GRADE 5 & 6 MATH

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GRADE 5 & 6
IN-SCHOOL PREPARATION

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CW Physics, Science & Math Day Activities

A correlation with the Ontario Mathematics Curriculum, Grades 5-6

NSN	=	Number sense and numeration	GSS	=	Geometry and spatial sense
M	=	Measurement	PA	=	Patterning and algebra
DMP	=	Data management and probability			

ACTIVITY	GRADE 5 Overall expectations	GRADE 6 Overall expectations
Numbers the Park *collecting and analyzing data, average, percent*	- NSN – represent and explore relationships between decimals, mixed numbers, and fractions - NSN – understand the significance of numbers within the surrounding environment - NSN – justify in oral and written expression the method chosen for calculations - M – estimate, measure and record - PA – apply patterning strategies to problem-solving situations - DMP – interpret displays of data and present the information using mathematical terms	- NSN – represent and explore relationships between decimals, mixed numbers, and fractions - NSN – understand the significance of numbers in the greater world - NSN – justify and verify the method chosen for calculations - NSN – use and verify estimation strategies - M – estimate, measure and record - PA – apply patterning strategies to problem-solving situations - DMP – interpret displays of data and present the information using mathematical terms
Geometry at the Park *measurement, average distance, scale of map*	- GSS – identify, describe, compare and classify geometric figures - GSS – use language effectively to describe geometric concepts	- GSS – identify, describe, compare and classify geometric figures - GSS – use language effectively to describe geometric concepts
Measurement at the Park *measurement, estimation*	- M – demonstrate an understanding of and ability to apply appropriate metric prefixes in measurement and estimation activities - M – identify relationships between and among measurement concepts (linear, temporal, monetary)	- M – demonstrate an understanding of and ability to apply appropriate metric prefixes in measurement and estimation activities - M – identify relationships between and among measurement concepts (linear, temporal, monetary)
Probability at the Park *probability, data management*	- DMP – evaluate and use data from graphic organizers - DMP – demonstrate an understanding of probability concepts and use mathematical symbols - DMP – pose and solve simple problems involving the concept of probability	- DMP – systematically collect, organise, and analyse data - DMP – interpret displays of data and present the information using mathematical terms - DMP – evaluate data and make conclusions from the analysis of data - DMP – use a knowledge of probability to pose and solve problems

MEETING THE EXPECTATIONS

Scavenger Hunt at the Park *Number, geometry, measurement, patterning, probability*	- NSN – whole numbers, decimals, fractions, operations, negative numbers - M – length, capacity, volume - GSS – shapes, figures - PA – numeric and geometric patterns - DMP - probability	- NSN – whole numbers, decimals, fractions, operations, negative numbers - M – length, capacity, volume - GSS – shapes, figures - PA – numeric and geometric patterns - DMP – probability
Another Scavenger Hunt at the Park *Number, geometry, measurement, patterning, probability*	- NSN – whole numbers, decimals, fractions, operations, negative numbers - M – length, capacity, volume - GSS – shapes, figures - PA – numeric and geometric patterns - DMP - probability	- NSN – whole numbers, decimals, fractions, operations, negative numbers - M – length, capacity, volume - GSS – shapes, figures - PA – numeric and geometric patterns - DMP – probability
Fermi Questions at the Park *Measurement, estimation, problem solving*	- M – solve problems - M – estimate, measure and record	- M – solve problems - M – estimate, measure and record
More Fermi Questions at the Park *Measurement, estimation, problem solving*	- M – solve problems - M – estimate, measure and record	- M – solve problems - M – estimate, measure and record
Bumper Cars (poster) Data management and probability	- DMP – interpret displays of data and present the information using mathematical terms	- DMP – interpret displays of data and present the information using mathematical terms
Colourful Accents (poster) Data management and probability	- DMP – interpret displays of data and present the information using mathematical terms	- DMP – interpret displays of data and present the information using mathematical terms
Powerful Shapes (poster) Geometry and spatial sense	- GSS – shapes, figures - GSS – identify, describe, compare and classify geometric figures - GSS – use language effectively to describe geometric concepts	- GSS – shapes, figures - GSS – identify, describe, compare and classify geometric figures - GSS – use language effectively to describe geometric concepts
Motion Curves (poster) Geometry and spatial sense	- GSS – shapes, figures - GSS – identify, describe, compare and classify geometric figures - GSS – use language effectively to describe geometric concepts	- GSS – shapes, figures - GSS – identify, describe, compare and classify geometric figures - GSS – use language effectively to describe geometric concepts
Number Quest (poster) Number sense and numeration	- NSN – whole numbers, decimals, fractions - NSN – understand the significance of numbers within the surrounding environment	- NSN – whole numbers, decimals, fractions - NSN – understand the significance of numbers in the greater world

MEETING THE EXPECTATIONS

Tasty Numbers (poster) Number sense and numeration	- NSN – whole numbers, decimals, fractions, operations - NSN – represent and explore relationships between decimals, mixed numbers, and fractions - NSN – understand the significance of numbers within the surrounding environment	- NSN – whole numbers, decimals, fractions, operations - NSN – represent and explore relationships between decimals, mixed numbers, and fractions - NSN – understand the significance of numbers in the greater world
Thrill Patterns (poster) Patterning and algebra	- PA – numeric and geometric patterns - PA – apply patterning strategies to problem-solving situations	- PA – numeric and geometric patterns - PA – apply patterning strategies to problem-solving situations
Geometric Patterns (poster) Patterning and algebra	- PA – numeric and geometric patterns - PA – apply patterning strategies to problem-solving situations	- PA – numeric and geometric patterns - PA – apply patterning strategies to problem-solving situations
How many riders? (poster) Measurement	- M – solve problems - M – estimate, measure and record	- M – solve problems - M – estimate, measure and record
Average Speed of the Ride (poster) *Measurement*	- M – solve problems - M – estimate, measure and record	- M – solve problems - M – estimate, measure and record

HELPFUL HINTS

During the school year, you and your students engage in a variety of learning experiences. As the year progresses, you watch your students grow mathematically.

Now that the school year is coming to an end, it's time to enjoy an outing at Canada's Wonderland. This activity booklet is designed to help you and your students take full advantage of the educational and recreational opportunities found at the Park.

This booklet contains three different types of activities that can be copied for class use:

- Park-based activities
- math-concept-based activities
- ride-based activities

You and your students can select different activities, begin them in the classroom (think and discuss), continue them at the Park , and finish them in the classroom (work together).

Most of the student activities have corresponding notes for you, the teacher. These notes contain ideas that you can use to stimulate motivating discussions (think and discuss), assess student computational skill (try these), make multidisciplinary connections , extend the Park experience (wrap up), and assess student growth (ongoing assessment).

In the General Notes section, you will find several items that may help you in organizing your trip to the Park. For example, there is a planning guide that will help you select the activities that are appropriate for your students. You also will find a sheet of instructions that you can copy and distribute to your students. In addition, you will find suggestions for instructing your students about ride safety and about making measurements. There also is an organization checklist that you can use to keep track of your preparations for the trip, and a list of ideas for bulletin boards that you and your students can assemble as a follow-up.

Good luck, and enjoy!

MAKING MEASUREMENTS

TIME Times can be measured easily using a watch with a second hand or a digital watch with a stopwatch mode. When measuring the period of a ride that involves repetitive or circular motion, measure the time for several repetitions of the motion and take an average. This will give a better estimate.

Time measurements can be made while on a ride, but in many instances, it may be easier to take the time measurements while standing in line - or do both and compare the results.

DISTANCE Since students cannot interfere with the normal operation of the rides, they will not be able to make direct measurements of the ride heights, diameters, and so on. Most of these types of measurements have been provided in the data bank, but you may wish to withhold some measurements from your students and have them either calculate or estimate them for themselves. Listed below are two suggestions for determining distance:

PACING Students can determine the length of a step by walking at a normal rate over a measured distance. If they divide the distance by the number of steps, they can get the average distance per step. Knowing this, they can estimate horizontal distances.

RIDE STRUCTURE Distance estimates can be made by noting repeated structures in a ride's construction. For example, the tracks on many rides have regularly spaced cross structures, and students can estimate the space between them easily. A total distance can then be calculated by multiplying the number of cross structures by the estimated space between them. Students can use this method to estimate both horizontal and vertical distances in rides. Note that the choice of referent structural components needs to be made properly by avoiding those that are not equidistantly spaced.

Math Poster Activities - Teacher Notes

There are 10 Math Poster Activities around the Park: 2 Poster Activities per strand.

The posters are at various locations through out the Park. They are mounted at eye-level.

The posters are included on the following pages for your reference.

Decide ahead of time which ones students should complete. You may want to give students some choice by asking them to complete 1 Poster Activity per strand.

The student notes section has a tracking sheet for students to use (a copy is included below for your reference), as well as some notes to help them complete the activities.

POSTER TITLE	STRAND	LOCATION	COMPLETED
Bumper Cars	Data management and probability		
Colourful Accents	Data management and probability		
Powerful Shapes	Geometry and spatial sense		
Motion Curves	Geometry and spatial sense		
Number Quest	Number sense and numeration		
Tasty Numbers	Number sense and numeration		
Thrill Patterns	Patterning and algebra		
Geometric Patterns	Patterning and algebra		
How Many Riders?	Measurement		
Average Speed of the Ride	Measurement		

BUMPER CARS

Bumper Cars

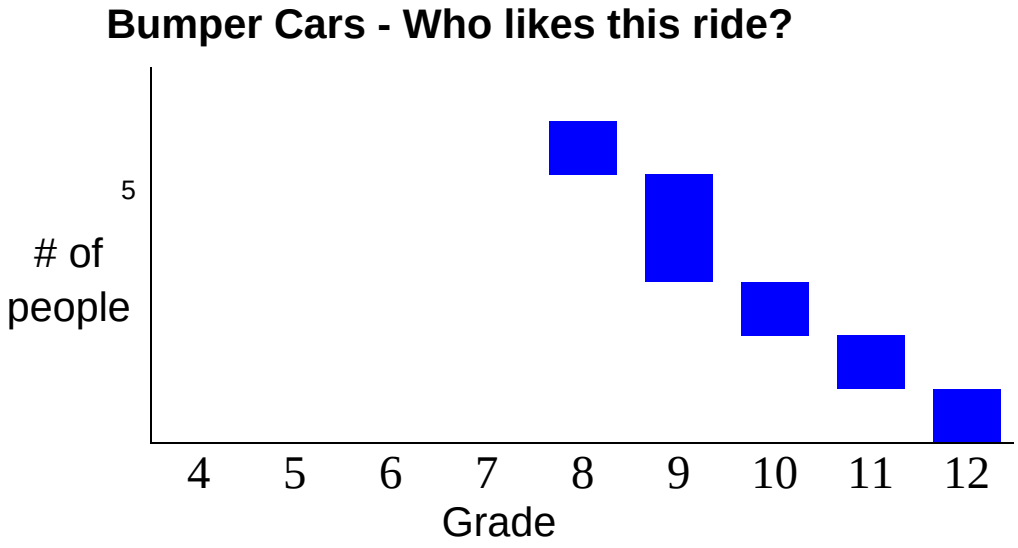
Data *Management and Probability*

Below is a ‘made-up' tally chart and bar graph showing how many people use the bumper cars, *Krachenwagon*.

Collect your own data by asking 25 people waiting to use the ride what is their grade. Use a tally chart to record your data. Then make up a bar graph to display your data.

What conclusions can you draw?

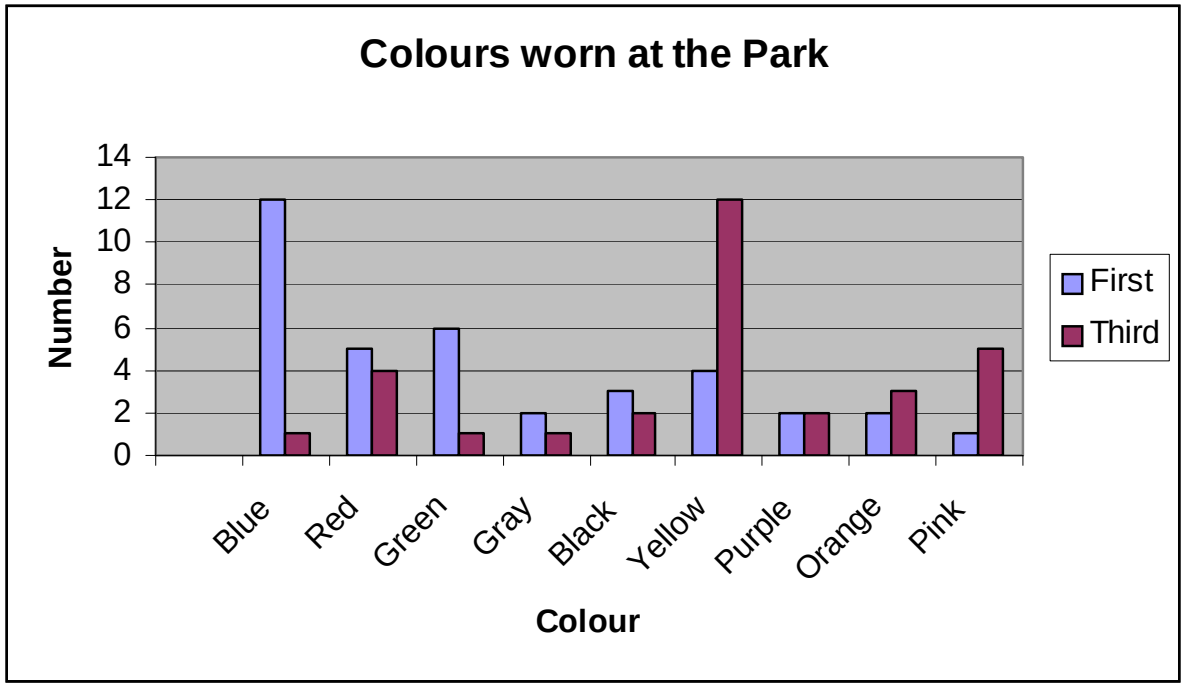
Grade	#of people
4	*III*
5	*IIII*
6	*III*
7	*~~IIII~~*
8	*~~IIII~~ I*
9	*~~IIII~~*
10	*III*
11	*II*
12	*I*



COLOURFUL ACCENTS!!

Data Management and Probability

Below is a 'made-up' bar graph showing the colours worn by people at the Park. Collect your own data by observing 25 people at the Park. For each person, record the most prominent colour and the accent colour (the third most prominent colour). Use a tally chart to record your data. Then make up a bar graph like the one shown below to display your data. What conclusions can you draw?



POWERFUL SHAPES

Geometry and Spatial Sense

The **Wild Beast** is a massive serpentine designed wooden coaster. With approximately 900 metres of track, this wildcat coaster reaches maximum speeds through a never-ending stretch of camel humps and hairpin turns.

Take a close look at the structure that supports the **Wild Beast**. Make a sketch of part of the structure and identify the different shapes used. Discuss the following points with a partner and then record your thoughts.

- The wooden structure that supports the **Wild Beast** has been especially designed to be very strong and safe. How do the shapes used in the structure add to its strength?
- Suppose that a wooden roller coaster is designed using vertical wooden poles with no diagonal braces. Would this be stronger or weaker than the structure used in the **Wild Beast**? Why?
- Diagonal braces are often used in the construction of houses. What purpose do you think they serve? Explain your reasoning.

MOTION CURVES

Geometry and Spatial Sense

Visit **Antique Carrousel**.

- Focus your attention on the head of one person on the ride.
  - Draw a sketch to show the path of their head through the air (from your perspective).
  - Describe the path in your own words.

- Imagine having a birds-eye view of the ride.
  Draw a sketch to show the path of their head (from the birds-eye
- view perspective).
  Describe the path in your own words.
-

Repeat this for **Psyclone**.

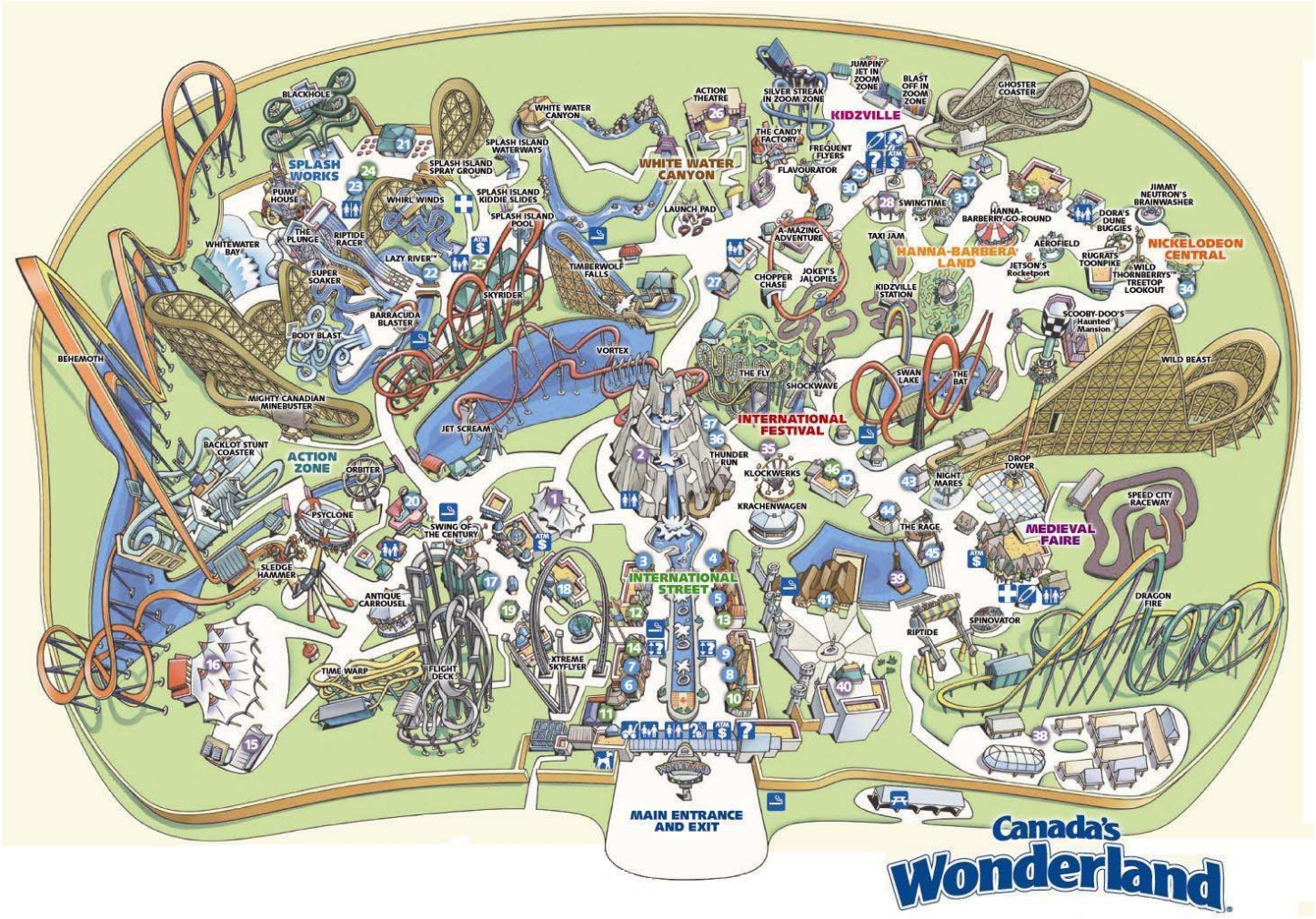
Repeat it again for **Sledge Hammer**.

NUMBER QUEST

Number Sense and Numeration

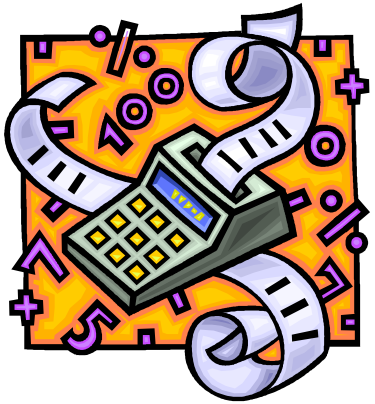
As you walk around the Park, look for numbers written on signs, buildings, etc.

- What is the biggest number you can find? Where? What is its use?
- What is the smallest number you can find? Where? What is its use?



TASTY NUMBERS

Number Sense and Numeration

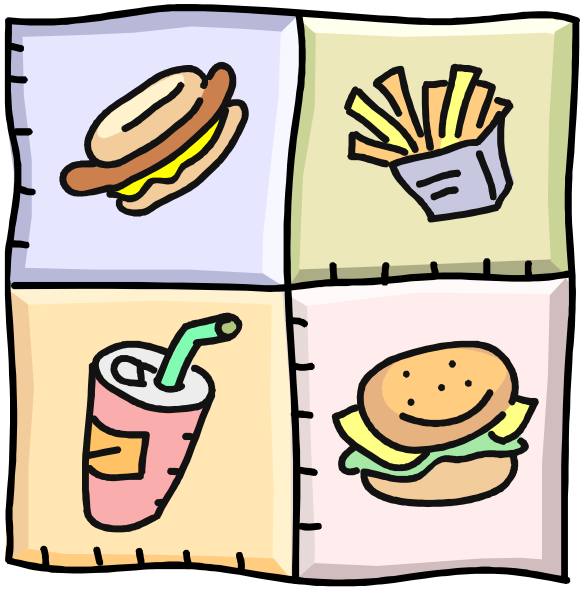


Visit an eating place, such as:

- **Thrill Burger**
- **Pizza Pizza**
- **You Go Grill**
- **Hot Potato**
- **Back Lot Café**

Pick your favourite options for lunch - include a drink.

- Calculate the total cost - don't forget to add 8% PST and 5% GST.



Visit another eating place.

Pick your favourite options for lunch - include a drink.

- Calculate the total cost - don't forget to add 8% PST and 5% GST.

What is the difference in price?

Thrill Patterns

Patterning and Algebra

Visit a thrill ride, such as:
Sledge Hammer, Psyclone, Shockwave, Riptide, Drop Tower, The Fly, Flight Deck, Vortex, The Bat, SkyRider, Dragon Fire, Wild Beast, or Xtreme Skyflyer.

Measure the following:

- The number of seconds of the ride.
- The number of seconds between rides.

Use the pattern you've identified to estimate the following:

- How many times can the ride run between 10 am and 8 pm?
- How many people could possibly enjoy this ride between 10 am and 8 pm?

Geometric Patterns

Patterning and Algebra

As you walk through the Park, notice the various geometric patterns:

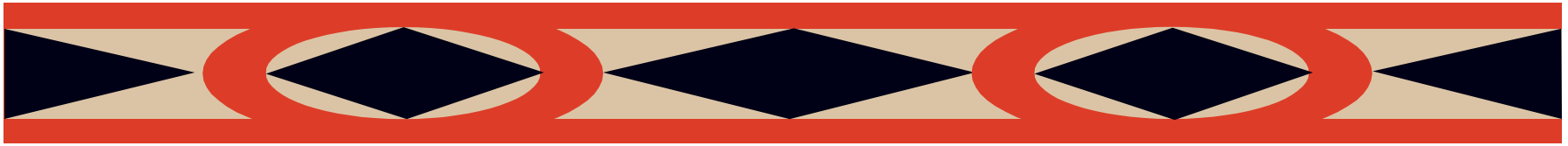
- Patterns in ride structures
- Patterns on pathways
- Patterns in buildings
- Patterns in designs
- Etc.

Make a sketch of three of your favourite patterns.

Extend each pattern.

Describe one of the patterns in your own words.

- Someone else reading your description should be able to reproduce the pattern accurately.



HOW MANY RIDERS?

Measurement

If all the rides are running at the same time, how many people could possibly be on the rides at the same time? Use your estimation skills!

AVERAGE SPEED OF THE RIDE

Measurement

Visit **Wild Beast.**

- This ride has approximately 900 m of track.
- How long does the ride last?
- What is the average speed of the ride in m/s?

Visit **Mighty Canadian Minebuster.**

- **Mighty Canadian Minebuster** is the largest and longest wooden coaster in Canada.
- **Minebuster** reaches astounding speeds of more than 90 km/h on its 1200 m of serpentine designed track. . How long does the ride last? .

What is the average speed of the ride in m/s?

Visit **Drop Tower.**

- On **Drop Tower**, free falling at more than 100 km/h, 23 stories flash by as the ground races up and catches riders in a silent, smooth stop.
- The ride is about 69 m high.
- How long does the ride last?
- What is the average speed of the ride in m/s?

STUDENT ACTIVITIES

NUMBERS AT THE PARK

GEOMETRY AT THE PARK

PROBABILITY AT THE PARK

MEASUREMENT AT THE PARK

SCAVENGER HUNT AT THE PARK

FERMI QUESTIONS AT THE PARK

POSTER ACTIVITIES

NUMBERS AT THE PARK

1. As you walk around the Park, try to find examples for each of the following. Can you find an example no one else will come up with?

   a) The fraction ½.
   - One half of the shoes at the Park are left and one half are right.
   -
   -
   -

   b) The biggest number.
   - There are approximately 8 000 people at the Park today.
   -
   -
   -

   c) A negative integer.
   - I lost a $5 bill. (-5).
   -
   -
   -

   d) The smallest fraction.
   - Approximately one out of ten people are wearing hats today. (1/10)
   -
   -
   -

   e) The smallest decimal.
   - I bought a cookie and the charge was $0.25.
   -
   -

NUMBERS AT THE PARK (cont'd)

2. Would you save money if you bought a season pass?

a) How much does a day's admission to the Park cost?

b) How much does a season pass cost?

c) How many times would you have to come to the Park so that the season pass pays for itself?

d) How much money would you save with a season pass if you came to the Park once every week in the summer?

3. Which is the most popular ride?
   a) Complete the table for your three favourite rides at the Park. Your will need to visit each ride and collect data. Use a calculator to complete the last column.

RIDE	# OF OCCUPIED SEATS	TOTAL # OF SEATS	# OF OCCUPIED SEATS / TOTAL # OF SEATS (as a fraction)	# OF OCCUPIED SEATS / TOTAL # OF SEATS (as a decimal)

b) Based on the data in the table, which of the three rides is most popular? Explain.

c) Explain what each of the following numbers would mean if they were in the last column of your table.

- 0.5
- 1
- 0

4. As you walk around the Park, try to find examples of pairs of things that are approximately equal in number. Explain your reasoning. Can you find an example that no one else will come up with?

- The number of eyes and the number of feet.
  Each person has two eyes and two feet.
-
-
-
-

5. How well can you estimate? Explain how you arrived at your answer.

a) Which is greater: The number of people at the Park or the number of litres of water at the Park?

b) Which is smaller: The number of bills in everyone's pockets or the number of coins in everyone's pockets?

c) Which is taller: The tallest tree at the Park or the shortest ride at the Park?

d) Which is more: The number of seats at the Park or the number of people at the Park?

GEOMETRY AT THE PARK

1. As you walk around the Park, try to find examples for each of the following. Can you find examples no one else will come up with?

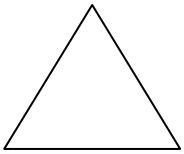
a) A rectangle. Did you know that a square is also a rectangle?

- The side of a can of pop is a rectangle (if you take off the ends and cut and flatten the side).
-
-
-

b) A parallelogram. Did you know a rhombus, a square, and a rectangle are also parallelograms?

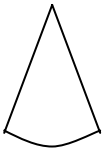
- The face of a $5 bill is a parallelogram.
-
-
-

c) A triangle.



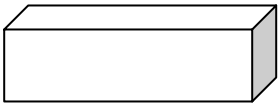
- You'll find a triangle in a roof.
-
-
-

d) A cone.



- Check the tip of you pencil.
-
-
-

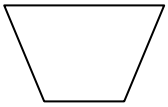
e) A rectangular prism.

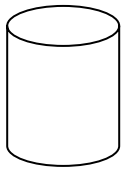


- This sheet of paper is a rectangular prism, if you lay it flat.
-
-
-

GEOMETRY AT THE PARK (cont'd)

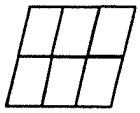
2. What other shapes and solids do you see at the Park? Can you find one that no one else will see?





-
-
-
-

3. Can you find tessellations at the Park? Can you find one that no one else will see?
   - Some of the walkways at the Park use a tessellation of patio stones.
   -
   -
   -



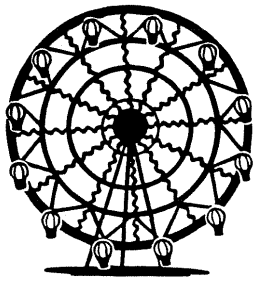
4. Which are your favourite rides?
   a) Complete the table for three of your favourite rides at the Park. You will need to visit each ride and collect date.

RIDE	TWO-DIMENSIONAL SHAPES IN THE RIDE	THREE-DIMENSIONAL FIGURES IN THE RIDE

   b) Which of the two-dimensional shapes you found in the ride is used least often in the ride? Why do you think this is the case?

   c) Which of the three-dimensional figures you found in the ride is used most often in the ride? Why do you think this it the case?

5. Find and sketch three different shapes at the Park. Then draw all the lines of symmetry for each shape.



6. Find and sketch two examples of shape with the following number of symmetry lines. Draw the lines of symmetry for each shape.

a) No lines of symmetry

b) One line of symmetry

c) Two lines of symmetry

d) Four lines of symmetry

7. Can you find shapes that have more than ten lines of symmetry?

PROBABILITY AT THE PARK

Before you get to the Park:

1. The paragraph below describes one of the rides at Canada's Wonderland.

Riptide: Canada's Wonderland's super swing with attitude and altitude. **Riptide** will take passengers through snap rollovers and unyielding 360 degree twists and turns and they are propelled through moments of zero gravity and finally quenched by an inescapable wall of water.

Count how many times each letter of the alphabet appears in the above paragraph. Use the table below to keep a tally.

A	B	C	D	E	F	G	H	I	J	K	L	M
N	O	P	Q	R	S	T	U	V	W	X	Y	Z

2. Count how many times each letter of the alphabet appears in the paragraph below. Use the table to keep the tally.

FOR THE KIDS: The best in fun for your kids and the kid in you! Visit **Scooby-Doo's Haunted Mansion**. Plus, bring your kids to *KidZville* and *Hanna-Barbera Land*, an entire themed area full of attractions, show and life-like characters, all designed for the young and the young at heart!

A	B	C	D	E	F	G	H	I	J	K	L	M
N	O	P	Q	R	S	T	U	V	W	X	Y	Z

3. Study the data in the tables from questions 1 and 2.
   a) Which three letters appear most often?

   b) Which three letters appear least often?

   c) Do vowels or consonants appear most often?

At the Park:

4. Use the date from questions 1 and 2 to make predictions.
   a) Which three letters are most likely to appear in signs at the Park?

   b) Which three letters are least likely to appear in signs at the Park

5. Test your predictions.
   a) Record the phrases that appear on the next 10 signs you see at the Park.

1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

5. b) Count how many times each letter of the alphabet appears in the phrases you recorded. Use the table to keep the tally.

A	B	C	D	E	F	G	H	I	J	K	L	M
N	O	P	Q	R	S	T	U	V	W	X	Y	Z

c) How many of the three letters you predicted would appear most often actually did so?

d) How many of the three letters you predicted would appear least often actually did so?

6. When you made your predictions in question 4, you used probability. That is, you made an estimate of the chance that some letters would occur more often than others. Consider each of the following probability statements. Do you agree or disagree? Explain your reasoning.

   a) The probability that an X occurs in a sentence is very close to zero.

   b) For every ten letters in a sentence, about three of them will be wither A, E, or N.

   c) The probability that one of the vowels A, E, I, O or U occurs in a sentence is about 7 out of 20.

7. Make two probability statements of your own.
   a)

   b)

MEASUREMENT AT THE PARK

Before you get to the Park:

1. a) Calculate your resting heart rate. Sit still for three minutes. Measure your heart rate for one minute. Or, measure your heart rate for 20 seconds and multiply by 3.

b) Run slowly on the spot for one minute. Measure your heart rate again.

c) Run vigorously on the spot for one minute. Measure your heart rate again.

d) Sit still for three minutes. Measure your heart rate again.

e) Do you think your heart rate changes as you watch a movie? Explain.

f) Do you think your heart rate changes as you sleep? Explain.

g) Do you think your heart rate changes as you eat? Explain.

h) Do you think your heart rate will change during your visit to Canada's Wonderland? Explain.

2. a) Measure the length of your normal stride. Walk normally for 5 steps. Measure the distance you traveled. Calculate your stride length.

b) Measure your height.

At the Park:

3. a) Sit on a bench for three minutes. Do you think your heart rate will be different from your heart rate in question 1. a)? Explain. Measure your heart rate.

b) Measure your heart rate as you wait for a ride.

c) Measure your heart rate right after the ride.

d) Make a conclusion about the effect of the ride on your heart rate.

e) Repeat questions 3. b)-d) for another ride. Is the effect on your heart rate the same? Explain.

4. Use the grid below to sketch a bar graph of your heart rate before, right after and three minutes after you go on your favourite ride. Describe what is happening at three different points on the graph.

5 a) Decide which ride you'll visit next. Estimate how far the ride is from where you are.

b) As you walk to the ride, count your steps.

c) Use your stride length measurement from question 2. a) to calculate the distance to the ride.

6. a) Pick your favourite roller coaster ride. Estimate how many times your height it would take to reach the top of the ride. Describe how you arrived at your estimate.

b) Use your measurement from question 2. b) to calculate the height of the ride.

SCAVENGER HUNT AT THE PARK

As you make your way through the Park, look for at least two examples that fit in each scavenger hunt category.

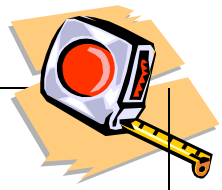
Play a game: At the end of your day at the Park, compare your examples with those of a partner. Count the examples you came up with that your partner does not have. The person with the highest total wins the game.

Number Sense and Numeration

Can you find:	Examples
Fractions	
Numbers larger than 100	
Decimals	
Negative numbers	
Operations with numbers	

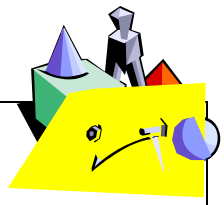
SCAVENGER HUNT AT THE PARK (cont'd)

Measurement



Can you find:	Examples
Something that is approximately 10 metres in length	
Something that is best measured in litres	
The longest ride	
The most/least expensive item you can purchase at the Park	
Something whose volume is approximately 1 m^3	

Geometry and Spatial Sense

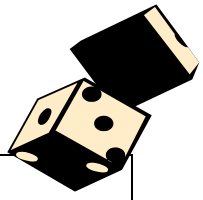


Can you find:	Examples
A cylinder	
A rectangular prism	
An acute triangle	
A regular polygon	
A cone	

Patterning and Algebra

Can you find:	Examples
Something that repeats	
A numeric pattern	
A geometric pattern	

Data Management and Probability



Can you find:	Examples
Something that rarely happens at the Park (when the Park is open)	
Something that happens about 50% of the time at the Park (when the Park is open)	
Something that almost always happens at the Park (when the Park is open)	

ANOTHER SCAVENGER HUNT AT THE PARK

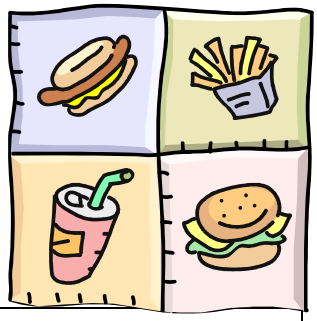
As you make your way through the park look for at least two examples of math questions that fit in each scavenger hunt category, and briefly answer each question (approximate answers are fine). A couple of examples are given below, to get you started.

The categories match the five strands that you study in mathematics: number, geometry, pattern, measurement and probability.

Play a game: At the end of your day at the Park, compare your examples with those of a partner. Count the examples you came up with that your partner does not have on her/his list. The person with the highest total wins the game.

At the rides

Can you find:	Examples
numbers	• How many people are waiting at the _____ ride? Answer = ___
geometry	• What is the most common shape at the _____ ride? Answer = ___
patterns	• What repeating patterns are there at the _____ ride? Answer = ___
measurements	
probability	



At the food courts

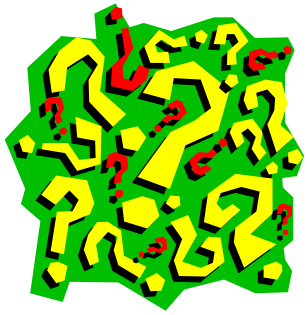
Can you find:	Examples
numbers	
geometry	
patterns	
measurements	• How many calories are there in a hot dog lunch? Answer = ____
probability	• What is the probability that two people in a row will order the same lunch? Answer = ____

At the shops

Can you find:	Examples
numbers	
geometry	
patterns	
measurements	
probability	

At the games

Can you find:	Examples
numbers	
geometry	
patterns	
measurements	
probability	



What is a Fermi Question?

Here is an example of a Fermi question:

> If everyone at the Park on Physics, Science, and Math Day held hands and stretched out in a straight line, how long would the line be?

A Fermi question often does not have an exact answer. It requires that you make reasonable assumptions and estimates and make calculations that lead to a reasonable guess. Often Fermi questions deal with large numbers.

In solving the Fermi question above you need to estimate the following:

- How many people are at the Park during Physics, Science, and Math Day?
- What is the average arm span?

Then you need to calculate how long the line would be. Try it ☺

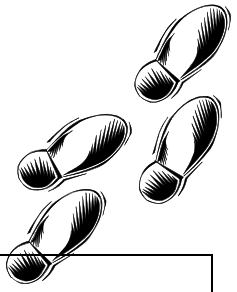
Fermi questions are named after the Italian physicist Enrico Fermi (1901-1954) who is best known for his contribution to nuclear physics. Fermi was also famous for his ability to figure out in his head problems like the one above.

When solving the questions below, share your assumptions, estimates and calculations with a partner. Discuss how your thinking is similar or different.

Quenching Your Thirst

If all the drinks purchased today at the Park were poured into a container, how big would the container have to be? Would the fountain area by the main gate be too big or too small?

Assumptions and Estimates	Calculations



Footsteps

How many footsteps will there be at the Park today?

Assumptions and Estimates	Calculations

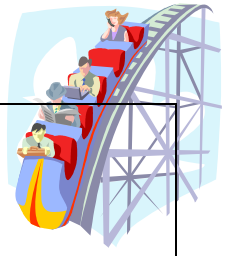
Heartbeats

How many heartbeats will there be at the Park today?

Assumptions and Estimates	Calculations

Visitors to the Park

How many people visit the Park during one season?



Assumptions and Estimates	Calculations

A Long Way to Go

What is the total distance walked and traveled on rides by everyone at the Park today?

Assumptions and Estimates	Calculations

Pages and Pages

How many pages would it take to record all the words spoken by everyone at the Park today?

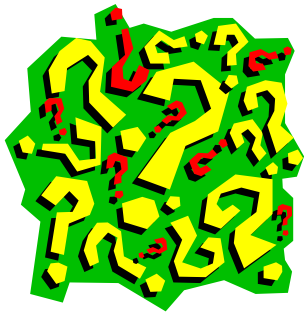
Assumptions and Estimates	Calculations

Screams

How many screams will there be at the Park today?

Assumptions and Estimates	Calculations

MORE FERMI QUESTIONS AT THE PARK



What is a Fermi Question?

Here is an example of a Fermi question:

If you add the ages of all the people at Physics, Science and Math Day, what would be the total number of years?

In solving the Fermi question above you need to estimate the following:

- How many people are at the Park during Physics, Science and Math Day?
- What is the average age?

Then you need to calculate the total number of years. Try it ☺

Assumptions and Estimates	Calculations
There are _____ people at the Park. The average age is _____	

When solving the questions below, share your assumptions, estimates and calculations with a partner. Discuss how your thinking is similar or different.

Blink, blink

We all blink many, many times each day without even noticing that we're doing it. If you count all the blinks of all the people at Canada's Wonderland, what would be the total number of blinks?

Assumptions and Estimates	Calculations

Visits to the Park

How many times have you visited Canada's Wonderland? What is the total number of visits to the Park, for all the people attending Physics, Science and Math Day?

Assumptions and Estimates	Calculations

Lots of smiles

How many smiles will there be at the Park during Physics, Science and Math Day?

Assumptions and Estimates	Calculations

How far?

How many kilometres did you travel to get to the Park? What is the total distance traveled by cars and buses to bring people to Physics, Science and Math Day?

Assumptions and Estimates	Calculations

A sea of basketballs

How many basketballs would it take to fill **Krachenwagon**, the bumper cars, driving area when not in use?

Assumptions and Estimates	Calculations

MORE FERMI QUESTIONS AT THE PARK (cont'd)

Take a breath

How many breaths will there be at the Park during at Physics, Science and Math Day?

Assumptions and Estimates	Calculations

Your question

Make up your own Fermi question. Then answer it below.

……

……

Assumptions and Estimates	Calculations

POSTER ACTIVITIES

There are 10 Math Poster Activities around the Park. The posters are at various locations through out the Park. They are mounted at eye-level. Your teacher will tell you which Poster Activities you should complete.

Use the chart below to keep track of the Poster Activities: where you have found them and whether you have completed them.

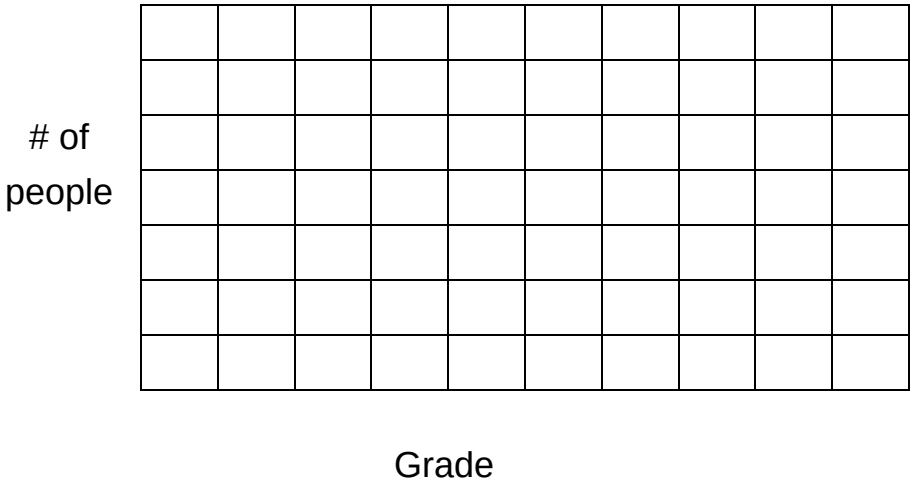
POSTER TITLE	STRAND	LOCATION	COMPLETED
Bumper Cars	Data management and probability		
Colourful Accents	Data management and probability		
Powerful Shapes	Geometry and spatial sense		
Motion Curves	Geometry and spatial sense		
Number Quest	Number sense and numeration		
Tasty Numbers	Number sense and numeration		
Thrill Patterns	Patterning and algebra		
Geometric Patterns	Patterning and algebra		
How Many Riders?	Measurement		
Average Speed of the Ride	Measurement		

Use the following notes to help you complete the Poster Activities.

Bumper Cars

Use the tally chart to collect your data.
Use the grid to draw the bar graph.

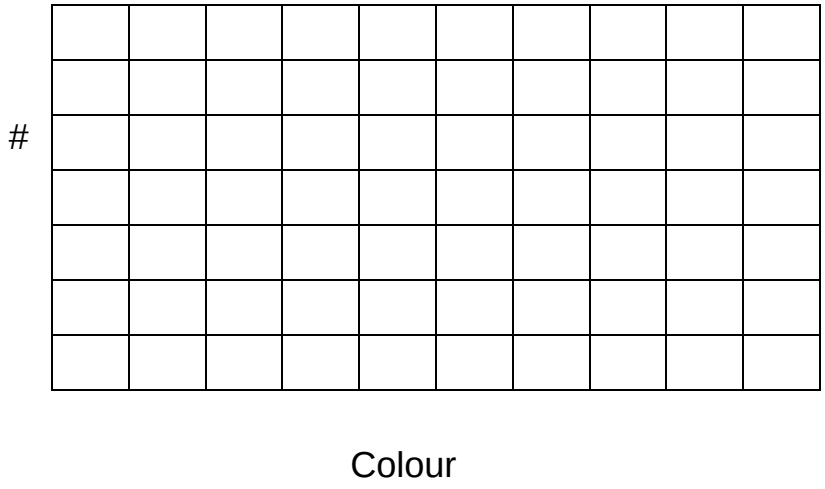
Grade	***#of people***



Colourful Accents

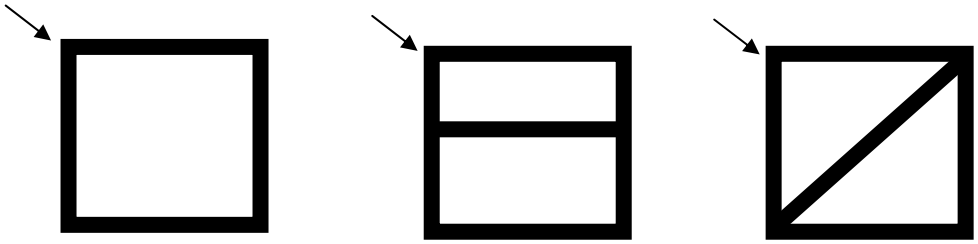
Use the tally chart to collect your data.
Use the grid to draw the bar graph.

Colour	***1st***	***3rd***



Powerful shapes

The diagrams below show three wooden constructions, held together by nails.
Imagine putting pressure on the vertices (as shown by the arrows). Which construction(s) would keep its (their) shape under pressure? Why?



Motion Curves

Take the time to share your diagrams with your partner. Discuss similarities and differences. Justify your reasoning.

Number Quest

As you walk around the Park, look for numbers written on signs, buildings, etc.

Tasty Numbers

Here is a calculation that shows you how to calculate the cost of a meal, including 13% tax (PST + GST):

Cost of meal before tax = $7.95
13% tax = $7.95 x 0.13 = $1.03
Total = $7.95 + $1.03 = $8.98

Thrill Patterns

As you walk around the park, notice how many people fit in each of the rides.
Which ride holds the most people?

Also, notice how long the rides last and how much time elapses between rides.
Which ride lasts the longest?

Geometric Patterns

As you walk through the Park, notice the various geometric patterns:

- Patterns in ride structures
- Patterns on pathways
- Patterns in buildings
- Patterns in designs
- Etc.

How Many Riders?

As you walk around the Park, notice how many people fit in each of the rides. Use the map below to record your findings.

Average Speed of the Ride

If you travel 200 metres in 25 seconds while on a ride, then the average speed is calculated as follows:

Average speed = distance / time = 200 m / 25 s = 8 m/s.