Answer questions by sorting, organising and arranging information Make sensible statements about the information and be able to back up their statements with appropriate displays. 	<p>Data Squares (from nzmaths.co.nz) http://www.nzmaths.co.nz/resource/data-squares-level-2</p> <p>Do Data Squares lesson from nzmaths. Do Session One, Two and Three. For Session Four change it to the following to incorporate a Travelwise theme:</p> <p>Session Four</p> <p>Students are to work in pairs to design and compile their own data square set. Each pair of students needs to design three questions to ask 24 other students in the class. The first question will be “Are you a boy or a girl?” with three new questions added.</p>										

Discuss and brainstorm suitable Travelwise questions.

Sample questions:

- How many kilometres is your house from the school?
- How many centimetres taller are you than someone who needs a booster seat? (If shorter record as negative. You need to be 148cm before you no longer need a booster seat).

Specific instructions will be needed with questions like this, so it's clear where to start and finish measuring.

- How fast can you run 100m?
- What is your favourite . . . ? (A list of possible favourites to select from is best with questions like this.)
- What time do you leave your house to get to school?
- (When organising the data from questions like this, categories may be needed, e.g. before 8 pm, 8 to 9 pm, 9 to 10 pm, and later than 10 pm.)

Before starting to collect data each pair of students needs to write three statements about what they expect to find out about the class.

Each pair of students needs to collect information and make 24 data squares from students in the class.

At this point, teachers may wish to discuss the likely difference in results between randomly selecting 24 students from the class and hand picking 24 friends. A quick example is a good way to illustrate this point at this level of the curriculum. The point to get across is that hand picking students to answer a question can give a misleading impression of the class; if it is assumed that it is representative of the whole class. For example, the teacher selects five rugby-loving boys in the class and asks them to name their favourite sport. All the boys are likely to say rugby, with the resulting statement make, "Everyone answered rugby, so the favourite sport in the class is rugby" or "Everyone in this class loves rugby".

Once the data squares are completed, students are to sort and arrange them to look for things of interest. Each pair of students can prepare a brief report of the things they have discovered.

Session 5: remains the same

<http://www.nzmaths.co.nz/resource/data-squares-level-2>

Level 3 Prior Knowledge:		Skills:
<ul style="list-style-type: none"> • Measurement (cm, km) • Time 		<ul style="list-style-type: none"> • Using a map scale to figure out distance • Measuring in cm • Creating and interpreting graphs
Achievement Objectives:	Learning Intentions: Level 3	Learning Experiences:
<p>AO: Statistical investigation (Level 3)</p> <ul style="list-style-type: none"> • Conduct investigations using the statistical enquiry cycle: <ul style="list-style-type: none"> – gathering, sorting, and displaying multivariate category and whole number data and simple time-series data to answer questions; – identifying patterns and trends in context, within and between data sets; – communicating findings, using data displays. 	<p>WALT (Level 3):</p> <ul style="list-style-type: none"> • Collect information • Sort information into categories • Answer questions by sorting, organising and arranging information • Make sensible statements about the information with supporting evidence 	<p>Data Squares (from nzmaths.co.nz) http://www.nzmaths.co.nz/resource/data-squares-level-3?parent_node= Do Data Squares lesson from nzmaths. Do Session One, Two and Three. For Session Four change it to the following to incorporate a Travelwise theme:</p> <p>Session Four</p> <p>Students are to work in pairs to design and compile their own data square set. Each pair of students needs to design three questions to ask 24 other students in the class. The first question will be "Are you a boy or a girl?" with three new questions added.</p> <p>Discuss and brainstorm suitable Travelwise questions</p> <p>Sample questions:</p> <ul style="list-style-type: none"> • How many kilometres is your house from the school? • How many centimetres taller are you than someone who needs a booster seat? (If shorter record as negative). (Need to be 148cm before you no longer need a booster seat.) <p>Specific instructions will be needed with questions like this, so it's clear where to start and finish measuring.</p> <ul style="list-style-type: none"> • How fast can you run 100m? • What is your favourite . . . ? <p>A list of possible favourites to select from is best with questions like this.</p> <ul style="list-style-type: none"> • What time do you leave your house to get to school? • When organising the data from questions like this, categories may be needed, e.g. before • 8 pm, 8 to 9 pm, 9 to 10 pm, and later than 10 pm.

		<p>Before starting to collect data each pair of students needs to write three statements about what they expect to find out about the class.</p> <p>Each pair of students needs to collect information and make 24 data squares from students in the class.</p> <p>At this point, teachers may wish to discuss the likely difference in results between randomly selecting 24 students from the class and hand picking 24 friends. A quick example is a good way to illustrate this point at this level of the curriculum. The point to get across is that hand picking students to answer a question can give a misleading impression of the class; if it is assumed that it is representative of the whole class. For example, the teacher selects five rugby-loving boys in the class and asks them to name their favourite sport. All the boys are likely to say rugby, with the resulting statement make, "Everyone answered rugby, so the favourite sport in the class is rugby" or "Everyone in this class loves rugby".</p> <p>Once the data squares are completed, students are to sort and arrange them to look for things of interest. Each pair of students can prepare a brief report of the things they have discovered.</p> <p>Session 5: remains the same http://www.nzmaths.co.nz/resource/data-squares-level-3?parent_node=</p>
<p>AO: Statistical investigation (Level 3)</p> <ul style="list-style-type: none"> • Conduct investigations using the statistical enquiry cycle: <ul style="list-style-type: none"> – gathering, sorting, and displaying multivariate category and whole number data and simple time-series data to answer questions; – identifying patterns and trends in context, within and between data sets; – communicating findings, using data displays. 	<p>WALT: Level 3</p> <ul style="list-style-type: none"> • Display data in bar graphs, stem and leaf graphs • Discuss features of data displays using middle, spread, and outliers 	<p>Child Restraints (adapted from nzmaths.co.nz) Choose a Yr 1-2 class to work with.</p> <p>Session 1 Students will learn how to measure each other using metre rulers. They will convert between metres and centimetres (e.g. 1.4m = 140cm). Teachers may need to help them to problem solve how to measure accurately over 1m.</p> <p>Session 2 Once students can efficiently and accurately measure, they will visit a Year 1 and/or 2 class. They will each measure a student from that class and record their heights as cm and metres.</p>

Session 3



Have a student tell you their Y1/2 buddy's height in cm. Place it on the graph without explaining how you positioned it. Ask another student to tell you the height of their buddy and put it on the graph. Again don't give an explanation.

Then ask the students:

Can anyone explain why I've put those numbers at that place on the graph?

Discuss the 'tens' digit as the stem and the 'ones' digit as the leaves.

Now get the students to add their buddy's heights on the graph that has been started.

Look at the stem-and-leaf graph and discuss.

- Which is the most common height?
- Can you see the similarities between this stem and leaf graph and a bar graph? Do they give you the same information?
- Which height is near the middle? (Stem-and-leaf graphs are great for answering this question as you can count in from either "end" of the data).
- Which heights are grouped together in clusters?
- What is the spread of heights? Is there a big gap between the shortest and tallest student?
- Which heights are lying outside the cluster?

Then ask the students – How many Y1 and/or 2s should be in a child restraint/ booster seat? (Have to be 148cm or taller before they do not need one).

Go back to the buddy class and find out how many students are properly restrained in the class. This could be followed up with some pamphlets going home about child restraints if necessary.

Level 4 Prior Knowledge:		Skill:
<ul style="list-style-type: none"> • Simple surveys - purpose and format • Percentages 		Interpreting data and drawing conclusions
Achievement Objectives:	Learning Intentions: Level 4	Learning Experiences:
AO: Statistical investigation (Level 4) <ul style="list-style-type: none"> • Plan and conduct investigations using the statistical enquiry cycle: <ul style="list-style-type: none"> – determining appropriate variables and data collection methods; – gathering, sorting, and displaying multivariate category, measurement, and time-series data to detect patterns, variations, relationships, and trends; – comparing distributions visually; – communicating findings, using appropriate displays 	WALT: Level 4 <ul style="list-style-type: none"> • Use spreadsheets to display and analyse data • Compare features of data distribution 	Our School's Roll Surveys - Methods of getting to and from school Use your school's roll surveys (spreadsheets) from the last two years (available in your Safe School Travel Plans or from your Community Transport Coordinator). <ol style="list-style-type: none"> 1. Create a graph in Excel (or another suitable program) to compare the data from the two roll call surveys 2. Note the changes between the two years, if any. 3. Draw conclusions - changes, why? No change, why?
	WALT (Level 4): <ul style="list-style-type: none"> • Plan an investigation • Use spread sheets to display and analyse data • Discuss features of data displays • Compare features of data distributions 	I Travel to School Use the following nzmaths maths lesson: http://www.nzmaths.co.nz/resource/travel-school-i
AO: Statistical investigation (Level 4) <ul style="list-style-type: none"> • Plan and conduct investigations using the statistical enquiry cycle: <ul style="list-style-type: none"> – determining appropriate variables and data collection methods; – gathering, sorting, and displaying multivariate category, measurement, and time-series data to detect patterns, variations, relationships, and trends; – comparing distributions visually; – communicating findings, using appropriate displays 	WALT: (Level 4) <ul style="list-style-type: none"> • Compare and discuss factors related to stopping distance • Interpret a chart and draw conclusions 	Stopping Distances Read the information on : http://www.sdt.com.au/safedrive-directory-STOPPINGDISTANCE.htm Stopping distances <ol style="list-style-type: none"> 1. Discuss the four components of stopping distances. 2. What are the human factors of stopping distance affected by? 3. What does braking distance depend on? 4. Braking distance from 100Kms per hour- According to the chart what is the safest model car? The least safe? What is the difference between the safest and least safe? Discuss the importance of this.

Assessment: below are examples of assessment rubrics

Mathematics & Statistics	Working towards Level 1	Level 1	Level 2	Level 3	Level 4
Measurement	I cannot group similar objects together.	I can make a pictograph (independently or with support).	I can make a pictograph and tally chart independently. I can make a bar graph (independently or with support).	I can read and create a stem and leaf graph. I can talk about the data (spread, mode, median etc.).	I can convert between centimetres and metres.
Statistical Investigation		I can make statements about a pictograph.	I can make statements about a pictograph and bar graph.	I can create and interpret data squares.	I can use a spread sheet to make sense of data and create graphs. I can analyse and compare data and make statements about it.

Achievement Objectives:

- Mathematics
- www.nzmaths.co.nz
- Computer with a spread sheet program
- Metre rulers
- Graphs (for Level 1 activities)
- Coloured pencils or crayons to draw with
- Data squares
- Various websites