Name________________________________ Date ______________________

Number
Unit 1 Master 1

Hundred Chart

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

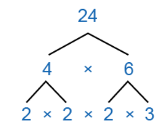
Number

Activity 1 Assessment
Investigating Prime Factorization

Prime Factorization and Powers		
Represents a number as a product of factors in different ways. 24 “I can think of 24 as 2 × 12, 4 × 6, or as 2 × 2 × 6.”	Identifies prime and composite numbers. “24 is a composite number because it has more than 2 factors. 23 is a prime number because it has only 2 factors, 1 and itself.”	Determines the prime factorization of a number. 24 4 × 6 2 × 2 × 2 × 3 “24 = 2 × 2 × 2 × 3”
Observations/Documentation		

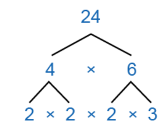
Activity 1 Assessment
Investigating Prime Factorization

Prime Factorization and Powers (cont'd)

Writes repeated multiplication of identical factors as a power and vice versa.	Rewrites prime factorization of a number using powers.	Flexibly uses prime factorization to identify common factors and divisibility.
$2 \times 2 \times 2 = 2^3$ $3^4 = 3 \times 3 \times 3 \times 3$ "In the power 2^3, 2 is the base and 3 is the exponent."	$24 = 2 \times 2 \times 2 \times 3$ "I can rewrite the prime factorization using powers: $24 = 2^3 \times 3$."	 "24 is divisible by 2, 3, 4, 6, $2 \times 2 \times 2$ or 8, and $2 \times 2 \times 3$ or 12."

Observations/Documentation

Activity 2 Assessment
Investigating Powers and Divisibility of Numbers

Prime Factorization and Powers		
Represents a number as a product of factors in different ways. 24 “I can think of 24 as 2 × 12, 4 × 6, or as 2 × 2 × 6.”	Identifies prime and composite numbers. “24 is a composite number because it has more than 2 factors. 23 is a prime number because it has only 2 factors, 1 and itself.”	Determines the prime factorization of a number.  “24 = 2 × 2 × 2 × 3”
Observations/Documentation		

Activity 2 Assessment

Investigating Powers and Divisibility of Numbers

Prime Factorization and Powers (cont'd)

Writes repeated multiplication of identical factors as a power and vice versa.

$2 \times 2 \times 2 = 2^3$
$3^4 = 3 \times 3 \times 3 \times 3$

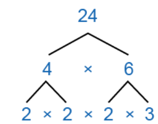
"In the power 2^3, 2 is the base and 3 is the exponent."

Rewrites prime factorization of a number using powers.

$24 = 2 \times 2 \times 2 \times 3$

"I can rewrite the prime factorization using powers: $24 = 2^3 \times 3$."

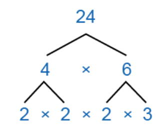
Flexibly uses prime factorization to identify common factors and divisibility.



"24 is divisible by 2, 3, 4, 6, $2 \times 2 \times 2$ or 8, and $2 \times 2 \times 3$ or 12."

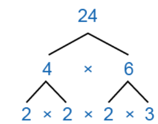
Observations/Documentation

Activity 3 Assessment
Number Relationships Consolidation

Prime Factorization and Powers		
Represents a number as a product of factors in different ways. 24 “I can think of 24 as 2 × 12, 4 × 6, or as 2 × 2 × 6.”	Identifies prime and composite numbers. “24 is a composite number because it has more than 2 factors. 23 is a prime number because it has only 2 factors, 1 and itself.”	Determines the prime factorization of a number.  “24 = 2 × 2 × 2 × 3”
Observations/Documentation		

Number

Activity 3 Assessment
Number Relationships Consolidation

Prime Factorization and Powers (cont'd)		
Writes repeated multiplication of identical factors as a power and vice versa. $2 \times 2 \times 2 = 2^3$ $3^4 = 3 \times 3 \times 3 \times 3$ "In the power 2^3, 2 is the base and 3 is the exponent."	Rewrites prime factorization of a number using powers. $24 = 2 \times 2 \times 2 \times 3$ "I can rewrite the prime factorization using powers: $24 = 2^3 \times 3$."	Flexibly uses prime factorization to identify common factors and divisibility.  "24 is divisible by 2, 3, 4, 6, 2 × 2 × 2 or 8, and 2 × 2 × 3 or 12."
Observations/Documentation		

Name________________________________ Date_____________________

Number
Unit 2 Line Master 1

Integer Situations

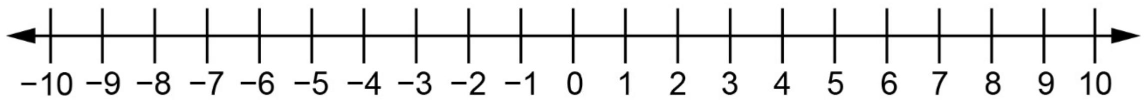
The temperature is 7°C above zero.	The car is parked 2 floors below ground level.
A student withdrew $5 from a bank account.	The golfer was 4 under par for the round.
The song dropped 1 position on the hit chart.	The barn swallow was flying at an altitude of 2 m above the ground.
The dancer took 3 steps backward.	The child deposited $6 into the piggy bank.
The student walked down 9 flights of stairs.	The item was on sale for $10 off.

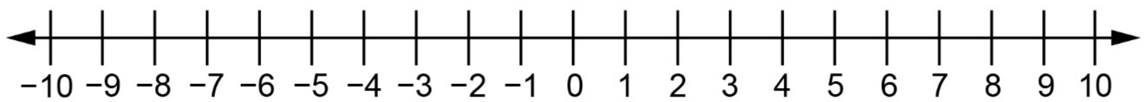
Name________________________________ Date_____________________

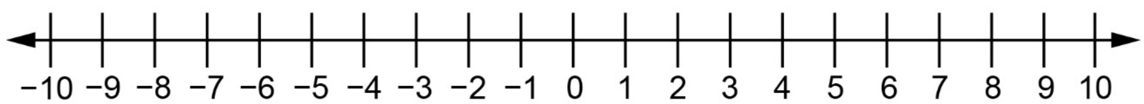
Number
Unit 2 Line Master 2a

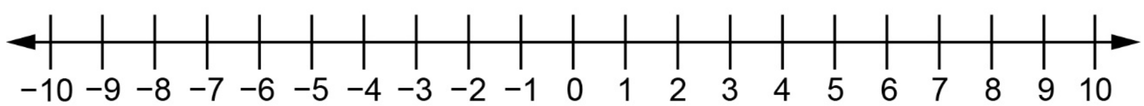
Number Lines (−10 to 10)

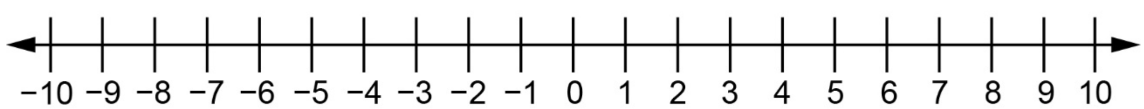
Horizontal

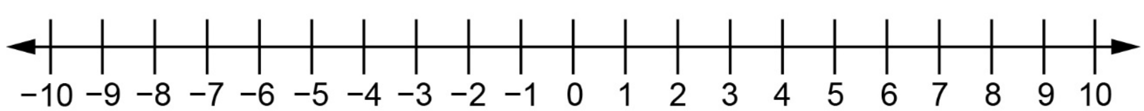










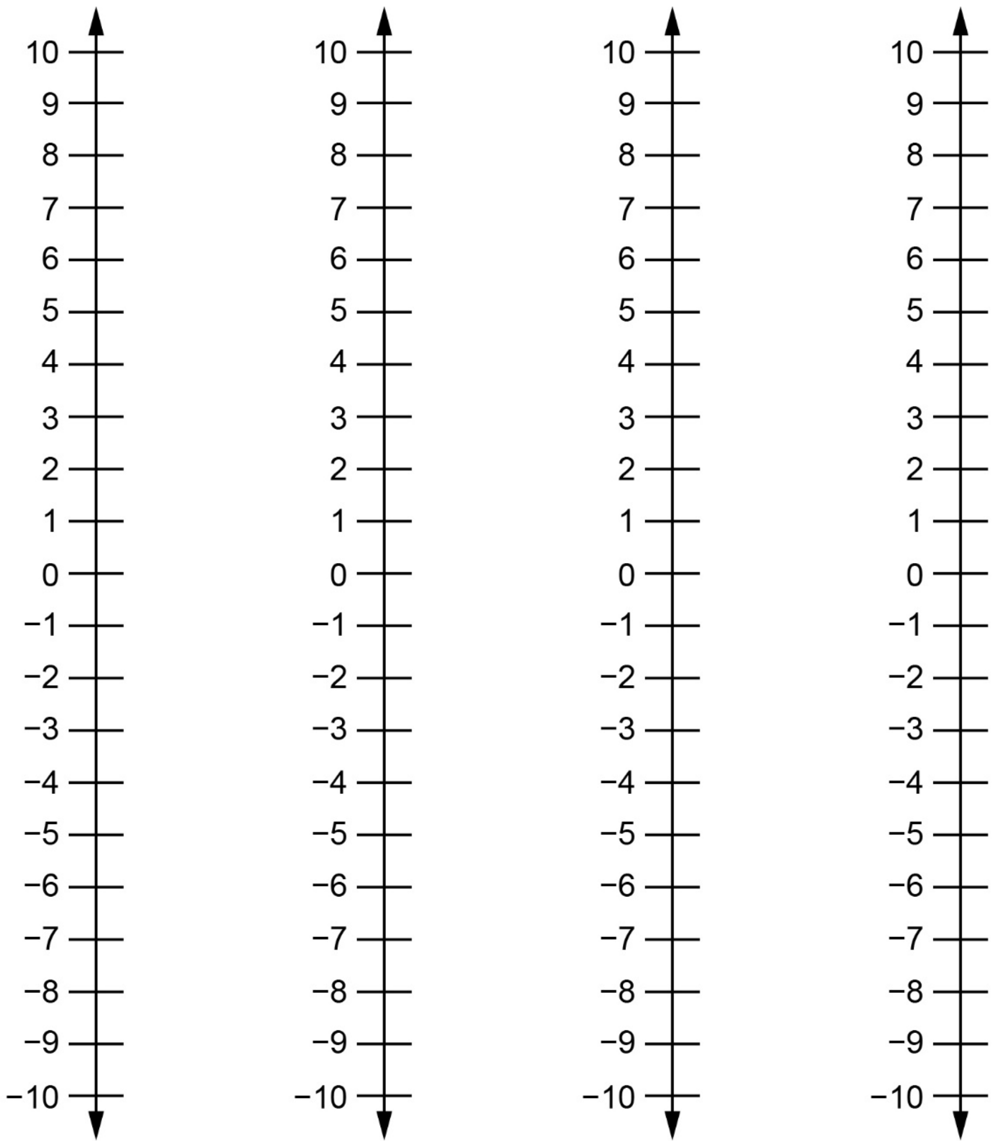


Name________________________________ Date_____________________

Number
Unit 2 Line Master 2b

Number Lines (−10 to 10)

Vertical



Name________________________________ Date_____________________

Number
Unit 2 Line Master 3a

Elevations Below Sea Level

Place	Country	Elevation (Below Sea Level)
Laguna del Carbon	Argentina	−105 m
Lake Eyre	Australia	−16 m
Baku	Azerbaijan	−28 m
Lake Assal	Djibouti	−153 m
Lake Enriquillo	Dominican Republic	−46 m
Allenby Bridge	Jordan–West Bank	−381 m
Dead Sea	Jordan–West Bank–Israel	−430 m
Atyrau Airport	Kazakhstan	−22 m
Badwater Basin, Death Valley, California	United States	−85 m
Jericho	West Bank	−258 m

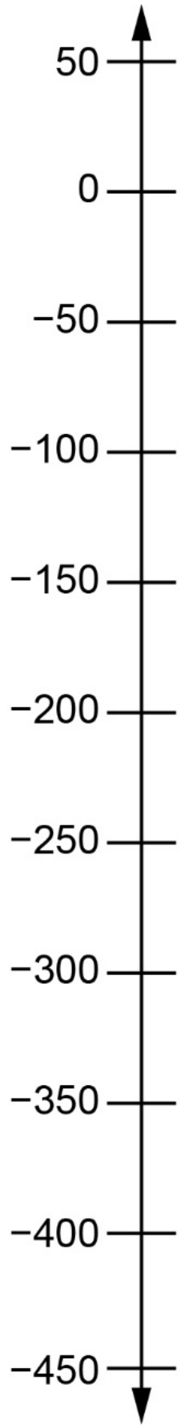
Source: https://en.wikipedia.org/wiki/List_of_places_on_land_with_elevations_below_sea_level

Name________________________________ Date_____________________

Number
Unit 2 Line Master 3b

Elevations Below Sea Level

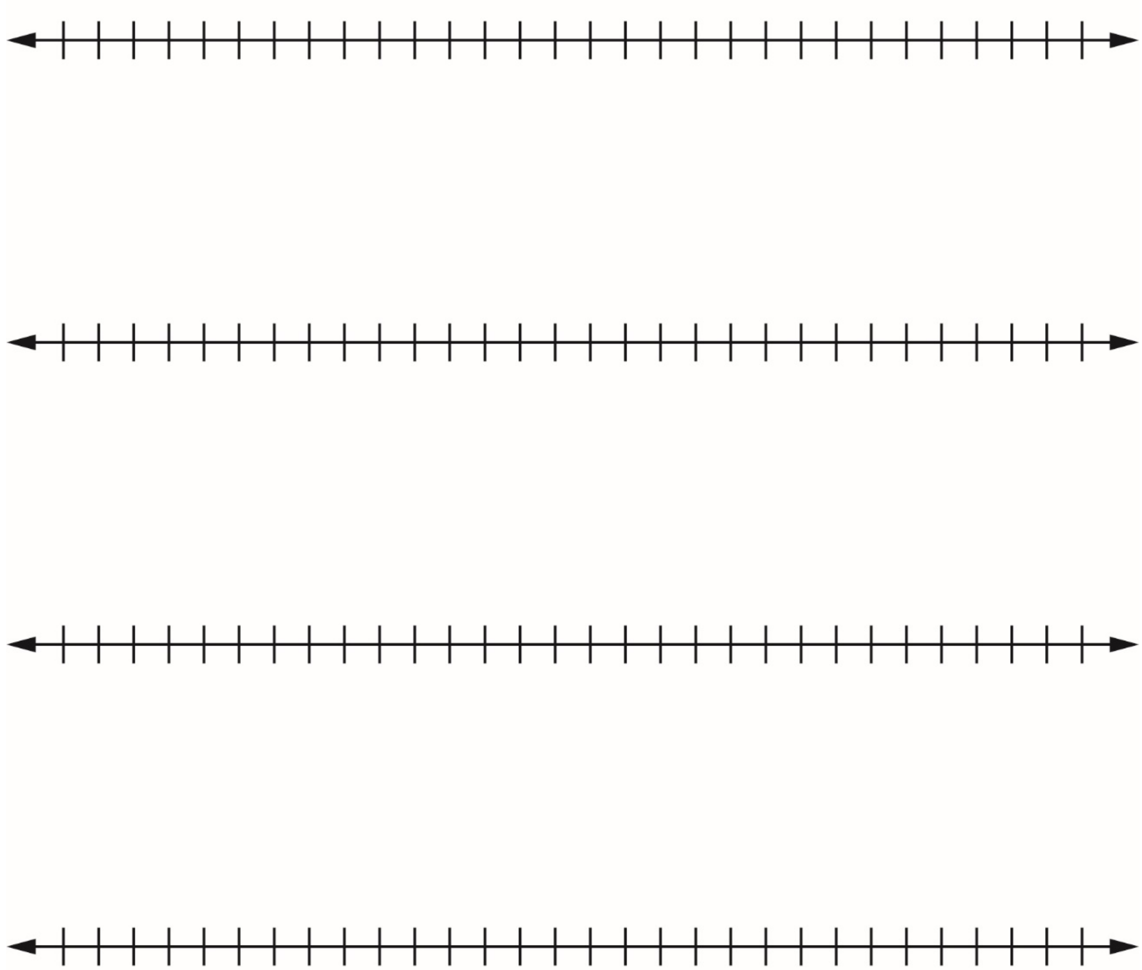
Number Line



Name________________________________ Date_____________________

Number
Unit 2 Line Master 4a

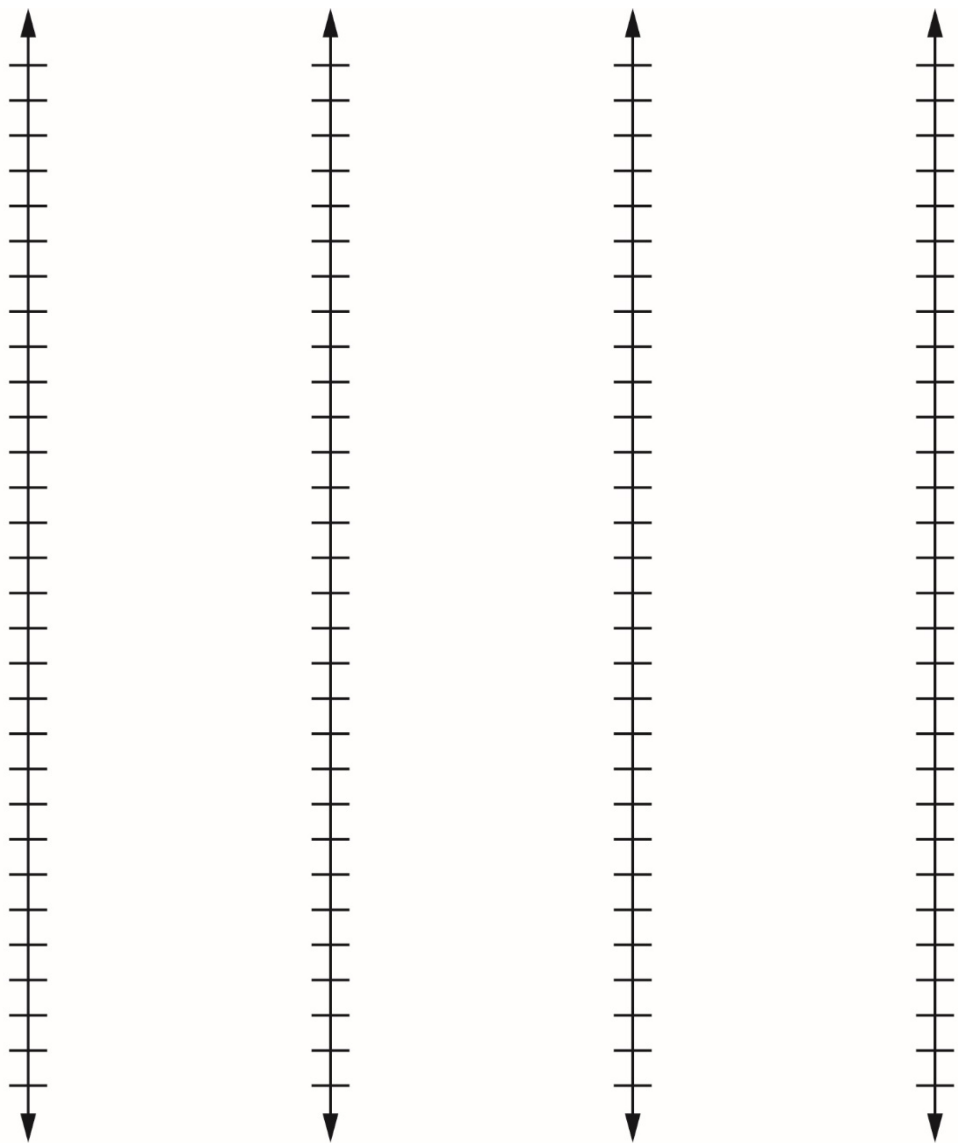
Number Lines 1



Name________________________________ Date_____________________

Number
Unit 2 Line Master 4b

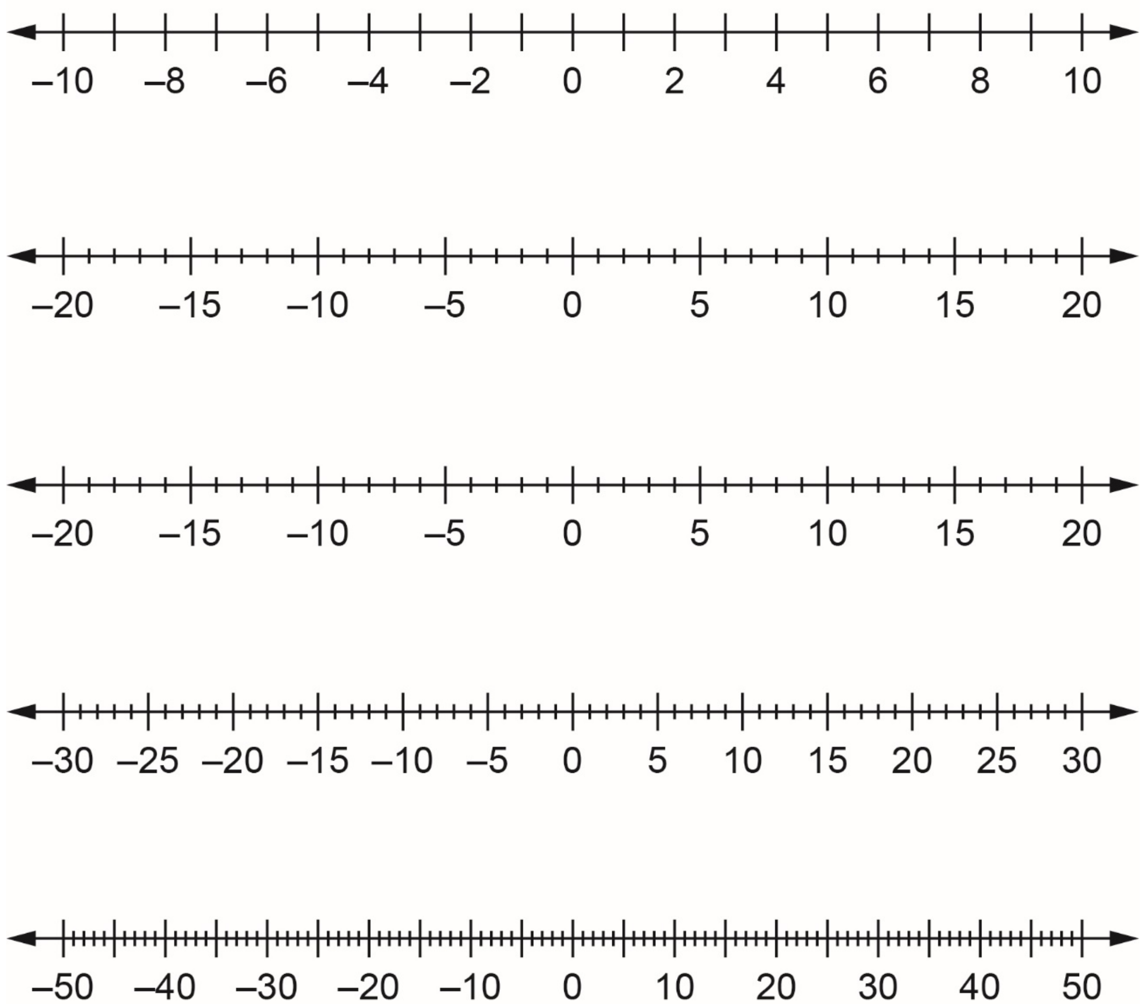
Number Lines 2



Name________________________________ Date_____________________

Number
Unit 2 Line Master 4c

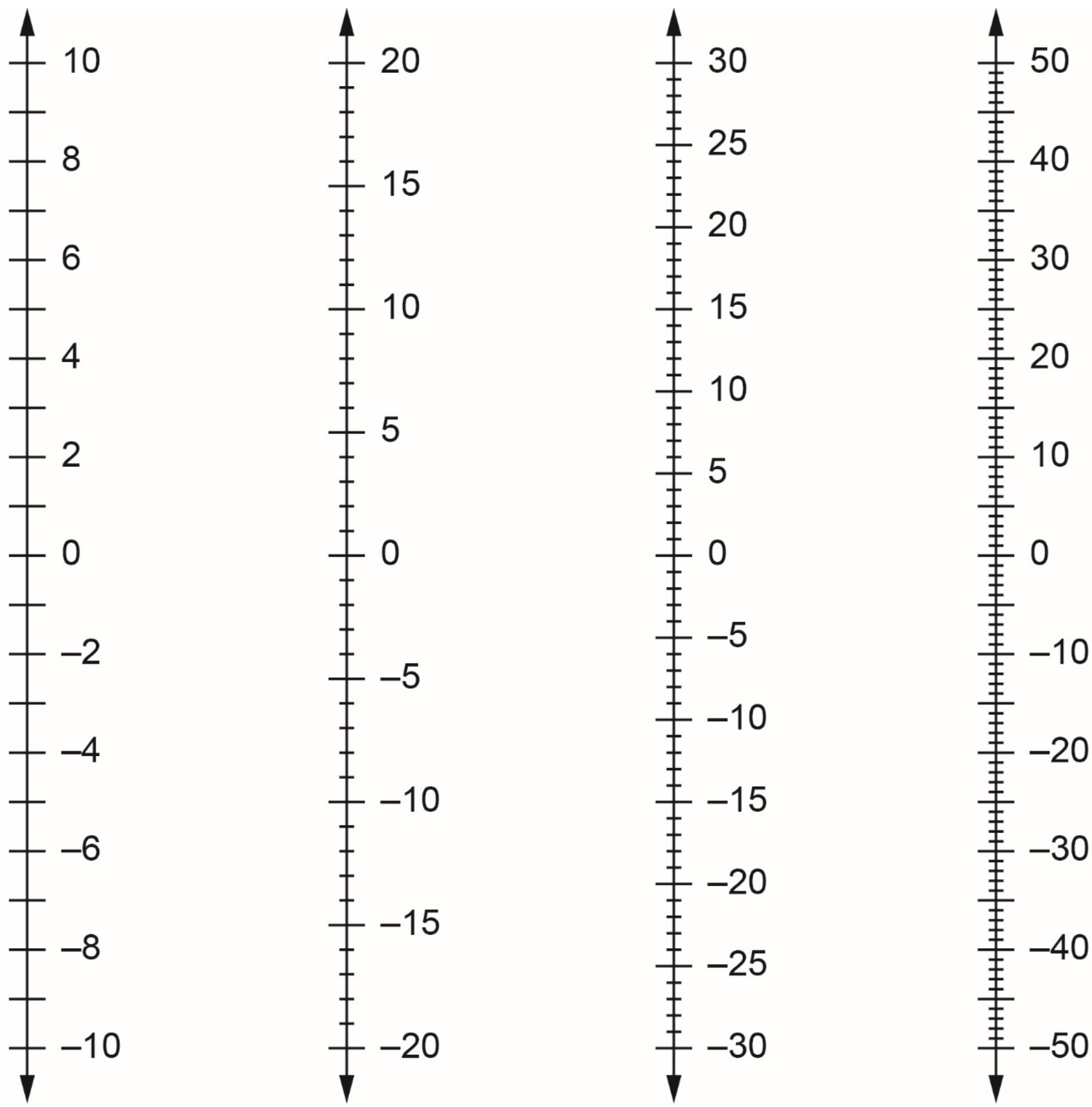
Number Lines 3



Name________________________________ Date_____________________

Number
Unit 2 Line Master 4d

Number Lines 4



Name________________________________ Date_____________________

Number
Unit 2 Master 5a

Track and Field Relay Race Cards

Representing Situations

Represent this situation with an integer. **You go up 6 floors in an elevator.**	Represent this situation with an integer. **You climb down 5 rungs on a ladder.**
Represent this situation with an integer. **The temperature drops 7°C.**	Represent this situation with an integer. **You borrow $5 from a friend.**
Represent this situation with an integer. **You deposit $20 in your account.**	Represent this situation with an integer. **The kite is 50 m above the ground.**
Represent this situation with an integer. **You dove 15 m below sea level.**	Represent this situation with an integer. **You earned $15 cutting grass.**
Represent this situation with an integer. **You spent $12 at the movies.**	Represent this situation with an integer. **You withdrew $10 from your account.**

Name________________________________ Date_____________________

Number
Unit 2 Master 5b

Track and Field Relay Race Cards

Comparing Integers

Use < or > to compare. **+8 ____ –3**	Use < or > to compare. **–6 ____ –9**
Use < or > to compare. **3 ____ 18**	Use < or > to compare. **–19 ____ –10**
Use < or > to compare. **+12 ____ –5**	Use < or > to compare. **–2 ____ –12**
Use < or > to compare. **0 ____ –16**	Use < or > to compare. **+6 ____ –6**
Use < or > to compare. **+7 ____ –5**	Use < or > to compare. **–1 ____ 1**

Name________________________________ Date_____________________

Number
Unit 2 Master 5c

Track and Field Relay Race Cards
Ordering Integers

Order from least to greatest. **–6, 8, 0**	Order from least to greatest. **–8, –10, –6**
Order from least to greatest. **+5, –5, –1**	Order from least to greatest. **+19, –18, –17**
Order from least to greatest. **–3, 8, –7**	Order from greatest to least. **–15, 11, 5**
Order from greatest to least. **–24, 15, 3**	Order from greatest to least. **–6, 19, 0**
Order from greatest to least. **–2, 13, –14, 0**	Order from greatest to least. **17, –13, 9, –4**

Name________________________________ Date_____________________

Number
Unit 2 Master 5d

Track and Field Relay Race Cards
Adding Integers

Add. **$-7 + 3$**	Add. **$-3 + 2$**
Add. **$-13 + (-7)$**	Add. **$-12 + (-8)$**
Add. **$5 + (-5)$**	Add. **$6 + (-8)$**
Add. **$-4 + (-6)$**	Add. **$+5 + 3$**
Add. **$-18 + (-11)$**	Add. **$29 + (-12)$**

Name________________________________ Date_____________________

Number
Unit 2 Master 5e

Track and Field Relay Race Cards

Pass the Baton Cards: Team Questions

–6 and +6 is an example of what type of pair? Resume play if answered correctly. If incorrect, each player moves back 2 spaces.	**Provide 3 examples of integers used in daily life.** Resume play if answered correctly. If incorrect, each player moves back 2 spaces.
The temperature increased by 7°C to 19°C. What was the starting temperature? Resume play if answered correctly. If incorrect, each player moves back 2 spaces.	**Provide 3 pairs of integers that have a sum of 0.** Resume play if answered correctly. If incorrect, each player moves back 2 spaces.
You have $15 in the bank. You withdraw $5 and deposit $8. What is your balance? Resume play if answered correctly. If incorrect, each player moves back 2 spaces.	**The temperature was –3°C. It rose 15°C, then fell 7°C. What was the final temperature?** Resume play if answered correctly. If incorrect, each player moves back 2 spaces.
What is the additive inverse of each of these numbers? **–12, +9, –27** Resume play if answered correctly. If incorrect, each player moves back 2 spaces.	**Write this difference as a sum, then find the sum.** **–13 – 9** Resume play if answered correctly. If incorrect, each player moves back 2 spaces.

Name________________________________ Date_____________________

Number
Unit 2 Master 5f

Track and Field Relay Race Cards
Blank Cards

Represent this situation with an integer. Move Ahead One Space if Correct.	Represent this situation with an integer. Move Ahead One Space if Correct.
Use < or > to compare. Move Ahead One Space if Correct.	Use < or > to compare. Move Ahead One Space if Correct.
Order from least to greatest. Move Ahead One Space if Correct.	Order from least to greatest. Move Ahead One Space if Correct.
Add. Move Ahead One Space if Correct.	Add. Move Ahead One Space if Correct.
Resume play if answered correctly. If incorrect, each player moves back 2 spaces.	Resume play if answered correctly. If incorrect, each player moves back 2 spaces.

Name________________________________ Date_____________________

Number
Unit 2 Master 6

Track and Field Relay Race
Gameboard

Number

Activity 4 Assessment

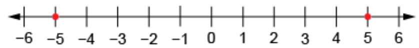
Representing Integers

Exploring Integers

Describes integers in terms of a positive or negative distance from zero.

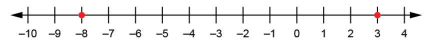
"–5 is 5 units to the left of 0
on a horizontal number line.
+3 is 3 units to the right of 0."

Understands that an integer and its opposite are the same distance from zero but on opposite sides of zero.



"Negative 5 is the same distance
from zero as positive 5."

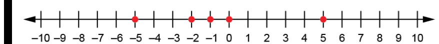
Recognizes that the value of negative numbers decreases as the number of digits increases.



"−8 is less than +3
because it is less than zero:
−8 < 3."

Compares and orders positive and negative integers.

−5, 0, −2, 5, −1

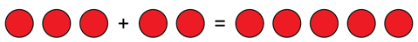
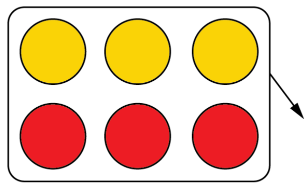
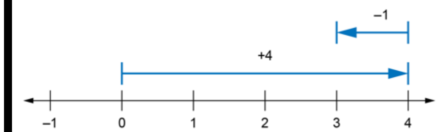


"From least to greatest:
−5, −2, −1, 0, 5"

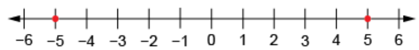
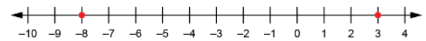
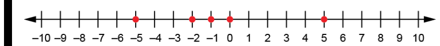
Observations/Documentation

Number

Activity 4 Assessment
Representing Integers

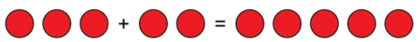
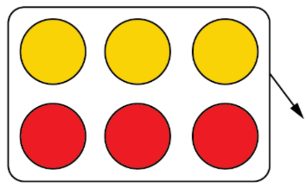
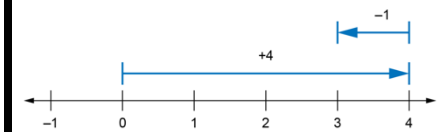
Exploring Integers (cont'd)			
Adds integers with like signs concretely or pictorially (e.g., using counters or number lines).  –3 + (–2) = –5 "The sum of two negative integers is negative."	Recognizes that the sum of a number and its additive inverse is 0.  –3 + (+3) = 0 "Adding an integer and its opposite gives 0."	Adds integers with different signs concretely (e.g., using counters and zero pairs or number lines).  4 + (–1) = 3 "I moved right to model +4, then left to model –1. I ended up at +3."	Flexibly adds integers and solves addition story problems. –6 + 2 "I think of it as the sum of 0 and another integer." –6 + 2 = (–4 + (–2)) + 2 = –4 + (–2 + 2) = –4 + 0 = –4
Observations/Documentation			

Activity 5 Assessment
Comparing and Ordering Integers

Exploring Integers			
Describes integers in terms of a positive or negative distance from zero. “–5 is 5 units to the left of 0 on a horizontal number line. +3 is 3 units to the right of 0.”	Understands that an integer and its opposite are the same distance from zero but on opposite sides of zero.  “Negative 5 is the same distance from zero as positive 5.”	Recognizes that the value of negative numbers decreases as the number of digits increases.  “−8 is less than +3 because it is less than zero: −8 < 3.”	Compares and orders positive and negative integers. −5, 0, −2, 5, −1  “From least to greatest: −5, −2, −1, 0, 5”
Observations/Documentation			

Number

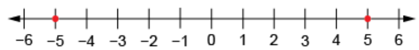
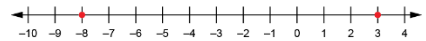
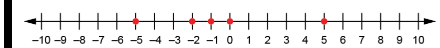
Activity 5 Assessment
Comparing and Ordering Integers

Exploring Integers (cont'd)			
Adds integers with like signs concretely or pictorially (e.g., using counters or number lines).  –3 + (–2) = –5 "The sum of two negative integers is negative."	Recognizes that the sum of a number and its additive inverse is 0.  –3 + (+3) = 0 "Adding an integer and its opposite gives 0."	Adds integers with different signs concretely (e.g., using counters and zero pairs or number lines).  4 + (–1) = 3 "I moved right to model +4, then left to model –1. I ended up at +3."	Flexibly adds integers and solves addition story problems. –6 + 2 "I think of it as the sum of 0 and another integer." –6 + 2 = (–4 + (–2)) + 2 = –4 + (–2 + 2) = –4 + 0 = –4
Observations/Documentation			

Number

Activity 6 Assessement
Investigating Addition with Integers

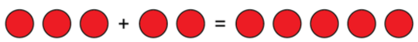
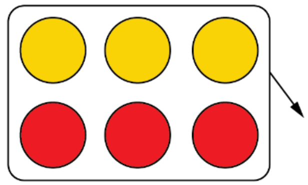
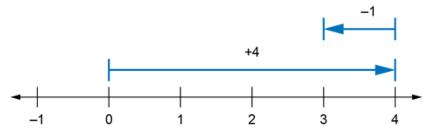
Exploring Integers

Describes integers in terms of a positive or negative distance from zero.	Understands that an integer and its opposite are the same distance from zero but on opposite sides of zero.	Recognizes that the value of negative numbers decreases as the number of digits increases.	Compares and orders positive and negative integers.
"–5 is 5 units to the left of 0 on a horizontal number line. +3 is 3 units to the right of 0."	 "Negative 5 is the same distance from zero as positive 5."	 "−8 is less than +3 because it is less than zero: −8 < 3."	−5, 0, −2, 5, −1  "From least to greatest: −5, −2, −1, 0, 5"

Observations/Documentation

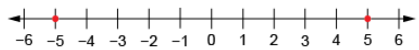
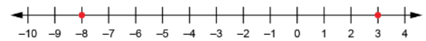
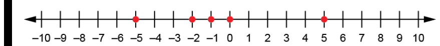
Activity 6 Assessment

Investigating Addition with Integers

Exploring Integers (cont'd)			
Adds integers with like signs concretely or pictorially (e.g., using counters or number lines).  $-3 + (-2) = -5$ "The sum of two negative integers is negative."	Recognizes that the sum of a number and its additive inverse is 0.  $-3 + (+3) = 0$ "Adding an integer and its opposite gives 0."	Adds integers with different signs concretely (e.g., using counters and zero pairs or number lines).  $4 + (-1) = 3$ "I moved right to model +4, then left to model –1. I ended up at +3."	Flexibly adds integers and solves addition story problems. $-6 + 2$ "I think of it as the sum of 0 and another integer." $-6 + 2 = (-4 + (-2)) + 2$ $= -4 + (-2 + 2)$ $= -4 + 0$ $= -4$
Observations/Documentation			

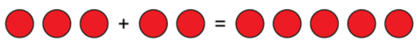
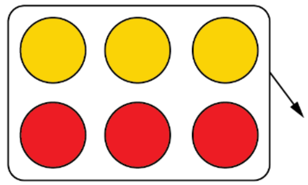
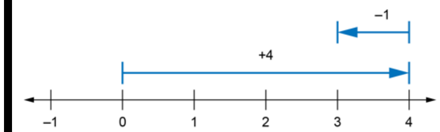
Number

Activity 7 Assessment
Consolidating Integers

Exploring Integers			
Describes integers in terms of a positive or negative distance from zero. "–5 is 5 units to the left of 0 on a horizontal number line. +3 is 3 units to the right of 0."	Understands that an integer and its opposite are the same distance from zero but on opposite sides of zero.  "Negative 5 is the same distance from zero as positive 5."	Recognizes that the value of negative numbers decreases as the number of digits increases.  "−8 is less than +3 because it is less than zero: −8 < 3."	Compares and orders positive and negative integers. −5, 0, −2, 5, −1  "From least to greatest: −5, −2, −1, 0, 5"
Observations/Documentation			

Number

Activity 7 Assessment
Consolidating Integers

Exploring Integers (cont'd)			
Adds integers with like signs concretely or pictorially (e.g., using counters or number lines).  –3 + (–2) = –5 "The sum of two negative integers is negative."	Recognizes that the sum of a number and its additive inverse is 0.  –3 + (+3) = 0 "Adding an integer and its opposite gives 0."	Adds integers with different signs concretely (e.g., using counters and zero pairs or number lines).  4 + (–1) = 3 "I moved right to model +4, then left to model –1. I ended up at +3."	Flexibly adds integers and solves addition story problems. –6 + 2 "I think of it as the sum of 0 and another integer." –6 + 2 = (–4 + (–2)) + 2 = –4 + (–2 + 2) = –4 + 0 = –4
Observations/Documentation			

Name________________________________ Date_____________________

Number
Unit 3 Line Master 1a

Electricity Usage

Appliance	On-Time per day	On-Time per day (decimal)	On-Time per day (fraction)	On-Time per day (%)
Bathroom lighting	2 h 57 min		$\frac{12}{100}$	
Cooking stove, ventilation	2 h 12 min	0.09		
Dishwasher	1 h 7 min			5%
Floor heating	4 h 5 min			17%
Iron, vacuum cleaner	2 h 2 min		$\frac{8}{100}$	
Lighting	7 h 58 min	0.33		
Refrigerator	15 h 36 min		$\frac{65}{100}$	
TV, modem, PC, video	12 h 42 min			53%
Washing machine	32 min	0.02		
Water heater	5 h 46 min		$\frac{24}{100}$	

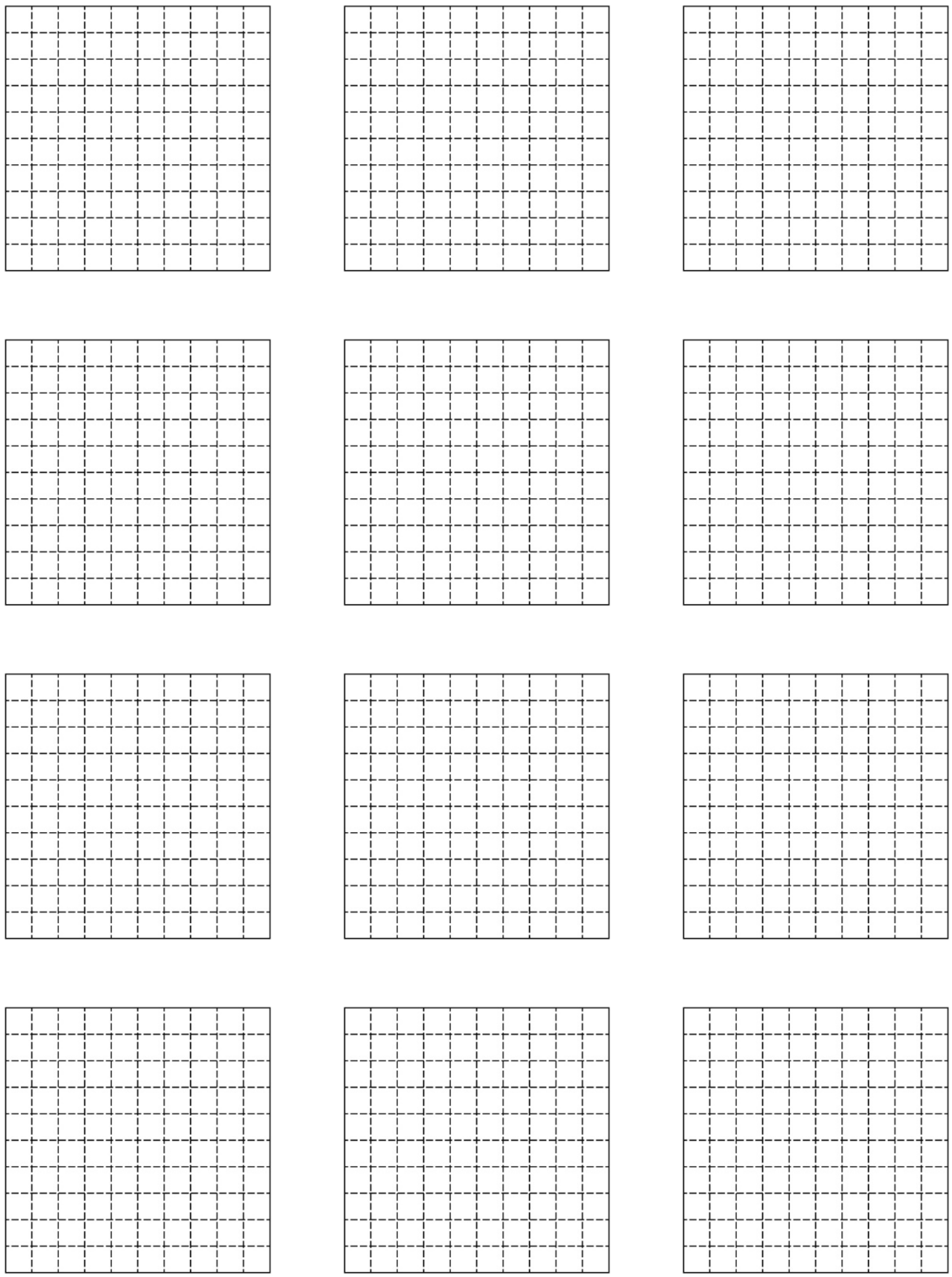
Source: https://www.researchgate.net/figure/Operation-times-and-energy-consumption-of-home-appliances_tbl1_268406195

Name________________________________ Date_____________________

Number
Unit 3 Line Master 1b

Electricity Usage

Grids



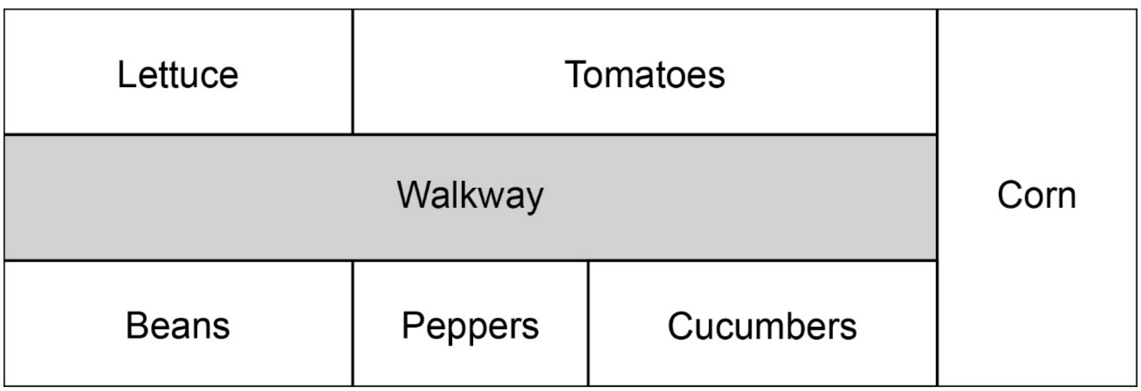
Name________________________________ Date_____________________

Number
Unit 3 Line Master 2a

Centre Tasks

Centre A: The Garden (Representing Fractions)

The residents of an apartment building decided to make a rectangular community garden.
Their design is shown below.
The walkway is part of the garden.
What fraction of the garden does each type of vegetable cover?
Explain.



Name________________________________ Date_____________________

Number
Unit 3 Line Master 2b

Centre Tasks (cont'd)

Centre B: Planting Seeds (Comparing Fractions)

Seeds come in small packages, with different numbers of seeds in each, depending on the type of vegetable.

This table shows the fraction of the garden each package of seeds will cover.

Vegetable	Lettuce	Tomatoes	Corn	Peppers	Cucumbers	Beans
Fraction of garden covered with 1 package of seeds	$\frac{1}{9}$	$\frac{1}{9}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{3}$

Use the fractions you identified in Centre A. Determine how many packages of each seed the gardeners should buy.

Name________________________________ Date_____________________

Number
Unit 3 Line Master 2c

Centre Tasks (cont'd)

Centre C: Tending to the Garden (Working with Percents)

These tasks need to be completed daily to maintain the garden.

Task	**Time (h)**
Watering	2
Weeding	4
Fertilizing	0.5
Pruning	1
Maintenance of Walkway	1
Picking/Cleaning Crop	1.5

The gardeners want to divide up the tasks equally.
To do this, they would like a visual that shows
each time as a percent of the total daily time: 10 h.
Create a visual to help the gardeners.

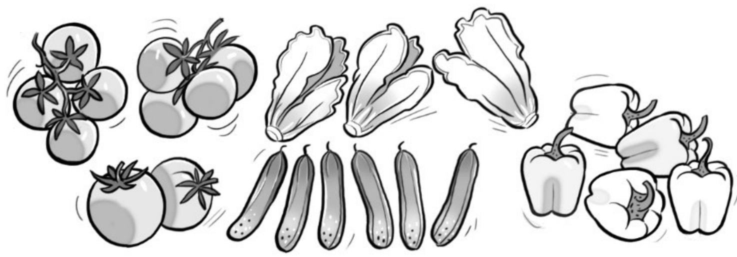
Name________________________________ Date_____________________

Number
Unit 3 Line Master 2d

Centre Tasks (cont'd)

Centre D: Harvesting Vegetables (Fractions of a Set)

One day in mid-August, 24 vegetables were harvested from the garden.
Here is the harvest:



- Show each type of vegetable as a fraction of the whole harvest for that day.
- Order the fractions from least to greatest.
- Create a visual to show the harvest.
  Partition the rectangle to show the harvest of each type of vegetable.

Today's Harvest

Name________________________________ Date_____________________

Number
Unit 3 Line Master 2e

Centre Tasks (cont'd)

Centre E: Applying Fertilizer (Relating Fractions, Decimals, and Percents)

The gardeners want to use an organic fertilizer that is high in nitrogen and low in potash. Here are their options.

Natural Nutrients Fertilizer	Greener Growers Fertilizer	Perfect Plants Fertilizer
Nitrogen: $\frac{1}{5}$	Nitrogen: 0.15	Nitrogen: 5%
Phosphate: $\frac{1}{10}$	Phosphate: 0.2	Phosphate: 10%
Potash: $\frac{1}{20}$	Potash: 0.05	Potash: 5%

- Which fertilizer best matches their needs?
- For the chosen fertilizer, express the value of each chemical as:
  - a fraction
  - a decimal
  - a percent
- Identify the fertilizer that has the most phosphate.
  Show your thinking.

Name______________________________ Date____________________

Number
Unit 3 Line Master 2f

Centre Tasks (cont'd)

Centre F: Selling the Harvest (Ratios and Rates)

The gardeners decide to sell some of their harvest at the local farmer's market.

- One week they harvest 50 tomatoes, and 20 peppers.
  What is the ratio of tomatoes to peppers? peppers to tomatoes?
- The second week, their harvest of tomatoes and peppers is double the first week. The third week, the harvest is half the first week.
  Write equivalent ratios to represent the numbers of tomatoes and peppers each week.

They package some of their produce into bunches to sell at the market.

- They sell 3 peppers for $3.60. How much does one pepper cost?
- One cucumber costs 75¢. How much does it cost for 5 cucumbers?
- A 2 kg basket of tomatoes sells for $6.00.
  What is the cost for a 1 kg basket? A 10 kg basket?

Name________________________________ Date_____________________

Number
Unit 3 Line Master 2g

Centre Tasks (cont'd)

Answers

Centre A:

Lettuce: $\frac{2}{18}$ or $\frac{1}{9}$; Tomatoes: $\frac{3}{18}$ or $\frac{1}{6}$; Corn: $\frac{3}{18}$ or $\frac{1}{6}$;
Cucumbers: $\frac{2}{18}$ or $\frac{1}{9}$; Peppers: $\frac{1}{18}$; Beans: $\frac{2}{18}$ or $\frac{1}{9}$

Centre B:

Lettuce: 1 package; Tomatoes: 2 packages; Corn: 1 package;
Cucumbers: 1 package; Peppers: 1 package; Beans: 1 package

Centre C:

Visual to show: Watering: 20%; Weeding: 40%; Fertilizing: 5%;
Pruning: 10%; Maintenance of Walkway: 10%;
Picking/Cleaning Crop: 15%

Centre D:

Tomatoes: $\frac{10}{24}$, or $\frac{5}{12}$; Cucumbers: $\frac{6}{24}$, or $\frac{1}{4}$; Lettuce: $\frac{3}{24}$, or $\frac{1}{8}$;
Peppers: $\frac{5}{24}$;

Least to greatest: $\frac{1}{8}$, $\frac{5}{24}$, $\frac{1}{4}$, $\frac{5}{12}$

Today's Harvest

T	T	T
T	T	T
T	T	T
T	C	C
C	C	C
C	L	L
L	P	P
P	P	P

Name________________________________ Date_____________________

Number
Unit 3 Line Master 2h

Centre Tasks (cont'd)

Answers

Centre E: Natural Nutrients Fertilizer; Nitrogen: $\frac{1}{5}$, 0.2, 20%;

Phosphate: $\frac{1}{10}$, 0.1, 10%; Potash: $\frac{1}{20}$; 0.05, 5%;

Greener Growers Fertilizer; 20%.

Centre F:

Tomatoes: Peppers
50:20 = 5:2
Peppers: Tomatoes
20:50 = 2:5

Week 2:
50:20 = 100:40
They harvest 100 tomatoes and 40 peppers in week 2.
Week 3:
50:20 = 25:10
They harvest 50 tomatoes and 10 peppers in week 3.

$\frac{\$3.60}{3} = \frac{\$1.20}{1}$ Divide numerator and denominator by 3.
One pepper costs $1.20.

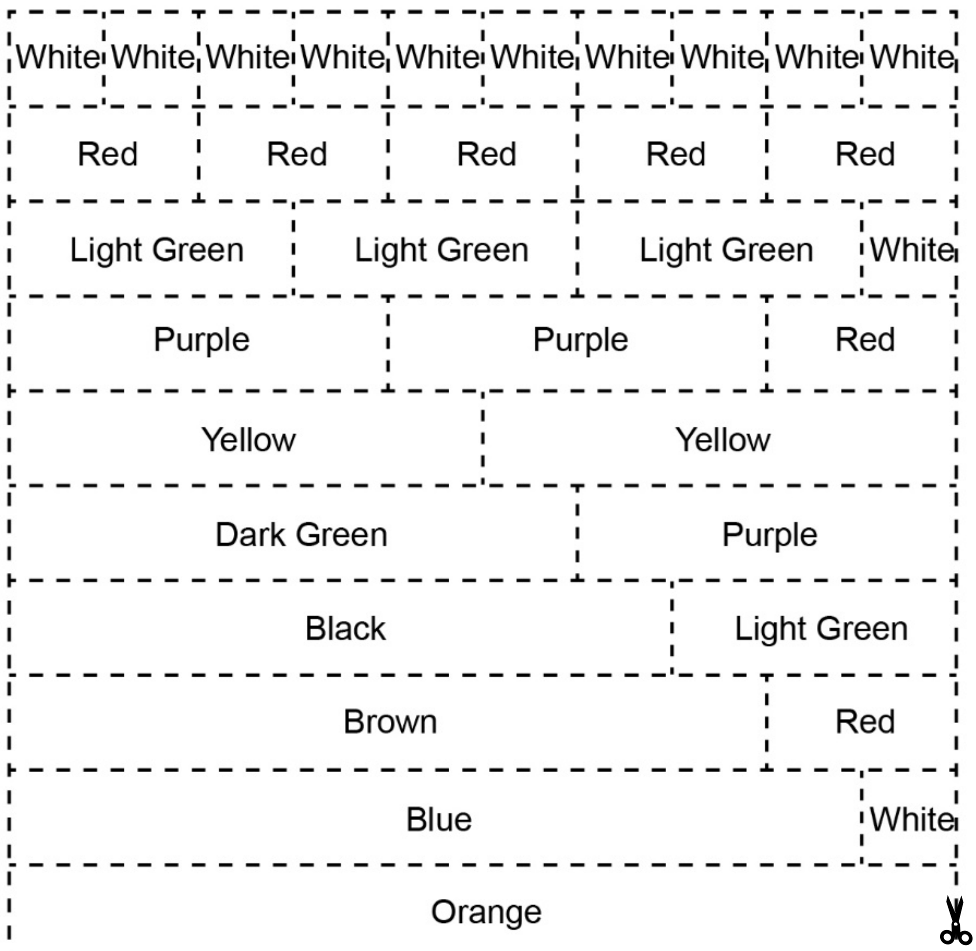
80¢ is the same as $0.80
$\frac{\$0.80}{1} = \frac{\$4.00}{5}$ Multiply numerator and denominator by 5.
Five cucumbers cost $4.00.

$\frac{\$6.00}{2} = \frac{\$3.00}{1}$ $\frac{\$3.00}{1} = \frac{\$30.00}{10}$
A 1 kg basket of tomatoes costs $3.00.
A 10 kg basket of tomatoes costs $30.00.

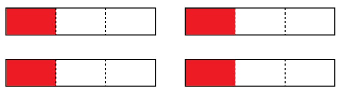
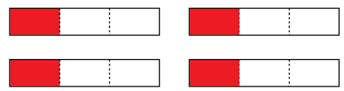
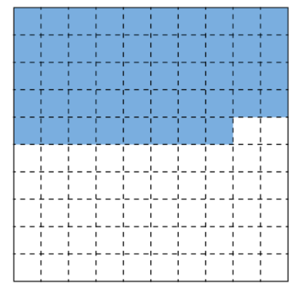
Name________________________________ Date_____________________

Number
Unit 3 Line Master 3

Relational Rods



Activity 8 Assessment
Relating Fractions to Quotients

Relating Fractions, Decimals, Percents, Ratios, and Rates			
Describes an equal-sharing situation using a fraction.  "To share 4 granola bars among 3 friends, I draw a picture that shows 4 wholes each divided into thirds."	Describes a fraction as a division statement and vice versa.  "To share 4 granola bars among 3 friends, I can write the division statement $4 \div 3$ or I can write a fraction $\frac{4}{3}$. The picture shows 4 wholes each divided into thirds. Each person gets 3 thirds and one more third or $1\frac{1}{3}$."	Makes connections between fractions, decimals, and percents.  "I see forty-eight hundredths, which is the same as 0.48 or $\frac{48}{100}$. Since percent is 'out of 100', it can also be thought of as 48% of something."	Determines the percent of a number. "I can determine 12% of 40 by multiplying 40 by 12 and dividing by 100." $40 \times 12 \div 100 = 480 \div 100$ $= 4.8$
Observations/Documentation			

Number

Activity 8 Assessment
Relating Fractions to Quotients

Relating Fractions, Decimals, Percents, Ratios, and Rates (cont'd)

Relates percent of a number to ratios and proportions.

"In the expression 12% of 50,
12% represents $\frac{12}{100}$.
I can use equivalent ratios to determine what 12% is of 50.

$$\frac{12}{100} = \frac{6}{50}$$

I divide the denominator by 2 to get 50. So, I divide the numerator by 2 to get 6."

Represents and records ratios and rates symbolically (using ratio table).

10 glue sticks cost $4.
How much will 60 glue sticks cost?

For example, using rates:

Glue Sticks	10	20	30	40	50	60
Cost ($)	4	8	12	16	20	24

"I skip-counted by 10s and 4s."

Represents and creates equivalent ratios and rates.

10 glue sticks cost $4.
How much will 60 glue sticks cost?

For example, using ratios:

"The ratio of glue sticks to cost is 10:4. To find the cost of 60 glue sticks, I multiply each term by 6."

$10 \times 6 : 4 \times 6$

60:24

Flexibly solves problems involving fractions, decimals, percents, ratios, and rates.

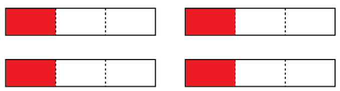
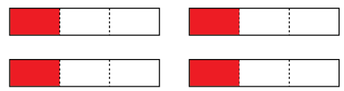
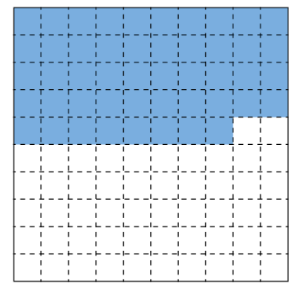
The ratio of dogs to cats in the animal shelter is 8:12. Show the comparison using percents.

"The whole is 8 + 12 = 20.
Since percent is "out of 100",
I multiply each term in the ratio by 5 because $5 \times 20 = 100$.
$8 \times 5 : 12 \times 5$, or 40:60
40% of the animals are dogs and 60% are cats."

Observations/Documentation

Number

Activity 9 Assessment
Relating Fractions, Decimals, and Percents

Relating Fractions, Decimals, Percents, Ratios, and Rates			
Describes an equal-sharing situation using a fraction.  "To share 4 granola bars among 3 friends, I draw a picture that shows 4 wholes each divided into thirds."	Describes a fraction as a division statement and vice versa.  "To share 4 granola bars among 3 friends, I can write the division statement 4 ÷ 3 or I can write a fraction $\frac{4}{3}$. The picture shows 4 wholes each divided into thirds. Each person gets 3 thirds and one more third or $1\frac{1}{3}$."	Makes connections between fractions, decimals, and percents.  "I see forty-eight hundredths, which is the same as 0.48 or $\frac{48}{100}$. Since percent is 'out of 100', it can also be thought of as 48% of something."	Determines the percent of a number. "I can determine 12% of 40 by multiplying 40 by 12 and dividing by 100." $40 \times 12 \div 100 = 480 \div 100$ $= 4.8$
Observations/Documentation			

Number

Activity 9 Assessment

Relating Fractions, Decimals, and Percents

<table>
<tr><th colspan="4">Relating Fractions, Decimals, Percents, Ratios, and Rates (cont'd)</th></tr>
<tr>
<td>Relates percent of a number to ratios and proportions.

"In the expression 12% of 50, 12% represents $\frac{12}{100}$.
I can use equivalent ratios to determine what 12% is of 50.

$\frac{12}{100} = \frac{6}{50}$

I divide the denominator by 2 to get 50. So, I divide the numerator by 2 to get 6."</td>
<td>Represents and records ratios and rates symbolically (using ratio table).

10 glue sticks cost $4.
How much will 60 glue sticks cost?

For example, using rates:
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"I skip-counted by 10s and 4s."</td>
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10 glue sticks cost $4.
How much will 60 glue sticks cost?

For example, using ratios:

"The ratio of glue sticks to cost is 10:4. To find the cost of 60 glue sticks, I multiply each term by 6."

$10 \times 6:4 \times 6$
60:24</td>
<td>Flexibly solves problems involving fractions, decimals, percents, ratios, and rates.

The ratio of dogs to cats in the animal shelter is 8:12. Show the comparison using percents.

"The whole is 8 + 12 = 20.
Since percent is "out of 100",
I multiply each term in the ratio by 5 because 5 × 20 = 100.
8 × 5:12 × 5, or 40:60
40% of the animals are dogs and 60% are cats."</td>
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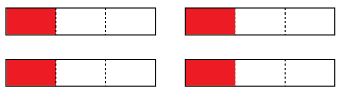
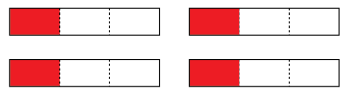
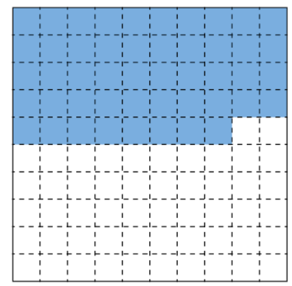
</table>

Number

Activity 10 Assessment
Equivalent Ratios and Rates

Relating Fractions, Decimals, Percents, Ratios, and Rates

Describes an equal-sharing situation using a fraction.	Describes a fraction as a division statement and vice versa.	Makes connections between fractions, decimals, and percents.	Determines the percent of a number.
 "To share 4 granola bars among 3 friends, I draw a picture that shows 4 wholes each divided into thirds."	 "To share 4 granola bars among 3 friends, I can write the division statement 4 ÷ 3 or I can write a fraction $\frac{4}{3}$. The picture shows 4 wholes each divided into thirds. Each person gets 3 thirds and one more third or $1\frac{1}{3}$."	 "I see forty-eight hundredths, which is the same as 0.48 or $\frac{48}{100}$. Since percent is 'out of 100', it can also be thought of as 48% of something."	"I can determine 12% of 40 by multiplying 40 by 12 and dividing by 100." $40 \times 12 \div 100 = 480 \div 100$ $= 4.8$

Observations/Documentation

Activity 10 Assessment

Equivalent Ratios and Rates

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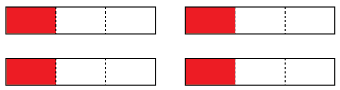
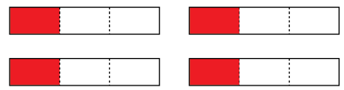
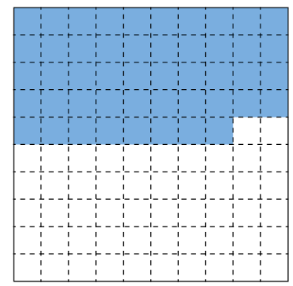
Number

Activity 11 Assessment
Unit Rates

Relating Fractions, Decimals, Percents, Ratios, and Rates			
Describes an equal-sharing situation using a fraction.  "To share 4 granola bars among 3 friends, I draw a picture that shows 4 wholes each divided into thirds."	Describes a fraction as a division statement and vice versa.  "To share 4 granola bars among 3 friends, I can write the division statement 4 ÷ 3 or I can write a fraction $\frac{4}{3}$. The picture shows 4 wholes each divided into thirds. Each person gets 3 thirds and one more third or $1\frac{1}{3}$."	Makes connections between fractions, decimals, and percents.  "I see forty-eight hundredths, which is the same as 0.48 or $\frac{48}{100}$. Since percent is 'out of 100', it can also be thought of as 48% of something."	Determines the percent of a number. "I can determine 12% of 40 by multiplying 40 by 12 and dividing by 100." $40 \times 12 \div 100 = 480 \div 100$ $= 4.8$
Observations/Documentation			

Number

Activity 11 Assessment
Unit Rates

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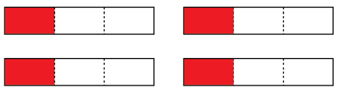
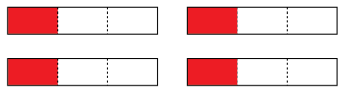
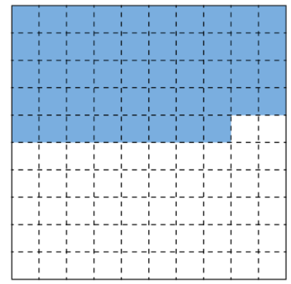
Activity 12 Assessment

Fractions, Decimals, Percents, Ratios, and Rates Consolidation

Relating Fractions, Decimals, Percents, Ratios, and Rates

Describes an equal-sharing situation using a fraction.	Describes a fraction as a division statement and vice versa.	Makes connections between fractions, decimals, and percents.	Determines the percent of a number.
 "To share 4 granola bars among 3 friends, I draw a picture that shows 4 wholes each divided into thirds."	 "To share 4 granola bars among 3 friends, I can write the division statement 4 ÷ 3 or I can write a fraction $\frac{4}{3}$. The picture shows 4 wholes each divided into thirds. Each person gets 3 thirds and one more third or $1\frac{1}{3}$."	 "I see forty-eight hundredths, which is the same as 0.48 or $\frac{48}{100}$. Since percent is 'out of 100', it can also be thought of as 48% of something."	"I can determine 12% of 40 by multiplying 40 by 12 and dividing by 100." $40 \times 12 \div 100 = 480 \div 100$ $= 4.8$

Observations/Documentation

Number

Activity 12 Assessment

Fractions, Decimals, Percents, Ratios, and Rates Consolidation

<table>
<tr><th colspan="4">Relating Fractions, Decimals, Percents, Ratios, and Rates (cont'd)</th></tr>
<tr>
<td>Relates percent of a number to ratios and proportions.

"In the expression 12% of 50,
12% represents $\frac{12}{100}$.
I can use equivalent ratios to determine what 12% is of 50.

$\frac{12}{100} = \frac{6}{50}$

I divide the denominator by 2 to get 50. So, I divide the numerator by 2 to get 6."</td>
<td>Represents and records ratios and rates symbolically (using ratio table).

10 glue sticks cost $4.
How much will 60 glue sticks cost?

For example, using rates:
<table><tr><td>Glue Sticks</td><td>10</td><td>20</td><td>30</td><td>40</td><td>50</td><td>60</td></tr><tr><td>Cost ($)</td><td>4</td><td>8</td><td>12</td><td>16</td><td>20</td><td>24</td></tr></table>
"I skip-counted by 10s and 4s."</td>
<td>Represents and creates equivalent ratios and rates.

10 glue sticks cost $4.
How much will 60 glue sticks cost?

For example, using ratios:

"The ratio of glue sticks to cost is 10:4. To find the cost of 60 glue sticks, I multiply each term by 6."

10 × 6:4 × 6
60:24</td>
<td>Flexibly solves problems involving fractions, decimals, percents, ratios, and rates.

The ratio of dogs to cats in the animal shelter is 8:12. Show the comparison using percents.

"The whole is 8 + 12 = 20.
Since percent is "out of 100",
I multiply each term in the ratio by 5 because 5 × 20 = 100.
8 × 5:12 × 5, or 40:60
40% of the animals are dogs and 60% are cats."</td>
</tr>
<tr><th colspan="4">Observations/Documentation</th></tr>
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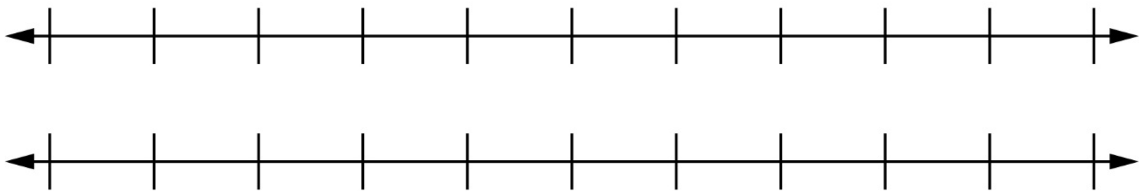
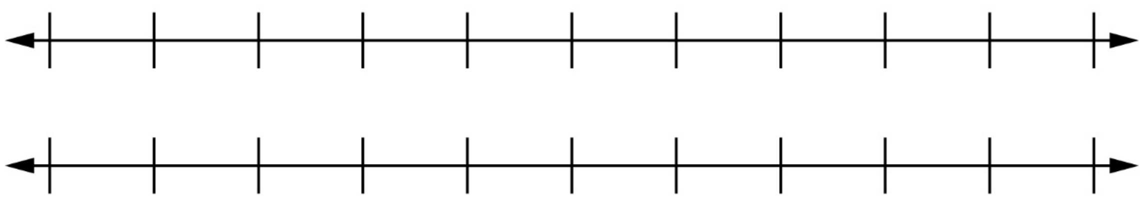
</table>

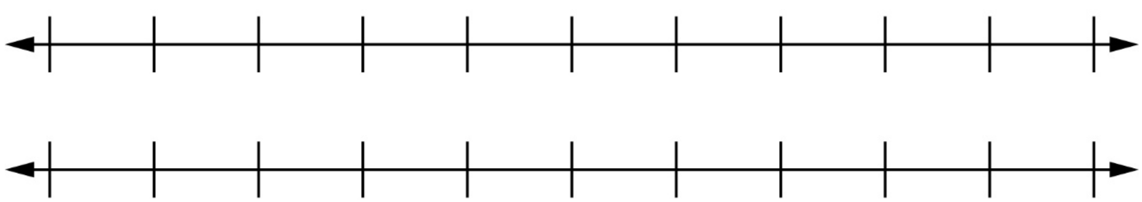
Name________________________________ Date_____________________

Number
Unit 4 Line Master 1

Double Number Lines







Name________________________________ Date_____________________

Number
Unit 4 Line Master 2

Paper Fraction Strips

Name________________________________ Date_____________________

Number
Unit 4 Line Master 3

Question and Answer Cards

Questions

Question: What is $2 \times \frac{3}{8}$?	Question: What is $3 \times \frac{5}{7}$?	Question: What is $4 \times \frac{2}{3}$?	Question: What is $6 \times \frac{3}{4}$?
Question: What is $7 \times \frac{1}{3}$?	Question: What is $9 \times \frac{1}{4}$?	Question: What is $5 \times \frac{1}{7}$?	Question: What is $5 \times \frac{1}{5}$?

Answers

Answer: $\frac{5}{7}$	Answer: $\frac{8}{3}$ or $2\frac{2}{3}$	Answer: $\frac{15}{7}$ or $2\frac{1}{7}$	Answer: $\frac{5}{5}$ or 1
Answer: $\frac{9}{4}$ or $2\frac{1}{4}$	Answer: $\frac{7}{3}$ or $2\frac{1}{3}$	Answer: $\frac{6}{8}$ or $\frac{3}{4}$	Answer: $\frac{9}{2}$ or $4\frac{1}{2}$

Name________________________________ Date_____________________

Number
Unit 4 Line Master 4a

Top Tipper

25% of $200	14% of $300	40% of $250
45% of $280	11% of $400	50% of $130
15% of $360	35% of $140	30% of $110
20% of $135	10% of $420	60% of $150

Name________________________________ Date______________________

Number
Unit 4 Line Master 4b

Top Tipper (cont'd)

12% of \$340	13% of \$225	18% of \$180
19% of \$190	22% of \$125	21% of \$145
24% of \$170	23% of \$290	17% of \$160
75% of \$380	55% of \$350	8% of \$120

Name________________________________ Date______________________

Number
Unit 4 Line Master 4c

Top Tipper (cont'd)

10% of $40	15% of $60	20% of $50
25% of $20	5% of $30	1% of $10
30% of $80	40% of $90	35% of $40
50% of $36	6% of $20	55% of $60

Name________________________________ Date_____________________

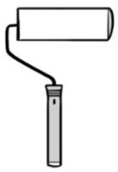
Number
Unit 4 Line Master 5

What Can I Buy?

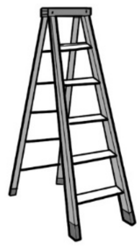
Paint can
$27.99

Paint brushes
$21.78

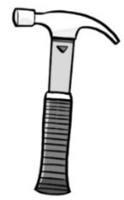
Paint tray
$8.90



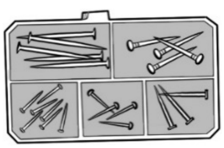
Paint roller
$9.57



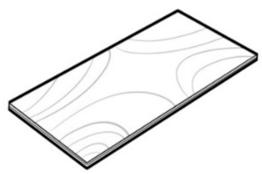
Ladder
$108.65



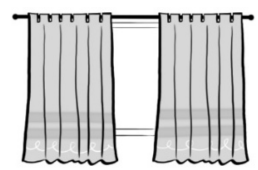
Hammer
$25.98



Box of nails
$33.33

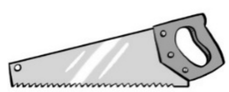


Sheet of plywood
$62.40



Curtains
$26.56

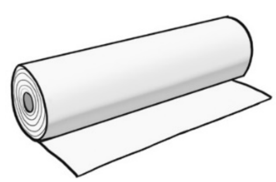
Lamp
$17.87



Saw
$19.99

Tablecloth
$25.96

Staple gun with staples
$39.95



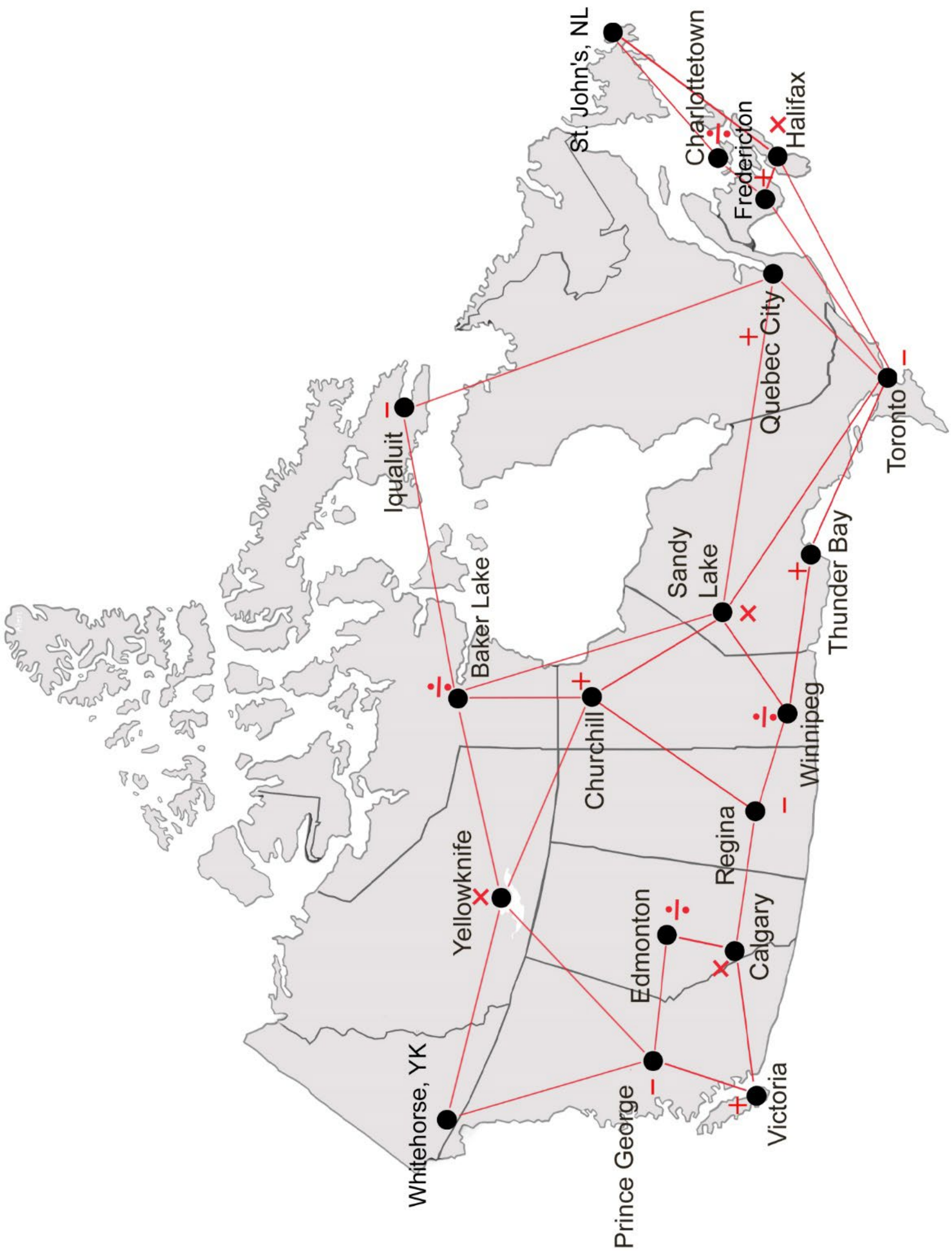
Roll of kraft paper
$45.99

Name________________________________ Date_____________________

Number
Unit 4 Line Master 6

Cross Canada Challenge!

Gameboard



Name________________________________ Date_____________________

Number
Unit 4 Line Master 7a

Cross Canada Challenge!
Game Cards

Multiplication

7.4 × 6	2.76 × 5
3.82 × 8	4 × 0.72
4 × 0.9	8 × 1.34
13 × 5.2	70 × 4.75
29 × 0.7	5.63 × 14
32 × 6.06	9 × 5.29
28 × 2.1	3.55 × 65

Name________________________________ Date_____________________

Number
Unit 4 Line Master 7b

Cross Canada Challenge! (cont’d)
Game Cards

Division

8.75 ÷ 5	16.4 ÷ 6
32.8 ÷ 4	77.6 ÷ 8
65.1 ÷ 3	44.1 ÷ 9
10.5 ÷ 16	70.8 ÷ 40
25.6 ÷ 28	14.6 ÷ 6
25.5 ÷ 15	5.08 ÷ 40
0.134 ÷ 20	8.75 ÷ 10

Name________________________________ Date_____________________

Number
Unit 4 Line Master 7c

Cross Canada Challenge! (cont'd)

Game Cards

Multiplication

$3 \times \frac{1}{4}$	$10 \times \frac{1}{8}$
$12 \times \frac{5}{6}$	$8 \times \frac{2}{5}$
$27 \times \frac{1}{3}$	$50 \times \frac{1}{10}$
$9 \times \frac{1}{8}$	$5 \times \frac{7}{8}$
$\frac{4}{9} \times 3$	$8 \times \frac{3}{5}$
10% of 350	5% of 240
5% of 800	10% of 420

Name________________________________ Date_____________________

Number
Unit 4 Line Master 7d

Cross Canada Challenge! (cont'd)

Game Cards

Addition

12.35 + 143.226	29.7 + 81.07
8.9 + 12.297 + 9.03	215.05 + 74.543
267.788 + 121.962	41.9 + 57.006
43.008 + 105.409	$\frac{6}{5} + \frac{7}{5}$
$\frac{5}{8} + \frac{11}{8}$	$\frac{1}{4} + \frac{2}{3}$
$2\frac{3}{4} + 3\frac{5}{8}$	$1\frac{2}{5} + 3\frac{7}{10}$
$\frac{1}{6} + \frac{5}{12}$	$\frac{1}{2} + \frac{3}{8}$

Name________________________________ Date_____________________

Number
Unit 4 Line Master 7e

Cross Canada Challenge! (cont'd)

Game Cards

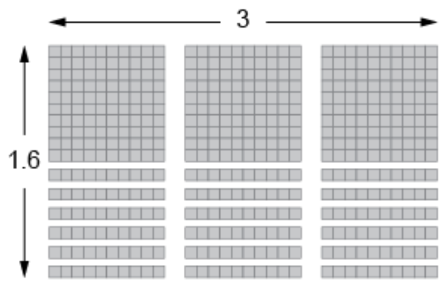
Subtraction

$121.5 - 37.309$	$29.654 - 14.022$
$57.28 - 38.176$	$16.79 - 9.84$
$33.007 - 29.999$	$73.01 - 22.1$
$179.4 - 75.04$	$\frac{9}{5} - \frac{4}{5}$
$8 - \frac{2}{3}$	$\frac{7}{4} - \frac{3}{4}$
$2\frac{3}{4} - 1\frac{3}{8}$	$5\frac{9}{10} - 4\frac{2}{5}$
$\frac{3}{4} - \frac{1}{3}$	$\frac{2}{3} - \frac{5}{9}$

Activity 13 Assessment
Multiplying Decimals by 2-Digit Numbers

<table>
<tr><th colspan="3">Multiplying and Dividing Decimals by 2-Digit Numbers</th></tr>
<tr>
<td>Models multiplication and division situations concretely and pictorially.

$1.6 \times 3 = ?$



“I used Base Ten Blocks to make an array with length 3 and width 1.6.
I then counted the blocks to get 4.8.

I could also use repeated addition:.
1.6 + 1.6 + 1.6 = 4.8”</td>
<td>Uses models and other strategies to solve multiplication and division situations.

$4.15 \times 25 = ?$

$4.15 \times 25 = (4.0 + 0.10 + 0.05) \times (20 + 5)$
$= (4.0 \times 20) + (0.10 \times 20) + (0.05 \times 20)$
$+ (4.0 \times 5) + (0.10 \times 5) + (0.05 \times 5)$
$= 80.0 + 2.0 + 1.0 + 20 + 0.5 + 0.25$
$= 103.75$</td>
<td>Uses the standard algorithm to multiply.

$4.15 \times 25 = ?$

“First, I multiplied as if there was no decimal.
Next, I counted the number of digits after the decimal point in each factor.
Then I placed the same number of digits after the decimal point in the product.”

1
2
4.15
× 25
2075 Multiply : 415 × 5
+ 8300 Multiply : 415 × 20
103.75</td>
</tr>
<tr><th colspan="3">Observations/Documentation</th></tr>
<tr><td></td><td></td><td></td></tr>
</table>

Number

Activity 13 Assessment

Multiplying Decimals by 2-Digit Numbers

Multiplying and Dividing Decimals by 2-Digit Numbers (cont'd)

Decomposes numbers to use partial quotients to divide.	Estimates to determine if answer to multiplication or division problem is reasonable.	Solves multiplication and division problems flexibly using a variety of strategies.
$4.44 \div 12 = ?$ $\begin{array}{r l} 12\overline{)444} & \\ -360 & \text{30 groups of 12} \\ \hline 84 & \\ -84 & \text{7 groups 12} \\ \hline 0 & \end{array}$ "I used partial quotients to divide as whole numbers, then estimated to place the decimal point. 4.44 is about 4 and 12 is about 10. So, $4 \div 10 = 0.40$ So, I placed the decimal point so 37 is close to 0.40: 0.37."	$\begin{array}{r} 0.37 \\ 12\overline{)4.44} \\ -36 \\ \hline 84 \\ -84 \\ \hline 0 \end{array}$ "\$4.44 is about \$4 and 12 is about 10. So, \$4 ÷ 10 = \$0.40 So, the answer is reasonable."	The area of a rectangular garden plot is 95.2 m2. The length of the garden is 14 m. What is the width? "I divided as I would whole numbers, then used estimation to place the decimal point. $\begin{array}{r} 6.8 \\ 14\overline{)95.2} \\ -84 \\ \hline 112 \\ -112 \\ \hline 0 \end{array}$ 95.2 is about 100, and 14 is about 10. $100 \div 10 = 10$. I placed the decimal point so that 68 is close to 10: 6.8. The width of the garden is 6.8 m."

Observations/Documentation

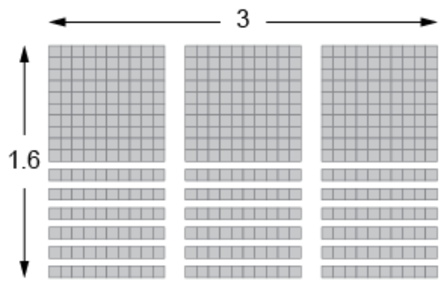
Number

Activity 14 Assessment
Dividing Decimals by 2-Digit Numbers

Multiplying and Dividing Decimals by 2-Digit Numbers

Models multiplication and division situations concretely and pictorially.

$1.6 \times 3 = ?$



"I used Base Ten Blocks to make an array with length 3 and width 1.6.
I then counted the blocks to get 4.8.

I could also use repeated addition:.
1.6 + 1.6 + 1.6 = 4.8"

Uses models and other strategies to solve multiplication and division situations.

$4.15 \times 25 = ?$

$$\begin{aligned} 4.15 \times 25 &= (4.0 + 0.10 + 0.05) \times (20 + 5) \\ &= (4.0 \times 20) + (0.10 \times 20) + (0.05 \times 20) \\ &\quad + (4.0 \times 5) + (0.10 \times 5) + (0.05 \times 5) \\ &= 80.0 + 2.0 + 1.0 + 20 + 0.5 + 0.25 \\ &= 103.75 \end{aligned}$$

Uses the standard algorithm to multiply.

$4.15 \times 25 = ?$

"First, I multiplied as if there was no decimal.
Next, I counted the number of digits after the decimal point in each factor.
Then I placed the same number of digits after the decimal point in the product."

$$\begin{array}{rl} {}^{1}_{2}4.15 & \\ \times\ \ 25 & \\ \hline 2075 & \text{Multiply : } 415 \times 5 \\ +\ 8300 & \text{Multiply : } 415 \times 20 \\ \hline 103.75 & \end{array}$$

Observations/Documentation

Activity 14 Assessment
Dividing Decimals by 2-Digit Numbers

Multiplying and Dividing Decimals by 2-Digit Numbers (cont’d)

Decomposes numbers to use partial quotients to divide.

4.44 ÷ 12 = ?

$$
\begin{array}{r l}
12\overline{)\,444} & \\
-360 & \text{30 groups of 12} \\
\hline
84 & \\
-84 & \text{7 groups 12} \\
\hline
0 &
\end{array}
$$

“I used partial quotients to divide
as whole numbers, then estimated
to place the decimal point.
4.44 is about 4 and 12 is about 10.
So, 4 ÷ 10 = 0.40
So, I placed the decimal point so 37
is close to 0.40: 0.37.”

Estimates to determine if answer to multiplication or division problem is reasonable.

$$
\begin{array}{r}
0.37 \\
12\overline{)\,4.44} \\
-\,36 \\
\hline
84 \\
-\,84 \\
\hline
0
\end{array}
$$

“$4.44 is about $4 and 12 is about 10.
So, $4 ÷ 10 = $0.40
So, the answer is reasonable.”

Solves multiplication and division problems flexibly using a variety of strategies.

The area of a rectangular garden plot is 95.2 m2.
The length of the garden is 14 m.
What is the width?

“I divided as I would whole numbers, then used estimation to place the decimal point.

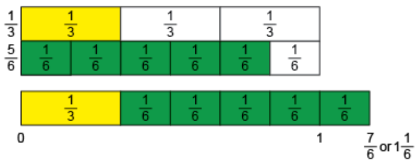
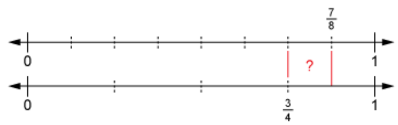
$$
\begin{array}{r}
6.8 \\
14\overline{)\,95.2} \\
-84 \\
\hline
112 \\
-112 \\
\hline
0
\end{array}
$$

95.2 is about 100, and 14 is about 10.
100 ÷ 10 = 10.
I placed the decimal point
so that 68 is close to 10: 6.8.
The width of the garden is 6.8 m.”

Observations/Documentation

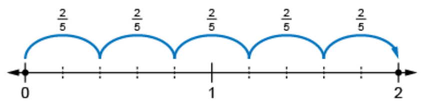
Number

Activity 15 Assessment
Adding and Subtracting Fractions

Addition and Subtraction of Fractions with Unlike Denominators			
Concretely solves problems. $\frac{1}{3}+\frac{5}{6}=?$  "I used fraction strips. I can see that $\frac{1}{3}=\frac{2}{6}$ and that $\frac{1}{3}+\frac{5}{6}=\frac{7}{6}$, or $1\frac{1}{6}$."	Models pictorially to solve problems. $\frac{7}{8}-\frac{3}{4}=?$  "I used a double number line. I modelled $\frac{7}{8}$ on the top line and $\frac{3}{4}$ on the bottom line, then found the difference. From the double number lines, I see the difference is $\frac{1}{8}$."	Uses equivalent fractions to symbolically solve problems. $\frac{1}{6}+\frac{1}{3}+\frac{1}{2}=?$ "I wrote equivalent fractions with a common denominator of 6. $\frac{1}{3}=\frac{2}{6}$ and $\frac{1}{2}=\frac{3}{6}$ $\frac{1}{6}+\frac{1}{3}+\frac{1}{2}=\frac{1}{6}+\frac{2}{6}+\frac{3}{6}$ $=\frac{6}{6}$, or 1 whole."	Fluently and flexibly solves problems. $3\frac{1}{4}-2\frac{7}{8}=?$ "I wrote $2\frac{7}{8}$ as an improper fraction, $\frac{23}{8}$. Then I subtracted $\frac{13}{4}-\frac{23}{8}$ using a common denominator of 8." $\frac{13}{4}-\frac{23}{8}=\frac{26}{8}-\frac{23}{8}$ $=\frac{3}{8}$
Observations/Documentation			

Number

Activity 16 Assessment
Multiplying Natural Numbers by Proper Fractions

Multiplication with Proper Fractions			
Models multiplication situations concretely and pictorially. $4 \times \frac{3}{5} = ?$  "I modelled the multiplication with fraction strips, then counted fifths: $4 \times \frac{3}{5} = \frac{12}{5}$, or $2\frac{2}{5}$"	Uses models and think-addition strategies, to solve multiplication problems. $5 \times \frac{2}{5} = ?$  "I know that multiplication is like repeated addition, so I used a number with each whole partitioned into fifths, then took 5 jumps of two-fifths: $5 \times \frac{2}{5} = 2$"	Relates multiplication of a natural number by a unit fraction to division. $4 \times \frac{1}{5} = 4 \div 5$	Flexibly solves multiplication problems. $5 \times \frac{3}{4} = \frac{5 \times 3}{4}$ $= \frac{15}{4}$ $= 3\frac{3}{4}$
Observations/Documentation			

Number

Activity 17 Assessment
Using Mental Math to Calculate Percents

Calculating Percents using Mental Math			
Explores number patterns and relationships. 100% of 360 = 360 50% of 360 = 180 25% of 360 = 90 12.5% of 360 = 45 What patterns do you see? "I see that the percent is halved each time and when this happens, the product is also halved."	Uses number patterns and relationships to solve problems. 50% of 80 = ? 10% is the same as 0.1 and 50% is the same as 0.5. So, 50% of 80 = 5 × 0.1 × 80 = 5 × 8 = 40	Uses mental math strategies and checks for reasonableness. Find 14% of \$300 14% = 10% + 5% – 1% 10% of \$300 = \$30 5% of \$300 = \$15 1% of \$300 = \$3 So, 14% of \$300 = \$30 + \$15 – \$3 = \$42	Fluently calculates percents using a variety of mental math strategies. 8% of 260 = ? 8% of 260 = (10% – 2%) of 260 = 10% of 260 – 2% of 260 = 26 – 2(2.6) = 26 – 5.2 = 20.8
Observations/Documentation			

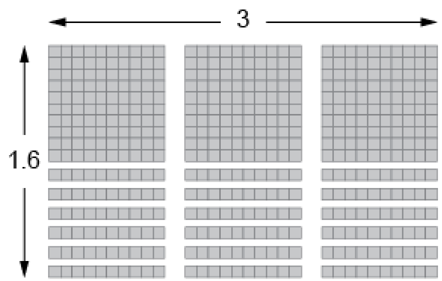
Number

Activity 18 Assessment
Problem Solving with Money

Problem Solving with Money (Including Tax)			
Recognizes prices involving dollars and cents. “The price of a bag of apples is $3.85. Apples don’t have tax added.”  	Estimates the cost of transactions involving several items, including tax. “I made friendly numbers to estimate the total cost: $10 + $10 + $46 = $66. Then for tax, 10% is about $7 and 5% is about $3.50. The total cost is about $69.50.”  Paint tray: $8.90 Paint roller: $9.57 Roll of kraft paper: $45.99	Calculates the cost of several items with prices in dollars and cents, including tax. “I used an algorithm. $\begin{array}{r} {}^{2\ 1} \\ 8.90 \\ {}_{2}\,9.67 \\ +\ 45.99 \\ \hline \$64.56 \end{array}$ Then I calculated the tax: 10% is $6.46 and 5% is $3.23. The total cost including tax: $67.79.”  Paint tray: $8.90 Paint roller: $9.57 Roll of kraft paper: $45.99	Calculates total cost including tax, and determines change. “To find the change from $500, I can use an algorithm or a calculator.” $\begin{array}{r} {}^{4\,9\,9\;\,9\,1} \\ \cancel{5}\cancel{0}\cancel{0}.\cancel{0}0 \\ -\ \ 67.79 \\ \hline \$432.21 \end{array}$
Observations/Documentation			

Activity 19 Assessment

Operations with Fractions, Decimals, and Percents Consolidation

Multiplying and Dividing Decimals by 2-Digit Numbers		
Models multiplication and division situations concretely and pictorially. 1.6 × 3 = ?  "I used Base Ten Blocks to make an array with length 3 and width 1.6. I then counted the blocks to get 4.8. I could also use repeated addition:. 1.6 + 1.6 + 1.6 = 4.8"	Uses models and other strategies to solve multiplication and division situations. 4.15 × 25 = ? 4.15 × 25 = (4.0 + 0.10 + 0.05) × (20 + 5) = (4.0 × 20) + (0.10 × 20) + (0.05 × 20) + (4.0 × 5) + (0.10 × 5) + (0.05 × 5) = 80.0 + 2.0 + 1.0 + 20 + 0.5 + 0.25 = 103.75	Uses the standard algorithm to multiply. 4.15 × 25 = ? "First, I multiplied as if there was no decimal. Next, I counted the number of digits after the decimal point in each factor. Then I placed the same number of digits after the decimal point in the product." 1 2 4.15 × 25 2075 Multiply : 415 × 5 + 8300 Multiply : 415 × 20 103.75

Observations/Documentation		

Number

Activity 19 Assessment

Operations with Fractions, Decimals, and Percents Consolidation

Multiplying and Dividing Decimals by 2-Digit Numbers (cont'd)

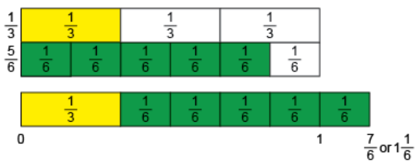
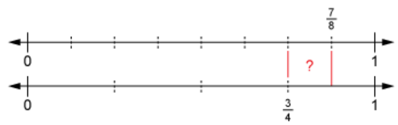
Decomposes numbers to use partial quotients to divide.	Estimates to determine if answer to multiplication or division problem is reasonable.	Solves multiplication and division problems flexibly using a variety of strategies.
4.44 ÷ 12 = ? $\begin{array}{r l} 12\overline{)444} & \\ -360 & \text{30 groups of 12} \\ \hline 84 & \\ -84 & \text{7 groups 12} \\ \hline 0 & \end{array}$ "I used partial quotients to divide as whole numbers, then estimated to place the decimal point. 4.44 is about 4 and 12 is about 10. So, 4 ÷ 10 = 0.40 So, I placed the decimal point so 37 is close to 0.40: 0.37."	$\begin{array}{r} 0.37 \\ 12\overline{)4.44} \\ -36 \\ \hline 84 \\ -84 \\ \hline 0 \end{array}$ "$4.44 is about $4 and 12 is about 10. So, $4 ÷ 10 = $0.40 So, the answer is reasonable."	The area of a rectangular garden plot is 95.2 m2. The length of the garden is 14 m. What is the width? "I divided as I would whole numbers, then used estimation to place the decimal point. $\begin{array}{r} 6.8 \\ 14\overline{)95.2} \\ -84 \\ \hline 112 \\ -112 \\ \hline 0 \end{array}$ 95.2 is about 100, and 14 is about 10. 100 ÷ 10 = 10. I placed the decimal point so that 68 is close to 10: 6.8. The width of the garden is 6.8 m."

Observations/Documentation

Number

Activity 19 Assessment

Operations with Fractions, Decimals, and Percents Consolidation

Addition and Subtraction of Fractions with Unlike Denominators			
Concretely solves problems. $\frac{1}{3}+\frac{5}{6}=?$  “I used fraction strips. I can see that $\frac{1}{3}=\frac{2}{6}$ and that $\frac{1}{3}+\frac{5}{6}=\frac{7}{6}$, or $1\frac{1}{6}$.”	Models pictorially to solve problems. $\frac{7}{8}-\frac{3}{4}=?$  “I used a double number line. I modelled $\frac{7}{8}$ on the top line and $\frac{3}{4}$ on the bottom line, then found the difference. From the double number lines, I see the difference is $\frac{1}{8}$.”	Uses equivalent fractions to symbolically solve problems. $\frac{1}{6}+\frac{1}{3}+\frac{1}{2}=?$ “I wrote equivalent fractions with a common denominator of 6. $\frac{1}{3}=\frac{2}{6}$ and $\frac{1}{2}=\frac{3}{6}$ $\frac{1}{6}+\frac{1}{3}+\frac{1}{2}=\frac{1}{6}+\frac{2}{6}+\frac{3}{6}$ $=\frac{6}{6}$, or 1 whole.”	Fluently and flexibly solves problems. $3\frac{1}{4}-2\frac{7}{8}=?$ “I wrote $2\frac{7}{8}$ as an improper fraction, $\frac{23}{8}$. Then I subtracted $\frac{13}{4}-\frac{23}{8}$ using a common denominator of 8.” $\frac{13}{4}-\frac{23}{8}=\frac{26}{8}-\frac{23}{8}$ $=\frac{3}{8}$
Observations/Documentation			

Name______________________________ Date ____________________

Number
Unit 5 Line Master 1a

Borrowing Scenario Cards

Scenario 1 Jane wants a $200 loan to buy a new bicycle. Jane plans to pay it back in 3 monthly installments. Jane earns $50 per week from their part-time job.	**Scenario 2** Antonio wants to borrow $500 from their older sister to buy a new video game console. Antonio plans to repay the loan within 6 months by giving the sister $100 each month. Antonio receives $80 each month from a paper route.
Scenario 3 Sarah wants to borrow $1000 from a bank to pay for a school trip. The bank offers a loan with an interest rate of 8% and a repayment period of 1 year. Sarah does not have a part-time job.	**Scenario 4** Alexi wants to start a small lawn care business and needs to borrow $500 from a bank to purchase tools and supplies. The bank offers a loan with a 10% interest rate and repayment period of 2 years.
Scenario 5 Emilio wants to borrow $50 from their best friend to buy a concert ticket. They plan to repay their friend within 2 weeks using money from a part-time babysitting job.	**Scenario 6** Jose wants to borrow $2000 from their grandparents to help pay the university tuition. They plan to repay their grandparents in monthly payments over 2 years, using money from a part-time job at the grocery store. The grandparents are not charging interest.
Scenario 7 Dom wants to borrow $300 from an online lender to buy a new smartphone. The lender charges 15% interest and requires repayment within 3 months. Dom makes $200 a month working at a golf course.	**Scenario 8** David wants to borrow $1500 from a bank to invest in a business idea. The bank offers a loan with an interest rate of 12% and a repayment period of 5 years. David currently has two other loans.
Scenario 9 Mia wants to borrow $100 from their older brother to buy a birthday gift for their parents. Mia plans to repay the loan within 1 month by doing extra chores around the house.	**Scenario 10** Ethan wants to borrow $7000 from a bank to get new windows in their house. The bank offers a loan with an interest rate of 6% and a repayment period of 3 years. Ethan works full time and makes $4000 a month.
Scenario 11 Oliver wants to borrow $200 from their parents to participate in an extracurricular activity at school. They agree that it would be an interest-free loan and they would allow Oliver to repay them in weekly installments over 2 months. Oliver has a part-time job.	**Scenario 12** Ryan wants to borrow $500 from a friend to start a small online business. Ryan agrees to repay their friend by giving them a percent of his profits for the first 6 months.

Name______________________________ Date ____________________

Number
Unit 5 Line Master 1b

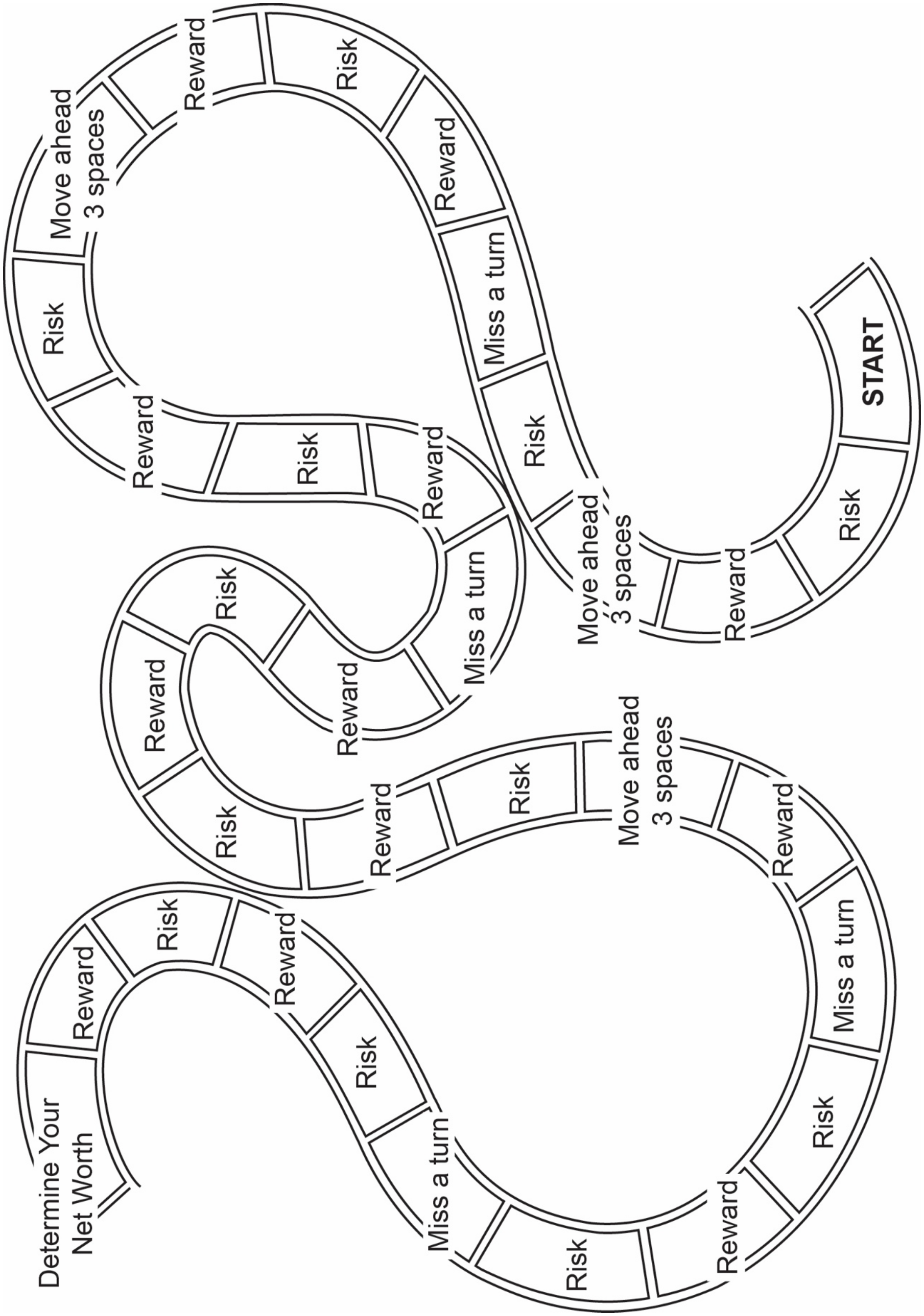
Borrowing Scenario Cards (cont'd)

Scenario 13 Lily wants to borrow $1200 from a bank to buy a laptop for school. The bank offers a loan with an interest rate of 9% and a repayment period of 2 years. Lily just lost her part-time job at a dance studio.	**Scenario 14** Marco wants to borrow $50 from their neighbour to buy a new video game. Marco plans to repay the neighbour within 2 weeks by helping with household chores. Marco defaulted on a loan from another neighbour.
Scenario 15 Ava wants to borrow $1500 from a financial institution to buy snow tires for their car. The institution offers a loan with an interest rate of 7% and a repayment period of 2 years. Ava works full-time at a dental office.	**Scenario 16** Bertha wants to borrow $5000 from a financial institution to go on a cruise with some friends. The institution offers a loan with an interest rate of 9% and a repayment period of 2 years. Bertha does not have a steady job.
Write your own scenario:	**Write your own scenario:**
Write your own scenario:	**Write your own scenario:**
Write your own scenario:	**Write your own scenario:**
Write your own scenario:	**Write your own scenario:**

Name________________________________ Date ____________________

Number
Unit 5 Line Master 2

Risk or Reward? Gameboard



Name______________________________ Date ____________________

Number
Unit 5 Line Master 3a

Risk Game Cards

Risk 1 The stock you invested in has experienced a significant drop in value. Lose $200.	**Risk 2** The real estate market has crashed, and the property you invested in has lost value. Lose $300.
Risk 3 The digital currency you invested in has been hacked, resulting in a loss of funds. Lose $150.	**Risk 4** The company you bought bonds from has filed for bankruptcy. Lose $250.
Risk 5 The mutual fund you invested in has underperformed, resulting in a lower return. Lose $100.	**Risk 6** The startup company you invested in has failed, and your investment has become worthless. Lose $400.
Risk 7 The government has raised interest rates, negatively affecting the value of your bonds. Lose $150.	**Risk 8** The stock market has experienced a major crash, causing a significant decline in your portfolio value. Lose $300.
Risk 9 The real estate property you invested in has incurred significant damage, reducing its value. Lose $200.	**Risk 10** The digital currency you invested in has been banned in your country, making it worthless. Lose $250.

Name________________________________ Date _____________________

Number
Unit 5 Line Master 3a

Risk Game Cards (cont'd)

Risk 11 The company you invested in has been hit with a major lawsuit, resulting in a decline in stock value. Lose $150.	**Risk 12** The mutual fund you invested in has suffered losses due to poor investment decisions. Lose $100.
Risk 13 The bond issuer you invested in has defaulted on their payments. Lose $200.	**Risk 14** The stock you invested in has been affected by negative news, causing a drop in value. Lose $100.
Risk 15 The real estate market in the area you invested in has become saturated, leading to decreased rental income. Lose $150.	**Write your own risk:**
Write your own risk:	**Write your own risk:**
Write your own risk:	**Write your own risk:**

Name________________________________ Date ____________________

Number
Unit 5 Line Master 4a

Reward Game Cards

Reward 1 The stock you invested in has surged in value. Gain $250.	**Reward 2** The real estate property you invested in has been rented out, generating steady monthly income. Gain $200.
Reward 3 The digital currency you invested in has experienced a major increase in value. Gain $300.	**Reward 4** The company you bought bonds from has experienced significant growth, resulting in higher interest payments. Gain $150.
Reward 5 The mutual fund you invested in has outperformed expectations, resulting in a higher return. Gain $100.	**Reward 6** The startup company you invested in has been acquired by a larger company, resulting in a substantial return on investment. Gain $400.
Reward 7 The government has lowered interest rates, positively impacting the value of your bonds. Gain $150.	**Reward 8** The stock market has experienced a significant surge, leading to an increase in the value of your portfolio. Gain $300.
Reward 9 The real estate property you invested in has appreciated in value. Gain $200.	**Reward 10** The digital currency you invested in has gained widespread acceptance, increasing its value. Gain $250.

Name________________________________ Date _____________________

Number
Unit 5 Line Master 4b

Reward Game Cards (cont'd)

Reward 11 The company you invested in has announced record-breaking profits, causing a surge in stock value. Gain $150.	**Reward 12** The mutual fund you invested in has received positive media coverage and attracted more investors, resulting in higher returns. Gain $100.
Reward 13 The bond issuer you invested in has improved its financial standing, leading to higher interest payments. Gain $200.	**Reward 14** The stock you invested in has received positive analyst recommendations, causing an increase in value. Gain $100.
Reward 15 The real estate market in the area you invested in has experienced high demand, leading to increased rental income. Gain $150.	**Write your own reward:**
Write your own reward:	**Write your own reward:**
Write your own reward:	**Write your own reward:**

Name_______________________________ Date ____________________

Number
Unit 5 Line Master 5

Money Smart Scenario Cards

Entrepreneurial Scenario: Starting a Small Business

You and your group members have decided to start a small business. You require additional funds to cover the initial setup costs, like purchasing equipment and inventory. Discuss and determine the most suitable borrowing option and investment strategy to secure the necessary funds.

Home Renovation Scenario: Home Renovation

Your group has plans to renovate a house to increase its value, then rent the house out to make money. As a team, explore the various ways to obtain funds for the renovation, considering borrowing options and investment avenues.

Higher Education Scenario: Funding Schooling

You and your group members are pursuing higher education and need to pay for tuition fees, accommodation, and other expenses. Analyze the potential borrowing options and other ways you could invest money to help finance your education.

Retirement Scenario: Saving for the Future

Your group is exploring different strategies to accumulate sufficient funds for retirement, including borrowing and investing money wisely. Consider the risk level of each member, age of desired retirement, and desired retirement lifestyle and develop an approach to borrow/invest.

Non-profit Scenario: Animal Shelter

Your group is passionate about animals and would like to establish a non-profit animal shelter to support your furry friends. Discuss the options for borrowing and investing money to support the dogs or cats. Make sure you think of how you can make the shelter sustainable.

Activity 20 Assessment
Borrowing Money

Borrowing Money		
Defines the term loan and identifies some reasons why people might borrow money. "I know that vehicles are a lot of money and people may need to borrow money to purchase one."	Identifies basic sources of loans and understands that borrowing money involves repayment. "I know that a bank or financial institution may lend money and that it needs to be repaid. If not repaid, there will be penalties and it will be difficult for me to get a loan in the future."	Identifies factors to consider when deciding to borrow money. "I have a full-time job with a regular income and the interest rate is quite low. I can afford the monthly payments and would be able to pay the loan back on time."
Observations/Documentation		

Number

Activity 20 Assessment
Borrowing Money

Borrowing Money (cont'd)		
Identifies factors used by banks and financial institutions when making decisions about loans. "They have a full-time job, a good loan history, and very little debt. I think the bank would grant them the loan."	Analyzes the risks and benefits of borrowing money in a variety of situations. Jane wants a $200 loan to buy a new bicycle. Jane plans to pay it back in 3 monthly installments. Jane earns $50 per week from their part-time job. "Jane makes about $200 per month from their part-time job. A new bicycle will get Jane to and from their job. The repayment time is reasonable. There is a risk that Jane loses her job and source of income."	Identifies situations where an individual can responsibly take on debt. "Jane makes about $200 per month, so they should be able to pay back $200 over 3 months. It seems unlikely that Jane will lose their job, and the risk of Jane not repaying the money seems low. I think Jane can responsibly take on the debt."
Observations/Documentation		

Number

Activity 21 Assessment
Investing Money

Investing Money			
Defines the term investing and identifies some reasons why people invest money. "I know that investing involves purchasing something that is expected to earn additional money or increase in value. Many people invest money for their retirement."	Identifies different types of investments and describes the general purpose/benefits of each. "People can buy stocks and when they do, they have ownership in the company. They can earn money through dividends and capital gains."	Analyzes the risks associated with each type of investment. "Stocks can provide relatively high returns, but there is a higher risk of losing some or all of the investment. They are affected by the economy and by the company's performance."	Analyzes the risks and benefits associated with different investment opportunities to make reasonable investment choices. "I know stocks often involve high risk, but I think electric vehicles are the way of the future. So, I will buy stocks in a company that makes electric vehicle battery cells. I will only spend $2000 because I can afford to lose that if I am wrong."
Observations/Documentation			

Number

Activity 22 Assessment
Financial Literacy Consolidation

Borrowing Money		
Defines the term loan and identifies some reasons why people might borrow money. “I know that vehicles are a lot of money and people may need to borrow money to purchase one.”	Identifies basic sources of loans and understands that borrowing money involves repayment. “I know that a bank or financial institution may lend money and that it needs to be repaid. If not repaid, there will be penalties and it will be difficult for me to get a loan in the future.”	Identifies factors to consider when deciding to borrow money. “I have a full-time job with a regular income and the interest rate is quite low. I can afford the monthly payments and would be able to pay the loan back on time.”
Observations/Documentation		

Number

Activity 22 Assessment
Financial Literacy Consolidation

Borrowing Money (cont'd)		
Identifies factors used by banks and financial institutions when making decisions about loans. "They have a full-time job, a good loan history, and very little debt. I think the bank would grant them the loan."	Analyzes the risks and benefits of borrowing money in a variety of situations. Jane wants a $200 loan to buy a new bicycle. Jane plans to pay it back in 3 monthly installments. Jane earns $50 per week from their part-time job. "Jane makes about $200 per month from their part-time job. A new bicycle will get Jane to and from their job. The repayment time is reasonable. There is a risk that Jane loses her job and source of income."	Identifies situations where an individual can responsibly take on debt. "Jane makes about $200 per month, so they should be able to pay back $200 over 3 months. It seems unlikely that Jane will lose their job, and the risk of Jane not repaying the money seems low. I think Jane can responsibly take on the debt."
Observations/Documentation		

Number

Activity 22 Assessment
Financial Literacy Consolidation

Investing Money			
Defines the term investing and identifies some reasons why people invest money. "I know that investing involves purchasing something that is expected to earn additional money or increase in value. Many people invest money for their retirement."	Identifies different types of investments and describes the general purpose/benefits of each. "People can buy stocks and when they do, they have ownership in the company. They can earn money through dividends and capital gains."	Analyzes the risks associated with each type of investment. "Stocks can provide relatively high returns, but there is a higher risk of losing some or all of the investment. They are affected by the economy and by the company's performance."	Analyzes the risks and benefits associated with different investment opportunities to make reasonable investment choices. "I know stocks often involve high risk, but I think electric vehicles are the way of the future. So, I will buy stocks in a company that makes electric vehicle battery cells. I will only spend $2000 because I can afford to lose that if I am wrong."
Observations/Documentation			

Name________________________________ Date_____________________

Patterning and Algebra
Unit 1 Line Master 1

Representing a Function

Day, *d*	Number of Club Members, *M*
1	8
2	11
3	14
4	
5	

Name______________________________ Date____________________

Patterning and Algebra
Unit 1 Line Master 2a

Buying Video Games

In 14 weeks, Zac earned $504 to buy some video games for a children's hospital. Each game costs $64.

Complete the table to show how many games Zac can buy.

Number of Games Bought, *n*	Total Money Spent ($), *S*	Money Left Over ($), *L*

Write a rule and algebraic expression that relate the number of games and the total money spent.

Is it an increasing or a decreasing function?

Name________________________________ Date_____________________

Patterning and Algebra
Unit 1 Line Master 2b

Buying Video Games (cont'd)

Write a rule and algebraic expression that relate the number of games and the money left over.

Is it an increasing or a decreasing function?

How many video games can Zac buy? Show your work.
Is there money left over? Explain.

Patterning and Algebra

Activity 1 Assessment

Investigating Functions

Investigating Functions

Identifies variables (dependent and independent) as changing quantities in a given situation.

Kaspar earned $20 to spend on loot bags for their party guests. They want to put a mini flashlight in each loot bag. A flashlight costs $3.

Number of Flashlights, *n*	Money Left, *M* ($)
1	17
2	14
3	11
4	8
5	5
6	2

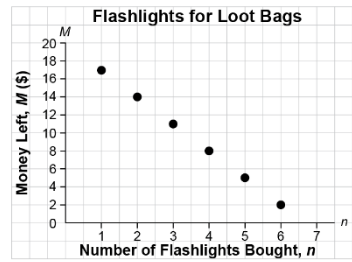
"The money left *depends* on the number of flashlights bought. So, *M* is the dependent variable and *n* is the independent variable."

Describes the rule that relates the values of the dependent variable to the values of the independent variable.

Number of Flashlights, *n*	Money Left, *M* ($)
1	17
2	14
3	11
4	8
5	5
6	2

"Multiply the number of flashlights bought by 3, then subtract from 20 to get the money left in dollars."

Represents corresponding values of the dependent and independent variables of a function (table of values, points on the Cartesian plane).



"From the graph, I can see that as the number of flashlights increases by 1, the money left decreases by 3."

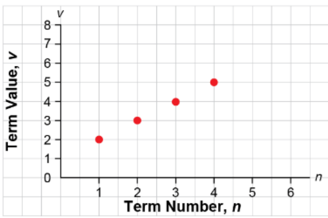
Represents a function as an algebraic expression.

"I used the rule to write an algebraic expression: Multiply the number of flashlights purchased, *n*, by 3, then subtract from 20 to get the money left in dollars, *M*. The expression is 20 – 3*n*."

Observations/Documentation

Activity 1 Assessment

Investigating Functions

Investigating Functions (cont’d)			
Relates between various representations of the same function.  Add 1 to the term number, n, to get the term value, v. “The graph and the rule both represent the same function because on the graph, each term value is one more than the term number.”	Determines a value of the dependent variable given the independent variable. Bikes are available for rent for $10, plus $3 per hour. How much would it cost to rent a bike for 9 hours? “An expression that relates the total cost, C, to the number of hours, n, is $3n + 10$. To find the cost for 9 hours, I evaluated the expression for $n = 9$. $3(9) + 10 = 37$ It would cost $37.”	Uses strategies flexibly to determine a value of the independent variable given the value of the dependent variable. A person paid $43. For how many hours did they rent the bike? “I set the expression equal to 43, then used inverse operations to solve the equation.” $3n + 10 = 43$ $3n + 10 – 10 = 43 – 10$ $3n = 33$ $\frac{3n}{3} = \frac{33}{3}$ $n = 11$	Flexibly solves problems involving functions. Yuri has $455 in the bank. To buy tickets, Yuri takes out $15 each week, for 20 weeks. After 20 weeks, will Yuri have enough money left to donate $175 to the Terry Fox Run? “An expression that relates the amount left in the bank in dollars, A, to the number of weeks, w, is: $455 – 15w$ After 20 weeks, the amount left in the bank will be: $455 – 15(20) = 455 – 300$, or 155; $155. Yuri will not be able to donate $175 to the Terry Fox Run.”
Observations/Documentation			

Patterning and Algebra

Activity 2 Assessment

Representing Functions Algebraically

Investigating Functions

Identifies variables (dependent and independent) as changing quantities in a given situation.

Kaspar earned $20 to spend on loot bags for their party guests. They want to put a mini flashlight in each loot bag. A flashlight costs $3.

Number of Flashlights, *n*	Money Left, *M* ($)
1	17
2	14
3	11
4	8
5	5
6	2

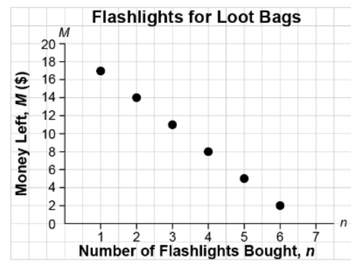
"The money left *depends* on the number of flashlights bought. So, *M* is the dependent variable and *n* is the independent variable."

Describes the rule that relates the values of the dependent variable to the values of the independent variable.

Number of Flashlights, *n*	Money Left, *M* ($)
1	17
2	14
3	11
4	8
5	5
6	2

"Multiply the number of flashlights bought by 3, then subtract from 20 to get the money left in dollars."

Represents corresponding values of the dependent and independent variables of a function (table of values, points on the Cartesian plane).



"From the graph, I can see that as the number of flashlights increases by 1, the money left decreases by 3."

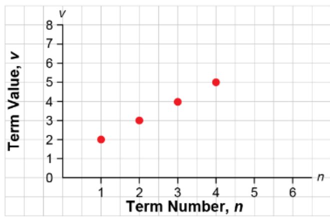
Represents a function as an algebraic expression.

"I used the rule to write an algebraic expression: Multiply the number of flashlights purchased, *n*, by 3, then subtract from 20 to get the money left in dollars, *M*. The expression is 20 – 3*n*."

Observations/Documentation

Activity 2 Assessment

Representing Functions Algebraically

Investigating Functions (cont'd)			
Relates between various representations of the same function.  Add 1 to the term number, n, to get the term value, v. "The graph and the rule both represent the same function because on the graph, each term value is one more than the term number."	Determines a value of the dependent variable given the independent variable. Bikes are available for rent for \$10, plus \$3 per hour. How much would it cost to rent a bike for 9 hours? "An expression that relates the total cost, C, to the number of hours, n, is $3n + 10$. To find the cost for 9 hours, I evaluated the expression for $n = 9$. $3(9) + 10 = 37$ It would cost \$37."	Uses strategies flexibly to determine a value of the independent variable given the value of the dependent variable. A person paid \$43. For how many hours did they rent the bike? "I set the expression equal to 43, then used inverse operations to solve the equation." $3n + 10 = 43$ $3n + 10 – 10 = 43 – 10$ $3n = 33$ $\frac{3n}{3} = \frac{33}{3}$ $n = 11$	Flexibly solves problems involving functions. Yuri has \$455 in the bank. To buy tickets, Yuri takes out \$15 each week, for 20 weeks. After 20 weeks, will Yuri have enough money left to donate \$175 to the Terry Fox Run? "An expression that relates the amount left in the bank in dollars, A, to the number of weeks, w, is: $455 – 15w$ After 20 weeks, the amount left in the bank will be: $455 – 15(20) = 455 – 300$, or 155; \$155. Yuri will not be able to donate \$175 to the Terry Fox Run."
Observations/Documentation			

Patterning and Algebra

Activity 3 Assessment

Solving Problems Involving Functions

Investigating Functions

Identifies variables (dependent and independent) as changing quantities in a given situation.

Kaspar earned $20 to spend on loot bags for their party guests. They want to put a mini flashlight in each loot bag. A flashlight costs $3.

Number of Flashlights, *n*	Money Left, *M* ($)
1	17
2	14
3	11
4	8
5	5
6	2

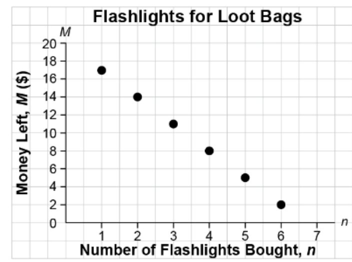
"The money left *depends* on the number of flashlights bought. So, *M* is the dependent variable and *n* is the independent variable."

Describes the rule that relates the values of the dependent variable to the values of the independent variable.

Number of Flashlights, *n*	Money Left, *M* ($)
1	17
2	14
3	11
4	8
5	5
6	2

"Multiply the number of flashlights bought by 3, then subtract from 20 to get the money left in dollars."

Represents corresponding values of the dependent and independent variables of a function (table of values, points on the Cartesian plane).



"From the graph, I can see that as the number of flashlights increases by 1, the money left decreases by 3."

Represents a function as an algebraic expression.

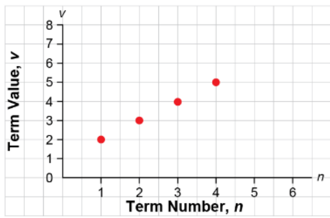
"I used the rule to write an algebraic expression: Multiply the number of flashlights purchased, *n*, by 3, then subtract from 20 to get the money left in dollars, *M*. The expression is 20 – 3*n*."

Observations/Documentation

Patterning and Algebra

Activity 3 Assessment

Solving Problems Involving Functions

Investigating Functions (cont'd)			
Relates between various representations of the same function.  Add 1 to the term number, n, to get the term value, v. “The graph and the rule both represent the same function because on the graph, each term value is one more than the term number.”	Determines a value of the dependent variable given the independent variable. Bikes are available for rent for \$10, plus \$3 per hour. How much would it cost to rent a bike for 9 hours? “An expression that relates the total cost, C, to the number of hours, n, is $3n + 10$. To find the cost for 9 hours, I evaluated the expression for $n = 9$. $3(9) + 10 = 37$ It would cost \$37.”	Uses strategies flexibly to determine a value of the independent variable given the value of the dependent variable. A person paid \$43. For how many hours did they rent the bike? “I set the expression equal to 43, then used inverse operations to solve the equation.” $3n + 10 = 43$ $3n + 10 - 10 = 43 - 10$ $3n = 33$ $\frac{3n}{3} = \frac{33}{3}$ $n = 11$	Flexibly solves problems involving functions. Yuri has \$455 in the bank. To buy tickets, Yuri takes out \$15 each week, for 20 weeks. After 20 weeks, will Yuri have enough money left to donate \$175 to the Terry Fox Run? “An expression that relates the amount left in the bank in dollars, A, to the number of weeks, w, is: $455 - 15w$ After 20 weeks, the amount left in the bank will be: $455 - 15(20) = 455 - 300$, or 155; \$155. Yuri will not be able to donate \$175 to the Terry Fox Run.”
Observations/Documentation			

Activity 4 Assessment

Functions Consolidation

Investigating Functions

Identifies variables (dependent and independent) as changing quantities in a given situation.

Kaspar earned $20 to spend on loot bags for their party guests. They want to put a mini flashlight in each loot bag. A flashlight costs $3.

Number of Flashlights, *n*	Money Left, *M* ($)
1	17
2	14
3	11
4	8
5	5
6	2

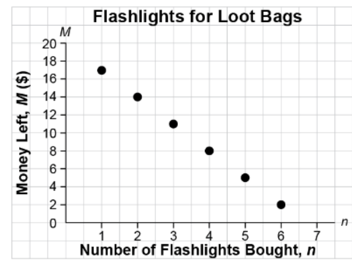
"The money left *depends* on the number of flashlights bought. So, *M* is the dependent variable and *n* is the independent variable."

Describes the rule that relates the values of the dependent variable to the values of the independent variable.

Number of Flashlights, *n*	Money Left, *M* ($)
1	17
2	14
3	11
4	8
5	5
6	2

"Multiply the number of flashlights bought by 3, then subtract from 20 to get the money left in dollars."

Represents corresponding values of the dependent and independent variables of a function (table of values, points on the Cartesian plane).



"From the graph, I can see that as the number of flashlights increases by 1, the money left decreases by 3."

Represents a function as an algebraic expression.

"I used the rule to write an algebraic expression: Multiply the number of flashlights purchased, *n*, by 3, then subtract from 20 to get the money left in dollars, *M*. The expression is $20 - 3n$."

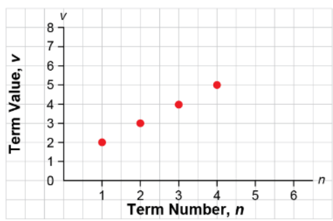
Observations/Documentation

Patterning and Algebra

Activity 4 Assessment

Functions Consolidation

Investigating Functions (cont'd)

Relates between various representations of the same function.	Determines a value of the dependent variable given the independent variable.	Uses strategies flexibly to determine a value of the independent variable given the value of the dependent variable.	Flexibly solves problems involving functions.
 Add 1 to the term number, *n*, to get the term value, *v*. "The graph and the rule both represent the same function because on the graph, each term value is one more than the term number."	Bikes are available for rent for $10, plus $3 per hour. How much would it cost to rent a bike for 9 hours? "An expression that relates the total cost, *C*, to the number of hours, *n*, is $3n + 10$. To find the cost for 9 hours, I evaluated the expression for $n = 9$. $3(9) + 10 = 37$ It would cost $37."	A person paid $43. For how many hours did they rent the bike? "I set the expression equal to 43, then used inverse operations to solve the equation." $3n + 10 = 43$ $3n + 10 - 10 = 43 - 10$ $3n = 33$ $\frac{3n}{3} = \frac{33}{3}$ $n = 11$	Yuri has $455 in the bank. To buy tickets, Yuri takes out $15 each week, for 20 weeks. After 20 weeks, will Yuri have enough money left to donate $175 to the Terry Fox Run? "An expression that relates the amount left in the bank in dollars, *A*, to the number of weeks, *w*, is: $455 - 15w$ After 20 weeks, the amount left in the bank will be: $455 - 15(20) = 455 - 300$, or 155; $155. Yuri will not be able to donate $175 to the Terry Fox Run."

Observations/Documentation

Name______________________________ Date____________________

Patterning and Algebra
Unit 2 Line Master 1

Claim Your Prize!

Skill-testing Question:

Answer:

Skill-testing Question:

Answer:

Skill-testing Question:

Answer:

Skill-testing Question:

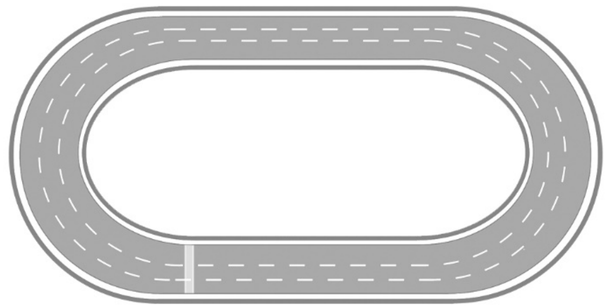
Answer:

Name________________________________ Date_____________________

Patterning and Algebra
Unit 2 Line Master 2

Story Problems

1. In one week, Jess ran 4 times as many laps of the track as Tyson.
   Jess ran 24 laps.
   How many laps did Tyson run?



2. 35 students went on a field trip.
   Three small buses were filled, and 5 students travelled in cars.
   How many students were in each bus?

3. Ashton has $20 in their savings account.
   They decide to deposit $5 per week, with a goal of saving $50.
   After how many weeks will Ashton reach their goal?

Name________________________________ Date_____________________

Patterning and Algebra
Unit 2 Line Master 3

Connect Four Game Board

Name________________________________ Date_____________________

Patterning and Algebra
Unit 2 Line Master 4a

Connect Four Game Cards

Simplifying Expressions

$7(a + 2) + 5a - 1$	$5b + 3 - b + 7$
$2(3c) + 4(5c)$	$5(6d) + 5d$
$2(e + 4) + 3(e + 3)$	$f + 11 + 4(f + 1)$
$9g + 2g - g + 6$	$3h + 2 + 4h - 1$
$7(j + 3) + j - 3$	$k + 14 + 10(k + 1)$
$3m + 2n + 6m + n$	$4(5p) + 9 + 2p + 1$
$7(3 + r) + 2(r + 3)$	$5s + 7 - 4 + 2s + 3$
$2t + 6 + t - 2 + t$	$4(3u) + 5v + 3u + 2(8v)$

Name________________________________ Date_____________________

Patterning and Algebra
Unit 2 Line Master 4b

Connect Four Game Cards

Solving Equations

$a - 7 = 15$	$3b = 39$
$2c + 5 = 13$	$4d - 9 = 31$
$5e + 2 + 3e + 1 = 40 + 3$	$3(2f + 1) + 2(f + 3) = 5^2$
$2(7g) + 6(2g) = 100 - 22$	$6^2 = 2h + 5 + 4h - 5$
$7(j + 1) + 3(j + 4) = 25 + 34$	$11k + 16 + 2k - 9 = 8 \times 9$
$5m + 9 + 2(m + 1) - 7 = 8 \times 11$	$3(6n) + 3(2n) = 12 \times 14$
$p + 2(p + 3) - 5 = 70 - 18$	$6q + 3 = 3q + 4 \times 6$
$8(r + 1) + 3(2r + 1) = 13 \times 3$	$5s + 2s = 10 + 4 \times 8$

Name________________________________ Date_____________________

Patterning and Algebra
Unit 2 Line Master 4c

Connect Four Game Cards

Skill-Testing Questions

$2 \times (9 - 4) + 4^2 - 3$	$35 \div (6 - 1) \times 2^3 + 1$
$5 + 3 \times 2 + 3^2 \times (13 - 9)$	$2^2 \times (12 - 7) \div (7 - 5) \times 3$
$5^2 \times (6 - 2) \div 10$	$(3 + 1) \times 2 + 2^2$

Name________________________________ Date_____________________

Patterning and Algebra
Unit 2 Line Master 4d

Connect Four Game Cards

Simplifying Expressions: Answers

$7(a + 2) + 5a - 1 = 12a + 13$	$5b + 3 - b + 7 = 4b + 10$
$2(3c) + 4(5c) = 26c$	$5(6d) + 5d = 35d$
$2(e + 4) + 3(e + 3) = 5e + 17$	$f + 11 + 4(f + 1) = 5f + 15$
$9g + 2g - g + 6 = 10g + 6$	$3h + 2 + 4h - 1 = 7h + 1$
$7(j + 3) + j - 3 = 8j + 18$	$k + 14 + 10(k + 1) = 11k + 24$
$3m + 2n + 6m + n = 9m + 3n$	$4(5p) + 9 + 2p + 1 = 22p + 10$
$7(3 + r) + 2(r + 3) = 9r + 27$	$5s + 7 - 4 + 2s + 3 = 7s + 6$
$2t + 6 + t - 2 + t = 4t + 4$	$4(3u) + 5v + 3u + 2(8v)$ $= 15u + 21v$

Name________________________________ Date_____________________

Patterning and Algebra
Unit 2 Line Master 4e

Connect Four Game Cards

Solving Equations: Answers

$a - 7 = 15$ $a = 22$	$3b = 39$ $b = 13$
$2c + 5 = 13$ $c = 4$	$4d - 9 = 31$ $d = 10$
$5e + 2 + 3e + 1 = 40 + 3$ $e = 5$	$3(2f + 1) + 2(f + 3) = 5^2$ $f = 2$
$2(7g) + 6(2g) = 100 - 22$ $g = 3$	$6^2 = 2h + 5 + 4h - 5$ $h = 6$
$7(j + 1) + 3(j + 4) = 25 + 34$ $j = 4$	$11k + 16 + 2k - 9 = 8 \times 9$ $k = 5$
$5m + 9 + 2(m + 1) - 7 = 8 \times 11$ $m = 12$	$3(6n) + 3(2n) = 12 \times 14$ $n = 7$
$p + 2(p + 3) - 5 = 70 - 18$ $p = 17$	$6q + 3 = 3q + 4 \times 6$ $q = 7$
$8(r + 1) + 3(2r + 1) = 13 \times 3$ $r = 2$	$5s + 2s = 10 + 4 \times 8$ $s = 6$

Name_________________________________ Date______________________

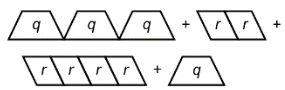
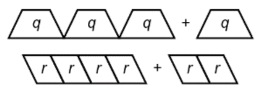
Patterning and Algebra
Unit 2 Line Master 4f

Connect Four Game Cards

Skill-Testing Questions: Answers

$2 \times (9 - 4) + 4^2 - 3 = 23$	$35 \div (6 - 1) \times 2^3 + 1 = 57$
$5 + 3 \times 2 + 3^2 \times (13 - 9) = 47$	$2^2 \times (12 - 7) \div (7 - 5) \times 3 = 30$
$5^2 \times (6 - 2) \div 10 = 10$	$(3 + 1) \times 2 + 2^2 = 12$

Activity 5 Assessment
The Order of Operations

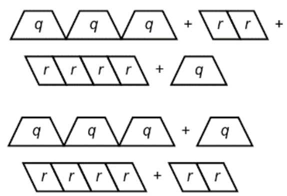
Variables and Equations			
Evaluates a numerical expression using the order of operations. $80 \div 5 \times (2 + 3) - 2^3$ $= 80 \div 5 \times 5 - 2^3$ $= 80 \div 5 \times 5 - 8$ $= 16 \times 5 - 8$ $= 80 - 8$ $= 72$ "I have to do the operation in parentheses first, then the power, then the multiplication and division in the order they appear, and then the subtraction."	Models an algebraic expression and combines like terms. $3q + 2r + 4r + q$   "$3q + 2r + 4r + q = 4q + 6r$"	Uses algebraic properties to rearrange terms in an algebraic expression. $6(b + 3) + 7b$ $= 6 \times b + 6 \times 3 + 7b$ $= 6b + 18 + 7b$ $= 6b + 7b + 18$ "I used the distributive property to eliminate the parentheses, then I used the commutative property to rearrange the terms."	Simplifies algebraic expressions by combining like terms. $6(b + 3) + 7b$ $= 6 \times b + 6 \times 3 + 7b$ $= 6b + 18 + 7b$ $= 6b + 7b + 18$ $= 13b + 18$ "$6b$ and $7b$ are like terms so I can add them."
Observations/Documentation			

Patterning and Algebra

Activity 5 Assessment
The Order of Operations

Variables and Equations (cont'd)			
Simplifies expressions on both sides of an equation. $2(3d + 4) - 1 = 100 \div 4$ $6d + 2 \times 4 - 1 = 25$ $6d + 8 - 1 = 25$ $6d + 7 = 25$ "I used algebraic properties to simplify the expressions on both sides of the equation. Now I have an equation with two operations."	Solves equations involving one or two operations using different strategies. $6d + 7 = 25$ $6d + 7 = 18 + 7$ So, $6d = 18$ "I used a balance model. Then, I know $6 \times 3 = 18$, so $d = 3$."	Verifies the solution to an equation. $2(3d + 4) - 1 = 100 \div 4$ $6d + 7 = 25$ To check, substitute $d = 3$. Left side $= 2(3d + 4) - 1$ $= 2(3 \times 3 + 4) - 1$ $= 2(13) - 1$ $= 26 - 1$ $= 25$ Right side $= 100 \div 4$ $= 25$ "Since the left side equals the right side, my solution is correct."	Flexibly works with equations to solve problems using a variety of strategies. Ava rents a bicycle to ride around the city. There is a flat fee of \$10, plus \$3 per hour. Ava pays a total of \$28. For how many hours did Ava rent the bicycle? $10 + 3n = 28$, where n is the number of hours that Ava rented the bicycle. $10 - 10 + 3n = 28 - 10$ $3n = 18$ $n = 6$ "I know $3 \times 6 = 18$, so $n = 6$. Ava rented the bicycle for 6 hours."
Observations/Documentation			

Activity 6 Assessment
Investigating Algebraic Expressions

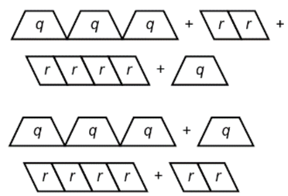
Variables and Equations			
Evaluates a numerical expression using the order of operations. $80 \div 5 \times (2 + 3) - 23$ $= 80 \div 5 \times 5 - 23$ $= 80 \div 5 \times 5 - 8$ $= 16 \times 5 - 8$ $= 80 - 8$ $= 72$ “I have to do the operation in parentheses first, then the power, then the multiplication and division in the order they appear, and then the subtraction.”	Models an algebraic expression and combines like terms. $3q + 2r + 4r + q$  “$3q + 2r + 4r + q = 4q + 6r$”	Uses algebraic properties to rearrange terms in an algebraic expression. $6(b + 3) + 7b$ $= 6 \times b + 6 \times 3 + 7b$ $= 6b + 18 + 7b$ $= 6b + 7b + 18$ “I used the distributive property to eliminate the parentheses, then I used the commutative property to rearrange the terms.”	Simplifies algebraic expressions by combining like terms. $6(b + 3) + 7b$ $= 6 \times b + 6 \times 3 + 7b$ $= 6b + 18 + 7b$ $= 6b + 7b + 18$ $= 13b + 18$ “$6b$ and $7b$ are like terms so I can add them.”
Observations/Documentation			

Activity 6 Assessment
Investigating Algebraic Expressions

Variables and Equations (cont'd)			
Simplifies expressions on both sides of an equation. $2(3d + 4) - 1 = 100 \div 4$ $6d + 2 \times 4 - 1 = 25$ $6d + 8 - 1 = 25$ $6d + 7 = 25$ "I used algebraic properties to simplify the expressions on both sides of the equation. Now I have an equation with two operations."	Solves equations involving one or two operations using different strategies. $6d + 7 = 25$ $6d + 7 = 18 + 7$ So, $6d = 18$ "I used a balance model. Then, I know $6 \times 3 = 18$, so $d = 3$."	Verifies the solution to an equation. $2(3d + 4) - 1 = 100 \div 4$ $6d + 7 = 25$ To check, substitute $d = 3$. Left side $= 2(3d + 4) - 1$ $= 2(3 \times 3 + 4) - 1$ $= 2(13) - 1$ $= 26 - 1$ $= 25$ Right side $= 100 \div 4$ $= 25$ "Since the left side equals the right side, my solution is correct."	Flexibly works with equations to solve problems using a variety of strategies. Ava rents a bicycle to ride around the city. There is a flat fee of $10, plus $3 per hour. Ava pays a total of $28. For how many hours did Ava rent the bicycle? $10 + 3n = 28$, where n is the number of hours that Ava rented the bicycle. $10 - 10 + 3n = 28 - 10$ $3n = 18$ $n = 6$ "I know $3 \times 6 = 18$, so $n = 6$. Ava rented the bicycle for 6 hours."
Observations/Documentation			

Activity 7 Assessment

Investigating Algebraic Properties

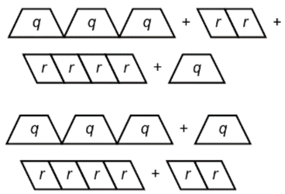
Variables and Equations			
Evaluates a numerical expression using the order of operations. $80 \div 5 \times (2 + 3) - 2^3$ $= 80 \div 5 \times 5 - 2^3$ $= 80 \div 5 \times 5 - 8$ $= 16 \times 5 - 8$ $= 80 - 8$ $= 72$ "I have to do the operation in parentheses first, then the power, then the multiplication and division in the order they appear, and then the subtraction."	Models an algebraic expression and combines like terms. $3q + 2r + 4r + q$  "$3q + 2r + 4r + q = 4q + 6r$"	Uses algebraic properties to rearrange terms in an algebraic expression. $6(b + 3) + 7b$ $= 6 \times b + 6 \times 3 + 7b$ $= 6b + 18 + 7b$ $= 6b + 7b + 18$ "I used the distributive property to eliminate the parentheses, then I used the commutative property to rearrange the terms."	Simplifies algebraic expressions by combining like terms. $6(b + 3) + 7b$ $= 6 \times b + 6 \times 3 + 7b$ $= 6b + 18 + 7b$ $= 6b + 7b + 18$ $= 13b + 18$ "$6b$ and $7b$ are like terms so I can add them."
Observations/Documentation			

Patterning and Algebra

Activity 7 Assessment
Investigating Algebraic Properties

Variables and Equations (cont'd)			
Simplifies expressions on both sides of an equation. $2(3d + 4) - 1 = 100 \div 4$ $6d + 2 \times 4 - 1 = 25$ $6d + 8 - 1 = 25$ $6d + 7 = 25$ "I used algebraic properties to simplify the expressions on both sides of the equation. Now I have an equation with two operations."	Solves equations involving one or two operations using different strategies. $6d + 7 = 25$ $6d + 7 = 18 + 7$ So, $6d = 18$ "I used a balance model. Then, I know $6 \times 3 = 18$, so $d = 3$."	Verifies the solution to an equation. $2(3d + 4) - 1 = 100 \div 4$ $6d + 7 = 25$ To check, substitute $d = 3$. Left side $= 2(3d + 4) - 1$ $= 2(3 \times 3 + 4) - 1$ $= 2(13) - 1$ $= 26 - 1$ $= 25$ Right side $= 100 \div 4$ $= 25$ "Since the left side equals the right side, my solution is correct."	Flexibly works with equations to solve problems using a variety of strategies. Ava rents a bicycle to ride around the city. There is a flat fee of \$10, plus \$3 per hour. Ava pays a total of \$28. For how many hours did Ava rent the bicycle? $10 + 3n = 28$, where n is the number of hours that Ava rented the bicycle. $10 - 10 + 3n = 28 - 10$ $3n = 18$ $n = 6$ "I know $3 \times 6 = 18$, so $n = 6$. Ava rented the bicycle for 6 hours."
Observations/Documentation			

Activity 8 Assessment
Writing and Solving Equations

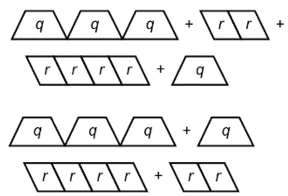
Variables and Equations			
Evaluates a numerical expression using the order of operations. $80 \div 5 \times (2 + 3) - 23$ $= 80 \div 5 \times 5 - 23$ $= 80 \div 5 \times 5 - 8$ $= 16 \times 5 - 8$ $= 80 - 8$ $= 72$ “I have to do the operation in parentheses first, then the power, then the multiplication and division in the order they appear, and then the subtraction.”	Models an algebraic expression and combines like terms. $3q + 2r + 4r + q$  “$3q + 2r + 4r + q = 4q + 6r$”	Uses algebraic properties to rearrange terms in an algebraic expression. $6(b + 3) + 7b$ $= 6 \times b + 6 \times 3 + 7b$ $= 6b + 18 + 7b$ $= 6b + 7b + 18$ “I used the distributive property to eliminate the parentheses, then I used the commutative property to rearrange the terms.”	Simplifies algebraic expressions by combining like terms. $6(b + 3) + 7b$ $= 6 \times b + 6 \times 3 + 7b$ $= 6b + 18 + 7b$ $= 6b + 7b + 18$ $= 13b + 18$ “$6b$ and $7b$ are like terms so I can add them.”
Observations/Documentation			

Patterning and Algebra

Activity 8 Assessment
Writing and Solving Equations

Variables and Equations (cont'd)			
Simplifies expressions on both sides of an equation. $2(3d + 4) – 1 = 100 ÷ 4$ $6d + 2 × 4 – 1 = 25$ $6d + 8 – 1 = 25$ $6d + 7 = 25$ "I used algebraic properties to simplify the expressions on both sides of the equation. Now I have an equation with two operations."	Solves equations involving one or two operations using different strategies. $6d + 7 = 25$ $6d + 7 = 18 + 7$ So, $6d = 18$ "I used a balance model. Then, I know $6 × 3 = 18$, so $d = 3$."	Verifies the solution to an equation. $2(3d + 4) – 1 = 100 ÷ 4$ $6d + 7 = 25$ To check, substitute $d = 3$. Left side $= 2(3d + 4) – 1$ $= 2(3 × 3 + 4) – 1$ $= 2(13) – 1$ $= 26 – 1$ $= 25$ Right side $= 100 ÷ 4$ $= 25$ "Since the left side equals the right side, my solution is correct."	Flexibly works with equations to solve problems using a variety of strategies. Ava rents a bicycle to ride around the city. There is a flat fee of $10, plus $3 per hour. Ava pays a total of $28. For how many hours did Ava rent the bicycle? $10 + 3n = 28$, where n is the number of hours that Ava rented the bicycle. $10 – 10 + 3n = 28 – 10$ $3n = 18$ $n = 6$ "I know $3 × 6 = 18$, so $n = 6$. Ava rented the bicycle for 6 hours."
Observations/Documentation			

Activity 9 Assessment
Variables and Equations Consolidation

Variables and Equations			
Evaluates a numerical expression using the order of operations. $80 \div 5 \times (2 + 3) - 2^3$ $= 80 \div 5 \times 5 - 2^3$ $= 80 \div 5 \times 5 - 8$ $= 16 \times 5 - 8$ $= 80 - 8$ $= 72$ "I have to do the operation in parentheses first, then the power, then the multiplication and division in the order they appear, and then the subtraction."	Models an algebraic expression and combines like terms. $3q + 2r + 4r + q$  "$3q + 2r + 4r + q = 4q + 6r$"	Uses algebraic properties to rearrange terms in an algebraic expression. $6(b + 3) + 7b$ $= 6 \times b + 6 \times 3 + 7b$ $= 6b + 18 + 7b$ $= 6b + 7b + 18$ "I used the distributive property to eliminate the parentheses, then I used the commutative property to rearrange the terms."	Simplifies algebraic expressions by combining like terms. $6(b + 3) + 7b$ $= 6 \times b + 6 \times 3 + 7b$ $= 6b + 18 + 7b$ $= 6b + 7b + 18$ $= 13b + 18$ "$6b$ and $7b$ are like terms so I can add them."
Observations/Documentation			

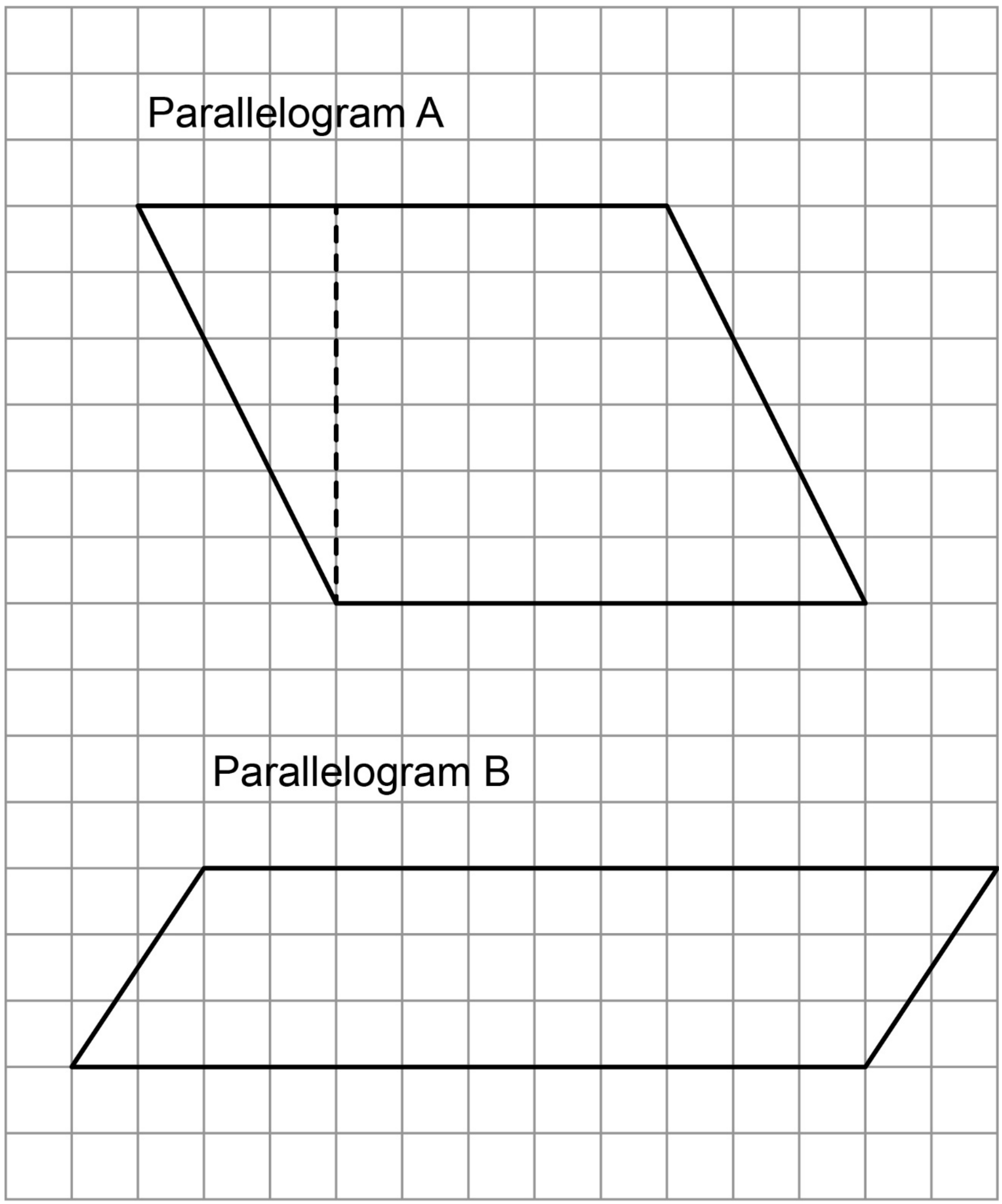
Activity 9 Assessment
Variables and Equations Consolidation

Variables and Equations (cont'd)			
Simplifies expressions on both sides of an equation. $2(3d + 4) - 1 = 100 \div 4$ $6d + 2 \times 4 - 1 = 25$ $6d + 8 - 1 = 25$ $6d + 7 = 25$ "I used algebraic properties to simplify the expressions on both sides of the equation. Now I have an equation with two operations."	Solves equations involving one or two operations using different strategies. $6d + 7 = 25$ $6d + 7 = 18 + 7$ So, $6d = 18$ "I used a balance model. Then, I know $6 \times 3 = 18$, so $d = 3$."	Verifies the solution to an equation. $2(3d + 4) - 1 = 100 \div 4$ $6d + 7 = 25$ To check, substitute $d = 3$. Left side $= 2(3d + 4) - 1$ $= 2(3 \times 3 + 4) - 1$ $= 2(13) - 1$ $= 26 - 1$ $= 25$ Right side $= 100 \div 4$ $= 25$ "Since the left side equals the right side, my solution is correct."	Flexibly works with equations to solve problems using a variety of strategies. Ava rents a bicycle to ride around the city. There is a flat fee of $10, plus $3 per hour. Ava pays a total of $28. For how many hours did Ava rent the bicycle? $10 + 3n = 28$, where n is the number of hours that Ava rented the bicycle. $10 - 10 + 3n = 28 - 10$ $3n = 18$ $n = 6$ "I know $3 \times 6 = 18$, so $n = 6$. Ava rented the bicycle for 6 hours."
Observations/Documentation			

Name________________________________ Date_____________________

Measurement
Unit 1 Line Master 1

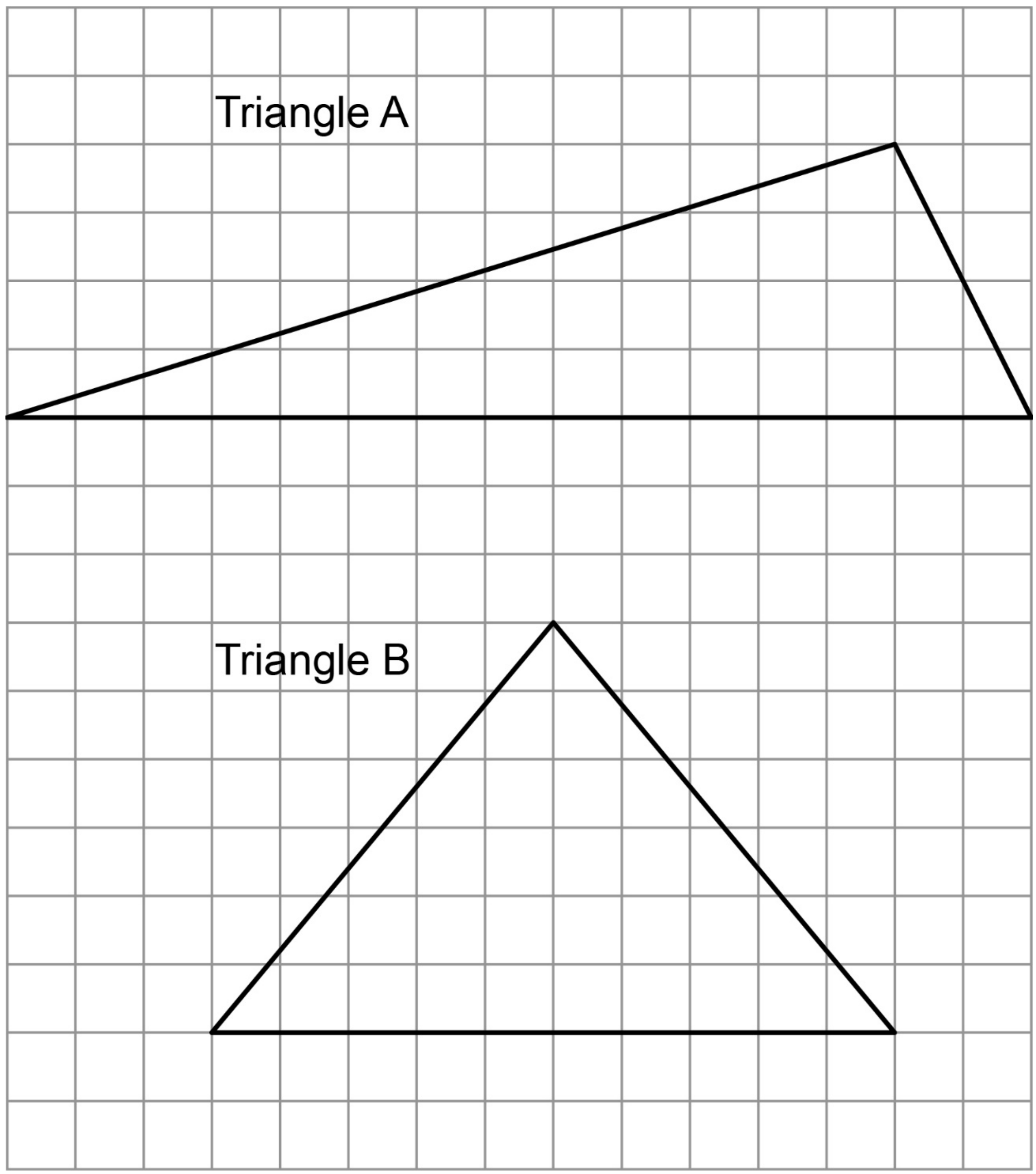
Area of Parallelograms



Name________________________________ Date_____________________

Measurement
Unit 1 Line Master 2

Area of Triangles

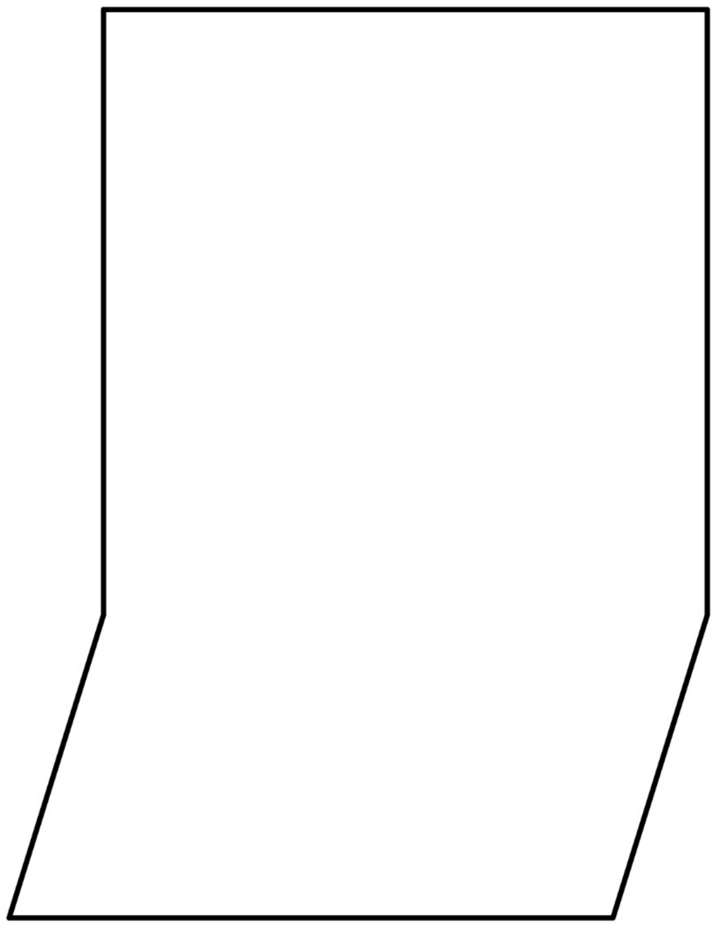


Name________________________________ Date_____________________

Measurement
Unit 1 Line Master 3a

Area of Composite Shapes

Shape A

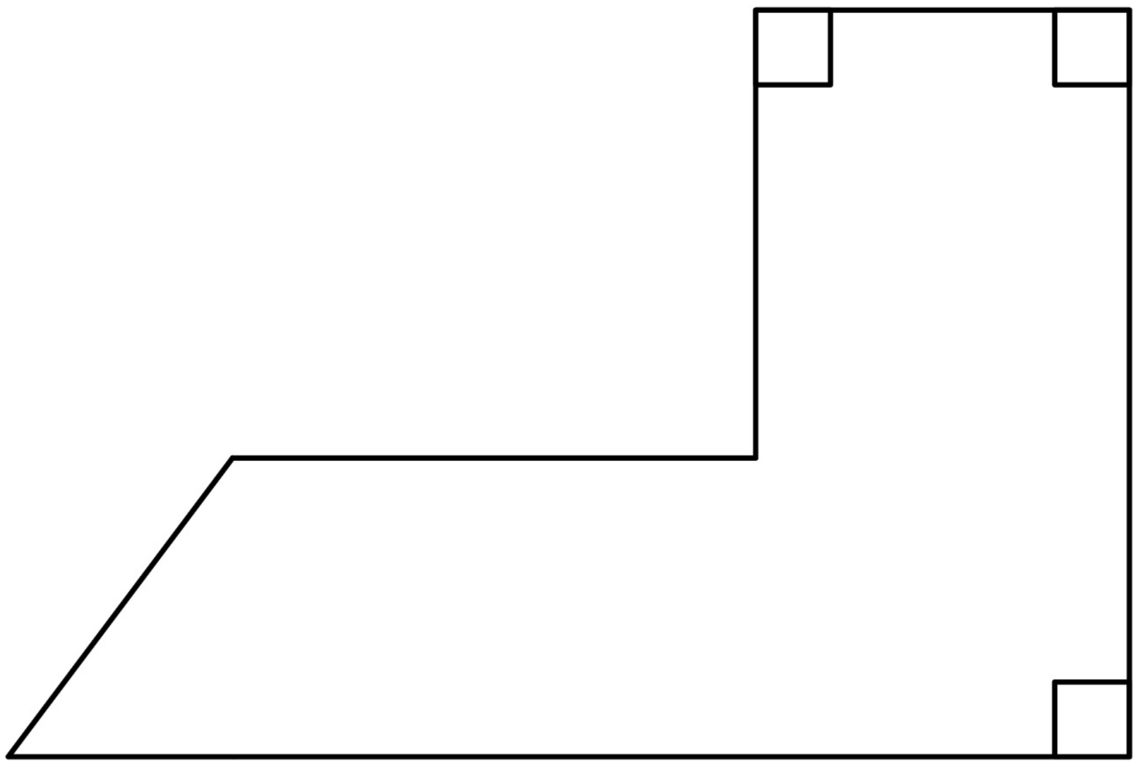


Name________________________________ Date_____________________

Measurement
Unit 1 Line Master 3b

Area of Composite Shapes (cont'd)

Shape B



Name________________________________ Date_____________________

Measurement
Unit 1 Line Master 4

Measuring Volume

Part A

Box	Estimate	Actual

Part B

Box	Estimate	Cubes in Bottom Layer	Number of Layers	Volume

Order from least to greatest volume:

Name________________________________ Date_____________________

Measurement
Unit 1 Line Master 5

Volume of Rectangular Prisms

Length	Width	Base Area	Height	Volume

Measurement

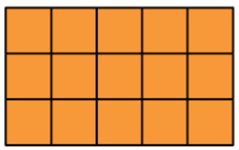
Activity 1 Assessment

Areas of Parallelograms and Triangles

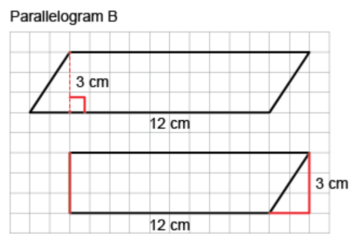
Measuring Area of Parallelograms and Triangles

Determines the area of a rectangle.

"A rectangle is an array of squares. To find the area, I multiply the number of rows by the number of columns or use the formula $A = b \times h$.
This rectangle has area
5 cm × 3 cm = 15 cm^2."

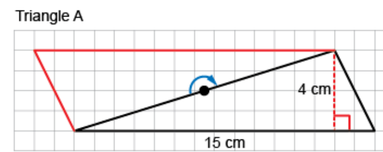


Partitions and rearranges a parallelogram to form a rectangle with the same base and height.



"I partitioned the parallelogram
and moved the triangle to
create a rectangle.
I then found the area of the rectangle:
$A = b \times h$ = 12 cm × 3 cm= 36 cm^2.
The area of the parallelogram is also 36 cm^2."

Doubles a triangle to create a parallelogram (area of triangle is one-half that of parallelogram).



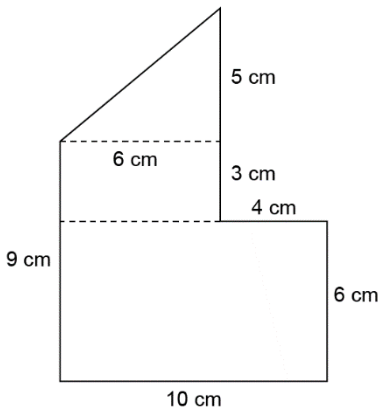
"I rotated the triangle to make a parallelogram
with the same base and height.
The area of the triangle is one-half
the area of the parallelogram.
Area of parallelogram:
15 cm × 4 cm = 60 cm^2
Area of triangle: 60 cm^2 ÷ 2 = 30 cm^2
So, the formula for the area of a triangle is:
$A = b \times h \div 2$."

Observations/Documentation

Activity 1 Assessment
Areas of Parallelograms and Triangles

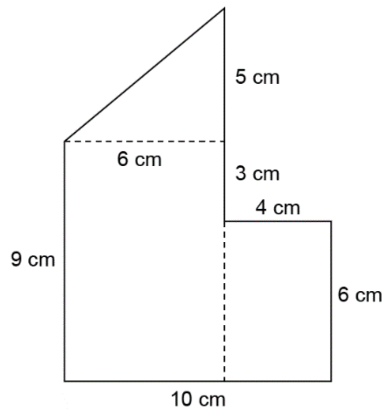
Measuring Area of Parallelograms and Triangles (cont'd)

Determines area by decomposing shapes into smaller shapes (rectangles, triangles, parallelograms), then adding their areas.



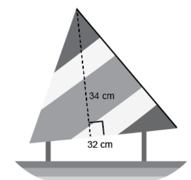
"I decomposed the shape into a triangle and 2 rectangles.
Area of small rectangle: 3 cm × 6 cm = 18 cm^2
Area of large rectangle: 6 cm × 10 cm = 60 cm^2
Area of triangle: 6 cm × 5 cm ÷ 2 = 15 cm^2
Area of composite shape:
18 cm^2 + 60 cm^2 + 15 cm^2 = 93 cm^2"

Decomposes a composite shape in different ways and realizes that its area doesn't change (conservation of area).



"I decomposed the shape into a triangle and 2 rectangles.
Area of small rectangle: 4 cm × 6 cm = 24 cm^2
Area of large rectangle: 9 cm × 6 cm = 54 cm^2
Area of triangle: 6 cm × 5 cm ÷ 2 = 15 cm^2
Area of composite shape:
24 cm^2 + 54 cm^2 + 15 cm^2 = 93 cm^2
The area is always the same no matter how I decompose the shape."

Flexibly solves problems involving the relationships among the areas of rectangles, parallelograms, and triangles.



What is the area of the sail on the toy boat?

"I doubled the triangular sail to make a parallelogram with the same base and height.
I found the area of the parallelogram:
34 cm × 32 cm = 1088 cm^2, then divided the area in half to find the area of the triangle:
1088 cm^2 ÷ 2 = 544 cm^2."

Observations/Documentation

Measurement

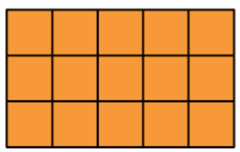
Activity 2 Assessment

Determining Area of Composite Shapes

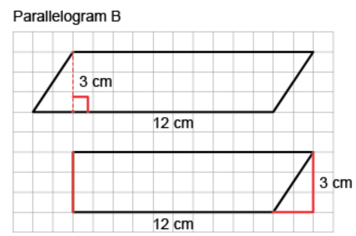
Measuring Area of Parallelograms and Triangles

Determines the area of a rectangle.

"A rectangle is an array of squares. To find the area, I multiply the number of rows by the number of columns or use the formula $A = b \times h$.
This rectangle has area
$5 \text{ cm} \times 3 \text{ cm} = 15 \text{ cm}^2$."

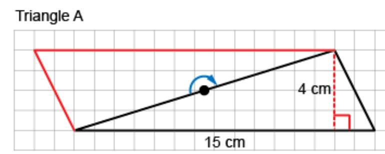


Partitions and rearranges a parallelogram to form a rectangle with the same base and height.



"I partitioned the parallelogram
and moved the triangle to
create a rectangle.
I then found the area of the rectangle:
$A = b \times h = 12 \text{ cm} \times 3 \text{ cm} = 36 \text{ cm}^2$.
The area of the parallelogram is also 36 cm^2."

Doubles a triangle to create a parallelogram (area of triangle is one-half that of parallelogram).



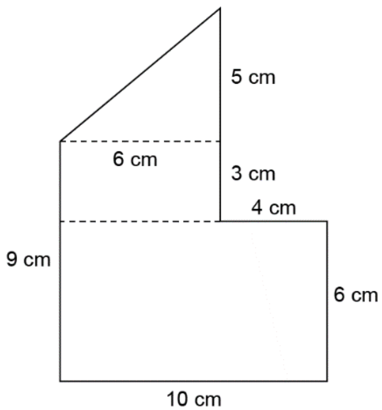
"I rotated the triangle to make a parallelogram
with the same base and height.
The area of the triangle is one-half
the area of the parallelogram.
Area of parallelogram:
$15 \text{ cm} \times 4 \text{ cm} = 60 \text{ cm}^2$
Area of triangle: $60 \text{ cm}^2 \div 2 = 30 \text{ cm}^2$
So, the formula for the area of a triangle is:
$A = b \times h \div 2$."

Observations/Documentation

Activity 2 Assessment
Determining Area of Composite Shapes

Measuring Area of Parallelograms and Triangles (cont’d)

Determines area by decomposing shapes into smaller shapes (rectangles, triangles, parallelograms), then adding their areas.



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Area of small rectangle: 3 cm × 6 cm = 18 cm^2
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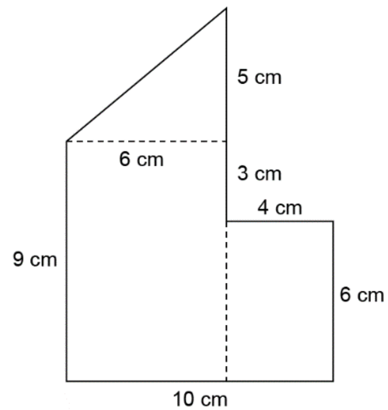
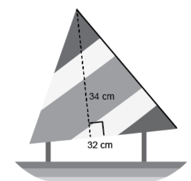
18 cm^2 + 60 cm^2 + 15 cm^2 = 93 cm^2”

Decomposes a composite shape in different ways and realizes that its area doesn’t change (conservation of area).



“I decomposed the shape into a triangle and 2 rectangles.
Area of small rectangle: 4 cm × 6 cm = 24 cm^2
Area of large rectangle: 9 cm × 6 cm = 54 cm^2
Area of triangle: 6 cm × 5 cm ÷ 2 = 15 cm^2
Area of composite shape:
24 cm^2 + 54 cm^2 + 15 cm^2 = 93 cm^2
The area is always the same no matter how I decompose the shape.”

Flexibly solves problems involving the relationships among the areas of rectangles, parallelograms, and triangles.

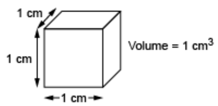
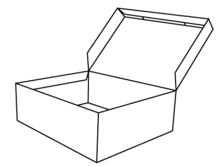
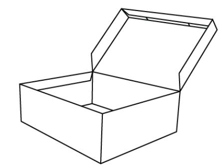


What is the area of the sail on the toy boat?

“I doubled the triangular sail to make a parallelogram with the same base and height.
I found the area of the parallelogram:
34 cm × 32 cm = 1088 cm^2, then divided the area in half to find the area of the triangle:
1088 cm^2 ÷ 2 = 544 cm^2.”

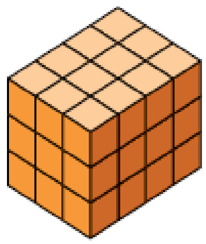
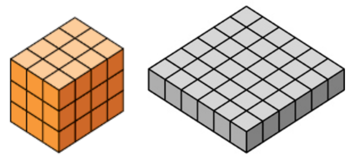
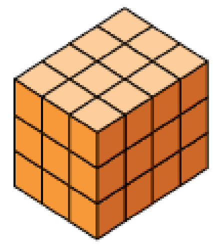
Observations/Documentation

Activity 3 Assessment
Investigating Volume

Interpreting and Expressing Volume			
Explores volume as the amount of space occupied by a 3-D shape.  "This cube occupies a space that can be measured. Each edge has a length of 1 cm and it has a volume of 1 cm^3."	Recognizes volume of 3-D shapes in familiar contexts. "Everyday objects have volume; for example, a loaf of bread and a cereal box."	Models volume using concrete materials (non-standard units).  "The volume of the box is about 12 marbles. Marbles aren't the greatest unit because they leave gaps."	Expresses volume of 3-D shapes using standard units (cubic metres, cubic centimetres).  "I filled the box with centimetre cubes. The volume of the box is about 24 cm^3."
Observations/Documentation			

Activity 3 Assessment
Investigating Volume

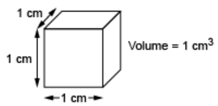
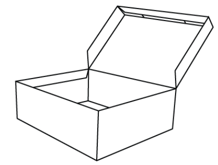
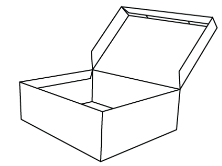
Interpreting and Expressing Volume (cont'd)

Models volume of a rectangular prism as a 3-D array of cubic units.	Recognizes that volume remains the same when decomposed or rearranged.	Determines the volume of a rectangular prism using multiplication.	Flexibly solves problems in various contexts that involve the volume of rectangular prisms.
 "The prism is a 3-D array of centimetre cubes. There are 12 cubes in each layer and 3 layers: 12 + 12 + 12 = 36. The prism has volume 36 cm^3."	 "I rearranged the 36 centimetre cubes to make a different prism. The number of cubes didn't change so, the volume is still 36 cm^3."	 "The prism has length 4 cm, width 3 cm and height 3 cm. The area of the base is 4 cm × 3 cm = 12 cm^2, and the volume of the prism is: Area of the base × height = 12 cm^2 × 3 cm = 36 cm^3."	A square prism has height 11 cm and volume 539 cm^3. Determine the side length of the square base. "Volume = area of base × height 539 cm^3 = Area of the base × 11 cm 539 ÷ 11 = 49 So, the area of the base is 49 cm^2. The base is a square, so all sides are equal: 49 cm^2 = s × s Since 7 × 7 = 49, the side length of the square base is 7 cm."

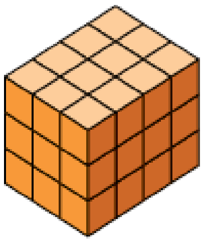
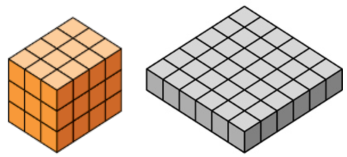
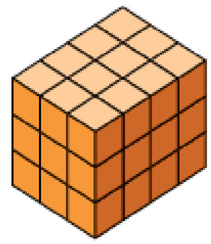
Observations/Documentation

Measurement

Activity 4 Assessment
Investigating Volume with Rectangular Prisms

Interpreting and Expressing Volume			
Explores volume as the amount of space occupied by a 3-D shape.  “This cube occupies a space that can be measured. Each edge has a length of 1 cm and it has a volume of 1 cm^3.”	Recognizes volume of 3-D shapes in familiar contexts. “Everyday objects have volume; for example, a loaf of bread and a cereal box.”	Models volume using concrete materials (non-standard units).  “The volume of the box is about 12 marbles. Marbles aren’t the greatest unit because they leave gaps.”	Expresses volume of 3-D shapes using standard units (cubic metres, cubic centimetres).  “I filled the box with centimetre cubes. The volume of the box is about 24 cm^3.”
Observations/Documentation			

Activity 4 Assessment
Investigating Volume with Rectangular Prisms

Interpreting and Expressing Volume (cont'd)			
Models volume of a rectangular prism as a 3-D array of cubic units.  "The prism is a 3-D array of centimetre cubes. There are 12 cubes in each layer and 3 layers: 12 + 12 + 12 = 36. The prism has volume 36 cm^3."	Recognizes that volume remains the same when decomposed or rearranged.  "I rearranged the 36 centimetre cubes to make a different prism. The number of cubes didn't change so, the volume is still 36 cm^3."	Determines the volume of a rectangular prism using multiplication.  "The prism has length 4 cm, width 3 cm and height 3 cm. The area of the base is 4 cm × 3 cm = 12 cm^2, and the volume of the prism is: Area of the base × height = 12 cm^2 × 3 cm = 36 cm^3."	Flexibly solves problems in various contexts that involve the volume of rectangular prisms. A square prism has height 11 cm and volume 539 cm^3. Determine the side length of the square base. "Volume = area of base × height 539 cm^3 = Area of the base × 11 cm 539 ÷ 11 = 49 So, the area of the base is 49 cm^2. The base is a square, so all sides are equal: 49 cm^2 = $s \times s$ Since 7 × 7 = 49, the side length of the square base is 7 cm."
Observations/Documentation			

Measurement

Activity 5 Assessment
Area and Volume Consolidation

<table>
<tr><th colspan="3">Measuring Area of Parallelograms and Triangles</th></tr>
<tr>
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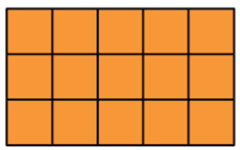
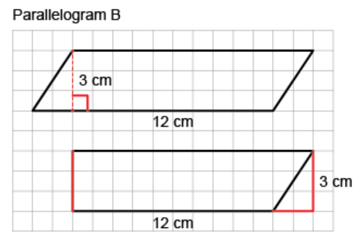
5 cm × 3 cm = 15 cm^2.”

</td>
<td>Partitions and rearranges a parallelogram to form a rectangle with the same base and height.



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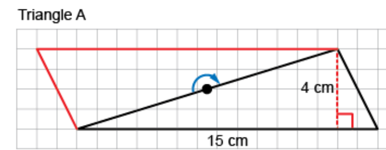

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The area of the triangle is one-half the area of the parallelogram.
Area of parallelogram:
15 cm × 4 cm = 60 cm^2
Area of triangle: 60 cm^2 ÷ 2 = 30 cm^2
So, the formula for the area of a triangle is:
$A = b \times h \div 2$.”</td>
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<tr><th colspan="3">Observations/Documentation</th></tr>
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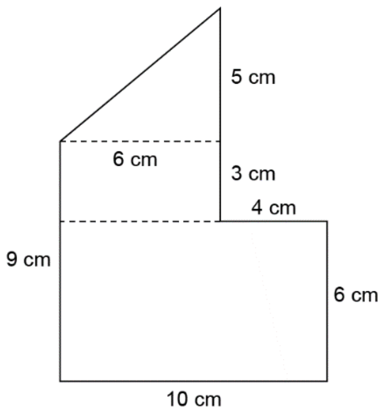
</table>

Measurement

Activity 5 Assessment
Area and Volume Consolidation

Measuring Area of Parallelograms and Triangles (cont'd)

Determines area by decomposing shapes into smaller shapes (rectangles, triangles, parallelograms), then adding their areas.



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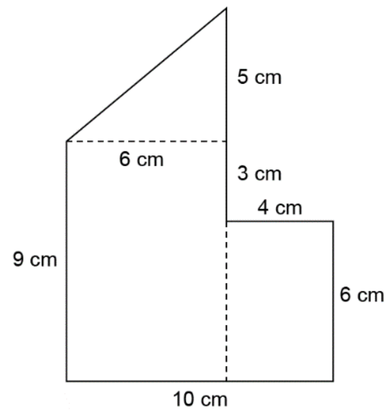

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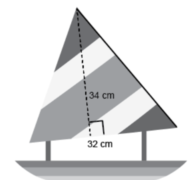

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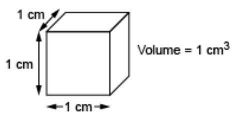
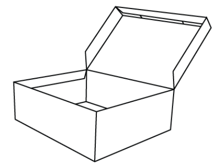
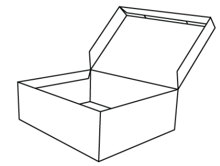
Observations/Documentation

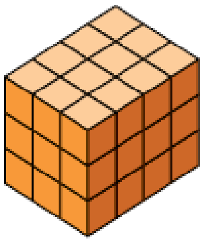
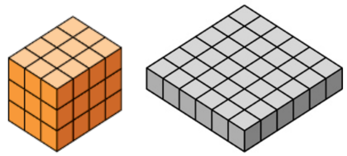
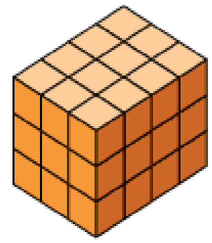
Activity 5 Assessment
Area and Volume Consolidation

Interpreting and Expressing Volume			
Explores volume as the amount of space occupied by a 3-D shape.  “This cube occupies a space that can be measured. Each edge has a length of 1 cm and it has a volume of 1 cm^3.”	Recognizes volume of 3-D shapes in familiar contexts. “Everyday objects have volume; for example, a loaf of bread and a cereal box.”	Models volume using concrete materials (non-standard units).  “The volume of the box is about 12 marbles. Marbles aren’t the greatest unit because they leave gaps.”	Expresses volume of 3-D shapes using standard units (cubic metres, cubic centimetres).  “I filled the box with centimetre cubes. The volume of the box is about 24 cm^3.”
Observations/Documentation			

Measurement

Activity 5 Assessment
Area and Volume Consolidation

Interpreting and Expressing Volume (cont'd)

Models volume of a rectangular prism as a 3-D array of cubic units.	Recognizes that volume remains the same when decomposed or rearranged.	Determines the volume of a rectangular prism using multiplication.	Flexibly solves problems in various contexts that involve the volume of rectangular prisms.
 "The prism is a 3-D array of centimetre cubes. There are 12 cubes in each layer and 3 layers: 12 + 12 + 12 = 36. The prism has volume 36 cm^3."	 "I rearranged the 36 centimetre cubes to make a different prism. The number of cubes didn't change so, the volume is still 36 cm^3."	 "The prism has length 4 cm, width 3 cm and height 3 cm. The area of the base is 4 cm × 3 cm = 12 cm^2, and the volume of the prism is: Area of the base × height = 12 cm^2 × 3 cm = 36 cm^3."	A square prism has height 11 cm and volume 539 cm^3. Determine the side length of the square base. "Volume = area of base × height 539 cm^3 = Area of the base × 11 cm 539 ÷ 11 = 49 So, the area of the base is 49 cm^2. The base is a square, so all sides are equal: 49 cm^2 = s × s Since 7 × 7 = 49, the side length of the square base is 7 cm."

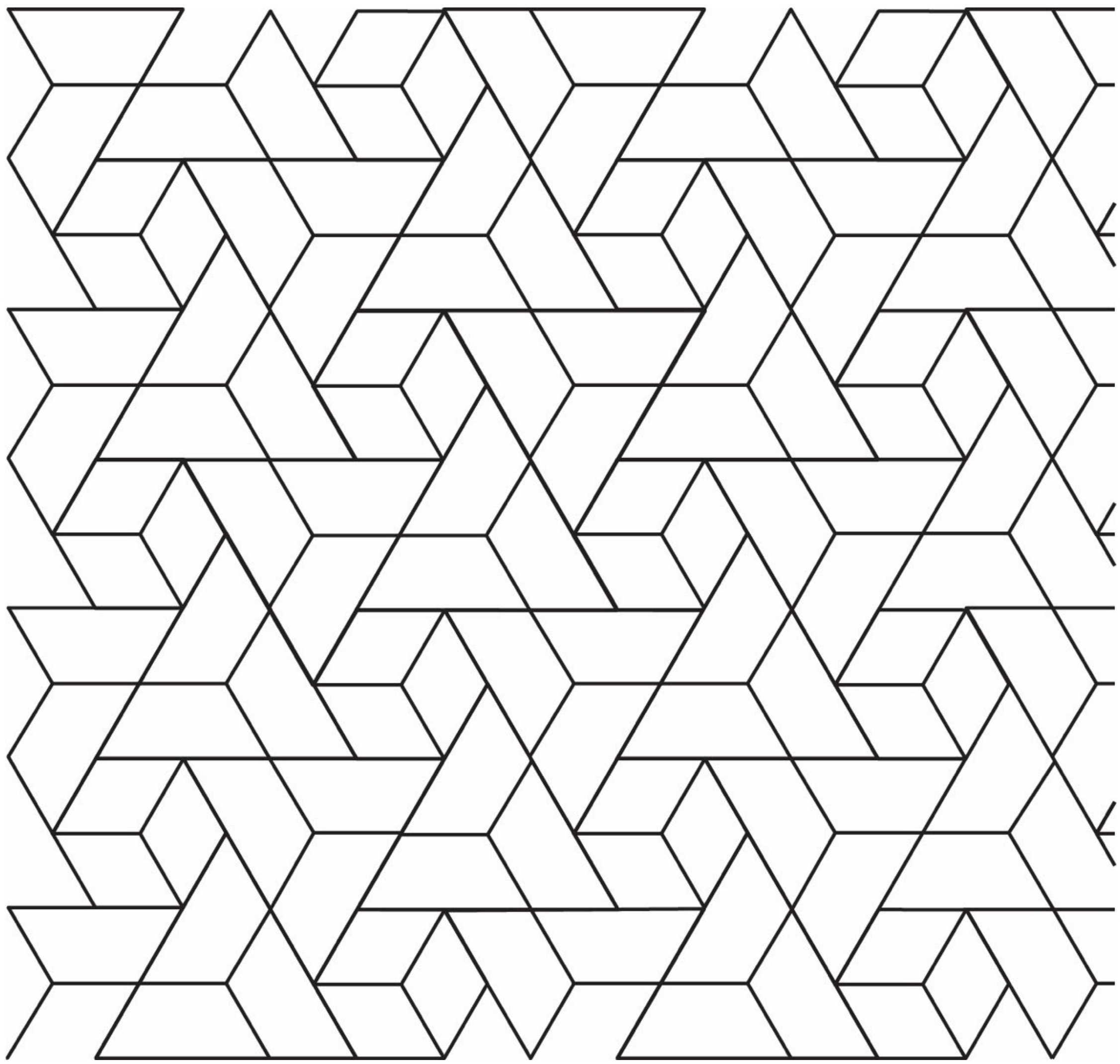
Observations/Documentation

Name________________________________ Date_____________________

Geometry
Unit 1 Line Master 1a

Symmetry in Tessellations

Tessellation A

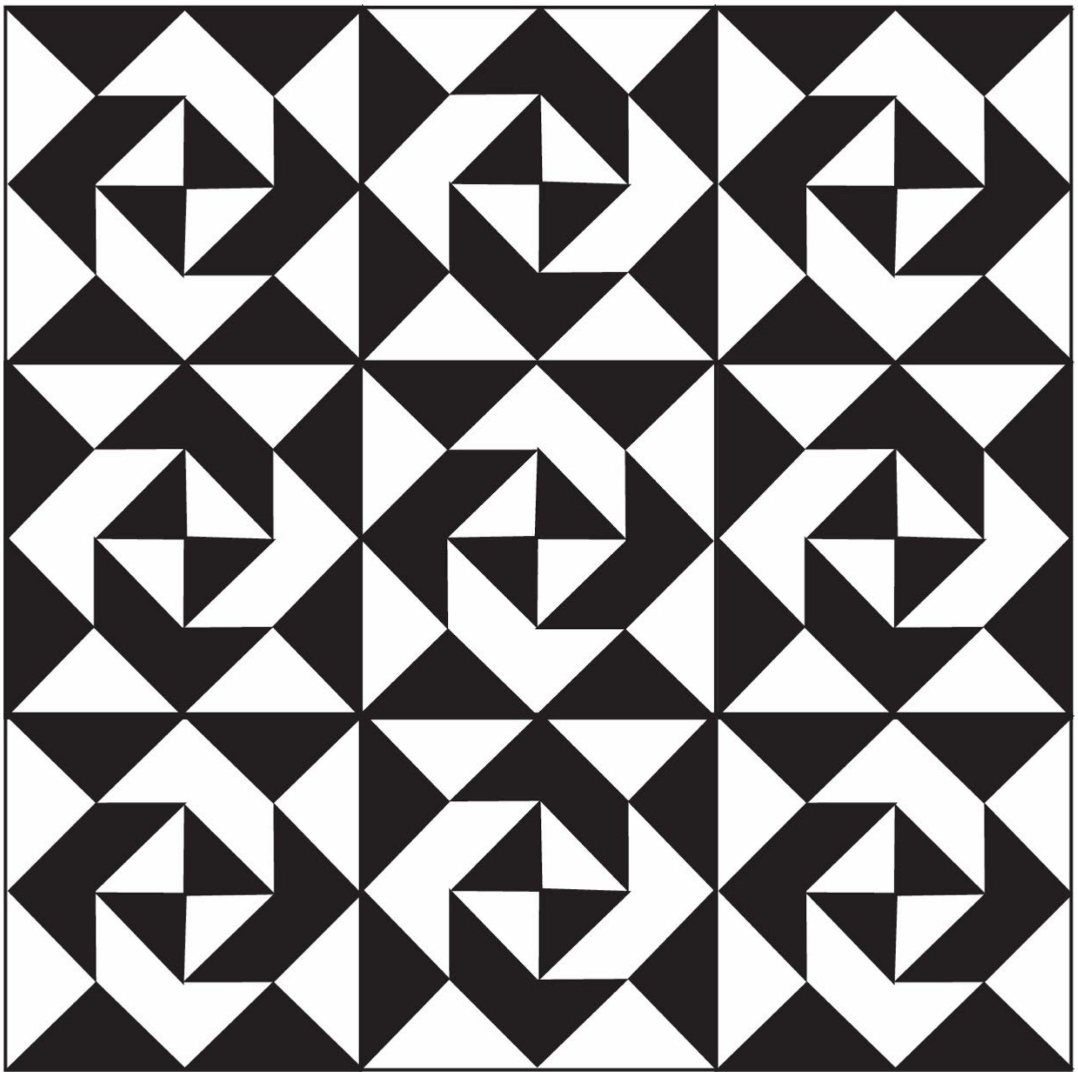


Name________________________________ Date_____________________

Geometry
Unit 1 Line Master 1b

Symmetry in Tessellations

Tessellation B

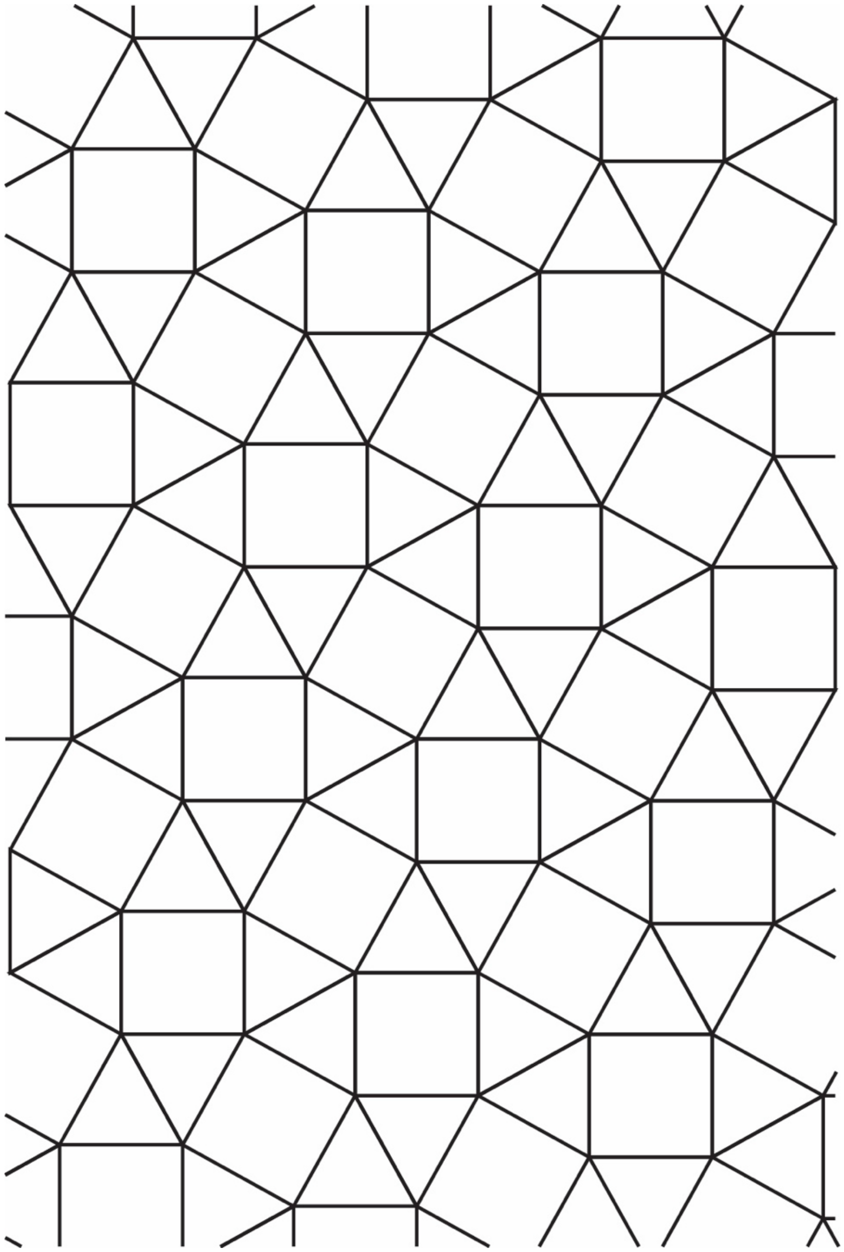


Name________________________________ Date_____________________

Geometry
Unit 1 Line Master 1c

Symmetry in Tessellations

Tessellation C

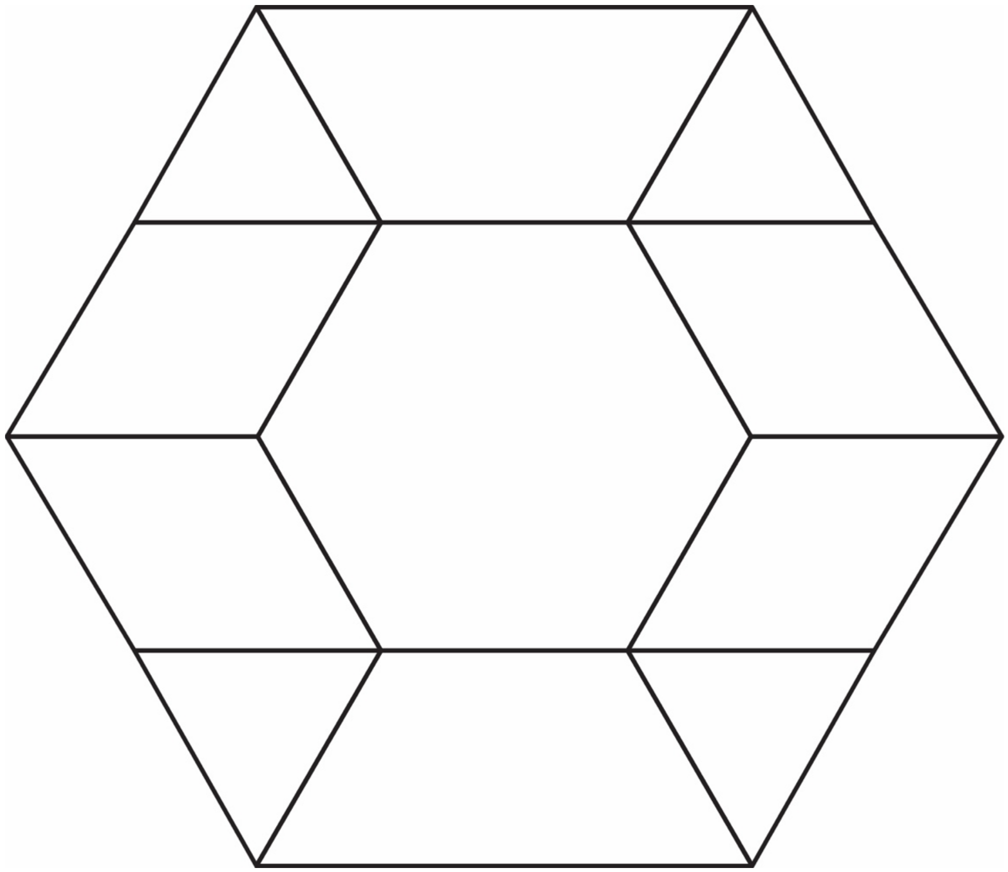


Name________________________________ Date_____________________

Geometry
Unit 1 Line Master 1d

Symmetry in Tessellations (Accommodation)

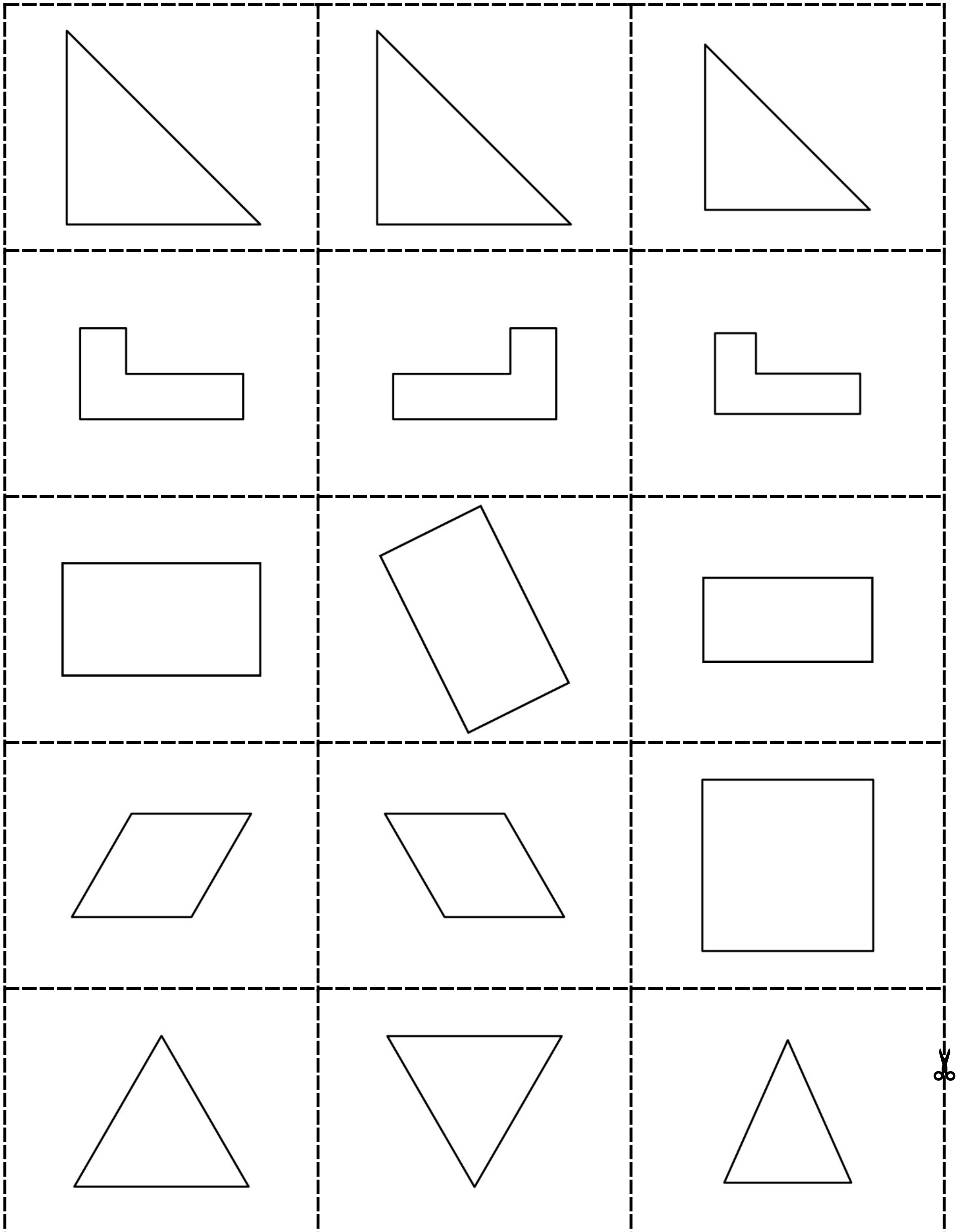
Tessellation D



Name________________________________ Date_____________________

Geometry
Unit 1 Line Master 2

Congruent Shapes



Name________________________________ Date_____________________

Geometry
Unit 1 Line Master 3

Stories through Tessellations

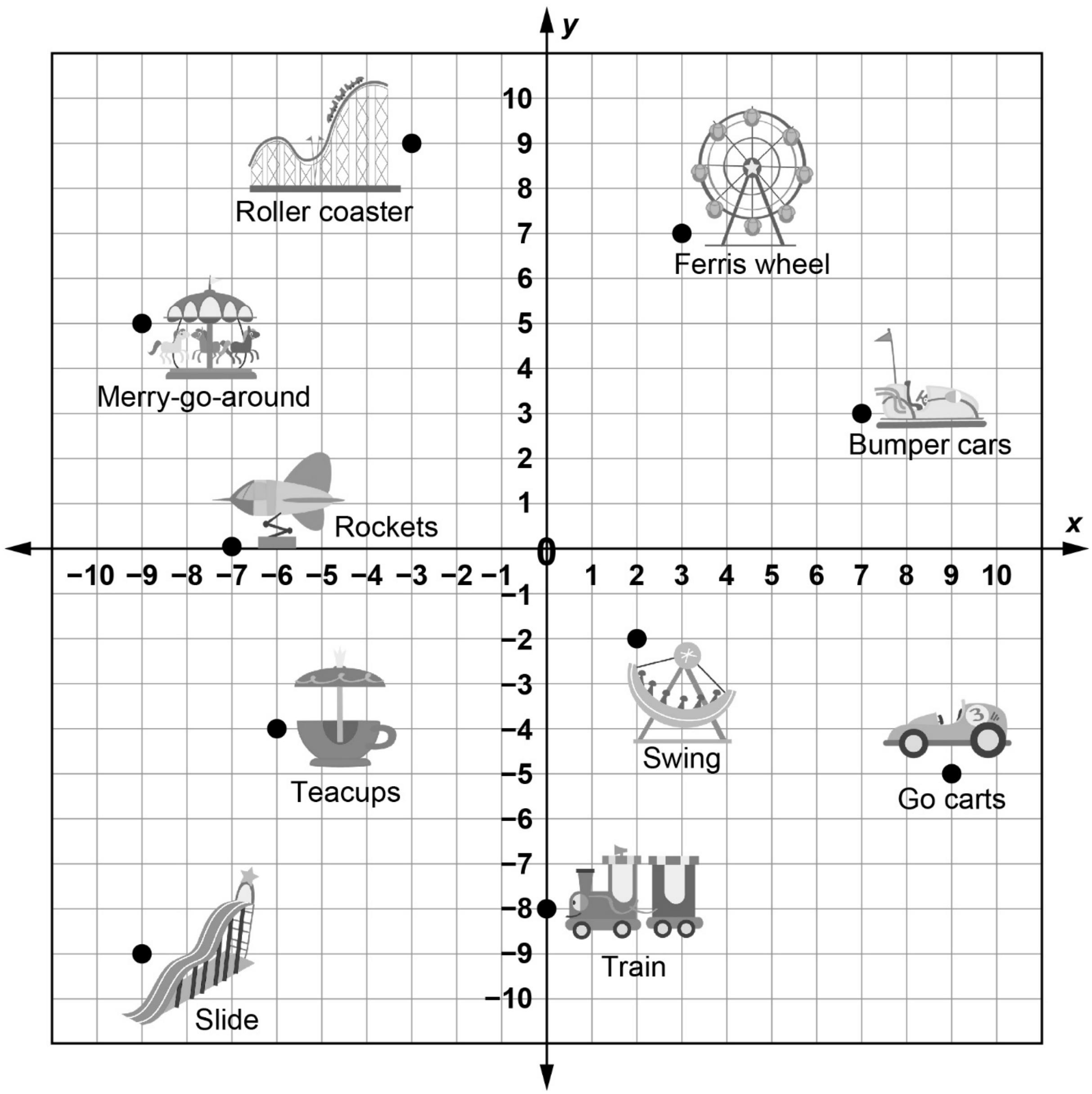
1. Create a tessellation to tell your own story.

2. What is the meaning and significance of your tessellation?
   What story does it tell?

Name________________________________ Date_____________________

Geometry
Unit 1 Line Master 4

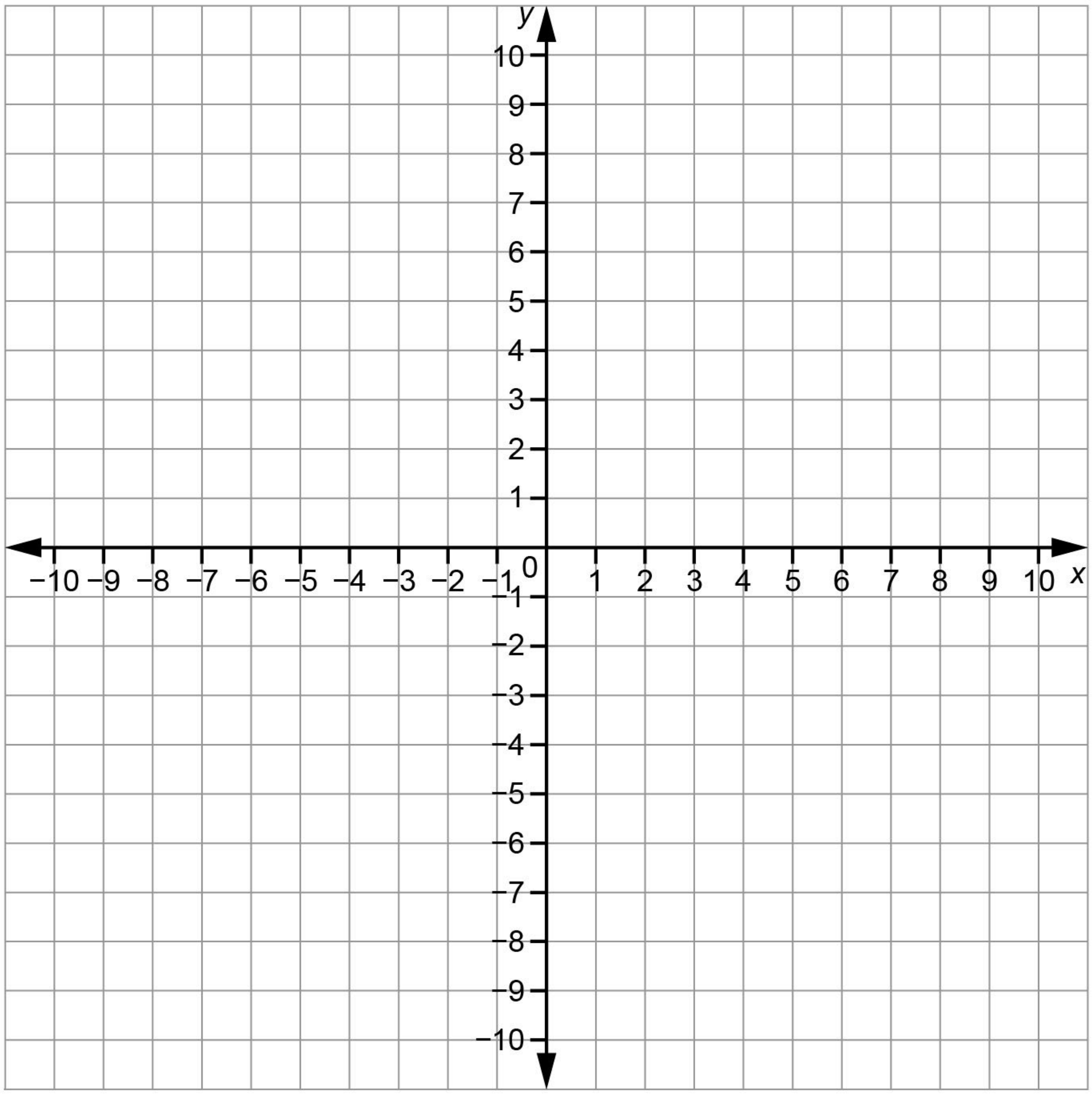
At the Amusement Park



Name________________________________ Date_____________________

Geometry
Unit 1 Line Master 5a

Fill the Cartesian Plane



Name________________________________ Date_____________________

Geometry
Unit 1 Line Master 5b

Fill the Cartesian Plane

Coordinates of the vertices of rectangle ABCD	Translations		Coordinates of the vertices of image rectangle
	Horizontal Left/right	Vertical Up/down	

Name______________________________ Date____________________

Geometry
Unit 1 Line Master 5c

Fill the Cartesian Plane

Coordinates of the vertices of rectangle ABCD	Translations		Coordinates of the vertices of image rectangle
	Horizontal Left/right	Vertical Up/down	

Name______________________________ Date____________________

Geometry
Unit 1 Line Master 5d

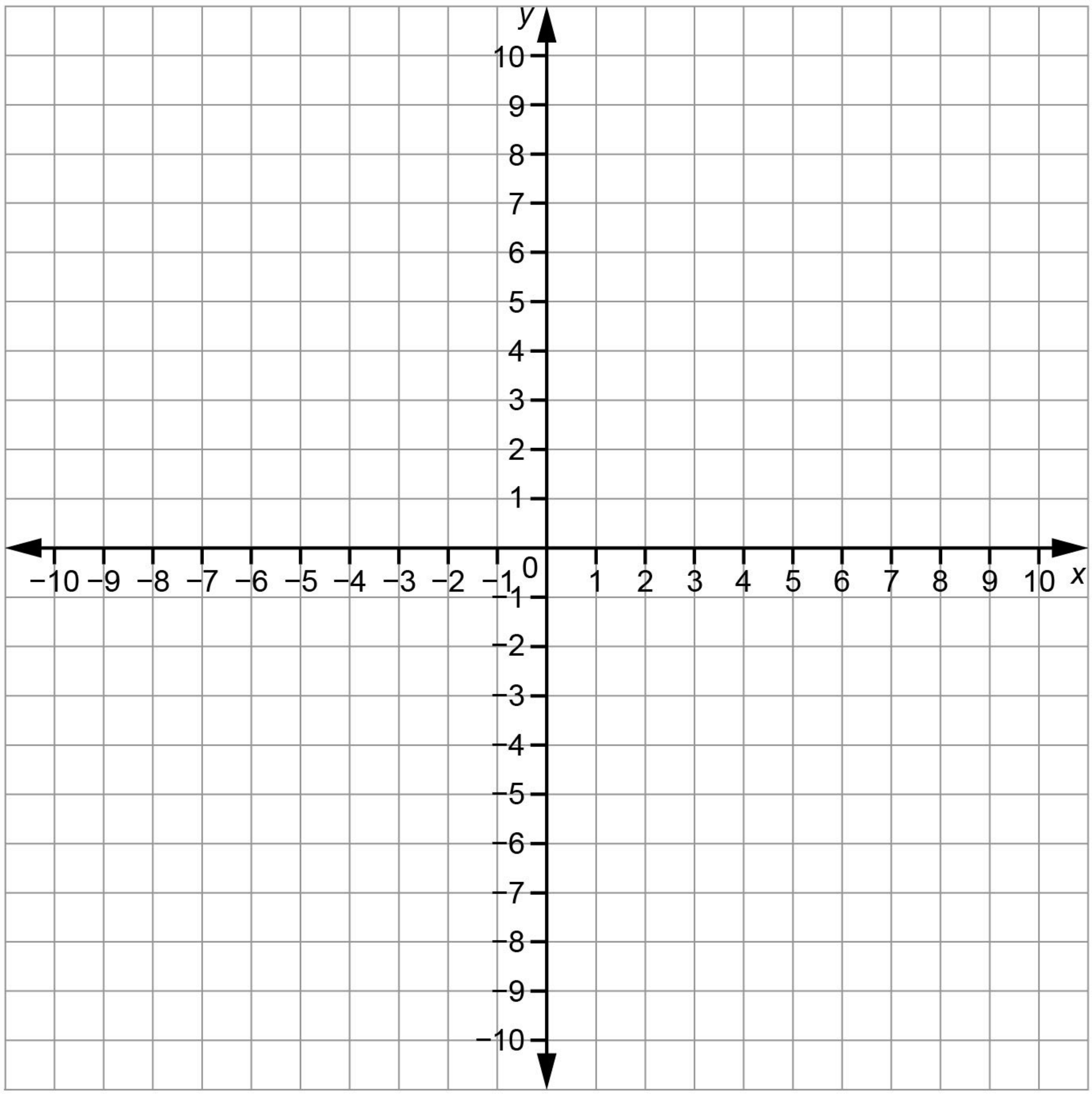
Fill the Cartesian Plane

Coordinates of the vertices of rectangle ABCD	Translations		Coordinates of the vertices of image rectangle
	Horizontal Left/right	Vertical Up/down	

Name_______________________________ Date____________________

Geometry
Unit 1 Line Master 6a

Reflecting a Polygon



Name________________________________ Date_____________________

Geometry
Unit 1 Line Master 6b

Reflecting a Polygon (cont'd)

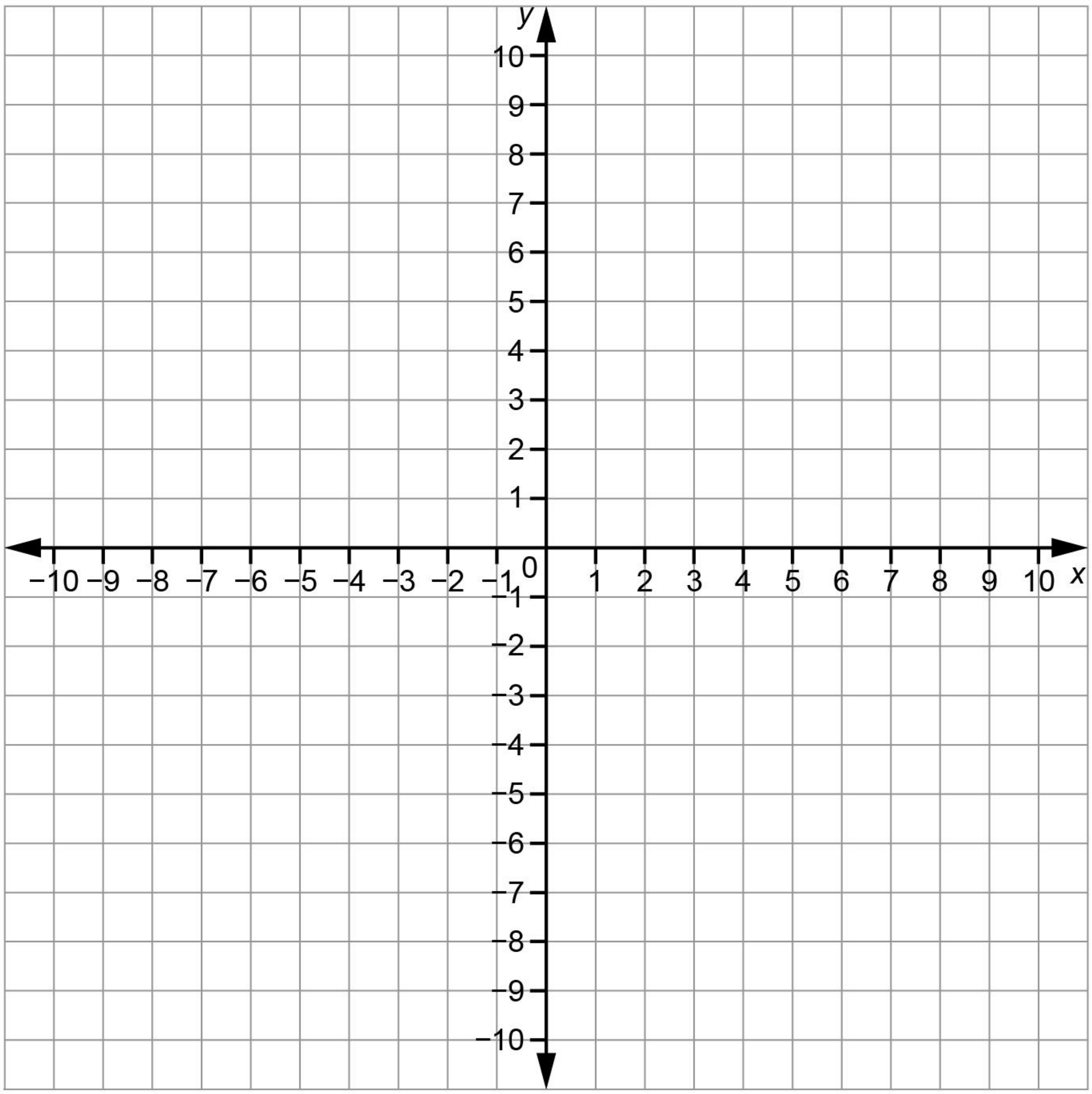
Reflection Image 1		
Description	Coordinates of Vertices of Polygon	Coordinates of Vertices of Image 1

Reflection Image 2		
Description	Coordinates of Vertices of Polygon	Coordinates of Vertices of Image 2

Name________________________________ Date_____________________

Geometry
Unit 1 Line Master 7a

Rotating a Polygon



Name______________________________ Date____________________

Geometry
Unit 1 Line Master 7b

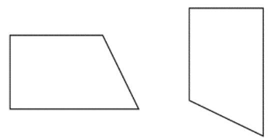
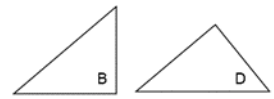
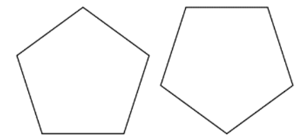
Rotating a Polygon (cont'd)

Rotation Image 1		
Description	Coordinates of Vertices of Polygon	Coordinates of Vertices of Image 1

Rotation Image 2		
Description	Coordinates of Vertices of Polygon	Coordinates of Vertices of Image 2

Rotation Image 3		
Description	Coordinates of Vertices of Polygon	Coordinates of Vertices of Image 3

Activity 1 Assessment
Exploring Congruence and Symmetry

Exploring Symmetry and Congruence			
Verifies symmetry of two shapes by reflecting or rotating one shape onto another.  "I reflected one trapezoid in a vertical line of reflection so that it mapped onto the other trapezoid exactly. So, the two shapes are symmetrical."	Describes the symmetry between two shapes as reflection symmetry or rotation symmetry, or a combination of two transformations.  "These two symmetrical shapes are related by a combination of transformations. I could reflect the shape on the left in a vertical line, then rotate the image counterclockwise until it has the same orientation as the other shape."	Demonstrates congruence between two shapes in any orientation by superimposing.  "The two shapes are congruent even though they have different orientations. I traced Shape B and placed the tracing on Shape D and they matched exactly. They have the same size and shape."	Understands that shapes related by symmetry are congruent to each other.  "These two shapes are related by rotation symmetry. I can map one shape onto the other through rotation so that they match exactly. This means the shapes are congruent as they have the same size and shape."
Observations/Documentation			

Geometry

Activity 2 Assessment
Investigating Tessellations

Investigating Tessellations in Star Blankets		
Describes features of First Nations or Métis star blankets. "I see many colours, patterns of colours, fabric, thread, an 8-pointed star, diamonds or rhombuses, and tessellations."	Identifies components of a tessellation on First Nations or Métis star blankets. "Star blankets have tessellations that are created by shapes that are spaced closely together."	Understands the significance of meaning of First Nations or Métis star blankets. "First Nation and Métis star blankets symbolize cultural teachings and traditions within the colours, designs, and learning."
Observations/Documentation		

Geometry

Activity 2 Assessment
Investigating Tessellations

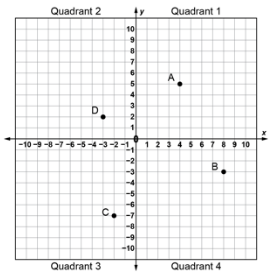
Investigating Tessellations in Star Blankets (cont'd)		
Describes the significance of gifting and receiving a First Nations or Métis star blanket. "Gifting and/or receiving a First Nations or Métis star blanket is a great honour. They may be given for a milestone, an achievement, or as a celebration."	Creates a tessellation that has personal meaning and significance. "Different shapes can be used to share a personal story through a tessellation."	Shares the significance of the 8-pointed star. "Each point of the star shares a story for First Nations or Métis peoples. The eighth point was added to honour Star Woman."
Observations/Documentation		

Geometry

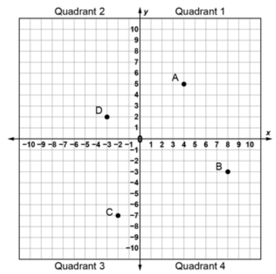
Activity 3 Assessment

Introduction to Cartesian Planes

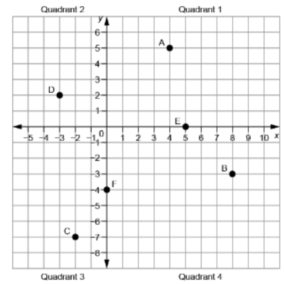
<table>
<tr><th colspan="4">Location and Transformations in the Cartesian Plane</th></tr>
<tr>
<td>Reads and interprets the Cartesian plane.



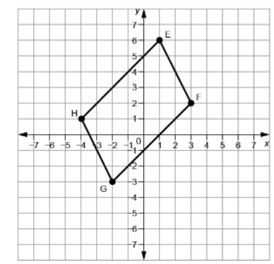
“The *x*-axis looks like a horizontal number line and the *y*-axis looks like a vertical number line, and the two number lines intersect.”</td>
<td>Locates points on a Cartesian plane using ordered pairs.



“Point A is at (4, 5), Point B is at (8, -3), Point C is at (-2, -7), and Point D is at (-3, 2).”</td>
<td>Uses coordinates to plot points on a Cartesian plane.



“I plotted Point E(5, 0) and Point F(0, –4).”</td>
<td>Models and describes the location of the vertices of a polygon in the Cartesian plane using coordinates.

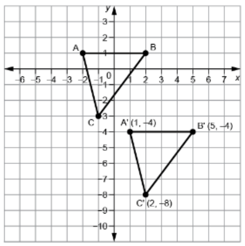


“I drew a parallelogram. Its vertices are at E(1, 6), F(3, 2), G(–2, –3), and H(–4, 1).”</td>
</tr>
<tr><th colspan="4">Observations/Documentation</th></tr>
<tr><td></td><td></td><td></td><td></td></tr>
</table>

Activity 3 Assessment
Introduction to Cartesian Planes

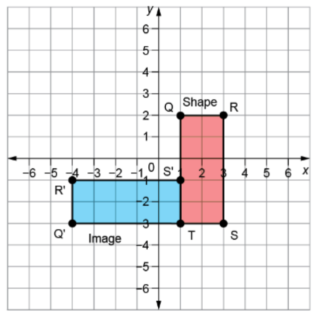
Location and Transformations in the Cartesian Plane (cont'd)

Describes and performs transformations of polygons on a Cartesian plane.



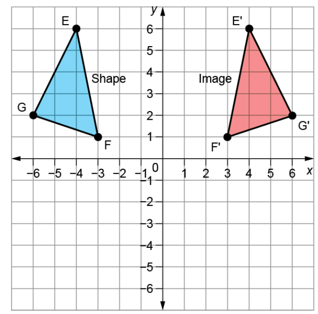
"I translated △ABC right 3 squares and down 5 squares to get △A'B'C'."

Identifies transformation used to move a polygon on a Cartesian plane.



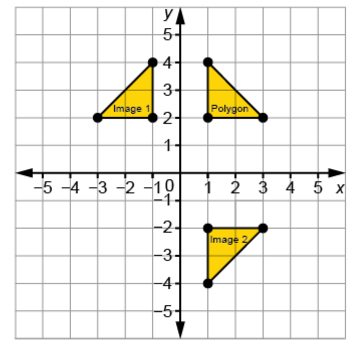
"The shape was rotated 90° counterclockwise about T to get the image. The shape and its image are congruent but have different orientations."

Relates the coordinates of a polygon and its image after a translation, reflection, or rotation.



"After a reflection in the *y*-axis, the *x*-coordinates of the vertices change sign, and the *y*-coordinates stay the same."

Flexibly visualizes and predicts where the image of a polygon will be after a transformation.

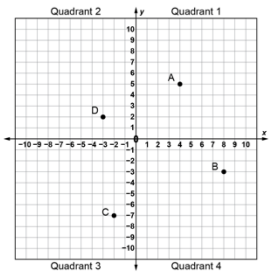
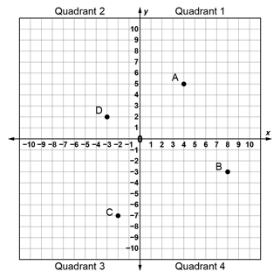
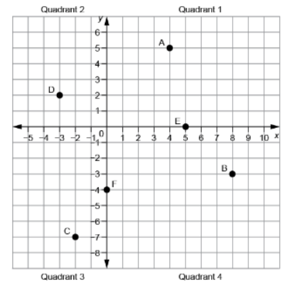
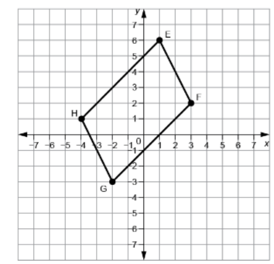


"I can picture the Polygon's reflection, Image 1, on the other side of the *y*-axis, and the Polygon's reflection, Image 2, on the other side of the *x*-axis. Each time, matching vertices will be the same distance from the line of reflection and the polygon, and its image will have opposite orientations."

Observations/Documentation

Geometry

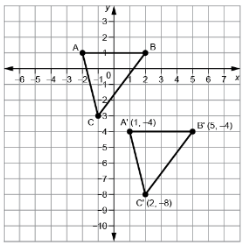
Activity 4 Assessment
Translating Polygons on a Cartesian Plane

Location and Transformations in the Cartesian Plane			
Reads and interprets the Cartesian plane.	Locates points on a Cartesian plane using ordered pairs.	Uses coordinates to plot points on a Cartesian plane.	Models and describes the location of the vertices of a polygon in the Cartesian plane using coordinates.
			
“The *x*-axis looks like a horizontal number line and the *y*-axis looks like a vertical number line, and the two number lines intersect.”	“Point A is at (4, 5), Point B is at (8, -3), Point C is at (-2, -7), and Point D is at (-3, 2).”	“I plotted Point E(5, 0) and Point F(0, –4).”	“I drew a parallelogram. Its vertices are at E(1, 6), F(3, 2), G(–2, –3), and H(–4, 1).”
Observations/Documentation			

Activity 4 Assessment
Translating Polygons on a Cartesian Plane

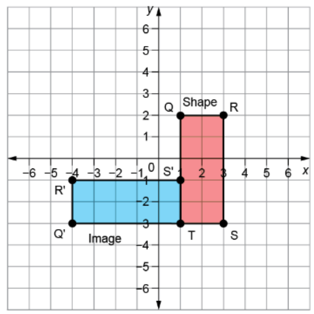
Location and Transformations in the Cartesian Plane (cont'd)

Describes and performs transformations of polygons on a Cartesian plane.



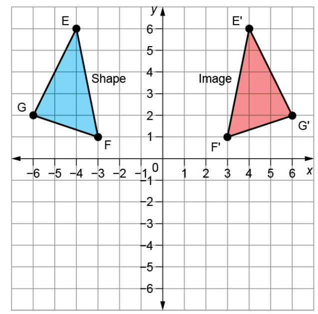
"I translated △ABC right 3 squares and down 5 squares to get △A'B'C'."

Identifies transformation used to move a polygon on a Cartesian plane.



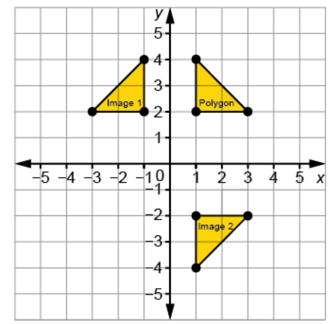
"The shape was rotated 90° counterclockwise about T to get the image. The shape and its image are congruent but have different orientations."

Relates the coordinates of a polygon and its image after a translation, reflection, or rotation.



"After a reflection in the *y*-axis, the *x*-coordinates of the vertices change sign, and the *y*-coordinates stay the same."

Flexibly visualizes and predicts where the image of a polygon will be after a transformation.



"I can picture the Polygon's reflection, Image 1, on the other side of the *y*-axis, and the Polygon's reflection, Image 2, on the other side of the *x*-axis. Each time, matching vertices will be the same distance from the line of reflection and the polygon, and its image will have opposite orientations."

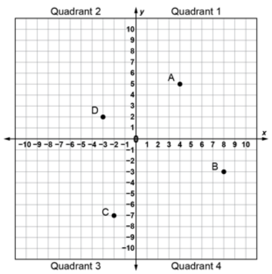
Observations/Documentation

Activity 5 Assessment

Reflecting and Rotating Polygons on a Cartesian Plane

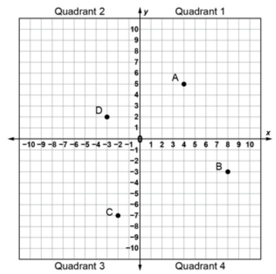
Location and Transformations in the Cartesian Plane

Reads and interprets the Cartesian plane.



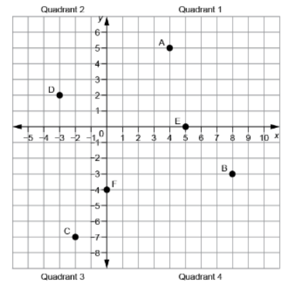
"The *x*-axis looks like a horizontal number line and the *y*-axis looks like a vertical number line, and the two number lines intersect."

Locates points on a Cartesian plane using ordered pairs.



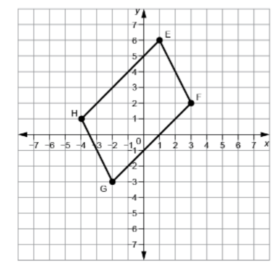
"Point A is at (4, 5), Point B is at (8, -3), Point C is at (-2, -7), and Point D is at (-3, 2)."

Uses coordinates to plot points on a Cartesian plane.



"I plotted Point E(5, 0) and Point F(0, –4)."

Models and describes the location of the vertices of a polygon in the Cartesian plane using coordinates.

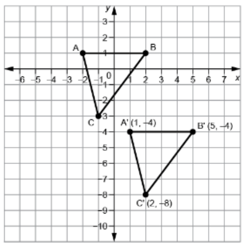
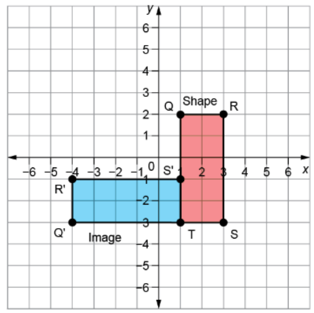
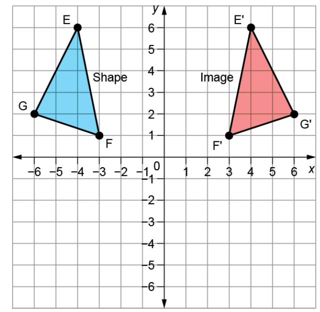
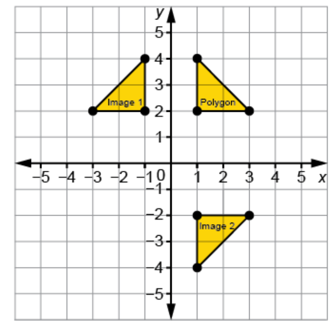


"I drew a parallelogram. Its vertices are at E(1, 6), F(3, 2), G(–2, –3), and H(–4, 1)."

Observations/Documentation

Activity 5 Assessment

Reflecting and Rotating Polygons on a Cartesian Plane

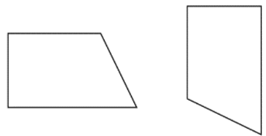
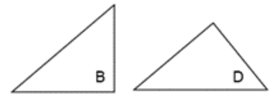
Location and Transformations in the Cartesian Plane (cont'd)			
Describes and performs transformations of polygons on a Cartesian plane.	Identifies transformation used to move a polygon on a Cartesian plane.	Relates the coordinates of a polygon and its image after a translation, reflection, or rotation.	Flexibly visualizes and predicts where the image of a polygon will be after a transformation.
 “I translated △ABC right 3 squares and down 5 squares to get △A'B'C'.”	 “The shape was rotated 90° counterclockwise about T to get the image. The shape and its image are congruent but have different orientations.”	 “After a reflection in the *y*-axis, the *x*-coordinates of the vertices change sign, and the *y*-coordinates stay the same.”	 “I can picture the Polygon's reflection, Image 1, on the other side of the *y*-axis, and the Polygon's reflection, Image 2, on the other side of the *x*-axis. Each time, matching vertices will be the same distance from the line of reflection and the polygon, and its image will have opposite orientations.”
Observations/Documentation			

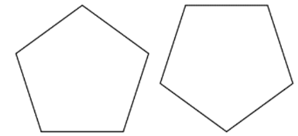
Geometry

Activity 6 Assessment

2-D Shapes, Transformations, and the Cartesian Plane Consolidation

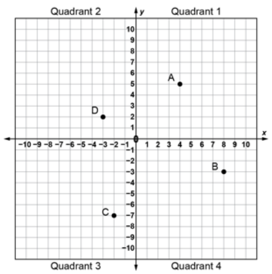
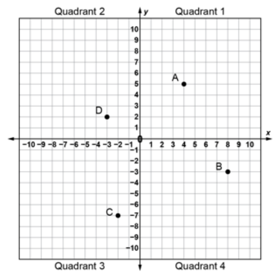
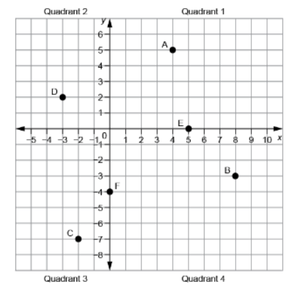
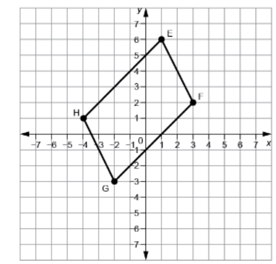
<table>
<tr><th colspan="4">Exploring Symmetry and Congruence</th></tr>
<tr>
<td>Verifies symmetry of two shapes by reflecting or rotating one shape onto another.

“I reflected one trapezoid in a vertical line of reflection so that it mapped onto the other trapezoid exactly. So, the two shapes are symmetrical.”</td>
<td>Describes the symmetry between two shapes as reflection symmetry or rotation symmetry, or a combination of two transformations.

“These two symmetrical shapes are related by a combination of transformations. I could reflect the shape on the left in a vertical line, then rotate the image counterclockwise until it has the same orientation as the other shape.”</td>
<td>Demonstrates congruence between two shapes in any orientation by superimposing.


“The two shapes are congruent even though they have different orientations. I traced Shape B and placed the tracing on Shape D and they matched exactly. They have the same size and shape.”</td>
<td>Understands that shapes related by symmetry are congruent to each other.

“These two shapes are related by rotation symmetry. I can map one shape onto the other through rotation so that they match exactly. This means the shapes are congruent as they have the same size and shape.”</td>
</tr>
<tr><th colspan="4">Observations/Documentation</th></tr>
<tr><td></td><td></td><td></td><td></td></tr>
</table>

Activity 6 Assessment

2-D Shapes, Transformations, and the Cartesian Plane Consolidation

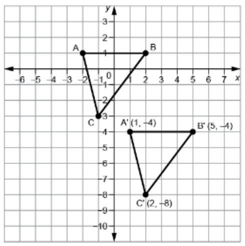
Location and Transformations in the Cartesian Plane			
Reads and interprets the Cartesian plane.  "The *x*-axis looks like a horizontal number line and the *y*-axis looks like a vertical number line, and the two number lines intersect."	Locates points on a Cartesian plane using ordered pairs.  "Point A is at (4, 5), Point B is at (8, -3), Point C is at (-2, -7), and Point D is at (-3, 2)."	Uses coordinates to plot points on a Cartesian plane.  "I plotted Point E(5, 0) and Point F(0, –4)."	Models and describes the location of the vertices of a polygon in the Cartesian plane using coordinates.  "I drew a parallelogram. Its vertices are at E(1, 6), F(3, 2), G(–2, –3), and H(–4, 1)."
Observations/Documentation			

Activity 6 Assessment

2-D Shapes, Transformations, and the Cartesian Plane Consolidation

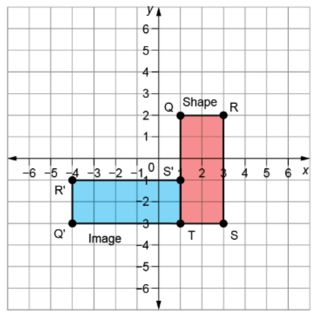
Location and Transformations in the Cartesian Plane (cont'd)

Describes and performs transformations of polygons on a Cartesian plane.



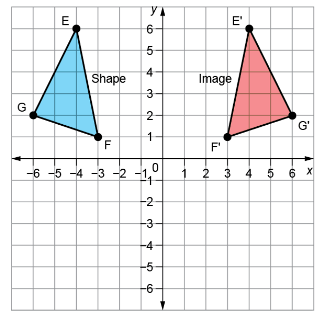
"I translated △ABC right 3 squares and down 5 squares to get △A'B'C'."

Identifies transformation used to move a polygon on a Cartesian plane.



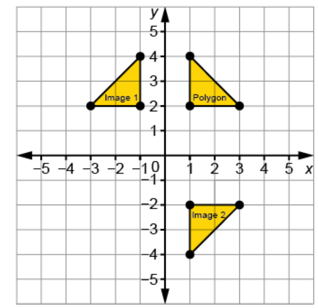
"The shape was rotated 90° counterclockwise about T to get the image. The shape and its image are congruent but have different orientations."

Relates the coordinates of a polygon and its image after a translation, reflection, or rotation.



"After a reflection in the *y*-axis, the *x*-coordinates of the vertices change sign, and the *y*-coordinates stay the same."

Flexibly visualizes and predicts where the image of a polygon will be after a transformation.



"I can picture the Polygon's reflection, Image 1, on the other side of the *y*-axis, and the Polygon's reflection, Image 2, on the other side of the *x*-axis. Each time, matching vertices will be the same distance from the line of reflection and the polygon, and its image will have opposite orientations."

Observations/Documentation

Name________________________________ Date_____________________

Data Management
Unit 1 Line Master 1

Event Cards

Likelihood Cards

Impossible	**Unlikely**	**Equally Likely**	**Likely**	**Certain**

Event Cards

You will fly in a spaceship tonight.	A square has four sides.	A leaf will fall from a tree in the forest today.	It will be dark tonight.
You will talk to someone today.	You will have a dream tonight.	If you enter a contest, you will win or not win.	You will see a whale in a swimming pool.
You will walk home from school.	You will get heads when you toss a coin.	After a rainstorm, you will see a rainbow.	You will pull a red marble from a bag that has 1 red marble and 3 blue marbles.
You will do something with your family on the weekend.	Snow will melt when it is brought inside.	You will roll an 8 using a number cube labelled from 1 to 6.	A ladybug will land on your hand today.

Name________________________________ Date_____________________

Data Management
Unit 1 Line Master 2a

My Events

My Events

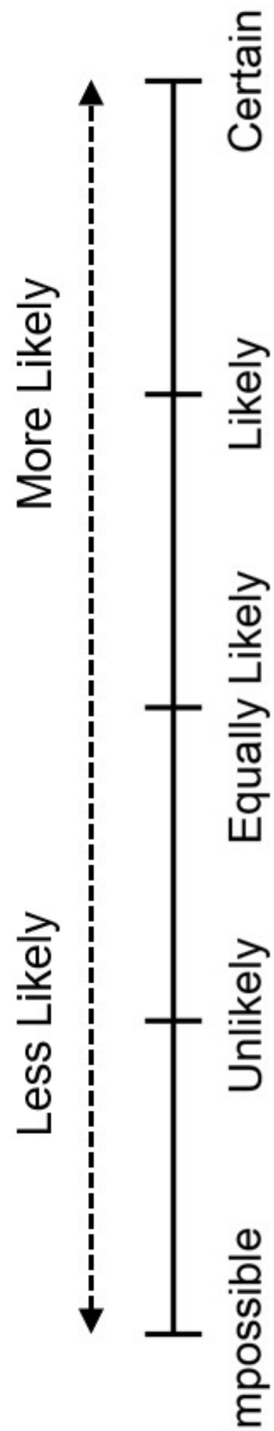
A	B	C
D	E	F

Name________________________________ Date_____________________

Data Management
Unit 1 Line Master 2b

My Events (cont'd)

Likelihood Line



Name________________________________ Date_____________________

Data Management
Unit 1 Line Master 3

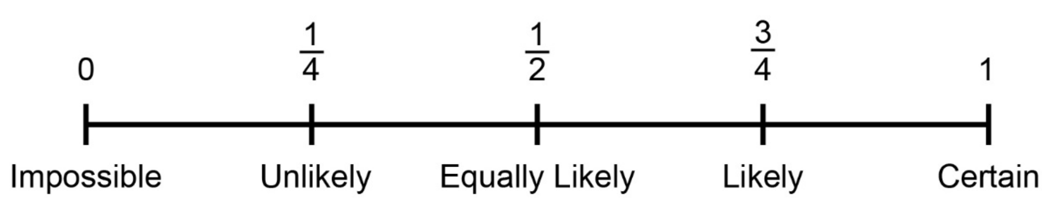
Representing Likelihoods with Fractions

The pointer on this spinner is spun.
Represent the likelihood of each event below as a fraction.

Event	Likelihood
A: landing on 2	
B: landing on 3	
C: landing on 4	
D: landing on 5	
E: landing on 6	
F: landing on 2, 3, 4, or 5	
G: landing on an even number	
H: landing on 3, 4, or 5	

Likelihood Line

Place each event on the likelihood line to show how likely it is to happen.



Name________________________________ Date_____________________

Data Management
Unit 1 Line Master 4

Relative-Frequency Table

	Tally	Frequency	Relative Frequency

Name________________________________ Date_____________________

Data Management
Unit 1 Line Master 5

Experiment Recording Sheet

Possible Outcomes	Likelihood	Prediction	Results	Combined Results

Name________________________________ Date_____________________

Data Management
Unit 1 Line Master 6a

Analyzing Relative Frequency

Part A

The pointer on this spinner is spun.
Determine the likelihood of each event.

Likelihoods

Event	Fraction	Decimal	Percent
not an even number			
12			
a number between 4 and 9			
a number less than 3			
a number less than 10			

Name______________________________ Date____________________

Data Management
Unit 1 Line Master 6b

Analyzing Relative Frequency (cont'd)

Part B

Use the likelihoods from Part A.

Predict the results of spinning the pointer 100 times.

Event	Prediction
not an even number	
12	
a number between 4 and 9	
a number less than 3	
a number less than 10	

A student conducted the experiment 100 times.

Event	Results
not an even number	18
12	0
a number between 4 and 9	26
a number less than 3	6
a number less than 10	100

How do your predictions compare with these results?

Name________________________________ Date_____________________

Data Management
Unit 1 Line Master 6c

Analyzing Relative Frequency (cont'd)

Use the results of the experiment to determine
the relative frequency of each event.

Relative Frequencies

Event	Results	Fraction	Decimal	Percent
not an even number	18			
12	0			
a number between 4 and 9	26			
a number less than 3	6			
a number less than 10	100			

Compare the relative frequencies with the expected likelihoods.
What do you notice? Why might this be?

Name________________________________ Date_____________________

Data Management
Unit 1 Line Master 7a

Rolling a Die and Relative Frequency

Let's use coding to explore the likelihood of rolling a 3 on a die.

Part 1

We'll start by rolling a die in Scratch and checking to see if a 3 is rolled.

1. Click the link to access Scratch: Simple Dice Roll Completed:

   https://scratch.mit.edu/projects/878484676/editor/

   - Click the green flag to see what happens.

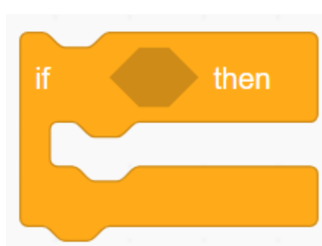
     A die is rolled each time the green flag is clicked.

2. Let's alter the code to check if a 3 is rolled.

   We will need to use a conditional structure.

Conditional structures are statements that tell computers to complete different actions based on different situations.

   In Scratch, conditional structures, or if statements, are found in the ***Control*** tab. The ***if*** statement will check if a condition is true and if it is, it will execute the code after the word ***then***. If the condition is not true, then nothing will happen.

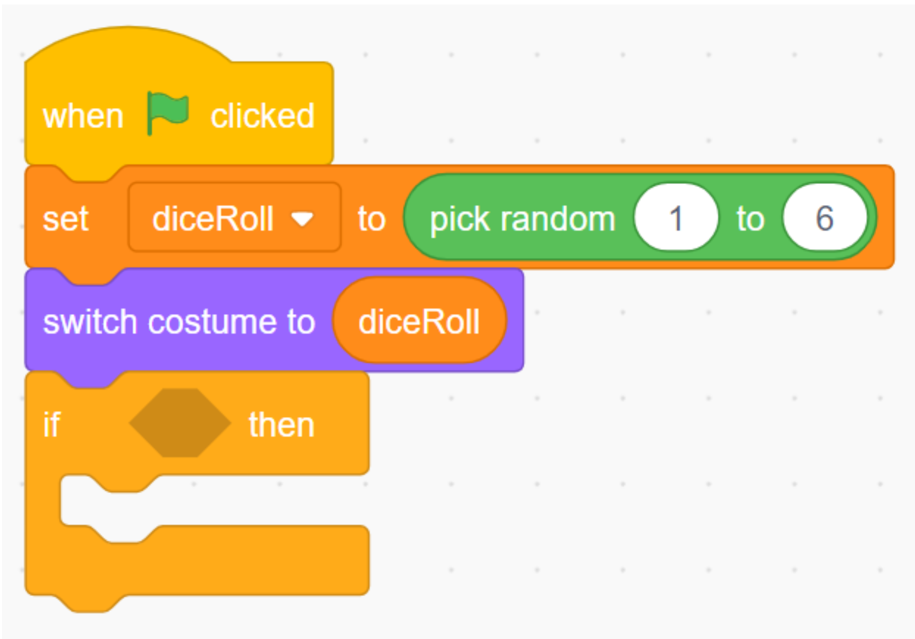


Name________________________________ Date_____________________

Data Management
Unit 1 Line Master 7b

Rolling a Die and Relative Frequency

- From the ***Control*** tab, select the ***if*** block and drag it below the ***switch costume*** block:



3. Now we will add the condition for the if statement.

- From the ***Operators*** tab, select the ***equal comparison operator*** () and drag it inside of the conditional part of the ***if*** block.
- From the ***Variables*** tab, select the ***diceRoll*** variable, and place it inside the first part of the ***equal comparison operator***.
- Type ***3*** in the second part of the ***equal comparison operator***.
- From the ***Looks*** tab, select the ***say*** block and place it inside of the ***if*** block.
- Type **3!** inside the ***say*** block.

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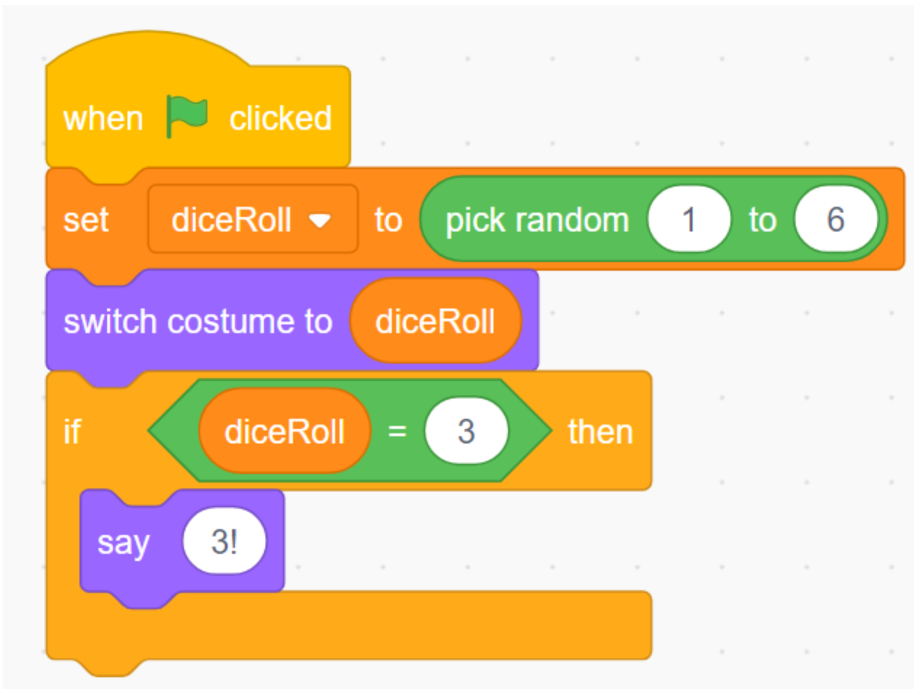
Data Management
Unit 1 Line Master 7c

Rolling a Die and Relative Frequency

➢ Here is a screenshot of the completed code.



➢ Test the application by clicking the green flag many times. Does it say “3!” each time the number three is rolled? If not, debug the application by carefully looking through the code.

Name______________________________ Date____________________

Data Management
Unit 1 Line Master 7d

Rolling a Die and Relative Frequency

Part 2

Let's use code to calculate the relative frequency of rolling a 3.

1. We can calculate the likelihood of rolling a 3 using simple math:

   There are 6 possible outcomes when rolling a die:
   1, 2, 3, 4, 5, 6

   So, the likelihood of rolling each of the numbers is 1 in 6, or $\frac{1}{6}$, or about 0.17.

   So, the likelihood of rolling a 3 is $\frac{1}{6}$.

2. We can describe the likelihood of an outcome in an experiment using relative frequency.

Frequency can be a count of categorized observations or trials in an experiment. Relative frequency of outcomes can be used to estimate the likelihood of an event.

   In our code, we will keep track of the number of times a 3 is rolled and the total number of rolls.

   Each time we click the green flag to roll the die, we will calculate the relative frequency of rolling a 3.

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Data Management
Unit 1 Line Master 7e

Rolling a Die and Relative Frequency

We will need three more variables in our application. We already have one variable called ***diceRoll***, which holds the number that is rolled on the die.

We will create these additional variables:

- **numRolls** to keep track of the number of times the die is rolled, which is also the number of times the green flag is clicked.
- **num3Rolled** to keep track of the number of times a 3 is rolled.
- **relativeFrequency** to keep track of the relative frequency of rolling a 3.

Everything will be reset when we click the ***space*** bar.

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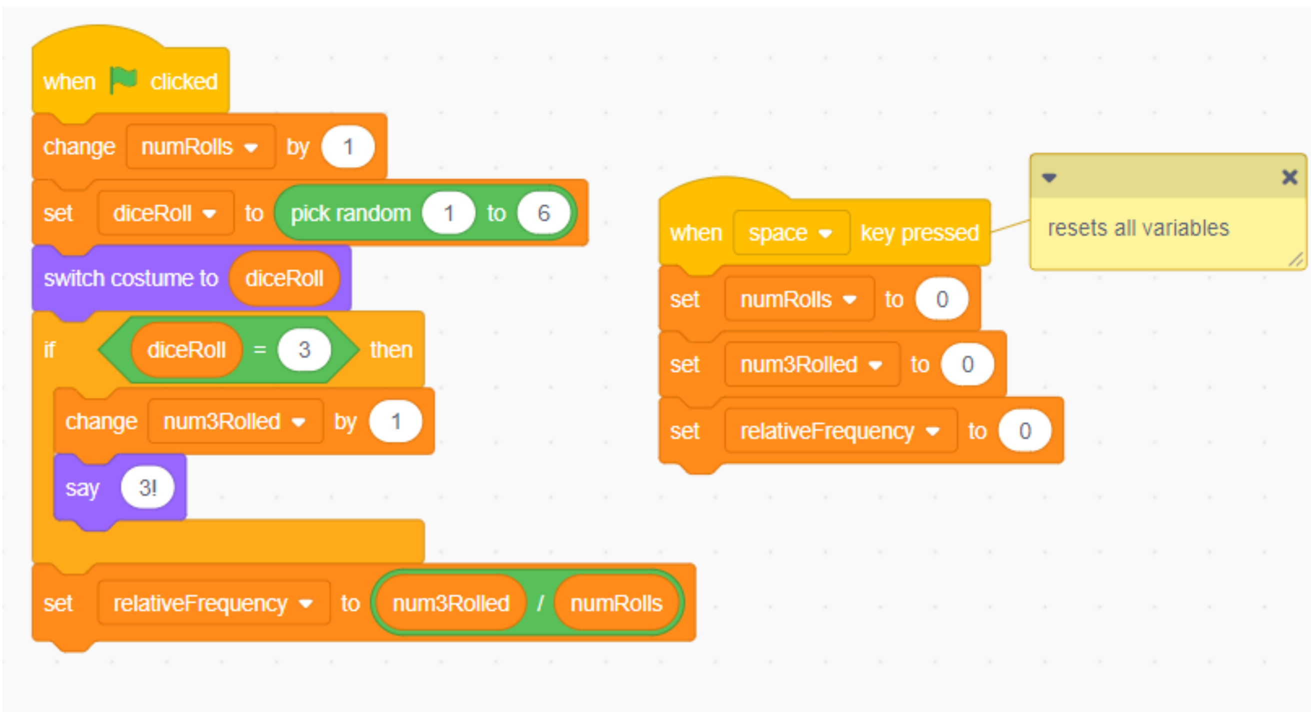
Data Management
Unit 1 Line Master 7f

Rolling a Die and Relative Frequency

You can alter your code from **Part A**, as shown below,
or you can click the link to the completed code with which you can experiment.

Link to completed code:
https://scratch.mit.edu/projects/878489604/editor

Screenshot of code:



In **Master 8**, we'll add a loop so we can simulate rolling a die hundreds, thousands, and even millions of times!

Name______________________________ Date____________________

Data Management
Unit 1 Line Master 8a

Simulating Multiple Rolls of a Die

Let's alter our code from **Master 7** to include a loop, or a repeat, which will simulate rolling a die hundreds, thousands, and even millions of times!

A *loop* is a repetition of instructions used in code. In Scratch, a repeat is used to make code blocks loop through multiple times.

What do you think will happen to the relative frequency of rolling a 3 with so many rolls?

Relative frequency provides a better estimate of the likelihood of an event with larger amounts of data.

1. We will start by adding a repeat block so that the die rolls 10 times at once.
   - Click the link to access the completed code from **Master 7**:

     https://scratch.mit.edu/projects/878489604/editor

   - From the ***Control*** tab, select the ***Repeat 10*** block and place it around all the code under the green flag block.
   - Since we are rolling the die 10 times and are keeping track of the number of times a 3 is rolled in the ***num3Rolled*** variable, we can remove the ***say 3!*** block.
   - Click on the green flag multiple times to see what happens! Don't forget that if you'd like to reset the variables to 0, you can click on the ***space*** bar.

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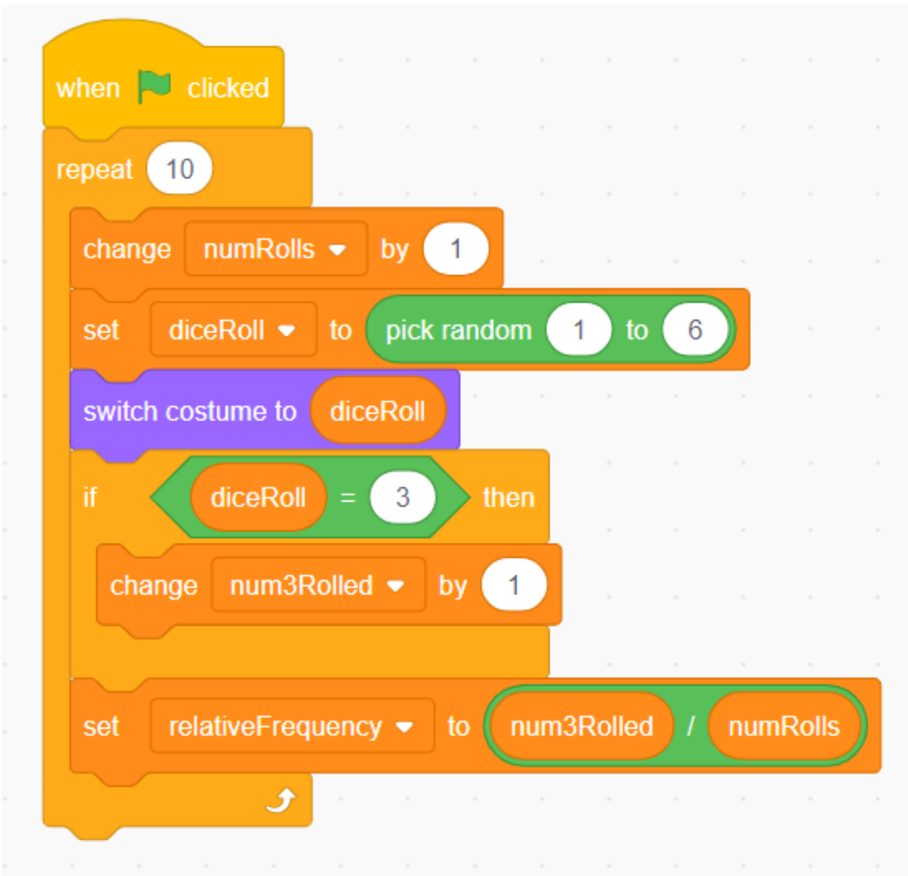
Data Management
Unit 1 Line Master 8b

Simulating Multiple Rolls of a Die

Here is a screenshot of the completed code.



2. Let's loop the code even more times!
   - Try changing the repeat number to 100 and then 1000.
   - What do you notice about the relative frequency of rolling a 3?
   - Does it get closer to the expected likelihood of $\frac{1}{6}$ or about 0.17?

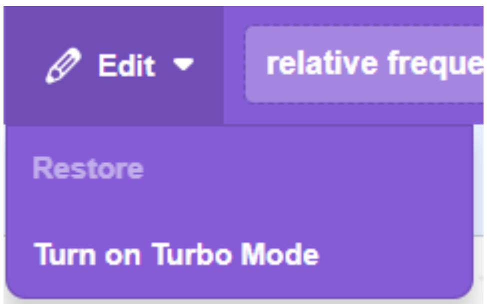
Name________________________________ Date_____________________

Data Management
Unit 1 Line Master 8c

Simulating Multiple Rolls of a Die

3. When you changed the repeat to 1000, you might have noticed that you had to wait a while for the 1000 rolls to happen.
   We can use **Turbo Mode** in Scratch to make this happen faster!

   - To turn on ***Turbo Mode***, select ***Edit*** and ***Turn on Turbo Mode***.



   - Try clicking the green flag with 1000 in the repeat to see what happens.
   - Change the repeat to 10 000 and even 1 000 000 or more!
   - What do you notice about the relative frequency when you roll the die so many times?

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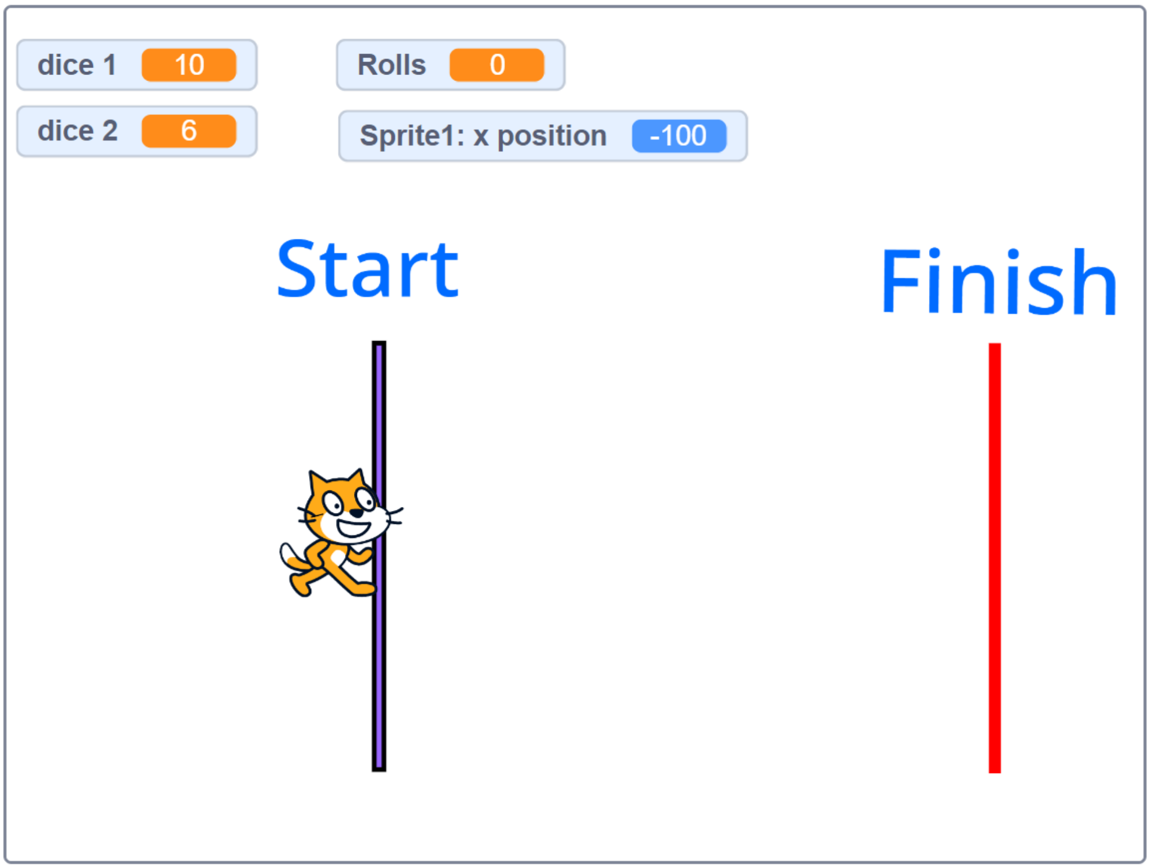
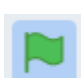
Data Management
Unit 1 Line Master 9a

Statistics Game

Block Coding Program

Click the link to access Scratch: Dice Game – Doubles:
https://scratch.mit.edu/projects/484777128/



The  starts the game, and the space bar rolls the dice.
Play until you win. Play again.
Compare your results with the class results when
students rolled number cubes.

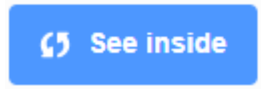
Name________________________________ Date_____________________

Data Management
Unit 1 Line Master 9b

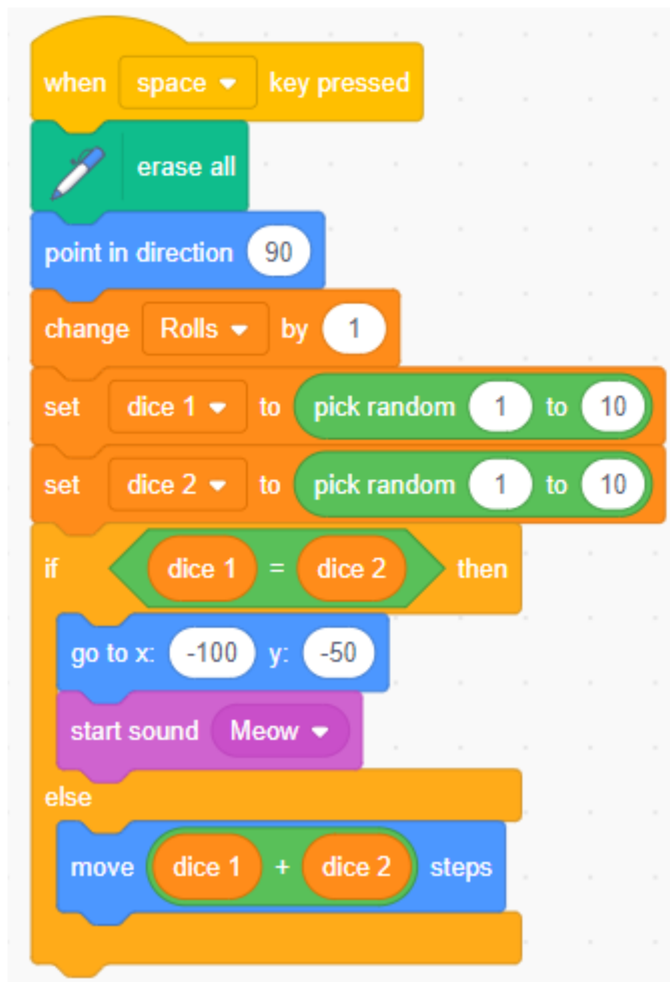
Statistics Game (cont'd)

Block Coding Program

Examine the Code

- Click **See Inside**. Look at the code. 

  What do you think the different blocks mean?
  How do they relate to the statistics experiment?



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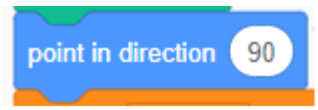
Data Management
Unit 1 Line Master 9c

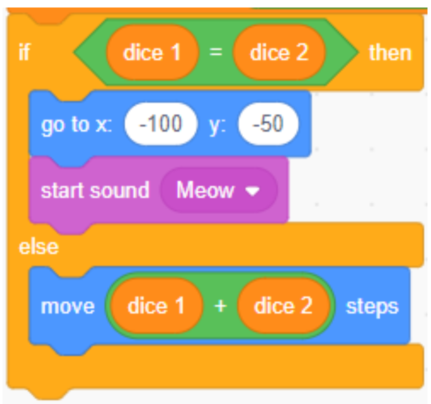
Statistics Game (cont’d)
Block Coding Program

- Connect the blocks to what happened during the experiment.
  For example,



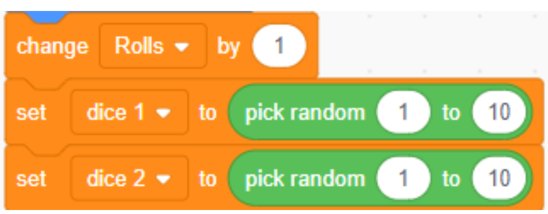
has Cat facing right (looking from Start to Finish).

has Cat starting at (–100,50).

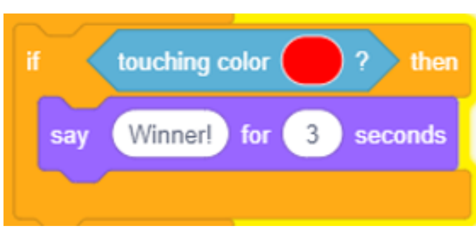


has Cat go back to Start if the dice match.

If the dice don’t match, the numbers rolled are added.
Then Cat takes that many steps.



has the roll tracked each time, and random numbers are chosen from 1 to 10.



has the Cat being declared the Winner!
when the Cat touches the red Finish Line.

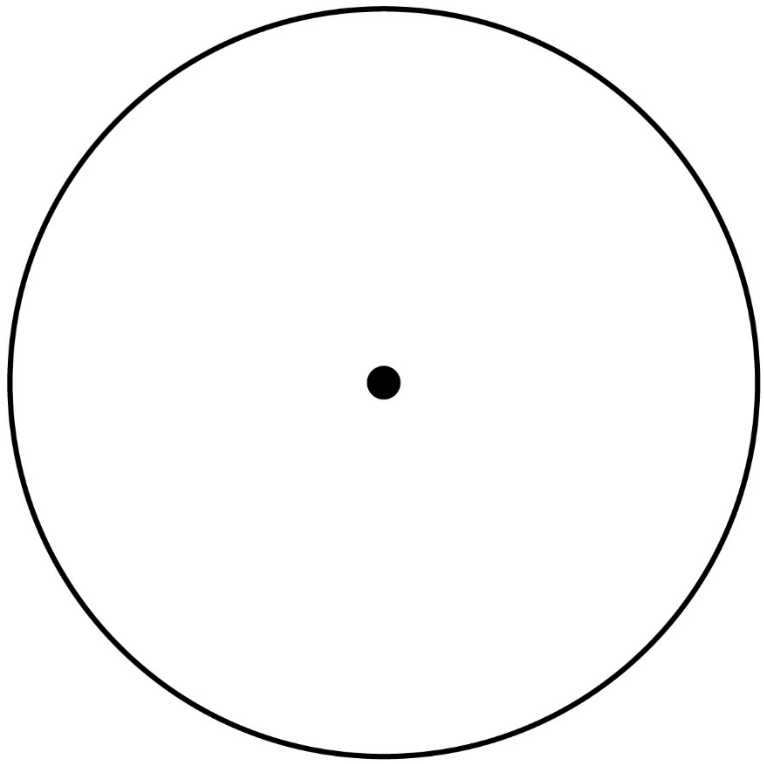
Note:
Cat starts at –100 and ends up at 150.
Thinking about the distance on each side of 0,
100 pixels + 150 pixels = 250 pixels.

Name________________________________ Date_____________________

Data Management
Unit 1 Line Master 10a

Is This What We Expected?

- Our Spinner



- Expected Likelihoods of Favourable Outcomes

Name_________________________________ Date______________________

Data Management
Unit 1 Line Master 10b

Comparing Predictions with Results

Number of Trials: ________

- Predictions

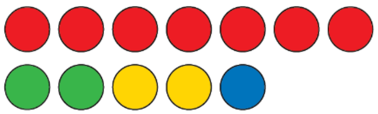
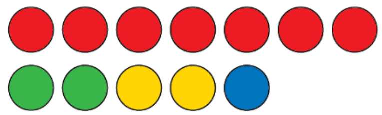
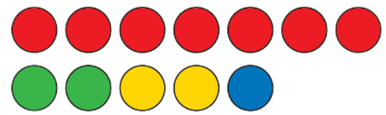
- Results of Experiment

- Relative Frequencies

- Comparing Results with Predictions

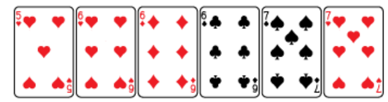
Data Management

Activity 1 Assessment
Describing the Likelihood of Events

Investigating Relative Frequency through Experiments			
Lists all possible outcomes for an experiment with equally likely outcomes. These counters are in a bag.  "I could get a red, green, yellow, or blue counter."	Determines expected likelihood of an event.  "Red: most likely, $\frac{7}{12}$; green: unlikely, $\frac{2}{12}$ or $\frac{1}{6}$; yellow: unlikely, $\frac{2}{12}$ or $\frac{1}{6}$; blue: least likely: $\frac{1}{12}$."	Uses the possible outcomes of an experiment to predict the likelihood of an event.  "There are 12 counters and 7 are red. 12 × 4 = 48, which is close to 50. So, in 50 trials I think I will get a red counter about 7 × 4, or 28 times."	Conducts experiment and organizes collected data. "I conducted the experiment. In 50 trials, I got a red counter 35 times."
Observations/Documentation			

Activity 1 Assessment

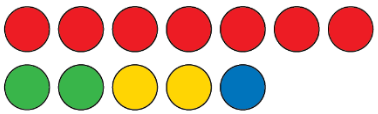
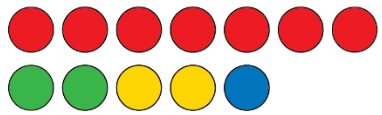
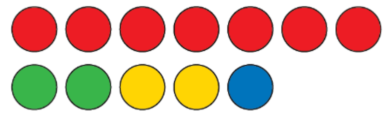
Describing the Likelihood of Events

Investigating Relative Frequency through Experiments (cont'd)			
Uses outcomes of experiment to determine relative frequencies. "I got a red counter 35 times in 50 trials. So, the relative frequency of getting red is $\frac{35}{50}$, or $\frac{70}{100}$, or 0.7, or 70%."	Realizes that relative frequencies vary among sets of collected data. "The relative frequency of getting red was different for other pairs of students. I got $\frac{35}{50}$, but others got $\frac{29}{50}$, $\frac{33}{50}$, and $\frac{37}{50}$."	Understands that with more trials of an experiment, the closer the actual results may be to expected likelihoods. "When I conducted more trials, I noticed that the results got closer to the expected likelihoods, but they still didn't match exactly."	Flexibly performs experiments, analyzes results, and compares and justifies predictions.  "The likelihood of drawing a 6 or a 7 is $\frac{5}{6}$. So, when I conduct the experiment 60 times, I would expect to get a 6 or 7 about 50 times. I got 6 or 7 forty-four times. I have to do more trials."
Observations/Documentation			

Data Management

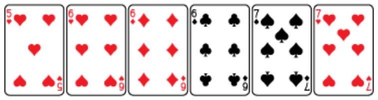
Activity 2 Assessment

Exploring Relative Frequency

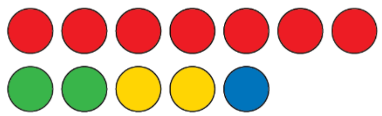
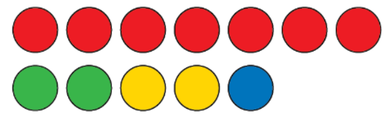
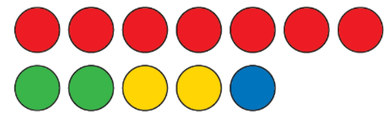
Investigating Relative Frequency through Experiments			
Lists all possible outcomes for an experiment with equally likely outcomes. These counters are in a bag.  “I could get a red, green, yellow, or blue counter.”	Determines expected likelihood of an event.  “Red: most likely, $\frac{7}{12}$; green: unlikely, $\frac{2}{12}$ or $\frac{1}{6}$; yellow: unlikely, $\frac{2}{12}$ or $\frac{1}{6}$; blue: least likely: $\frac{1}{12}$.”	Uses the possible outcomes of an experiment to predict the likelihood of an event.  “There are 12 counters and 7 are red. 12 × 4 = 48, which is close to 50. So, in 50 trials I think I will get a red counter about 7 × 4, or 28 times.”	Conducts experiment and organizes collected data. “I conducted the experiment. In 50 trials, I got a red counter 35 times.”
Observations/Documentation			

Activity 2 Assessment

Exploring Relative Frequency

Investigating Relative Frequency through Experiments (cont'd)			
Uses outcomes of experiment to determine relative frequencies. "I got a red counter 35 times in 50 trials. So, the relative frequency of getting red is $\frac{35}{50}$, or $\frac{70}{100}$, or 0.7, or 70%."	Realizes that relative frequencies vary among sets of collected data. "The relative frequency of getting red was different for other pairs of students. I got $\frac{35}{50}$, but others got $\frac{29}{50}$, $\frac{33}{50}$, and $\frac{37}{50}$."	Understands that with more trials of an experiment, the closer the actual results may be to expected likelihoods. "When I conducted more trials, I noticed that the results got closer to the expected likelihoods, but they still didn't match exactly."	Flexibly performs experiments, analyzes results, and compares and justifies predictions.  "The likelihood of drawing a 6 or a 7 is $\frac{5}{6}$. So, when I conduct the experiment 60 times, I would expect to get a 6 or 7 about 50 times. I got 6 or 7 forty-four times. I have to do more trials."
Observations/Documentation			

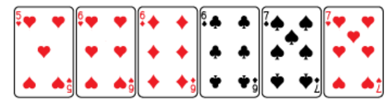
Activity 3 Assessment
Conducting Experiments

Investigating Relative Frequency through Experiments			
Lists all possible outcomes for an experiment with equally likely outcomes. These counters are in a bag.  “I could get a red, green, yellow, or blue counter.”	Determines expected likelihood of an event.  “Red: most likely, $\frac{7}{12}$; green: unlikely, $\frac{2}{12}$ or $\frac{1}{6}$; yellow: unlikely, $\frac{2}{12}$ or $\frac{1}{6}$; blue: least likely: $\frac{1}{12}$.”	Uses the possible outcomes of an experiment to predict the likelihood of an event.  “There are 12 counters and 7 are red. 12 × 4 = 48, which is close to 50. So, in 50 trials I think I will get a red counter about 7 × 4, or 28 times.”	Conducts experiment and organizes collected data. “I conducted the experiment. In 50 trials, I got a red counter 35 times.”
Observations/Documentation			

Data Management

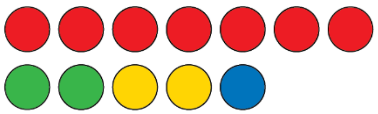
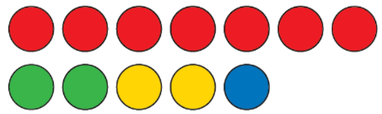
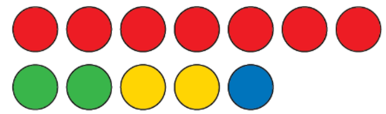
Activity 3 Assessment

Conducting Experiments

Investigating Relative Frequency through Experiments (cont'd)			
Uses outcomes of experiment to determine relative frequencies. "I got a red counter 35 times in 50 trials. So, the relative frequency of getting red is $\frac{35}{50}$, or $\frac{70}{100}$, or 0.7, or 70%."	Realizes that relative frequencies vary among sets of collected data. "The relative frequency of getting red was different for other pairs of students. I got $\frac{35}{50}$, but others got $\frac{29}{50}$, $\frac{33}{50}$, and $\frac{37}{50}$."	Understands that with more trials of an experiment, the closer the actual results may be to expected likelihoods. "When I conducted more trials, I noticed that the results got closer to the expected likelihoods, but they still didn't match exactly."	Flexibly performs experiments, analyzes results, and compares and justifies predictions.  "The likelihood of drawing a 6 or a 7 is $\frac{5}{6}$. So, when I conduct the experiment 60 times, I would expect to get a 6 or 7 about 50 times. I got 6 or 7 forty-four times. I have to do more trials."
Observations/Documentation			

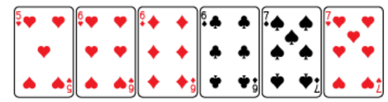
Activity 4 Assessment

Analyzing Relative Frequency

Investigating Relative Frequency through Experiments			
Lists all possible outcomes for an experiment with equally likely outcomes. These counters are in a bag.  "I could get a red, green, yellow, or blue counter."	Determines expected likelihood of an event.  "Red: most likely, $\frac{7}{12}$; green: unlikely, $\frac{2}{12}$ or $\frac{1}{6}$; yellow: unlikely, $\frac{2}{12}$ or $\frac{1}{6}$; blue: least likely: $\frac{1}{12}$."	Uses the possible outcomes of an experiment to predict the likelihood of an event.  "There are 12 counters and 7 are red. 12 × 4 = 48, which is close to 50. So, in 50 trials I think I will get a red counter about 7 × 4, or 28 times."	Conducts experiment and organizes collected data. "I conducted the experiment. In 50 trials, I got a red counter 35 times."
Observations/Documentation			

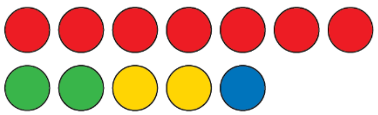
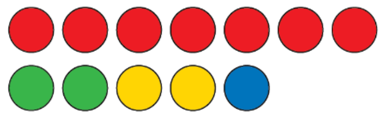
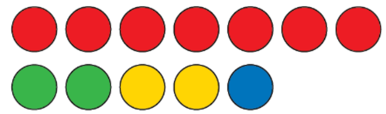
Activity 4 Assessment

Analyzing Relative Frequency

Investigating Relative Frequency through Experiments (cont'd)			
Uses outcomes of experiment to determine relative frequencies. "I got a red counter 35 times in 50 trials. So, the relative frequency of getting red is $\frac{35}{50}$, or $\frac{70}{100}$, or 0.7, or 70%."	Realizes that relative frequencies vary among sets of collected data. "The relative frequency of getting red was different for other pairs of students. I got $\frac{35}{50}$, but others got $\frac{29}{50}$, $\frac{33}{50}$, and $\frac{37}{50}$."	Understands that with more trials of an experiment, the closer the actual results may be to expected likelihoods. "When I conducted more trials, I noticed that the results got closer to the expected likelihoods, but they still didn't match exactly."	Flexibly performs experiments, analyzes results, and compares and justifies predictions.  "The likelihood of drawing a 6 or a 7 is $\frac{5}{6}$. So, when I conduct the experiment 60 times, I would expect to get a 6 or 7 about 50 times. I got 6 or 7 forty-four times. I have to do more trials."
Observations/Documentation			

Activity 5 Assessment

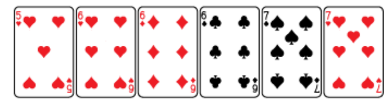
Coding: Exploring Statistics with Coding

Investigating Relative Frequency through Experiments			
Lists all possible outcomes for an experiment with equally likely outcomes. These counters are in a bag.  “I could get a red, green, yellow, or blue counter.”	Determines expected likelihood of an event.  “Red: most likely, $\frac{7}{12}$; green: unlikely, $\frac{2}{12}$ or $\frac{1}{6}$; yellow: unlikely, $\frac{2}{12}$ or $\frac{1}{6}$; blue: least likely: $\frac{1}{12}$.”	Uses the possible outcomes of an experiment to predict the likelihood of an event.  “There are 12 counters and 7 are red. 12 × 4 = 48, which is close to 50. So, in 50 trials I think I will get a red counter about 7 × 4, or 28 times.”	Conducts experiment and organizes collected data. “I conducted the experiment. In 50 trials, I got a red counter 35 times.”
Observations/Documentation			

Data Management

Activity 5 Assessment

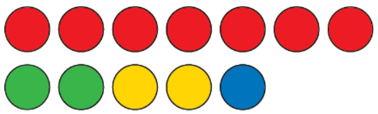
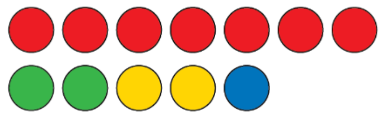
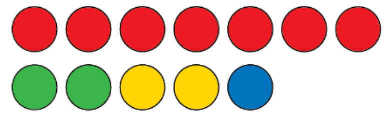
Coding: Exploring Statistics with Coding

Investigating Relative Frequency through Experiments (cont'd)			
Uses outcomes of experiment to determine relative frequencies. "I got a red counter 35 times in 50 trials. So, the relative frequency of getting red is $\frac{35}{50}$, or $\frac{70}{100}$, or 0.7, or 70%."	Realizes that relative frequencies vary among sets of collected data. "The relative frequency of getting red was different for other pairs of students. I got $\frac{35}{50}$, but others got $\frac{29}{50}$, $\frac{33}{50}$, and $\frac{37}{50}$."	Understands that with more trials of an experiment, the closer the actual results may be to expected likelihoods. "When I conducted more trials, I noticed that the results got closer to the expected likelihoods, but they still didn't match exactly."	Flexibly performs experiments, analyzes results, and compares and justifies predictions.  "The likelihood of drawing a 6 or a 7 is $\frac{5}{6}$. So, when I conduct the experiment 60 times, I would expect to get a 6 or 7 about 50 times. I got 6 or 7 forty-four times. I have to do more trials."
Observations/Documentation			

Data Management

Activity 6 Assessment

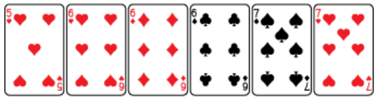
Statistics Consolidation

Investigating Relative Frequency through Experiments			
Lists all possible outcomes for an experiment with equally likely outcomes. These counters are in a bag.  "I could get a red, green, yellow, or blue counter."	Determines expected likelihood of an event.  "Red: most likely, $\frac{7}{12}$; green: unlikely, $\frac{2}{12}$ or $\frac{1}{6}$; yellow: unlikely, $\frac{2}{12}$ or $\frac{1}{6}$; blue: least likely: $\frac{1}{12}$."	Uses the possible outcomes of an experiment to predict the likelihood of an event.  "There are 12 counters and 7 are red. 12 × 4 = 48, which is close to 50. So, in 50 trials I think I will get a red counter about 7 × 4, or 28 times."	Conducts experiment and organizes collected data. "I conducted the experiment. In 50 trials, I got a red counter 35 times."
Observations/Documentation			

Data Management

Activity 6 Assessment

Statistics Consolidation

Investigating Relative Frequency through Experiments (cont'd)			
Uses outcomes of experiment to determine relative frequencies. "I got a red counter 35 times in 50 trials. So, the relative frequency of getting red is $\frac{35}{50}$, or $\frac{70}{100}$, or 0.7, or 70%."	Realizes that relative frequencies vary among sets of collected data. "The relative frequency of getting red was different for other pairs of students. I got $\frac{35}{50}$, but others got $\frac{29}{50}$, $\frac{33}{50}$, and $\frac{37}{50}$."	Understands that with more trials of an experiment, the closer the actual results may be to expected likelihoods. "When I conducted more trials, I noticed that the results got closer to the expected likelihoods, but they still didn't match exactly."	Flexibly performs experiments, analyzes results, and compares and justifies predictions.  "The likelihood of drawing a 6 or a 7 is $\frac{5}{6}$. So, when I conduct the experiment 60 times, I would expect to get a 6 or 7 about 50 times. I got 6 or 7 forty-four times. I have to do more trials."
Observations/Documentation			