Maths Trail

Stage 3

Maths Trail – Stage 3

Zoo Education

Introduction

This resource has been designed to provide you and your students with a comprehensive kit of information and activities to ensure that you gain the maximum benefit from your zoo excursion.

It is suggested that you read through the resource and select activities that are relevant to your students. The activities chosen can be amended to suit the particular needs, levels and interests of your class and then be incorporated into your program.

Contents

Student Requirements

- Photocopied worksheets
- Clipboard
- Pencil
- Coloured Pencils (optional)
- Calculator (optional)

Group Requirements

- 100m Tape measure or trundle wheel
- 1m length of string
- 1m ruler or small tape measure
- Stopwatch

NSW School Curriculum Links

The workshops and related teacher resources are curriculum based and follow the Department of Education and Training's COGs approach, incorporating a range of KLA outcomes into the pre, post and on-the-day excursion activities.

Outcomes – Stage 3

Measurement

MS3.1 - Length

Selects and uses the appropriate unit and device to measure lengths, distances and perimeters.

- Converting between metres and kilometres.
- Measuring and recording lengths or distances using combinations of millimetres, centimetres, metres and kilometres.
- Finding the perimeter of a large area.

MS3.2 - Area

Selects and uses the appropriate unit to calculate area, including the area of squares, rectangles and triangles.

- Recognising the need for a unit larger than the square kilometre.
- Identifying situations where square kilometres are used for measuring area eg a suburb.
- Using abbreviations for square kilometre (km2) and hectare (ha).
- Recognising that one hectare is equal to 10,000 square metres.
- Reading and interpreting scales on maps and simple scale drawings to calculate an area.

MS3.3 – Volume and Capacity

Selects and uses the appropriate unit to estimate and measure volume and capacity, including the volume of rectangular prisms.

- Recognising the need for a unit larger than the cubic centimetre.
- Selecting the appropriate unit to measure volume and capacity.
- Using the abbreviation for cubic metre (m3)
- Equating 1 cubic centimetre to 1 millilitre and 1000 centimetres to 1 litre

MS3.4 – Mass

Selects and uses the appropriate unit and measuring device to find the mass of objects.

- Recognises the need for a unit larger than the kilogram.
- Using the tonne to record large masses.
- Using the abbreviation for the tonne (t).
- Selecting and recording the appropriate unit and device to measure mass.

MS3.5 – Time

Uses twenty-four hour time and am and pm notation in real-life situations and constructs timelines.

- Using am and pm notation.
- Converting between 24-hour and am or pm notation.
- Reading, interpreting and using timetables from real-life situations, including those involving 24-hour time.
- Use a stopwatch to measure and compare duration of events.

Number

NS3.2 – Addition and Subtraction

Selects and applies appropriate strategies for addition and subtraction with counting numbers of any size.

- Selecting and applying appropriate mental, written or calculator strategies to solve addition and substraction problems.

NS3.3 – Multiplication and Division

Selects and applies appropriate strategies for multiplication and division.

- Selecting and applying appropriate mental, written or calculator strategies to solve multiplication and division problems.

Space and Geometry

SGS3.2 – Two-dimensional Space

Manipulates, classifies and draws two-dimensional shapes and describes side and angle properties.

- Making enlargements and reductions of two-dimensional shapes, pictures, maps, pyramids, cylinders, cones and spheres.

SGS3.3 - Position

Uses a variety of mapping skills.

- Finding a place on a map or in a directory, given its coordinates.
- Using scale to calculate the distance between two points on a map.
- Locating a place on a map which is given direction from a town or landmark.

Data

DS3.1 - Data

Displays and interprets data in graphs with scales of many-to-one correspondence.

- Drawing picture or column graphs using a key or scale.
- Interpreting sector (pie) graphs.

Working Mathematically

WMS3.2 – Applying Strategies

Selects and applies appropriate problem solving strategies, including technological applications, in undertaking investigations.

WMS3.4 – Reasoning

Gives a valid reason for supporting one possible solution over another.

Environmental Education Policy

In 2001 the Department of Education and Training released the Environmental Education Policy for Schools which is mandatory for all government schools from Kindergarten to Year 12. A visit to Taronga Western Plains Zoo is the perfect opportunity in helping to achieve some of the outcomes listed in the policy.

Students will Develop

Knowledge and understanding about:

- The nature and function of ecosystems and how they are interrelated
- The impact of people on environments (K2)

Skills in:

- Identifying and assessing environmental problems (S2)
- Communicating environmental problems to others (S3)
- Resolving environmental problems (S4)
- Adopting behaviours and practices that protect the environment (S5)

Values and Attitudes relating to:

- A respect for life on earth (V1)
- A commitment to act for the environment by supporting long term solutions to environmental problems (V3)

At the Zoo

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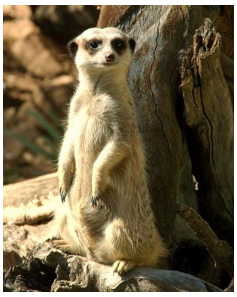
MS 3.1 – Length

At the Education Centre select the appropriate measuring device to find the lengths of the objects in the table below. Convert all your answers to centimetres

Object	Length	Length in Centimetres
Door Width		
Length of Classroom		
Croc Tank		
Length of Car		

MS 3.3 – Multiplication and Division

The Meerkat is primarily insectivorous in the wild but will also eat small vertebrates, eggs and some vegetable matter. You are going to help prepare part of their captive diet and calculate the cost per animal per week to feed. At the Meerkat exhibit count the total number of animals, and then calculate the total cost to feed the Meerkat colony



Weekly Diet / Animal	Cost / kg or per item	Cost / Week / Animal	Cost / Group
100g Mealworms	$35.00 per kilo		
50g Dry Dog Food	$1.20 per kilo		
3 Chicks	40c each		
4 Mice	$1.30 each		
1 Egg	20c each		
100 Crickets	$60.00 / 1000 crickets		
Total Cost:			

MS 3.3 – Volume and Capacity

Calculate the volume of the crocodile tank in cubic centimetres, convert your answer to litres. To prevent the tanks from turning green algae blocks are added to the tank. One algae block is needed for every 200 litres. How many blocks would you need to this tank?

Volume of tank = _____ cm^3

Volume of tank = _____ L

_____ algae blocks needed to keep this tank clean.

DS 3.1 - Data

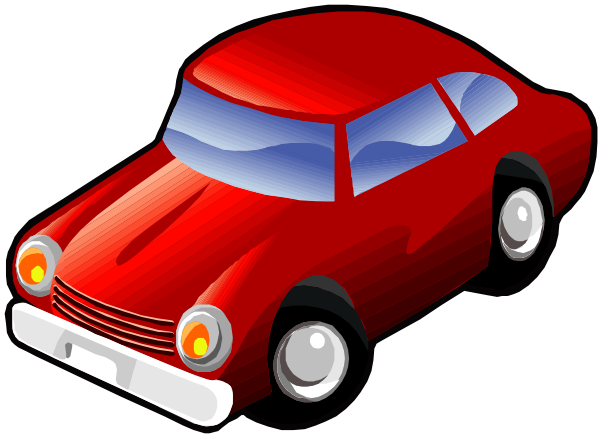
Go to the verandah of the Zoo Friends building. From here you can safely see the cars in the carpark. Survey the different types of vehicles parked in the car park.

Which vehicle type do you think will be the most common? _____

Tally the number of different types of vehicles you can see in the car park.

Vehicle Type	Tally	Total
Motorbike		
4WD		
Sedan		
Station Wagon		
Zoo Electic Cart		
Utes		
Trucks		

At school construct a column graph to show your results.



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MS 3.2 - Area

Looking at the main Hippopotamus exhibit, shade on the grid below the main island and the beach area. Draw in the fence line around the main lake. Now you can count the full or part squares to compare the area of water to land. Which area is larger? _____. Also mark on your map where you see any hippos.

Other animals that have both water and land as part of their exhibit include tiger, cheetah, tapir and dingo. As you continue your trail around the zoo decide which of these exhibits has the biggest area of water.

MS 3.4 – Mass

At the elephant exhibit find the mass of an African Elephant, convert this from kg to tonnes.

Elephant mass = _____ kg or _____ t

Name three other animals at the zoo that would have their mass measured in tonnes.

_____ _____ _____

DS 3.1 – Data

At the Sumatran Tiger exhibit look at the picture graph representing the decline of tigers. What does the one tiger symbol represent? _____

Calculate how many tigers there were in:

1700 _____ 1800 _____ 1900 _____ 1950 _____ 1990 _____

Record the number of different tiger species surviving today. Back at school draw your own picture graph to represent these figures.

Tiger Species Name	Number Surviving

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MS 3.1 – Length and MS 3.2 – Area

Use your trundle wheel to find the perimeter of the main koala enclosure. You will need to walk inside the external boundary fence. Now find the perimeter of the smaller koala holding area. Convert both your answers to kilometres.

	Perimeter (m)	Perimeter (km)
Koala Exhibit		
Smaller Holding Yard		

Outside the exhibit is a toilet block, calculate the area of this in square metres. The total area of Taronga Western Plains Zoo is 950ha with 350ha open to the public. A 130ha Australian native flora and fauna sanctuary is located within the grounds also. Convert these areas to square metres.

Toilet block area _____ m^2

	Area in Hectares	Area in Square Kilometres
Total Area of TWPZ		
Area of TWPZ Open to Public		
Sanctuary		

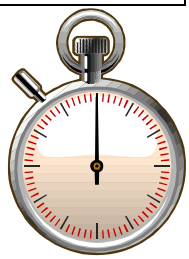
NS 3.4 – Fractions and Decimals

At the Galapagos Tortoise exhibit the tortoises only use part of the exhibit in the winter months to keep them near their warm night house. On the grid below shade in the area to represent the area the tortoises have access to in the winter months including their night house.

MS 3.5 – Time

Use a stopwatch in the playground to time activities to find their duration.

Activity	Time Taken (s)
Travel on Flying Fox	
Climb to top of play equipment	
Climb across monkey bars	
Swing 10 times on the swings	
Slide down the slippery dip	



Which activity took the least time?_____

Which activity took the greatest time?_____

NS 3.2 – Addition and Subtraction

Go to Bakhita's Café, make your selection from the menu board displayed at the front of the café, and then calculate the price of your meal. What change would you receive from $100.00?

	Menu Item Chosen	Cost
Appetiser		
Main Meal		
Dessert		
Drink		

Total Cost: $ _____

Change from $100.00: $ _____

MS 3.1 – Length and SGS 3.3 Position

The zoo map has been drawn for you. Use a piece of string and the scale to measure and record the distances you would travel on the road or walking tracks.

Meerkat to Kangaroos along the walking track _____

If you are at the African Elephants which toilets are closest? _____

How far is it from the Przewalski Horse to the Dingo exhibit? _____

You are at the Kangaroos and your legs are feeling a bit tired. How much further do you have to walk to meet you bus at the circuit exit?_____

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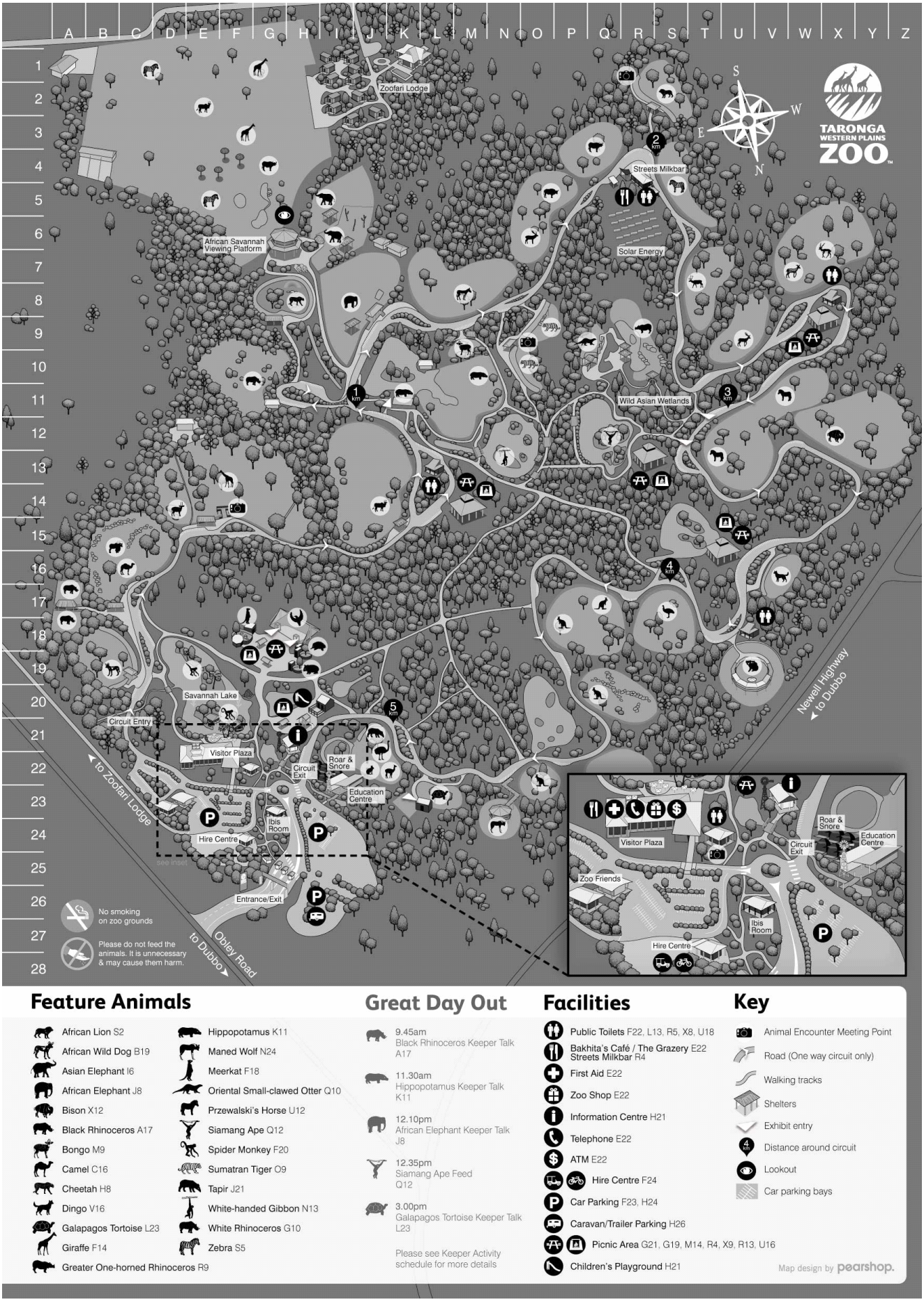

Feature Animals

- African Lion S2
- African Wild Dog B19
- Asian Elephant I6
- African Elephant J8
- Bison X12
- Black Rhinoceros A17
- Bongo M9
- Camel C16
- Cheetah H8
- Dingo V16
- Galapagos Tortoise L23
- Giraffe F14
- Greater One-horned Rhinoceros R9
- Hippopotamus K11
- Maned Wolf N24
- Meerkat F18
- Oriental Small-clawed Otter Q10
- Przewalski's Horse U12
- Siamang Ape Q12
- Spider Monkey F20
- Sumatran Tiger O9
- Tapir J21
- White-handed Gibbon N13
- White Rhinoceros G10
- Zebra S5

Great Day Out

- 9.45am Black Rhinoceros Keeper Talk A17
- 11.30am Hippopotamus Keeper Talk K11
- 12.10pm African Elephant Keeper Talk J8
- 12.35pm Siamang Ape Feed Q12
- 3.00pm Galapagos Tortoise Keeper Talk L23

Please see Keeper Activity schedule for more details

Facilities

- Public Toilets F22, L13, R5, X8, U18
- Bakhita's Café / The Grazery E22
- Streets Milkbar R4
- First Aid E22
- Zoo Shop E22
- Information Centre H21
- Telephone E22
- ATM E22
- Hire Centre F24
- Car Parking F23, H24
- Caravan/Trailer Parking H26
- Picnic Area G21, G19, M14, R4, X9, R13, U16
- Children's Playground H21

Key

- Animal Encounter Meeting Point
- Road (One way circuit only)
- Walking tracks
- Shelters
- Exhibit entry
- Distance around circuit
- Lookout
- Car parking bays

Map design by pearshop.

MS 3.5 – Time

Using the timetable of keeper talks and feeds choose five activities and convert the times from the am and pm times to 24-hour time.

Keeper Talk or Feed	am / pm	24-Hour Time

If you were having lunch at 1200 hours how long would you have before the first activity in the afternoon? _____

Are there any activities that occur at the same time? If so what are they?

_____

_____

The same keeper is presenting the first and the fourth activities. If the first activity went for 10 minutes how much time do they have before their second activity?_____

Post-visit Activities

Follow up activities give students the opportunity to consolidate information and share impressions gained and recorded at the zoo. Students can also research topics which have stimulated their interests.

Suggested follow up activities include:

- Using a map of the zoo students draw and measure the path they took during the day.
- On a map of Australia mark the location of some zoos, parks and aquaria. Give the grid reference of each location.
- Use three-dimensional objects such as carboard cylinders to make models of animals.
- Make a pie graph to represent the different activities you did during your day at the zoo.
- Calculate how much it costs to feed your pet for a week and then a year.
- Draw pictures of animals that would be weighed in tonnes.
- Redraw enlarged and reduced pictures of animals using a different scale.
- Make a model of an animals shelter using three-dimensional shapes.
- Research the weights of different animals in kilograms and convert to tonnes.
- Graph the area of your pets feed on grid paper and compare to the area of your own foot.

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