Math 7 -8 Activities- Menu D

UPPER CANADA District School Board

Creating Futures, Leading and Learning for All

Instructions: Each day, choose from the options below. Choose as many or as few as you have time for.

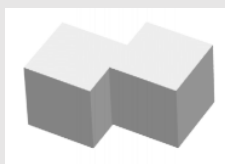|	A	B	C
Estimation	**Forwards and Backwards** The number 747 can be formed by adding a 3-digit number with its reversal: $$126$$ $$\underline{+\ 621}$$ $$747$$ Can you find the other two ways of making 747 in this way? NRICH	**What percent *and* degrees of the pie have been eaten?** ESTIMATION 180	**Sparky's Leash** When you let your dog Sparky out, he is tied to a rope that is pegged in the middle of your yard so Sparky can run around. **Estimate the area Sparky has to run if the rope is 5m long.**
Working with Numbers	**The Four 4's** Can you find every number between 0 and 20 using only four 4's and any operation? Here's an example: $$\sqrt{4} + \sqrt{4} + \frac{4}{4} = 5$$ youcubed	**Splat!** What is covered by each splat? 8	**Scientific Notation** Using the digits $1 - 9$, at most one time each, fill in the boxes to make a product that equals 800,000,000. $$(\square \times 10^{\square})(\square \times 10^{\square})$$
Activities / Puzzles	**What is the area of each shape?** The area of the full square is given in each diagram below. 1 ½ ¼	**"Cows in the Classroom"** The number on each bridge is the sum of the numbers of cows in each of the adjoining fields. Click here to try the puzzles! 6 10 4 11 9 5	**The Integers Card Game**
Problems	**The Ratio of Circumference to Diameter** Click here to learn how you can measure circular objects to explore the relationship between **circumference** and **diameter** of a **circle** in order to discover the **ratio, Pi.** NATIONAL COUNCIL OF TEACHERS OF MATHEMATICS CELEBRATING 100 YEARS	**What is the most common car colour where you live?** youcubed	**Surface Area** An object is made from two identical cubes, each with volumes of 8cm³, joined such that one overlaps half of one face of the other. **Find the Surface area.**
Technology	**Similarity and Congruence** Watch the video here. Then, click on the interactive task to identify different similar and congruent shapes. Answer additional questions here. LearnAlberta.ca	**Gizmo- Unit Conversions** Click here to follow to the steps to try a Gizmo on unit conversions! ExploreLearning	**Connect Three** Can you place three of your counters in a straight line before your opponent does? Play the game here. NRICH

Please click on this Icon, wherever you see it, to access Indigenous content.

Choice Board Background Information:

- ✓ Choice boards were created to provide flexibility in learning at home;
- ✓ Boards were planned for divisions: K-3, 4-6, 7-8 for open, individualized learning;
- ✓ Planned with recognition that parents may currently hold various roles at home;
- ✓ Designed to enhance the materials provided by the Ministry;
- ✓ Experiential learning focus with accessible materials at home;
- ✓ Low/No tech options;
- ✓ Accessible on mobile devices.

Choice Boards- Parents Can:

- ✓ Choose as many or as few learning opportunities as desired;
- ✓ Follow the days of the week or be flexible in using the choice boards;
- ✓ Be confident that the learning is based in curriculum;
- ✓ Engage other children in the home in common experiential learning (i.e. baking, reading, playing math games, being active together);
- ✓ Click on the links provided for further learning and sample questions to ask;
- ✓ Have fun!

Explanatory Notes: LEARN AT HOME CHOICE BOARDS FOR PARENTS AND EDUCATORS

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Choice Board Activities Provide:

- ✓ Clear connections to curriculum expectations and process skills;
- ✓ Open activities with options to individualize learning;
- ✓ Accessibility (many require little to no technology);
- ✓ Math – focus on numeracy skills;
- ✓ Literacy – focus on reading, writing, oral language and media literacy;
- ✓ French learning opportunities;
- ✓ Health and Physical Well-Being ;
- ✓ Opportunities to foster connections within the household;
- ✓ Focus on conversation and thinking.

Choice Boards- Teachers Can:

- ✓ Create classroom-based choice boards for students while they are learning at home;
- ✓ Incorporate ideas from the choice boards into teaching practices, daily and weekly planning;
- ✓ Explore and incorporate new resources into classroom learning;
- ✓ Engage students and families in virtually sharing learning with one another;
- ✓ Expand on activities in order to provide individualized learning opportunities;
- ✓ Incorporate other UCDSB resources (i.e. Math Tool, VLC, links) to extend student learning.

The "Circle" is very prominent in Indigenous cultures. The "Medicine Wheel" has many teachings pertaining to the "Circle of Life."

The "Sweat Lodge" epitomizes many of these teachings.

Please watch the attached video to understand more on the teachings of "Sweat Lodge." Then figure out how you might estimate the square footage required to build a lodge large enough to fit your family and friends.

[Introducing the Sweat Lodge](#)

Return Home

Forwards and Backwards

NRICH

The number 747 can be formed by adding a 3-digit number with its reversal:

$$126$$
$$+\ 621$$
$$747$$

Can you find the other two ways of making 747 in this way?

```
  ☐☐☐        ☐☐☐
+ ☐☐☐      + ☐☐☐
 7  4  7    7  4  7
```

Which other numbers between 700 and 800 can be formed from a number plus its reversal? There are more than five...

Can you explain how you know you have found all the possible numbers?

Extension:

How many numbers between 300 and 400 can be formed from a number plus its reversal? And between 800 and 900?...

The number 1251 can be formed by adding a 3-digit number with its reversal. Which other numbers between 1200 and 1300 can be formed from a number plus its reversal? And between 1900 and 2000? ...

Possible Solutions:

```
  3 2 4       2 2 5
+ 4 2 3     + 5 2 2
  7  4  7    7  4  7
```

Click here for more solutions!

Curriculum
Connections

Estimation 180

What percent *and* degrees of the pie have been eaten?

ESTIMATION180.COM

Solution

DEGREES:
319°

PERCENT:
88.6 %

ESTIMATION180.COM

Sparky's Leash

When you let your dog Sparky out, he is tied to a rope that is pegged in the middle of your yard so Sparky can run around.

1. Estimate the area Sparky has to run if the rope is 5m long.

The grass where the dog has access is now destroyed. You would like to replace this area with grass (sod).

2. Calculate the area that needs to be replaced. (Use a rope length of 5m).

3. Given the size of one piece of sod is 40 cm by 61 cm, how many pieces of sod would you need to buy?

Challenge Question:
What if your dog was tied to this rope in your yard with a dog house.

What is the area the dog can roam outside of the dog house?

See the solutions here.

Sparky's Leash

Solutions

1. Estimate the area Sparky has to run if the rope is 5m long.
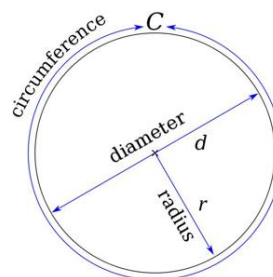
Sparky would make a circle with a radius of 10m. The area he has to run would be equal to: $A = \pi r^2$

Estimating Pi as 3 would give Sparky an approximate area of 3 x 5 x 5 = 75m².

2. Calculate the area that needs to be replaced. (Use a rope length of 5m).

$$A = \pi r^2$$
$$= \pi (5)^2$$
$$= 78.5 m^2$$

3. Given the size of one piece of sod is 40 cm by 61 cm, how many pieces of sod would you need to buy?

Area of one piece of sod:

= 61cm x 40cm

= 0.61m x 0.40m

= 0.244 m²

Number of pieces of sod needed:

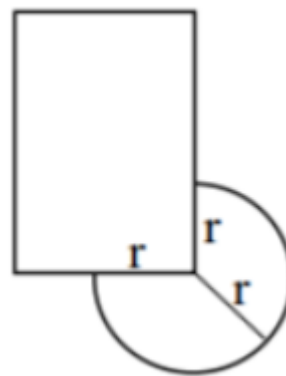= 78.5m² ÷ 0.244 m²

= 322 pieces of sod

Challenge Question:

What is the area the dog can roam outside of the dog house?

The dog house would make a right angle inside of the circle.
Therefore, one quarter of the circle would be blocked.

$$A = \frac{1}{4}\pi r^2$$
$$= \frac{1}{4}\pi (5)^2$$
$$= \frac{1}{4}(78.5 m^2)$$
$$= 19.6 m^2$$

Splat

To solve a Splat puzzle, you need to figure out what is covered up by the splat. For example, this puzzle has a total value of 5, but you only see 2 circles, so what is underneath the splat?

Puzzle   Answer

What is covered up by the splat? (hint: each splat is covering the same amount)

8

Solution

8

Scientific Notation OPEN MIDDLE

Using the digits 1 – 9, at most one time each, fill in the boxes to make a product that equals 800,000,000.

$$(\square \times 10^{\square})(\square \times 10^{\square})$$

Solution

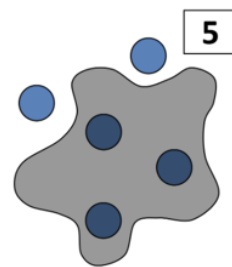Before you look at the solution… here is a hint:

How do the digits you choose for the exponents affect the product? How do the digits you choose to multiply by 10 affects the product?

Here are some potential answers:

$(4 \times 10^3) \times (2 \times 10^5)$

$(8 \times 10^6) \times (1 \times 10^2)$

What is the are of each shape?

The area of the full square is given in each diagram below. Justify your answer.

Three diagrams each showing an L-shaped arrangement of squares with a small labelled square: **1**, **½**, and **¼**.

Solutions

Possible Answers for the first diagram: **4**

What is the area of this shape?

$$\frac{1}{2} + \frac{1}{2} + \frac{1}{4} + \frac{3}{8} + \frac{3}{8}$$

$$= \frac{4}{8} + \frac{4}{8} + \frac{2}{8} + \frac{3}{8} + \frac{3}{8}$$

$$= \frac{16}{8}$$

$$= 2$$

= 1

"Cows in the Classroom"

Problem:

In the following diagrams, the number on each bridge is the sum of the numbers of cows in each of the adjoining fields. Pasture one has been completed. Find all of the unknown values.

Pasture 1: fields 6, 4, 5 with bridges 10, 11, 9

Pasture 2: fields 8, 7, 9 with bridges x, z, y

Pasture 3: fields 22, 31, C with bridges x, y, z — $x + y + z = 140$

Pasture 4: fields A, 4, 2 with bridges 7, C, B

Pasture 5: fields A, B, C with bridges 25, 28, y — $A + B + C = 38$

Pasture 6: fields A, B, D, 10 with bridges 24, 18, 25, x

Pasture 7: fields 12, A, B, 15 with bridges x, y, z, w — $A + B = 36$ and $w = z$

What if you only have unknown values? How would you solve this problem?

Using single digit numbers, find one solution. Then, find them all! *(numbers can't repeat)*

You may even want to have your neighbors try to solve the problem!

Fields A, B, D, C with bridges x, w, y, z

Curriculum Connections

What is the most common car colour where you live?

Look at the picture of the parking lot above. What do you notice? What do you wonder? Justify your answers using evidence from the image.

What is the most common car colour in your area? Can you make a prediction based on the parking lot image?

Develop a plan to collect data in order to verify if the parking lot image reflects car colour in your area.

Represent your data in a graph (for example, a bar graph or a pie chart). Remember to label all axes and give your graph a title!

Answer the following questions:
1. Distinguish between a census and a sample from a population. How did you sample the population of cars in your area?
2. Identify bias in your data collection method.
3. What is the most common car colour where you live?

Source: https://www.youcubed.org/wp-content/uploads/2019/10/Data-tells-us-about-ourselves.pdf

Curriculum Connections

Integers Card Game

Remove the Jacks, Queens, and Kings from a standard deck of playing cards..

Distribute the entire deck of cards to all players. In this game, red cards are negative integers while black cards are positive. Each person turns over 3 cards and finds the SUM (add all three cards together). The person with the highest value keeps the cards in a pile. Continue playing until one player has all the cards.

Extension: Instead of finding the sum you can find the PRODUCT of the three cards. (multiply all three cards together).

Sample Hand

Player 1

Player 2

Find the SUM

(-6) + (5) + (9)

= 8

Player 1 wins

(-10) + (3) + (-2)

= -9

Extension: Find the PRODUCT

(-6) x (5) x (9)

= - 270

Player 2 wins

(-10) x (3) x (-2)

= 60

Curriculum Connections

The Ratio of Circumference to Diameter

What is the relationship between circumference and diameter?

Click here for a review of circumference, radius and diameter from the Khan Academy!

Materials
- a piece of string, approximately 48" long, or a flexible tape measure
- circular objects to be measured
- ruler
- calculator
- Circumference Activity Sheet

Activity
1. Measure the **circumference** and the **diameter** of the circular objects that you found in your home using your piece of string or measuring tape. (Be sure to record your measurements using the same units!)

2. Record the following information in the Circumference Activity Sheet (download from Materials section above).
   - Description of each object
   - Circumference of each object
   - Diameter of each object
   - Circumference divided by diameter

Questions
1. What is the relationship between a circle's diameter and its radius?
2. What did you notice about the values in the last column?
3. What did you notice about the average of all of the values in the last column?

Follow-Up
The calculations in your last column have given you an approximation for the **ratio** of the **circumference** to the **diameter**, and this **ratio** has a special name: **π (pi)**.

Because of this relationship, algebraic notation can be used to write **circumference ÷ diameter = π** or, said another way, **π = C/d** which leads to the following **formula for circumference: C = π × d.**

Note: *You may have slightly different approximations for π. Determining the exact value of π is very hard to calculate, so approximations are often used.*

Answers to Questions Above:
1. The diameter of a circle is 2 times the radius or the radius is half of the diameter. Additionally, since there is a relationship between radius and diameter, you can also use the formula C = 2πr, since the diameter is twice the radius.
2. All of the values are close to π (~3.14).
3. The average of the values should be close to π (~3.14).

For an interactive Circle Tool click here!

Curriculum Connections

Surface Area

An object is made from two identical cubes, each with volumes of 8cm³, joined such that one overlaps half of one face of the other.
Find the Surface area.

Solution

Side length of one cube
$$= \sqrt[3]{8} = 2cm$$

Surface area of one cube
$$= 6 \times 2^2 = 24cm^2$$

But each of the two cubes have half of one face 'covered', hence the total surface area

$$= 2\left(24 - \frac{2^2}{2}\right) = 2 \times 22 = 44cm^2$$

Curriculum Connections

Similarity and Congruence

Watch the video <u>here</u>. Then, click on the interactive task to identify different similar and congruent shapes. Answer the questions below.

1) A class is told to draw a right triangle containing angles of 25° and 65°. Sketch 2 such triangles that meet the criteria above so they are:

    a) Congruent

    b) Similar

2) What additional information should be given to ensure that all students drawings will be congruent?

3) Repeat question 1 with a different set of angles.

Curriculum Connections

GIZMO – Unit Conversions

Explore*e*learning®

Instructions

1. Go to www.explorelearning.com

2. Click on "Login/Enroll"

   | *el* ▾ | 🔍 Find Gizmos | Learn More ▾ | 👤 Login / Enroll ▾ | Request Info ▾ |

3. Enter "LZC47M" into the Student Class Enrollment

   | *el* ▾ | 🔍 Find Gizmos | Learn More ▾ | 👤 Login / Enroll ▾ |

Username	Username
Password	Password
	Login Help? Login ➜

   Student Class Enrollment

   | Class Code | **Enroll in Class** |

4. If you have used Gizmos before, enter your login information.

   If you have not used Gizmos, create an account!

   ENROLL IN CLASS: Class 1 - Class 1
   TAUGHT BY: **Leanne Devlin**

   Confirm the class you wish to enroll in as a student. If you don't have an ExploreLearning user account, you can create a student account here.

   I **already have** an ExploreLearning account, **Login Now** to Enroll   ➜

   I need to **create** an ExploreLearning account, **Register Now** to Enroll   ➜

5. Click on "Unit Conversions" to launch the Gizmo!

   🚀 Launch

   Unit Conversions

   ▾ Use unit conversion tiles to convert from one unit to another. Tiles can be flipped to cancel units. Conve...
   Lesson Info

6. Your screen should look like this! Answer the questions here:

   You can also scroll down on the page for assessment questions!

7. You can also click on "Lesson Info" found on the top right hand side of the page to download further activities!

   [Curriculum Connections](#)

Connect Three

The game Connect Three is played with two spinners below:

Spin the two spinners, choose what order to place the numbers in, and add or subtract them to produce one of the totals shown on the board below, which you can then cover with one of your counters.

-12	-11	-10	-9	-8
-7	-6	-5	-4	-3
-2	-1	0	1	2
3	4	5	6	7
8	9	10	11	12

Can you place three of your counters in a straight line before your opponent does?

Play the game a few times, and then take a look at the questions below.
You can use the interactive version here or print this page to play away from the computer.

Some numbers can only be made in one way, but some can be made in many different ways.

Questions:
1) Can you work out the number of different ways of achieving each of the different totals?

2) **Does this influence the way in which you might choose to play the game?**

Curriculum
Connections

Source: https://nrich.maths.org/5864

	Task 1	Task 2	Task 3
Estimation	**Forwards and Backwards** Number Sense and Numeration **Grade 7** *Specific:* use estimation when solving problems involving operations with whole numbers decimals, and percents, to help judge the reasonableness of a solution. **Grade 8** *Specific:* use estimation when solving problems involving operations with whole numbers, decimals, percents, integers, and fractions, to help judge the reasonableness of a solution	**Estimation 180** Number Sense and Numeration **Grade 7** *Specific:* Determine, through investigation, the relationships among fractions, decimals, percents, and ratios. **Grade 8** *Specific:* Solve problems involving percent that arise from real-life contexts. **Grade 7&8** *Specific:* Use estimation when solving problems involving operations with whole numbers, decimals, percents, integers, and fractions, to help judge the reasonableness of a solution.	**Sparky's Leash** Number Sense and Numeration **Grade 7 & 8** *Specific:* Solve multi-step problems arising from real-life contexts and involving whole numbers and decimals, using a variety of tools and strategies. Measurement **Grade 7** *Specific:* Research and report on real-life applications of area measurements. **Grade 8** *Specific:* Solve problems that require conversions involving metric units of area, volume, and capacity.
Working with Numbers	**The Four 4's** Number Sense and Numeration **Grade 7** *Specific:* evaluate expressions that involve whole numbers and decimals, including expressions that contain brackets, using order of operations. **Grade 8** *Specific:* Evaluate expressions that involve integers, including expressions that contain brackets and exponents, using order of operations.	**Splat** Number Sense and Numeration **Grade 7** *Specific Expectations:* Use a variety of mental strategies to solve problems involving the addition and subtraction of fractions and decimals. *Specific Expectations:* Add and subtract fractions with simple like and unlike denominators, using a variety of tools and algorithms. **Grade 8** *Specific Expectations:* Solve problems involving addition, subtraction, multiplication, and division with simple fractions.	**Scientific Notation** Number Sense **Grade 8** *Specific:* express repeated multiplication using exponential notation; represent whole numbers in expanded form using powers of ten
Activities / Puzzles	**Area of each Shape** Number Sense and Numeration **Grade 7** *Specific:* Use a variety of mental strategies to solve problems involving the addition and subtraction of fractions and decimals. *Specific:* Add and subtract fractions with simple like and unlike denominators, using a variety of tools and algorithms. **Grade 8** *Specific:* Solve problems involving addition, subtraction, multiplication, and division with simple fractions.	**"Cows in the Classroom"** Patterning and Algebra **Grade 7** *Specific:* Evaluate algebraic expressions by substituting natural numbers for the variables. **Grade 8** *Specific:* Evaluate algebraic expressions with up to three terms, by substituting fractions, decimals, and integers for the variables.	**The Integers Card Game** Number Sense and Numeration **Grade 7** *Specific:* Add and subtract integers, using a variety of tools. **Grade 8** *Specific:* Represent the multiplication and division of integers, using a variety of tools. *Specific:* Solve problems involving operations with integers, using a variety of tools.
Problems	**The Ratio of Circumference to Diameter** Measurement **Grade 8** *Specific:* measure the circumference, radius, and diameter of circular objects, using concrete materials; determine, through investigation using a variety of tools (e.g., cans and string, dynamic geometry software) and strategies, the relationships for calculating the circumference and the area of a circle, and generalize to develop the formula for circumference and area; solve problems involving the estimation and calculation of the circumference and the area of a circle.	**What is the most common car colour?** Data Management **Grade 7 & 8** *Specific:* Collect data by conducting a survey or an experiment to do with themselves, their environment, issues in their school or community, or content from another subject and record observations or measurements; Collect and organize categorical, discrete, or continuous primary data and secondary data, and display the data in charts, tables, and graphs that have appropriate titles, labels, and scales, that suit the range and distribution of the data, using a variety of tools **Grade 7** *Specific:* Distinguish between a census and a sample from a population; Identify bias in data collection methods.	**Find the Surface Area** Measurement **Grade 7** *Specific:* Determine, through investigation using a variety of tools, the surface area of right prisms. *Specific:* Solve problems that involve the surface area and volume of right prisms and that require conversion between metric measures of capacity and volume.
Technology	**Similarity and Congruence** Geometry and Spatial Sense **Grade 7:** Specific: Distinguish between and compare similar shapes and congruent shapes, using a variety of tools and strategies. Specific: Demonstrate an understanding that enlarging or reducing two-dimensional shapes creates similar shapes.	**Gizmo- Unit Conversions** Measurement **Grade 7** *Specific:* solve problems that require conversion between metric units of measure (e.g., millimetres and centimetres, grams and kilograms, millilitres and litres) ; solve problems that require conversion between metric units of area (i.e., square centimetres, square metres). **Grade 7** *Specific: solve problems that require conversions involving metric units of area, volume, and capacity*	**Connect Three** Number Sense and Numeration **Grade 7** *Specific:* Add and subtract integers, using a variety of tools. **Grade 8** *Specific:* Solve problems involving operations with integers, using a variety of tools.