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Google Slides Lessons Preview





BC Math Curriculum Statistics – Grade 8

3-Part Lesson Format

Part 1 – Minds On!

- Learning Goals
- Discussion Questions
- Quotes
- And More!

MEASURES OF CENTRAL TENDENCY

Learning Goal

We are learning to **investigate** how changes in a data set (adding or removing values) influence the mean, median, and mode by using calculations and comparing results, so we can describe how these changes affect the overall distribution and patterns in the data.

MODE

Find the mode for the data sets below.

1 2 3 4 5 6 7 8 9 0 -



24, 8, 20, 12, 24, 16
Mode

36, 42, 39, 36, 45, 36
Mode

21, 28, 16, 40, 55
Mode

690, 725, 670, 718, 705, 600
Mode

72, 85, 91, 75, 78, 85
Mode

305, 318, 311, 327, 318, 302
Mode

144, 152, 144, 167, 152, 149
Mode

210, 225, 218, 238, 225, 210
Mode

480, 495, 502, 480, 517, 480
Mode

Part 2 – Action!

- Writing
- Matching
- Drag and Drop
- Drawing
- And More!

Part 3 – Consolidation!

- Exit Cards
- Quizzes
- Reflection
- And More!



MODE



Answer the questions below.

1 2 3 4 5 6 7 8 9 0

1) Students were asked to choose their favourite number from 1 to 10.
Data set: 6, 4, 8, 6, 9, 4, 2, 6, 4, 3, 4
What is the mode?

2) A group of students recorded how many kilometres they walked in a week.
Data set: 3, 5, 7, 4, 6, 8, 2
What is the **mode** of the data set?

3) Students voted for their favourite ice cream flavour:
Data set:
2, 3, 2, 1, 2, 4, 3, 2, 1, 2
Which flavour is the mode?

Chocolate	1
Vanilla	2
Strawberry	3
Mint	4

Chocolate
Vanilla
Strawberry
Mint



BC Math Curriculum Statistics – Grade 8

0 1 2 3 4
5 6 7 8 9

RANGE

1 2 3 4 5 6 7 8 9 0



Find the ranges of the data sets below.

Data Set	Calculation	Range
1) 9, 14, 6, 11, 18, 10		
2) 32, 45, 27, 41, 38, 29, 35		
3) 76, 84, 91, 73, 88, 95		
4) 102, 118, 97, 125, 110, 104, 121		
5) 186, 172, 199, 165, 178, 190		
6) 245, 268, 231, 259, 240, 252, 263		
7) 315, 342, 328, 356, 334, 349		
8) 410, 438, 425, 452, 417, 430, 444		

Find the missing point for the word problems below.

1 2 3 4 5 6 7 8 9 0 %

1) The average number of hours a student studied over 5 days was 2.8 hours. The hours studied each day are shown below, but one day is missing. Find the missing number of hours studied on Thursday.

Day	Monday	Tuesday	Wednesday	Thursday	Friday
Hours	3.0	2.5	2.0	?	3.5

2) The average daily number of steps taken over 7 days was 8,000 steps. The steps for each day are listed below, but one day is missing. Find the missing number of steps for Day 4.

Day	1	2	3	4	5	6	7
Steps	7500	8200	7900	?	8400	8100	7800

3) A swimmer's average lap time over 6 laps was 55.5 seconds. The lap times are shown below, but one value is missing. Find the missing lap time.

Laps	1	2	3	4	5	6
Time(S)	54.2	56.1	55.0	57.3	53.9	?

Read each situation and choose the best measure of central tendency.

#	Questions	Answer
1	A teacher wants to find the average score on a Grade 8 math test. The class has 30 students , and no scores are unusually high or low.	
2	A clothing store wants to know which shoe size sells the most so it can order more inventory.	
3	A city is studying house prices . Most homes cost between \$350,000 and \$700,000, but a few luxury homes cost several million dollars.	
4	A music app wants to know which music genre is most popular among Grade 8 students.	
5	A scientist measures the growth of 150 plants grown under the same conditions. The data has no unusual values .	
6	A researcher records the daily screen time of students. Most students use screens between 2 and 5 hours, but one student records 15 hours every day.	

Mean

Median

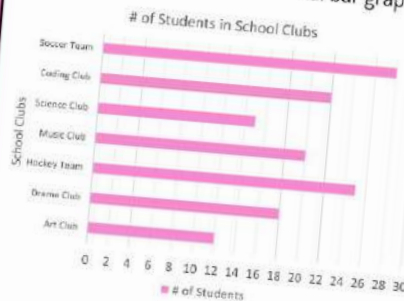
Mode



BC Math Curriculum Statistics – Grade 8

HORIZONTAL BAR GRAPH

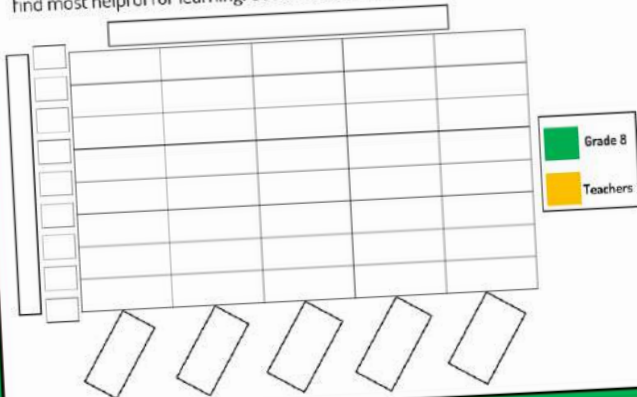
A student surveyed how many students are in different school clubs and displayed the data in a horizontal bar graph.



Questions	Answer
1) Which club has the greatest number of students?	
2) Which club has the least number of students?	
3) Did the student collect primary or secondary data?	Primary
4) Is the data quantitative or qualitative ?	Quantitative
5) What is the average (mean) number of students across all clubs?	Qualitative
6) What patterns or trends do you notice in the graph? List 2 observations and discuss with your classmates.	

CREATING A DOUBLE BAR GRAPH

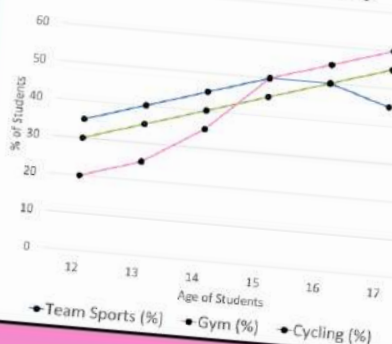
Grade 8 students and their teachers were surveyed about which classroom activity they find most helpful for learning. Use the data in the table to create a double bar graph.



Activity	Grade 8 Students	Teachers
Group Work	26	18
Class Discussions	20	28
Practice Questions	32	30
Educational Videos	24	16
Hands-On Projects	28	22

GRAPHS

Use the data in the table below.



Answer the questions below.

1) What percentage of 15-year-olds participate in team sports?	
2) Which activity has the highest participation among 17-year-olds?	
3) At which age is the difference between team sports and gym participation the smallest?	
4) Which activity shows the lowest overall increase from age 12 to age 17?	
5) Is there a relationship between age and gym participation? Explain your answer using evidence from the graph.	



Workbook Preview



Grade 8

Graphing and Probability

Graphing

	Curriculum Expectations	Pages
GP.1	Preview of 80 pages from this product that contains 212 pages total.	

MEAN**Mean** = the average in a set of data**Step 1:** Add up the numbers in the data set**Step 2:** Divide the sum by the amount of numbers in the set.**Example:****Data set:** 5, 6, 8, 5**Step 1:** $5 + 6 + 8 + 5 = 24$ **Step 2:** $24 \div 4 = 6$ **Part 1** Find the mean for each data set below

	Data	Total – Add Numbers	Mean
1)	13, 18, 23,		
2)	49, 75, 35		
3)	17, 26, 13, 44		
4)	3.5, 4.8, 5.2		
5)	15, 84, 53, 48, 40, 48		
6)	53, 67, 45, 19		
7)	71, 84, 98, 103		
8)	117, 125, 132, 154		
9)	35, 45, 27, 33		
10)	11.6, 18.2, 23.8, 44.4		

Part 2 Answer the word problems below

1) Jason has completed 5 math tests this year. His marks as percents are: 81%, 72%, 93%, 68%, and 86%. What was his average mark?

2) Logan bought 6 hockey cards for the following prices: \$13, \$18, \$32, \$9, \$44 and \$52. What was the average price for one hockey card?

MODE

Mode: The number that occurs the most in a data set. The mode is used to calculate data in nominal data sets.

Step 1: Order the numbers from least to greatest

Step 2: Find the number or numbers that show up the most – You can have zero mode or more than one mode.

Example: 5, 3, 7, 3, 9, 11

5, 3, 7, 9, 11

Answer: 3



	Ordered List	Mode
1) 13, 15, 11, 13, 11		
2) 22, 25, 23, 22, 28		
3) 37, 49, 35, 37, 49, 35, 47		
4) 65, 54, 58, 58, 54, 65, 54, 58		
5) 79, 72, 75, 76, 72, 79, 75, 79		
6) 91, 95, 94, 90, 91, 94, 95, 97		
7) 121, 102, 112, 114, 104, 117		

1) Justin tracks what time he goes to bed at for 15 days. His bedtimes are written below:

7, 11, 8, 8, 7, 9, 10, 10, 7, 8, 9, 9, 8, 11, 9

What time did Justin go to bed at most often in the 15 days? _____



2) Adults were asked to choose a number from the food menu. The results are represented in the data set. What is the mode?

4, 1, 2, 4, 2, 2, 4, 1, 2, 1, 4, 2, 3, 1, 2, 2, 3, 2, 3, 4, 1, 2, 3, 1, 2, 2, 1, 3, 3, 4, 1

Which food choice was most popular? _____

1	Fish
2	Chicken
3	Steak
4	Vegetables

MEDIAN

Median: The median is the middle number in a data set.

Step 1: put numbers in order from smallest to largest

Step 2: circle the number in the middle.

*** If there is an even amount of numbers in the data set, add the two numbers in the middle together and divide by 2. This is the median.

Part 1

Find the median of the data sets below

	Data	Ordered List	Median
1)	4, 7, 8, 12, 15	4, 7, <u>8, 8</u> , 12, 15	$8 + 8 = 16$ $16 \div 2 = 8$
2)	15, 17, 18, 19, 20		
3)	27, 20, 24, 28, 26, 22		
4)	58, 64, 42, 57, 68, 48		
5)	84, 95, 54, 68, 92, 75, 86, 95		
6)	105, 125, 108, 152, 128, 135, 133		
7)	10.2, 10.8, 12.3, 11.8, 12.5		

Part 2

Answer the word problems below

- 1) The average temperatures across all 13 provinces and territories are listed below:
11°C, 9°C, 8°C, 9°C, 5°C, 7°C, 2°C, 3°C, 9°C, 10°C, 8°C, 8°C, 6°C

What is the median temperature in Canada? _____

- 2) Ten students are asked how many hours a day they spend on their phones. The results are as follows: 4, 6, 5, 3, 1, 7, 5, 4, 6, 8

What is the median number of hours the students spend on their phones? _____

RANGE

Range: The range is the difference between the biggest and smallest number in a data set.

Step 1: Find the largest number and the smallest number.

Step 2: Subtract the smallest number from the largest number

Example: 13, 74, 37, 18, 32

Step 1: 13 = smallest 74 = largest

Step 2: $74 - 13 = 61$



Part 1 Find the range of the data sets below

		Calculations	Range
1)	8, 12, 15, 8	$15 - 4 = 11$	11
2)	61, 75, 81, 92, 7		
3)	85, 95, 81, 106, 132, 8		
4)	205, 135, 178, 171, 164, 199		
5)	234, 241, 258, 226, 231, 247		
6)	318, 365, 343, 352, 368, 376		
7)	433, 418, 427, 406, 448, 439		
8)	518, 475, 428, 596, 604, 410		

Part 2 Find the range in the word problems below

1. Robin collects strawberries for her summer job. She records how many strawberries she collects each day for a week. What is the range of strawberries she collects?

471, 528, 374, 486, 598, 446, 641

2. Steven records how many minutes of screen time he uses on his phone each week. His results for 6 weeks are listed below. What is the range?

247, 311, 485, 375, 201, 399

Estimating the Mean

The mean is the average number in a data set. When we understand what the mean of a data set is, we can estimate the mean easily without doing any calculations.

For example, in the data set: 22, 18, 16, 25, 20, we can estimate that the mean will be approximately 20, without doing any calculations. This is because the mean has to be between 16 and 25. We can also see that there are two numbers above 20, and two numbers below 20.

Part 1 1) Estimate the mean by circling one of the options
2) Calculate your answer by calculating the mean

	Data Set	Options			
		1	2	3	4
1)	5, 5, 7, 7, 6	4	5	6	7
2)	22, 25, 24, 23, 26	22	23	24	25
3)	13, 18, 16, 14, 19	14	16	18	19
4)	22, 19, 25, 15, 14	16	25	23	19
5)	64, 68, 57, 59, 62		66	67	62
6)	74, 88, 65, 81, 62			82	64
7)	83, 99, 72, 76, 85			78	89
8)	93, 95, 85, 105, 87			91	93
9)	121, 102, 133, 125, 144	108	111	125	134
10)	152, 168, 158, 148, 134	152	160	145	139

Part 2 Answer the word problems below by estimating

1) Meredith bought lunch every day from Monday to Friday last week. She spent: \$9, \$5, \$11, \$12, and \$8. Approximately how much did lunch cost her per day?



2) Michelle sells popcorn at a festival. She worked for 6 hours, selling the following dollar amounts each hour: \$22, \$32, \$45, \$27, \$38, and \$46. Approximately how much did she earn each hour?



Finding Missing Data Point Using Mean

We can determine the missing number in a series if we know the mean by using the following formula:

$$\text{Mean} = \frac{\text{Sum of given numbers} + x \text{ (unknown number)}}{\text{total numbers}}$$

Example: 25, 27, ?, 30 Mean = 26

Steps

- 1) Multiply number of total numbers you have by the mean ($26 \times 4 = 104$)
- 2) Add the numbers you know ($25 + 27 + 30 = 82$)
- 3) Find the difference (subtract) between 104 and 82 ($104 - 82 = 22$) – Answer = 22

Questions

Use the table below to find the missing data point

	Data Set		Calculations	Missing Data Point
Ex)	9, 16, ?, 22, 12, 19	15	1) $15 \times 6 = 90$ 2) $9 + 16 + 22 + 12 + 19 = 78$ 3) $90 - 78 = 12$	12
1)	12, 18, 6, ?, 15	17		
2)	48, ?, 32, 45, 30, 21	32		
3)	61, 35, 51, 23, ?	45		
4)	72, 41, 32, ?, 68, 65	57		
5)	91, 85, 60, 57, ?, 52	75		

Finding Missing Data Point Using Mean

Questions

Answer the word problems below

1) Leah has completed 5 assignments in math this year. She has the following marks (written as percentages) – 79%, 89%, 68%, 77%, and 78%.

In order to get an A- on her report card, she needs an 80 average or more. She has one more assignment left. What mark does she need to achieve an 80% average?



2) Tyler slept an average of 7 hours a week. He slept for 5.5 hours on both Monday and Tuesday. He slept for 6 hours on Thursday and 8.5 hours on Friday and Saturday. On Sunday, he slept for 9 hours! How long did he sleep on Wednesday?

3) Andre De Grasse was practicing his 100m race. He ran 10 full speed races last week. His average time was 10.2 seconds. His times have been presented in the table, but he is missing his time for race 7.

Race	1	2	3	4	5	6	7	8	9	10
Time	10.1	9.7	9.8	10.3	10.9	9.8		9.9	10.8	10.9

What was his time for race number 7?



Task Cards: Mean Detective

Objective

What are we learning about?

To help students understand and solve for a missing data point in a set by using the mean (average).

Materials

What you will need for the activity.

- 2
- Separate sheets for answers
- Pencils

1 2 3 4 5
6 7 8 9 0

Instructions

How to complete activity

1. Introduce the concepts covered in the lesson.
2. Organize the students into pairs and provide each pair with their sets of task cards.
3. Give each pair an answer recording sheet to record their answers.
4. Encourage teamwork by having students collaborate on finding solutions.
5. Allow students to select any task card to begin with, emphasizing that they can complete the cards in any order they prefer.
6. Instruct students to record the letter of their chosen answer (A, B, or C) on their answer sheet beside the task card's number.
7. Consider using a timer to create a dynamic challenge, adjusting the duration to fit the lesson's objectives and complexity.
8. After the activity, review the answers collectively, discussing any challenging questions and strategies used to solve them.
9. Have students reflect on the activity, sharing the methods they applied and obstacles they overcame.

Task Cards

Cut out the task cards below

Card 17:

77%, 80%, 84%, 82%, ?, 75%. If the average is 80%, what is the missing percentage?

- a) 78%
- b) 79%
- c) 82%

Card 18:

A student studied for 6.5, 5, 7, ?, and 6 hours in a week. If the average time studied was 6 hours, how many hours did the student study on the missing day?

- a) 5.5
- b) 7
- c) 6.5

Card 20:

The mean age of a group of 6 people is 25 years. Their ages are 22, 28, 23, 27, ?, and 24. What is the missing age?

- a) 26
- b) 25
- c) 24

Card 21:

A family spent \$350, \$420, \$410, and \$? on groceries over four weeks. If the average weekly spending was \$400, how much did they spend on the missing week?

- a) \$370
- b) \$380
- c) \$420

Card 22:

Students had a chance of 78% to pass. As a class score, they got 79%, 80%, 77%, and ? for a year. If the average is exactly 78%, what was the missing score?

- a) 77%
- b) 76%
- c) 77%

Card 23:

A soccer team won their games by 3, 5, ?, 2, and 4 points. If their average points won is 3.5, how many points did they win by in the missing game?

- a) 4 points
- b) 3.5 points
- c) 5 points

Card 24:

In a race, 5 runners had the following times in minutes: 12.5, 11.8, ?, 12.9, 11.5, with an average time of 12.1 minutes. What was the missing time?

- a) 12.0 min
- b) 11.8 min
- c) 12.4 min

Name: _____

20

Curriculum Connection
GP.1

Task Cards: Mystery Number Detectives

Answers

Record your answers below

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

13	
14	
15	
16	
19	
20	
21	
22	
23	
24	

Exit Cards

Cut Out

Cut out the exit cards below and have students complete them at the end of class

Name: _____

Answer the word problem below.

Sophia wants to read an average of 20 pages per day over a 10-day reading challenge. After 9 days, she has read the following number of pages each day: 18, 22, 20, 19, 21, 17, 23, 24, and 19. How many pages does she need to read on the 10th day to meet her goal?

Name: _____

Answer the word problem below.

Sophia wants to read an average of 20 pages per day over a 10-day reading challenge. After 9 days, she has read the following number of pages each day: 18, 22, 20, 19, 21, 17, 23, 24, and 19. How many pages does she need to read on the 10th day to meet her goal?

Name: _____

Answer the word problem below.

Sophia wants to read an average of 20 pages per day over a 10-day reading challenge. After 9 days, she has read the following number of pages each day: 18, 22, 20, 19, 21, 17, 23, 24, and 19. How many pages does she need to read on the 10th day to meet her goal?

Name: _____

Answer the word problem below.

Sophia wants to read an average of 20 pages per day over a 10-day reading challenge. After 9 days, she has read the following number of pages each day: 18, 22, 20, 19, 21, 17, 23, 24, and 19. How many pages does she need to read on the 10th day to meet her goal?

Outliers in Data Sets

An **outlier** in a data set are values that are significantly different from other measures. They may mean that something has gone wrong in the data collection, or they may represent a valid measure that needs further explanation.

Part 1

Circle any outliers in the data sets below

1)	7, 8, 9, 10, 5, 10, 42, 9	5)	1524, 1531, 1585, 1563, 1284
2)	12, 15, 18, 19, 84, 25, 72	6)	102.2, 10.5, 103.9, 104.6, 102.5, 62.1
3)	85, 90, 92, 94, 100, 105	7)	2751, 2853, 2623, 3547, 2345, 1258
4)	6.2, 6.5, 5.0, 6.8, 7.1, 7.5	8)	421, 521, 605, 2021, 4452, 506, 572

Part 2

For the data sets below

1) Jonah practiced his 400m race every day. He used the stop watches that automatically record his times on a computer. His times were: 55, 49, 51, 52, 132, and 48.

- Which of his scores was an outlier?
- What might have caused the outlier score?



2) Alex looked at how many steps he took last week. The number of steps he took over the last 7 days is recorded below:

10425, 12325, 8542, 9875, 2012, 1925, 120

- Which of the values are outliers?
- Explain why he may have an outlier of 2012 steps?
- Why might Alex have an outlier of 19252 steps?



3) Kylie has a business where she sells cakes. She recorded her last 15 days of cake sales.

8, 7, 9, 12, 6, 25, 7, 9, 8, 6, 10, 0, 11, 12, 8

- Which of the values are outliers?
- Explain what could have led to her selling 25 cakes on day 6.
- Explain what could have led to her selling 0 cakes on day 11.



Calculating Mean - Outliers

Outliers have a big impact on the mean of a data set. For example, if John records his last 5 long jumps and jumps the following distances:

6.5m, 6.8m, 1.5m, 6.2m, 6.1m

John explains after that on his third jump, he slipped and didn't perform a full jump. The data set has an outlier that doesn't reflect John's ability to jump. We can see the difference when we use an outlier in our calculation of the mean



Mean With Outlier = 5.42m
Mean Without Outlier = _____

Part 1

	Data Set	Mean With Outlier(s)	Mean Without Outlier(s)
1)	9, 7, 5, 25, 8, 6		
2)	21, 48, 24, 20, 26, 22		
3)	12.2, 15.6, 14.3, 28.4, 16.1		
4)	53, 105, 61, 11, 65, 58, 59		
5)	51, 81, 84, 83, 82, 84, 113		

Part 2

Answer the word problem below

1) Explain what happened in questions 4 and 5. Why was the mean similar with the outliers?

2) Marla's teacher is deciding between an A- and B+. An A- is between 80-84 and a B+ is between 77-79. Marla received the following marks:

78, 85, 81, 82, 77, 88, 52, 84

Should the teacher give Marla an A- or B+? Explain using outliers – do calculations!

Calculating Mode and Median - Outliers

Part 1

Calculate the mode using the outlier(s) and without the outlier(s)

	Data Set	Mode With Outlier(s)	Mode Without Outlier(s)
1)	11, 15, 12, 16, 45, 15, 12, 15, 12, 15		
2)	45, 7, 6, 21, 45, 46, 88, 47, 46		
3)	76, 132, 42, 81, 77		
4)	10, 11, 100, 208, 48, 112		
5)	254, 265, 575, 2		

Do the outliers influence the mode? Explain why or why not.

Part 2

Calculate the median using the outlier(s) and without the outlier(s)

	Data Set	Median With Outlier(s)	Median Without Outlier(s)
1)	15, 19, 16, 2, 47, 18, 17		
2)	45, 40, 99, 48, 43, 46, 45		
3)	75, 79, 125, 21, 72, 76, 75, 81		
4)	94, 88, 156, 92, 95, 96, 97, 41		
5)	8.5, 8.4, 8.8, 7.9, 8.3, 2.5, 21.5		

Do the outliers influence the median? Explain why or why not.

When To Use – Mean, Median, Mode

In general, we can use the following rules when deciding which measure of central tendency to use.

Mean

- Data without outliers or data sets with many data points to “wash out” outliers
- Provides accurate average of a data set and works well with all sizes of data sets

Mode

- Working with qualitative or nominal data
- Very easy to determine the mode and is not impacted by outliers
- Does not always give an accurate average of a data set

Median

- Works well with data that has outliers and with large data sets
- Less accurate than mean, but more accurate than mode

Questions

For each measure of central tendency will you choose to use? Explain

1)	The average points per game for each team on your team. You have a large data set with no outliers.
2)	People vote on their favourite number from 1 to 10. The numbers are: 10, 7, 5, 6, 4, 2, 5, 7, 5
3)	The average salaries for Canadians. Your data set has many outliers.
4)	The average amount of medicine that is effective. The data set is small with no outliers.
5)	People choose which meal number (1-6) they order from a fast-food restaurant.

Mean, Median, Mode – Hourly Rate



Questions

Answer the questions below

You are deciding between 3 jobs to take based on their hourly rates. You have the following data, which shows how much 5 of the employees at each business earn per hour.

	Employee 1	Employee 2	Employee 3	Employee 4	Employee 5
Business 1	\$45	\$16	\$17	\$45	\$15
Business 2	\$25	\$30	\$112	\$24	\$25
Business 3	\$20	\$21	\$54	\$56	

- Rank the businesses by their mean hourly rate. Which one would you choose?
- Instead of using the mean hourly rate, use the mode. Which business would you join?
- You want to make sure you select the best business, so you use the median hourly rate. Which business would you choose?
- You notice an outlier in business 2's data. What could be an explanation for this outlier?
- If you omit the outlier, what is the mean rate of business 2? Does this change your choice? Explain.
- If you were the business owner, would you include the outliers in your data? Explain.

Mean, Median, Mode – Dinner Out



Questions

Answer the questions below

You and your friends are comparing how many times you have been out for dinner in the past year. The following table shows how many dinners each friend has gone out for by month.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Ben	2	2	1	4	3	2	4	1	2	1	1	
Joe	1		3	2	5	4	3	1	2	2	1	
Ava	1		2	3	2	3	2	2	1	1	2	
Max	2	3		2	4	2	1	4	8	2	3	

- Calculate the mean for each friend's number of times out for dinner. Who went out for dinner the most per month?
- Compare the medians of each friend. Who went out for dinner the most per month?
- Compare the mode of each friend. Who went out for dinner the most per month?
- Using the mean, which month was most popular for going out for dinner?
- What is the mean of the medians for each friend's number of visits out for dinner?



Exit Cards

Cut Out

Cut out the exit cards below and have students complete them at the end of class

Name: _____

The table below shows the number of hours you and your friends have studied each week.

	Week 1	Week 2	Week 3	Week 4
	10	8	12	9
	7	11	10	13
Leo		15	11	14
Ava		6	7	8

- 1) Calculate the mean for each friend's number of study hours. Who studied the most on average per week?
- 2) Identify which week was the most popular for studying among all friends? On average, how much did the friends study that week?

Name: _____

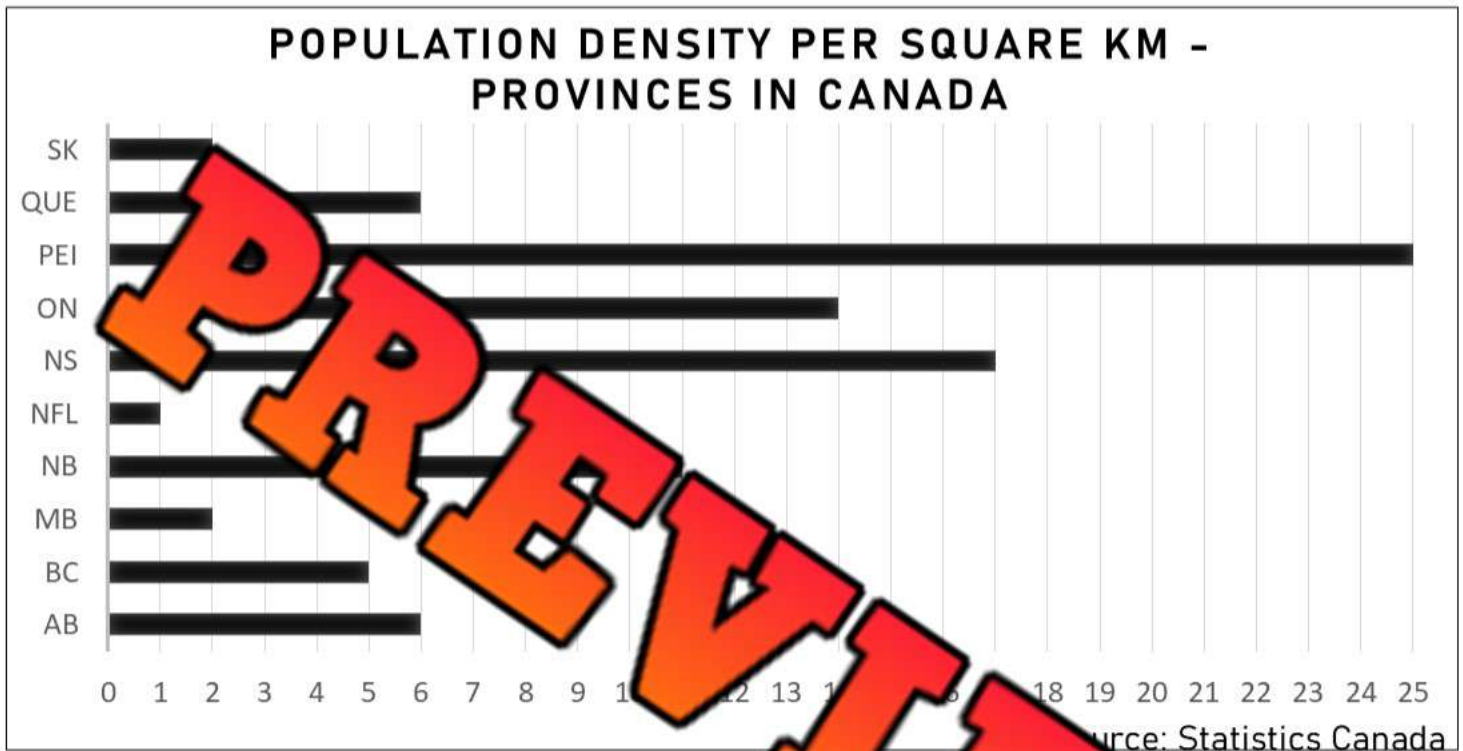
The table below shows the number of hours you and your friends have studied each week.

	Week 1	Week 2	Week 3	Week 4
Bob	10	8	12	9
Jack	7	11	10	13
Leo	12	15	11	14
Ava	9	6	7	8

- 1) Calculate the mean for each friend's number of study hours. Who studied the most on average per week?
- 2) Identify which week was the most popular for studying among all friends? On average, how much did the friends study that week?

Horizontal Bar Graph - Population

Grayson displayed the population density of the 10 provinces in Canada in a horizontal bar graph.



a) Which province has the greatest population density?

b) Which province has the lowest population density?

c) Did Grayson collect primary or secondary data?

d) Is the data quantitative or qualitative?

e) What is the average (mean) population density of all the provinces?

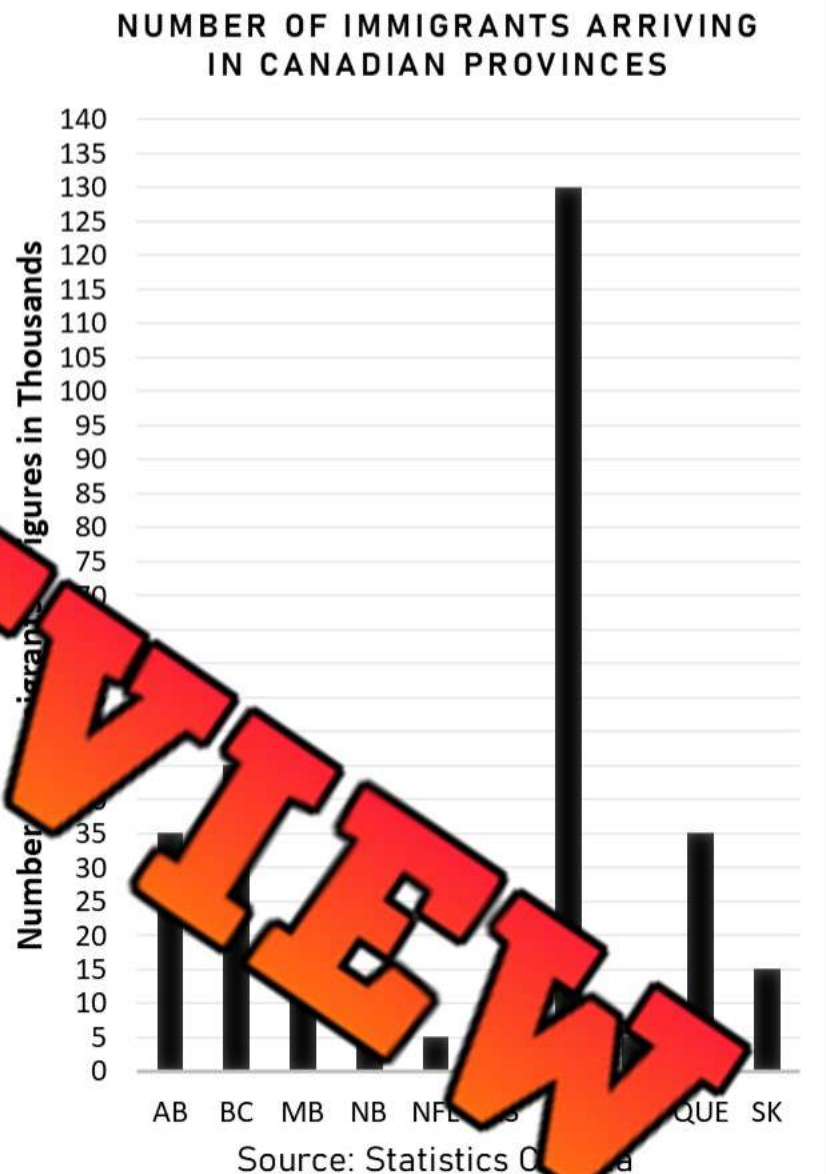
f) Is the mean population density of Alberta and BC higher or lower than Manitoba and Nova Scotia?

g) What surprised you about the data in the graph? List 2 things.

Vertical Bar Graph – Immigration

Canada is a popular place for people from other countries to move to. The number of immigrants who moved to Canadian provinces is represented in the bar graph. Fill in the frequency table below.

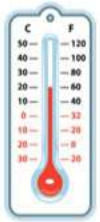
Province	Frequency
AB	
BC	
MB	
NB	
NFL	
NS	
ON	
PEI	
QUE	
SK	
Mean of Canada	
Mode of Canada	
Median of Canada	



- How many more immigrants moved to Ontario than New Brunswick?
- Did more immigrants move to Ontario than all the other provinces combined?
- Is the data quantitative or qualitative?
- Was the data collected from a primary or secondary source?
- In your opinion, what is one reason why more people immigrate to Ontario?

Interpreting a Double Bar Graph

The temperature in degrees Celsius for the 3rd week of May has been represented in the double bar graph below.



Temperatures in Degrees Celsius – 3rd Week of May



a) Which day was warmest in 2000 during this week?

b) Which day was the coldest in 2015 during this week?

c) What was the mean temperature in 2015 during this week?

d) What was the median temperature in 2000 during this week?

e) What conclusions can you draw from the data?

f) What could be the cause of the trend you noticed in the graph?

Activity Title: Flip the Data

Objective

What are we learning about?

Students will engage in a fun and active game where they read data from a bar graph and answer questions to earn the opportunity to flip a bottle or cup. This activity combines data interpretation skills with a physical challenge, adding excitement and a competitive element to learning.

Materials

What you will need for the activity.

- Bottle or cups for flipping
- A smartboard or projector to display bar graphs
- Timer (stopwatch or smartboard app)
- Question cards with questions on the bar graph data
- Scoreboard to keep track of team scores



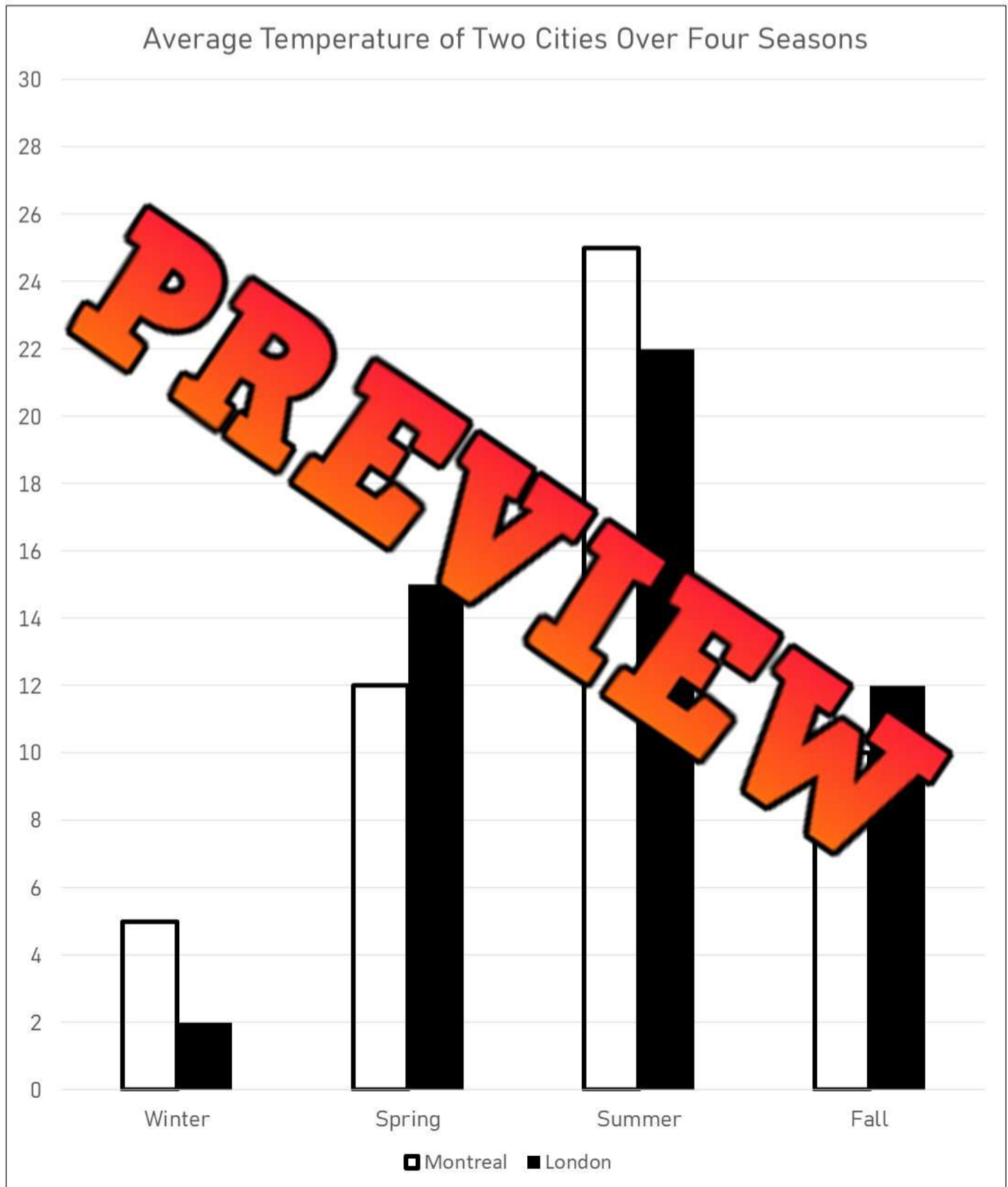
Instructions

How you will complete the activity.

1. Divide the class into small teams, ideally of 5 or 6 students each.
2. Prepare a series of bar graphs to display on the smartboard, with corresponding question cards that ask about the data in the graph.
3. One team at a time comes to the front where the graph is displayed.
4. Display the first bar graph on the smartboard.
5. The first student from the active team reads the graph and selects a question card. Start the timer when the question is first shown.
6. The student answers the question based on the data presented in the graph. The teacher checks the answer.
7. If the student answers correctly, they flip their bottle or cup repeatedly until they land it upright. When they do, the next teammate can take their turn.
8. If the student's answer is incorrect, they must try another question card before they can attempt to flip.
9. The team's turn ends either when all members have successfully flipped their bottle/cup or when the timer reaches a set limit (e.g., 3 minutes).
10. Record the team's time or number of successful flips on the scoreboard.
11. Repeat steps 4-10 for each team. The team with the fastest time wins.

Graph 4

What did you learn from the graph?



Graph 5

What did you learn from the graph?



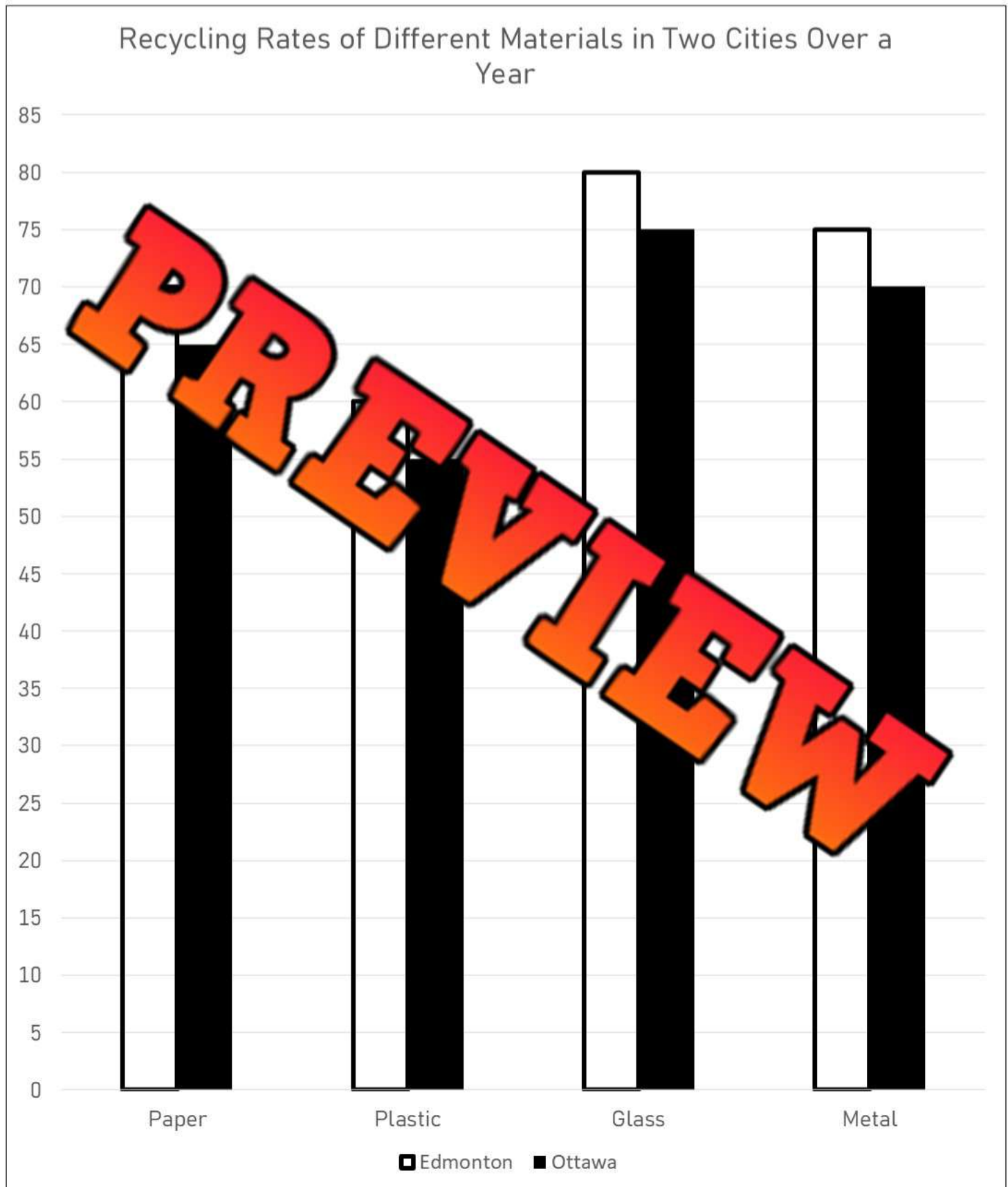
Graph 6

What did you learn from the graph?



Graph 7

What did you learn from the graph?



Questions

Choose a question to ask the student who is about to flip their bottle

What is the title of the graph?

What is the title of the Y-axis?

What is the title of the X-axis?

What does each bar on the graph represent?

Which category shows the highest values for both bars?

Which category shows the lowest values for both bars?

How is the data displayed on the graph?

What is the range shown on the Y-axis?

What is the total value represented by all bars?

What is the difference between the highest and lowest categories for both bars?

Are there any categories that have similar values? Which ones?

How does the value of one specific category compare to others?

What could be a possible reason for the highest value?

What could be a possible reason for the lowest value?

What trends can you observe from the graph?

How might this data be useful?

If you could add another category to this graph, what would it be?

How would you describe the overall distribution of data?

What insights or conclusions can you draw from this graph?

How might the information on the graph impact decisions or opinions?

What are the 2 sets of data representing?

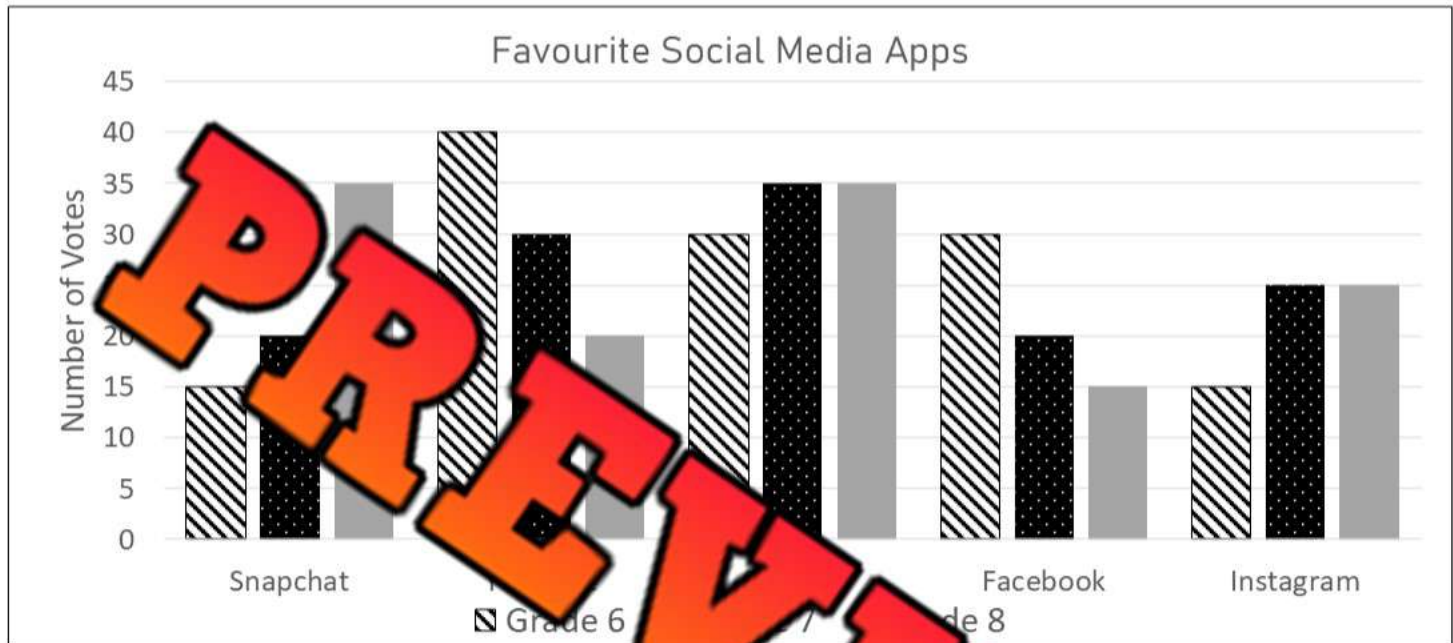
Name one surprising fact from this data

What scale was used in this graph?

What is a different scale that you could use in this graph?

Multiple-Bar Graph – Favourite Social Media

The students in grade 6, 7, and 8s were asked which social media app was their favourite. The results have been sorted by grade in the multiple-bar graph below.



Part 1

Fill in the frequency table by reading the multiple bar graph above

	6		7		8	
	#	%	#	%	#	%
Snapchat	15/130	12				
YouTube						
Tik Tok						
Facebook	30/130	23				
Instagram						
Total	/130					

Part 2

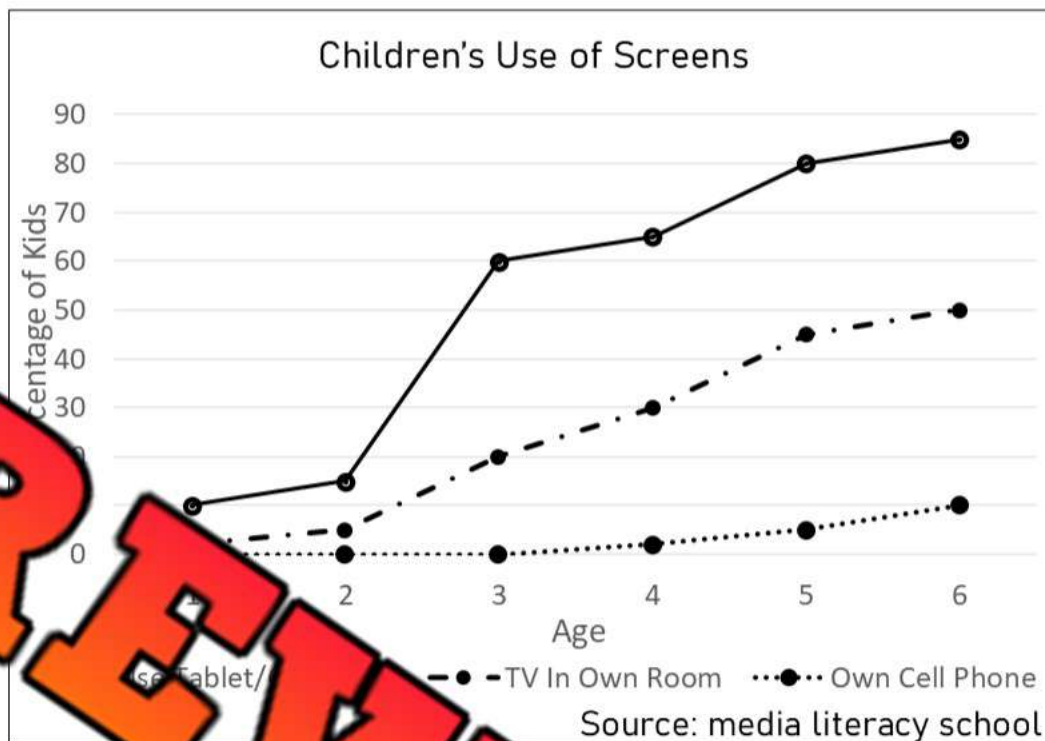
Answer the questions below

a) How many students in each grade were surveyed?

b) Which social media was the most popular? How many votes did it get?

Interpreting a Broken-Line Graph

Children are using screens younger and younger. The multiple-line graph represents the percentage of children who either use a tablet/computer or have a TV in their room or own a cell phone.



Questions

Answer the questions below.

- 1) What percentage of 5-year-olds use a tablet/computer?
- 2) What percentage of 6-year-olds own a cell phone?
- 3) Is there a relationship between the two variables – age and screen use?

- 4) At what age do most children start using a tablet/computer? Why do you think that is?

- 5) What do you think about this data? Is it good that children are using screens? Explain.

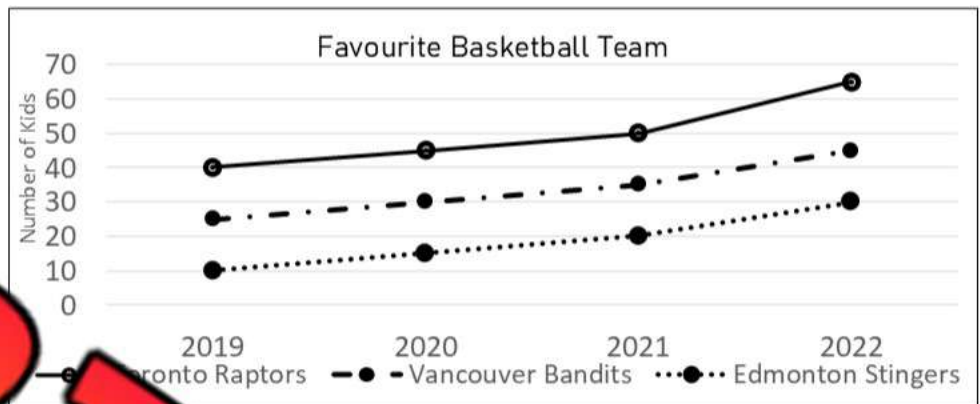
Exit Cards

Cut Out

Cut out the exit cards below and have students complete them at the end of class

Name: _____

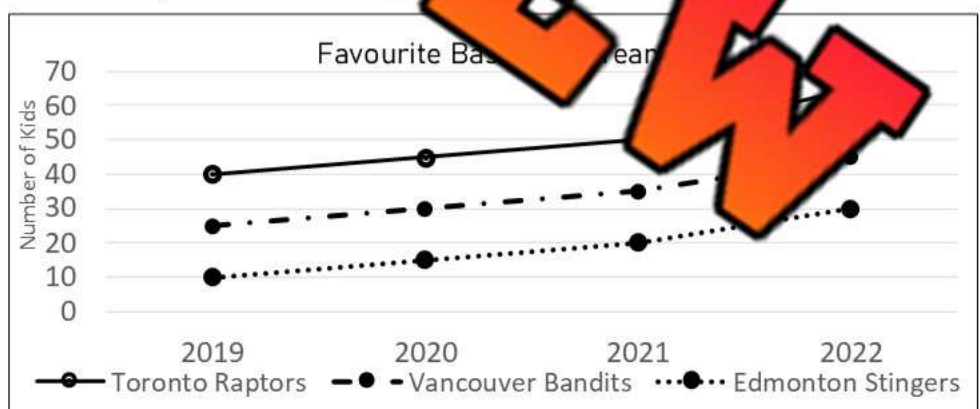
The graph represents how many students in a school like each of the Canadian basketball teams (Toronto Raptors, Vancouver Bandits, and Edmonton Stingers) as their favourite team. The data is collected over a 4-year period from 2019 to 2022.



- 1) How many students listed the Toronto Raptors as their favourite team in 2021?
- 2) How much did the popularity of the Vancouver Bandits increase between 2019 and 2022?
- 3) What is the trend for the Edmonton Stingers' popularity over the 4-year period?
- 4) What conclusions can you draw about how popular basketball is in Canada?

Name: _____

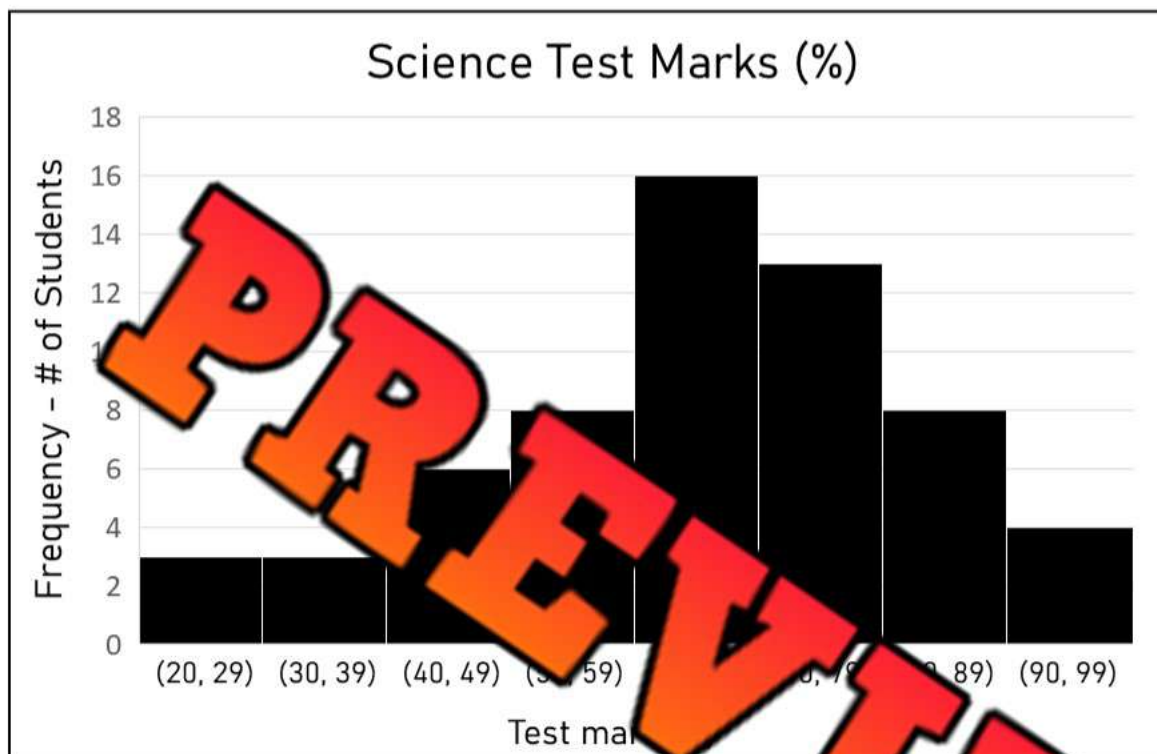
The graph represents how many students in a school like each of the Canadian basketball teams (Toronto Raptors, Vancouver Bandits, and Edmonton Stingers) as their favourite team. The data is collected over a 4-year period from 2019 to 2022.



- 1) How many students listed the Toronto Raptors as their favourite team in 2021?
- 2) How much did the popularity of the Vancouver Bandits increase between 2019 and 2022?
- 3) What is the trend for the Edmonton Stingers' popularity over the 4-year period?
- 4) What conclusions can you draw about how popular basketball is in Canada?

Interpreting a Histogram

The science teacher posted a histogram of the results of the last test.



Questions

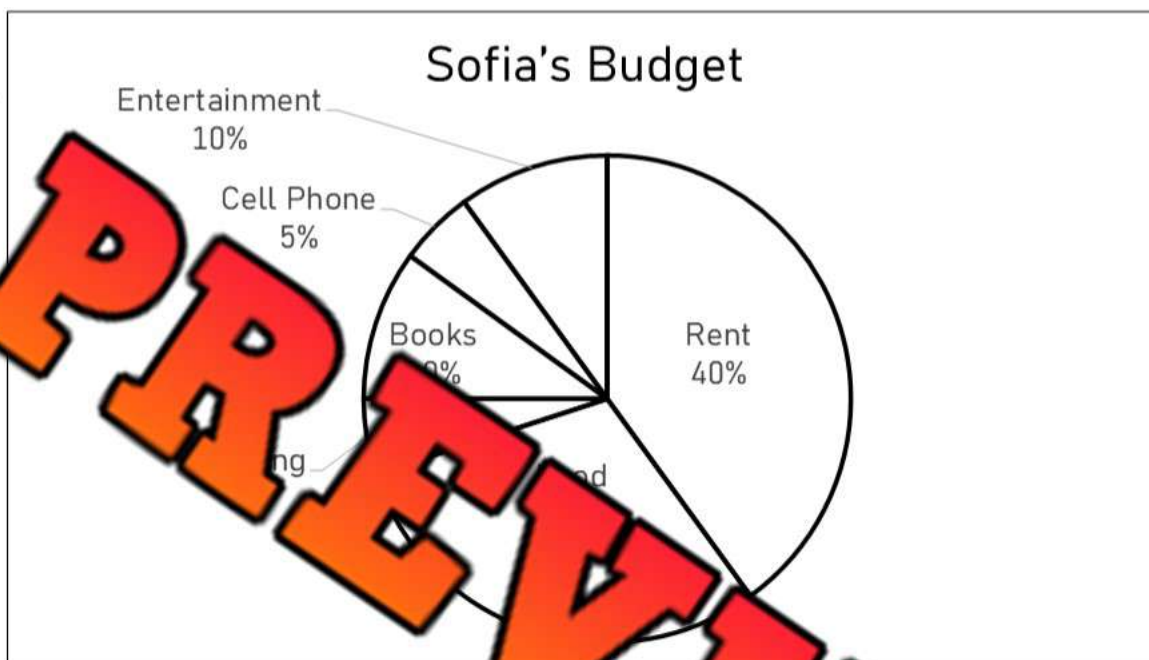
Fill in the tables below

Frequency Table	
0-9	
10-19	
20-29	
30-39	
40-49	
50-59	
60-69	
70-79	
80-89	
90-99	

a) Which test score was most common?	
b) Did most people <u>pass</u> or <u>fail</u> ?	
c) How many students failed the test (<50%)?	
d) How big are the intervals? What range of marks do they include?	
e) How many students took the test?	
f) How many students got an A (80%+)?	
g) Based on the results, do you think the test was easy, hard, or fair? Explain your thinking.	

Circle Graph - Budget

Sofia is heading to college soon. She has \$1000 to spend in total on the things she needs. She created a circle graph to better understand where her money is going.



Part 1

Fill in the frequency table below reading the circle graph

	Rent	Food	Clothing	Books	Cell Phone	Entertainment
%						
\$ Spent						

Part 2

Answer the questions below

- 1) What will Sofia spend most of her money on?
- 2) Which two expenses will account for 70% of her money?
- 3) How much money will she spend on everything except rent?
- 4) What percentage do all 6 expenses add up to?
- 5) What are your thoughts on her budget? How might your budget be the same or different?

Exit Cards

Cut Out

Cut out the exit cards below and have students complete them at the end of class

Name: _____

Alex is planning a vacation. He has \$1500 to spend in total on various activities and needs. He created a circle graph to better understand how he will allocate his money.

Alex's Vacation Budget



1) What will Alex spend most of his money on?

2) Which two categories together account for 65% of his vacation budget?

3) How much money will Alex spend on food and entertainment combined?

4) What percentage do all 5 categories add up to?

Name: _____

Alex is planning a vacation. He has \$1500 to spend in total on various activities and needs. He created a circle graph to better understand how he will allocate his money.

Alex's Vacation Budget



1) What will Alex spend most of his money on?

2) Which two categories together account for 65% of his vacation budget?

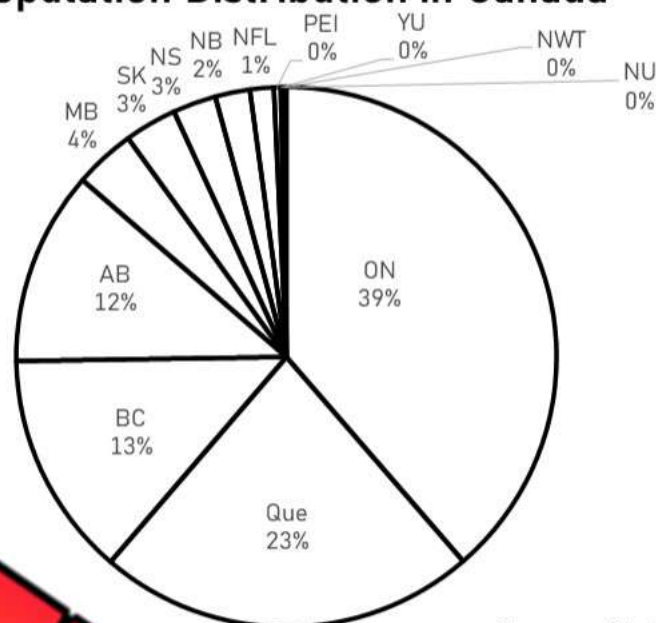
3) How much money will Alex spend on food and entertainment combined?

4) What percentage do all 5 categories add up to?

Circle Graph – Population Distribution

The population of each province and territory in Canada has been displayed in the circle graph.

Population Distribution in Canada



Source: StatCan

Part 1

Fill in the frequency table by using the circle graph

Province	AB	BC	MB	NB	NFL	NS	PEI	SK	NWT	YU	NU
Population Distribution %											

Part 2

Answer the questions below

- 1) What percentage of Canadians live in Ontario and Quebec?
- 2) Do half of Canadians live in Ontario and Alberta?
- 3) Do half of Canadians live in Alberta, BC, and Quebec?
- 4) Martin thinks that more than 4 of 5 Canadians live in 4 provinces in Canada. Is he correct? Explain.

- 5) Why do you think not many Canadians live in the territories? Explain.

Drawing a Circle Graph – Global Emissions

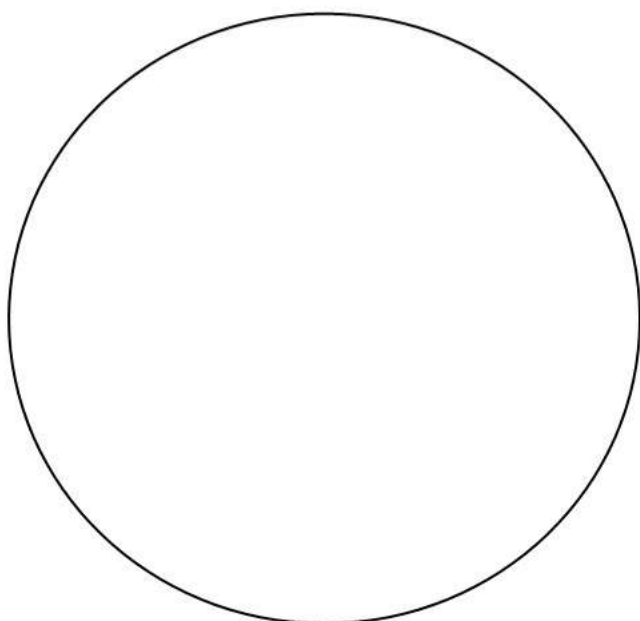
According to the World Resources Institute, Canada accounts for approximately 2% of global greenhouse emissions. The emissions each country produces are listed in the table below.



Part 1 Fill in the table below to determine the angle measurements for the circle graph

	Relative Frequency (as a percentage)	Fraction	Decimal	Angle Measure
China	30	30/100	0.30	$0.30 \times 360 = 108^\circ$
USA	15	15/100	0.15	$0.15 \times 360 = 54^\circ$
Europe	9			
Russia	5			
India				
Japan				
Brazil	2			
Canada	2			
Others	29			

Part 2 Use a protractor to draw the angles for the circle graph



1) How many times does China produce emissions compared to Canada?

2) Why do graphs sometimes use an "other" category?

3) Why do you think China produces so many emissions?

Collecting Qualitative Data – Circle Graph

Data Collection

Collect categorical data that you can plot using a circle graph

Question of Interest(Ex. Favourite _____ or
which app you use most)

Draw a table that will help you collect and organize your data.

Interpreting The Data

- 1) Was your data collected from a primary or secondary source?
- 2) What conclusions can you draw from your data? List findings.

- 3) How will graphing this data as a circle graph help readers understand the data?

Name: _____

60

Curriculum Connection
GP.1

Creating a Circle Graph

Use the data you collected to plot your graph. Remember the following labels:

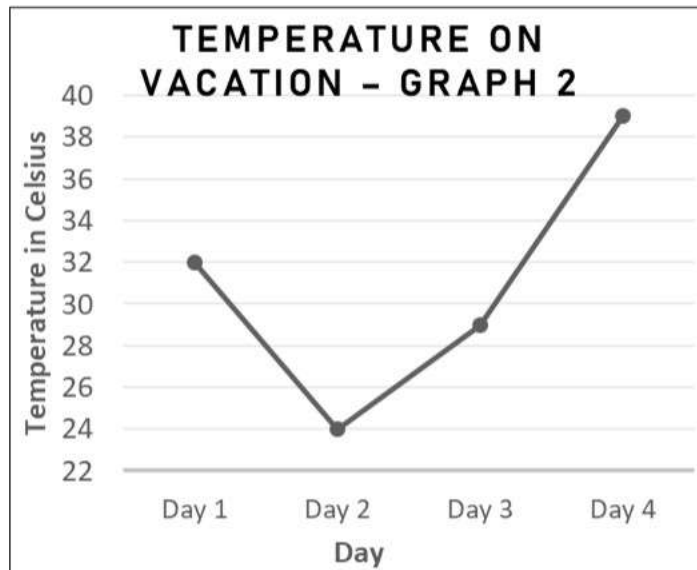
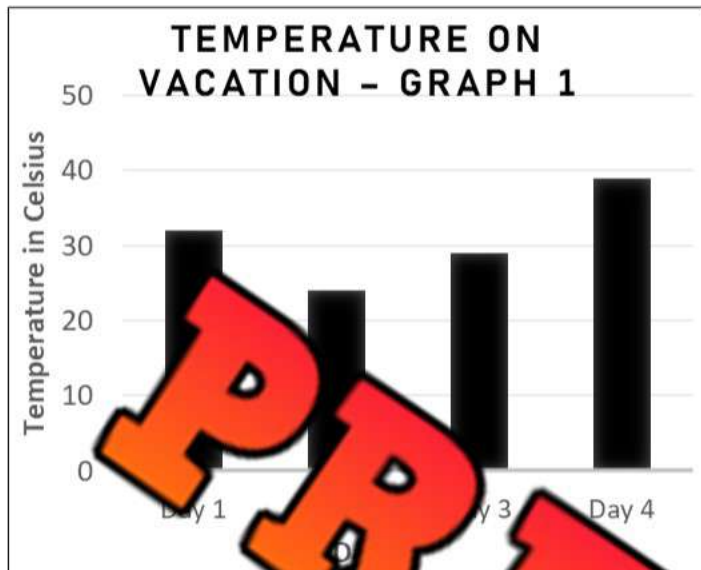
☐ Title

☐ Labels for each section

☐ Percentages/totals

PREVIEW

Displaying Data Using Different Graphs



Questions

Answer the questions below

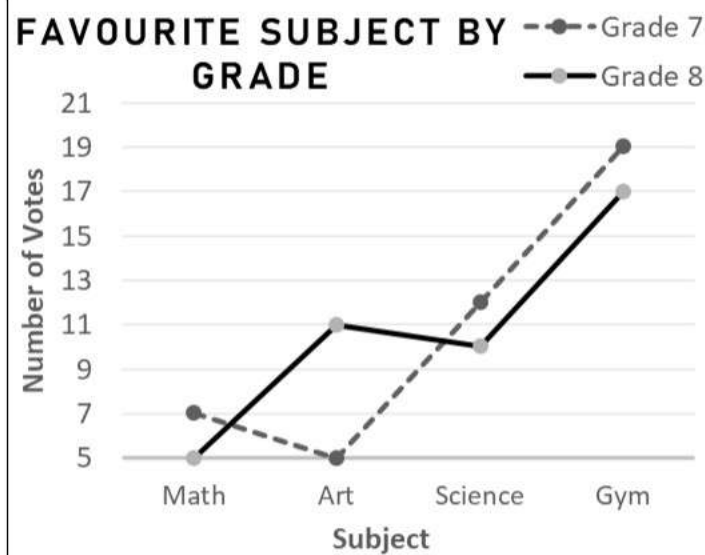
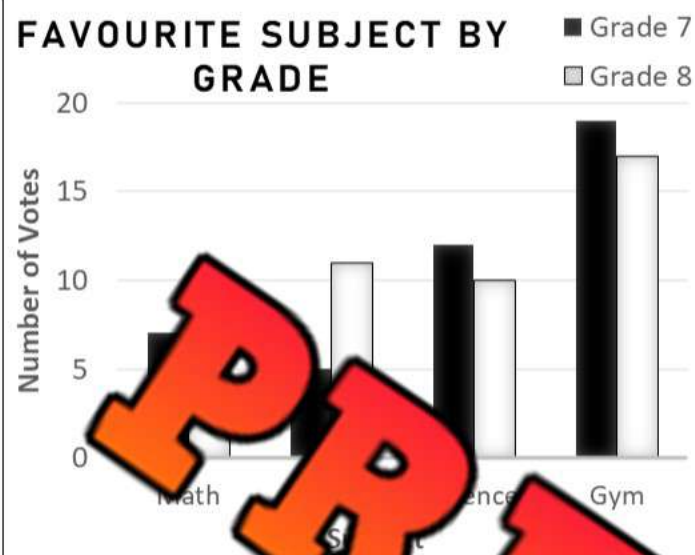
a) Which graph displays the data more clearly? Explain your choice.

b) Should a bar graph be used with continuous data? Explain your choice.

c) Which scale do you find easier to read? Explain which scale you would have chosen.

d) At the end of day 1, can we infer the temperature began to cool? Explain how the line graph supports this inference.

Displaying Data Using Different Graphs



Questions

Answers

Questions

a) Which graph displays the data more clearly? Explain your choice.

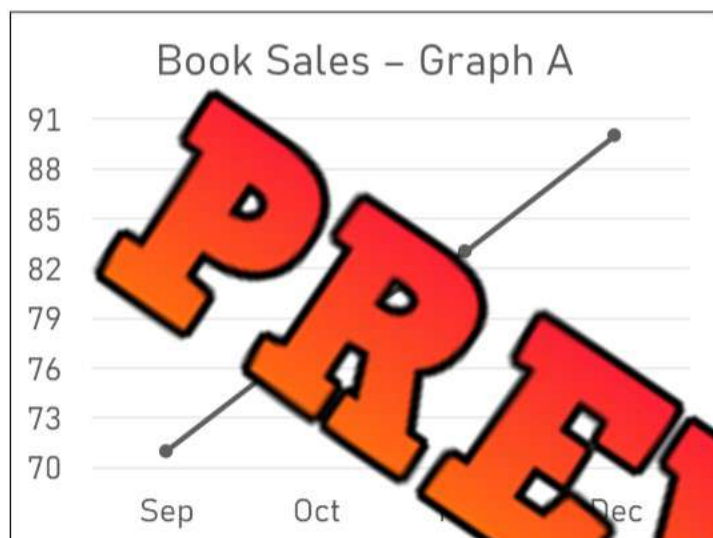
b) Is the data continuous or discrete? Explain how you know.

c) Which scale makes the data easier to understand? Explain.

d) Which graph is easier to read? Which one would you choose to display this data? Explain.

Misleading Graphs

Imagine you are selling a book you wrote. You want to show your customers that your book is a hot seller, so they should buy it now before it sells out. Which graph would you choose for an infographic?



Questions

What do you notice about the two graphs?

a) Which graph would you use to show customers that your book has been growing massively? Why?

b) How are the graphs different? Do they have the same data?

c) How many sales were made from September to December?

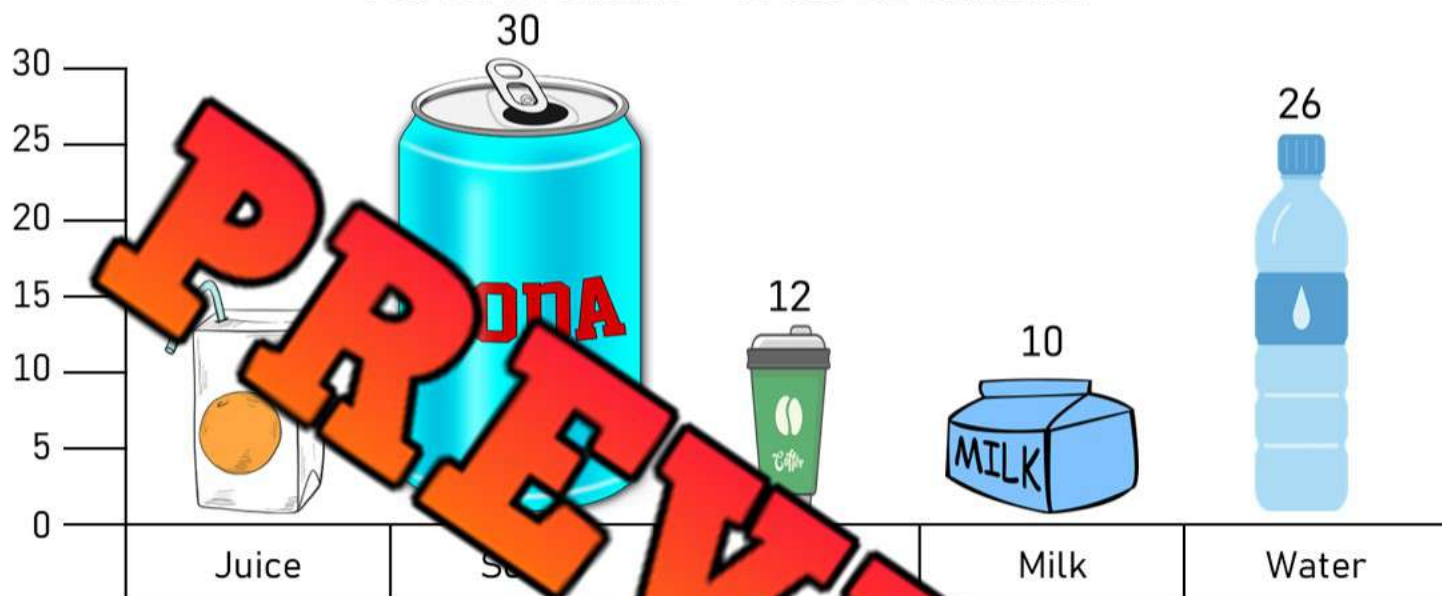
d) Does graph A make it seem like more books were sold? Explain.

d) Why is it important to read a graph carefully?

Misleading Pictograph – Favourite Drink

The grade 11 students at Jasper High School were asked what their favourite drink was. The results have been displayed in the pictograph below.

Favourite Drinks – Grade 11 Students



Questions

What do you notice about the pictograph?

a) What do you notice or wonder about the graph? List at least 2 things.

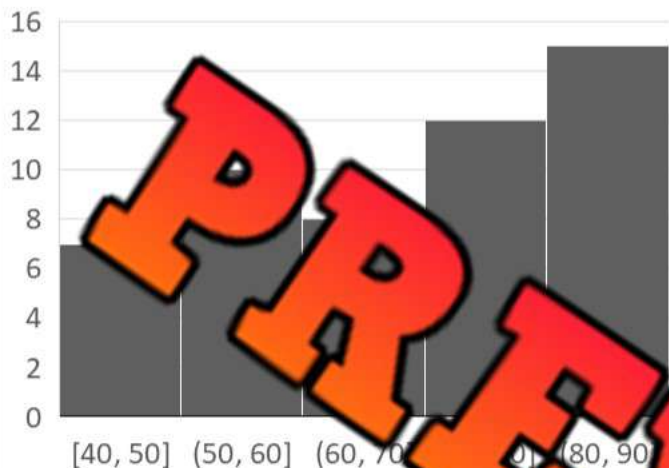
b) Why is the graph misleading? Explain at least 2 misleading parts of the graph.

c) Approximately how many times larger is the soda can than the water? Think volume instead of just height. How does this affect our understanding of the data?

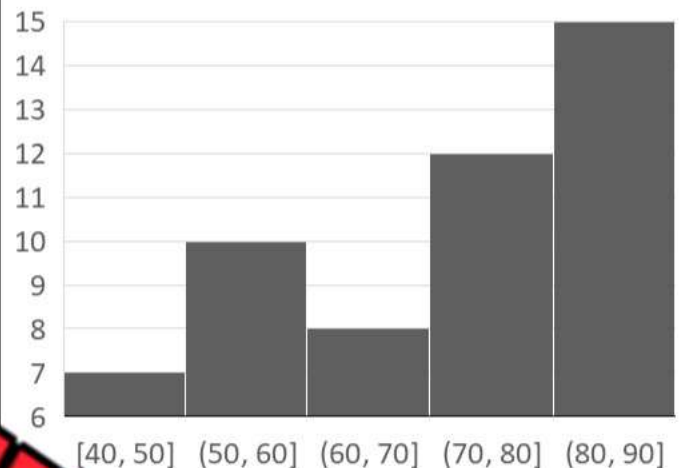
Misleading Graphs

Wellington High School is proud of how many students they have on their honour roll (80% or more). They want to show off their success by posting their data.

Graph A - Honour Roll



Graph B - Honour Roll



Questions

What do you notice about the two graphs?

a) Which histogram should Wellington High School use to emphasize their success?

b) How many more students were on the honour roll? _____

c) How many did not make the honour roll? _____

d) Would it be fair to use Graph B? Why or why not?

e) Make a connection – Have you ever seen an advertisement use a misleading graph?

Truth or Lie? Graph Edition

Objective

What are we learning about?

Students will learn to identify and explain misleading elements in graphs, developing critical thinking skills and understanding how data can be manipulated in visual representations.

Materials

What you will need for the activity.

- A set of printed graphs (some accurate, some misleading)
- Smartboard or projector to display the graphs



Instructions

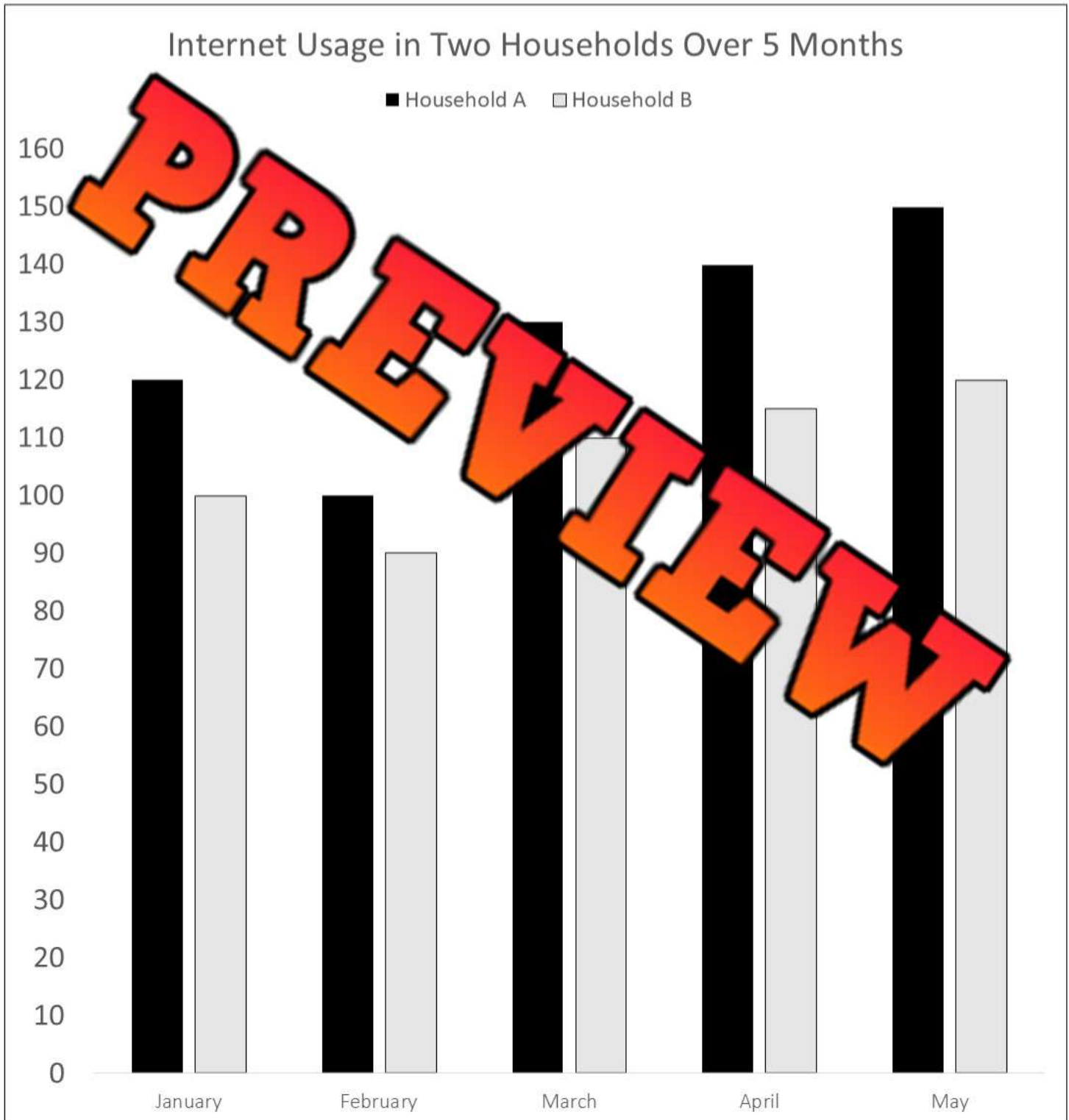
How you will complete the activity

1. Begin by explaining the concept of misleading graphs to the students, highlighting common ways graphs can be manipulated (e.g., changing scales, omitting data, exaggerating differences).
2. Show each graph one at a time on the smartboard or projector to ensure all students can see the graph clearly.
3. After showing each graph, ask the students to use finger signals to make their decision. They show one finger if they believe the graph is true and two fingers if they believe the graph is misleading in some way).
4. Once all students have made their decisions, invite a few students to explain their reasoning. Ask them to point out specific elements of the graph that make it true or misleading, such as the use of a misleading scale or omitted data.
5. Facilitate a class discussion to reinforce key concepts, summarizing the points made by the students and providing additional examples if necessary.
6. Repeat steps 3-6 for each graph in the set. Encourage students to look for new elements that might be misleading as they view different graphs.
7. After all graphs have been discussed, ask the students to reflect on what they have learned. Provide them with questions to think about or answer in their math journals or as a group.

Graph

What do you notice about the graph?

Two households tracked their internet usage from January to May to monitor their data consumption. The graph displays how much data each household used each month.



Graph

What do you notice about the graph?

Two car dealerships, Dealership A and Dealership B, recorded the number of cars sold each month from March to June. The pictograph shows how many cars were sold, with each car symbol representing five cars.

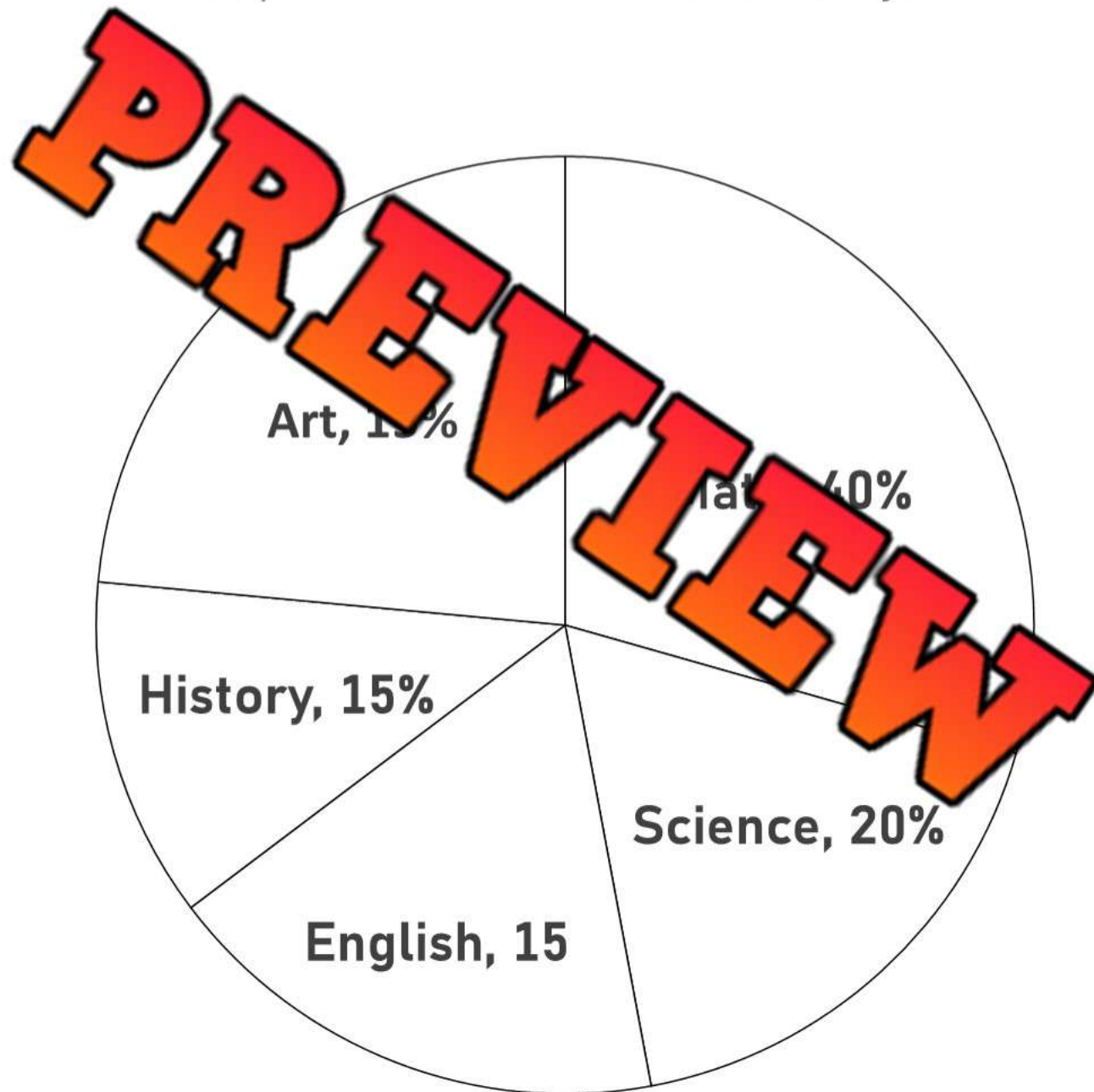


Graph

What do you notice about the graph?

A group of students tracked how much time they spent on different homework subjects—Math, Science, English, History, and Art. The circle graph displays how their time was divided between the subjects.

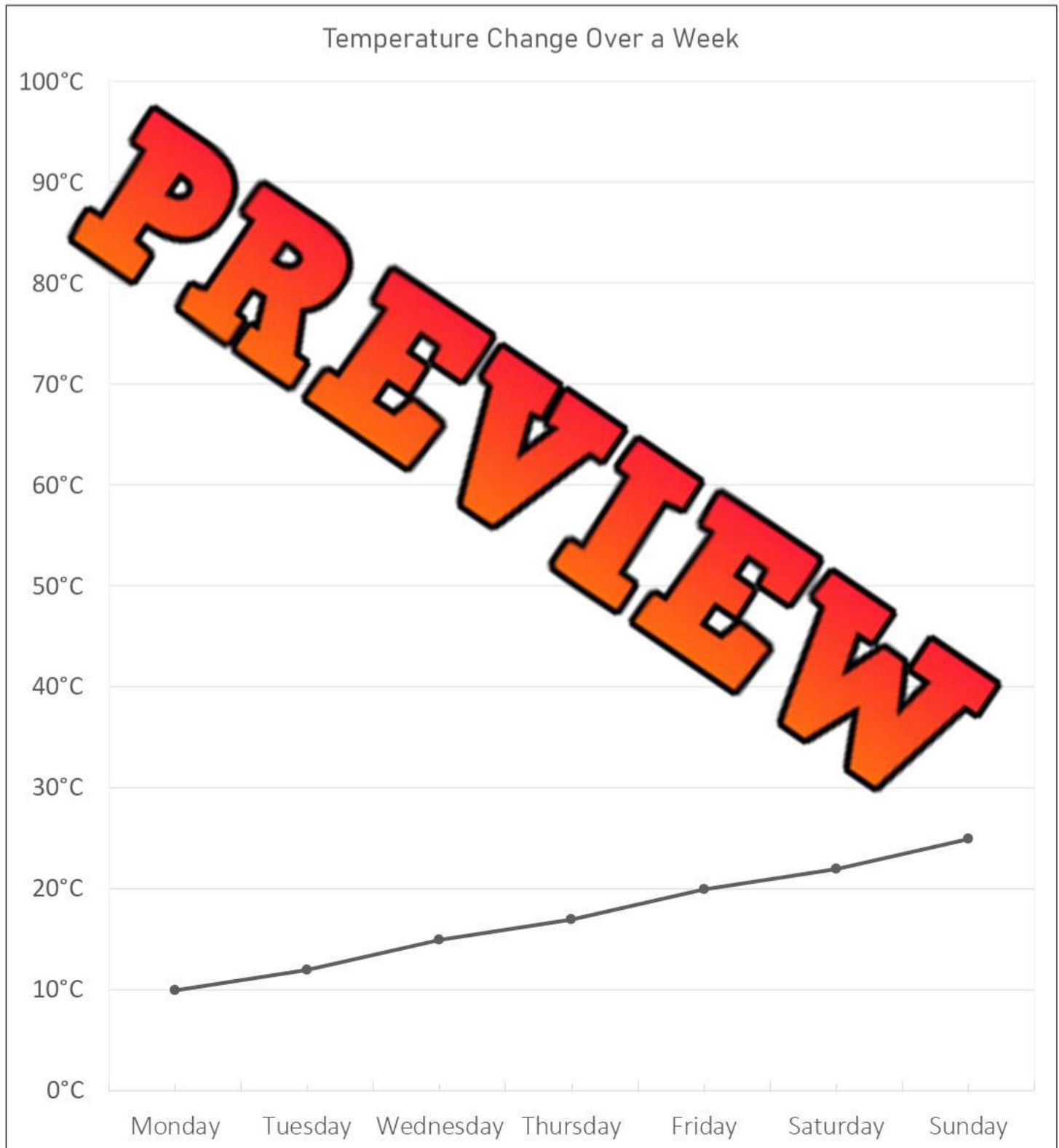
Time Spent on Different Homework Subjects



Graph

What do you notice about the graph?

The graph shows how temperatures fluctuated in a city over the course of a week, from Monday to Sunday.



Graph

What do you notice about the graph?

A movie theater recorded their attendance numbers for each day from Monday to Friday. The bar graph shows the number of people who attended the movies daily.

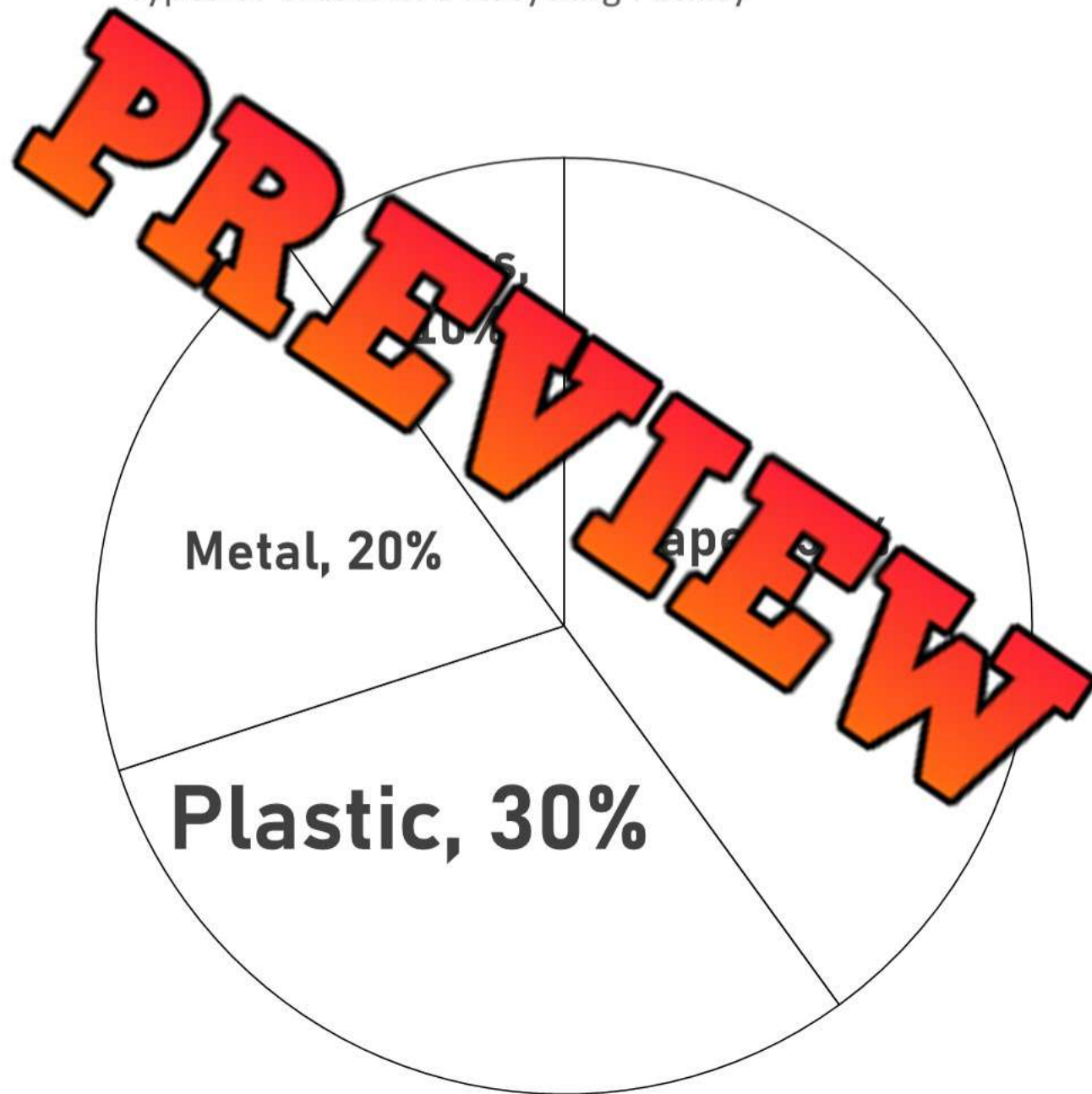


Graph

What do you notice about the graph?

A recycling facility is against the use of plastic for packaging, so they track the types of waste processed—paper, plastic, metal, and glass—and displayed them as a percentage of the total waste processed at their facility.

Types of Waste in a Recycling Facility



Graph

What do you notice about the graph?

This graph compares the average salaries in two professions—Engineering and Marketing—over five years. The graph was made by professionals in the field of engineering and marketing who believe their incomes have not increased enough.



Unit Test – Data Literacy

Part 1

Find the mean, median, mode for each data set below

Data Set	23, 28, 35, 11, 28
Mean	
Median	
Mode	
Range	

Data Set	36, 41, 55, 24, 37, 41
Mean	
Median	
Mode	
Range	

Part 2

Fill in the box below with the missing data point

	Data Set	Mean	Calculate	Missing Data Point
1)	18, 24, 27, 33, ?	30		
2)	48, 55, ?, 62, 68, 74	59		

Part 3

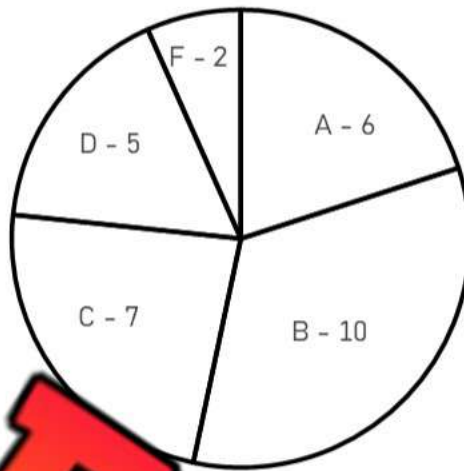
Calculate the mean using the outlier and without the outlier

	Data Set	Mean With Outlier(s)	Mean Without Outlier(s)
1)	9, 7, 5, 25, 8, 6		
2)	21, 48, 24, 20, 26, 22		
3)	12.2, 15.6, 14.3, 28.4, 16.1		

Part 4

Read the graph and answer the questions below

Mr. Douglas posted the results of his math test as a circle graph. He didn't post names, but posted how many A's, B's, C's, D's and F's he gave out.



Answer the following questions about the graph above

1. Fill in the frequency table

Grades	A	B	C	D	F
Frequency					
Percentage					

2. How many students wrote the math test? _____
3. Did half of the class get either an A or B? _____
4. Did more students get a B than a D or F combined? _____
5. How many people passed the test? _____ What percent of the class passed? _____
6. Mr. Douglas posted the specific marks below. What was the average mark? _____

92	8	51	62	68	49	58	87	67	55
61	88	72	75	56	85	78	65	79	93
75	78	72	71	78	73	70	99	63	57

7. There is one outlier in the data set. What is it? _____
8. What is the mean of the data set without the outlier? _____
9. What is the mode of the data set? _____

Part 5

What do you notice about the two graphs?

Fantastic Footwear is running an ad campaign comparing their products versus their competitor, Super Shoes.

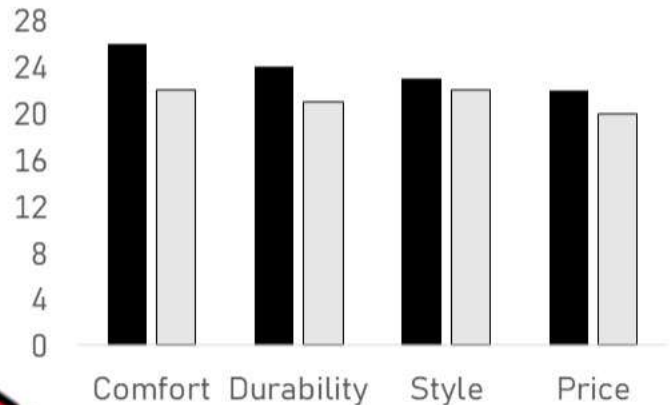
Best Shoes – Customer Votes – Graph A

■ Fantastic Footwear □ Super Shoes



Best Shoes – Customer Votes – Graph B

■ Fantastic Footwear □ Super Shoes



a) Which graph would you use to show you like Fantastic Footwear? Why?

b) How many more votes in total did Fantastic Footwear receive than Super Shoes?

c) Are Fantastic Footwear shoes a lot better than Super Shoes? Explain.

d) How did Fantastic Footwear create this misleading graph? Explain how they setup the graph to make it appear that their company is much better than Super Shoes.

Grade 8

Probability

	Curriculum Expectations	Pages That Cover the Expectations
GP.2	Theoretical probability with two independent events	89 - 124

Independent Events – Darts

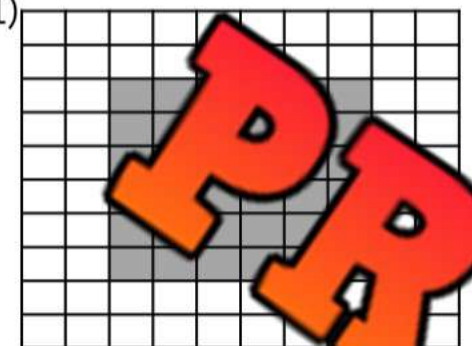


Independent events are two or more events that could happen at the same time without affecting the outcomes of the other events. Imagine below, that the shaded in area is a target and the white part is the wall. What is the probability of you hitting each target if you had two throws?

Questions

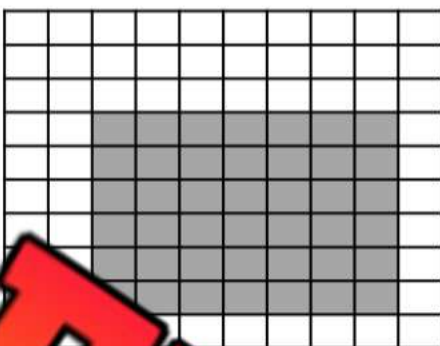
What is the probability of you hitting each target if you had two throws?

1)



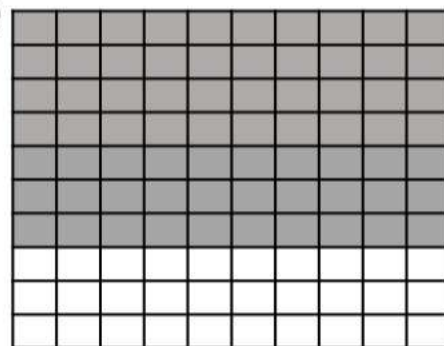
Fraction	Decimal	Percent

2)



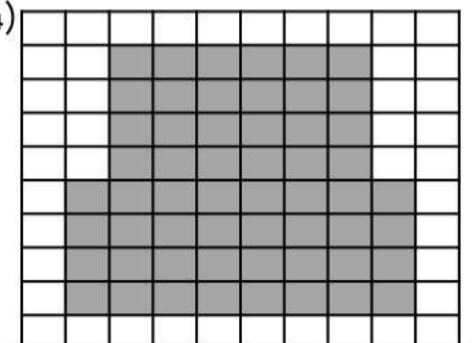
Fraction	Decimal	Percent

3)



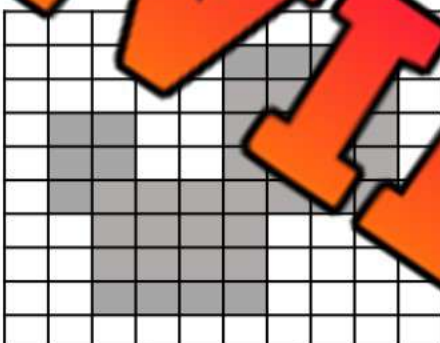
Fraction	Decimal	Percent

4)



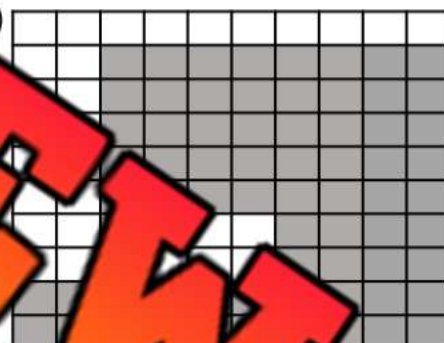
Fraction	Decimal	Percent

5)



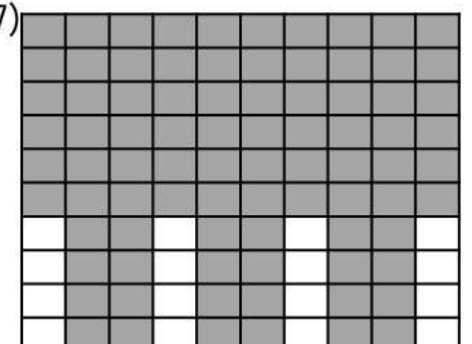
Fraction	Decimal	Percent

6)



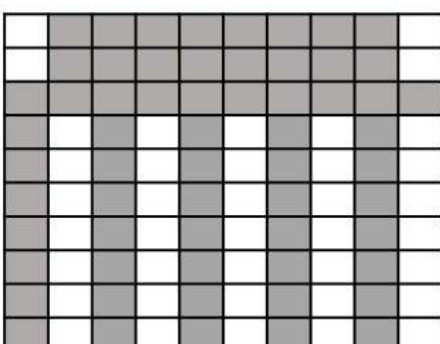
Fraction	Decimal	Percent

7)



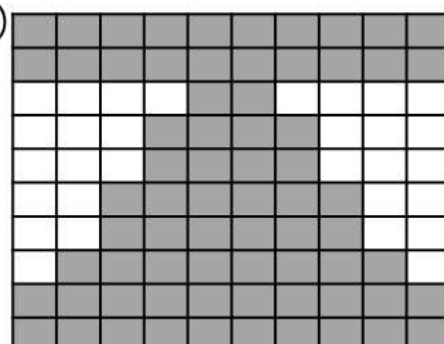
Fraction	Decimal	Percent

8)



Fraction	Decimal	Percent

9)



Fraction	Decimal	Percent

Independent Events – Rolling a Dice

Rolling a Dice

A dice has 6 sides. Each side has a number of dots between 1 and 6. When you roll a dice, you have an unlikely chance of rolling a certain number.



Questions

What is the probability of...

1) Rolling a 1?

Fraction	Decimal	Percent

2) Rolling a 5?

Fraction	Decimal	Percent

3) Rolling an odd number?

Fraction	Decimal	Percent

4) Rolling two six-sided dice and getting a 5 and a 2?

Fraction	Decimal	Percent

5) Rolling a six-sided dice and getting a 1 or a 2?

Fraction	Decimal	Percent

6) Rolling two six-sided dice and getting two even numbers?

Fraction	Decimal	Percent

7) Rolling three six-sided dice and getting a 1, 2, and a 3?

Fraction	Decimal	Percent

Independent Events – Rolling a Dice and Coin Flip

Rolling a Dice and Flipping a Coin

Rolling a dice and flipping a coin are two independent events. When we roll a dice, we have a $\frac{1}{6}$ chance at rolling a particular number. When we flip a coin, we have a $\frac{1}{2}$ chance of getting a heads or a tails. When we combine these events, we need to multiply their probabilities.

Probability of
rolling a 3 and
getting a heads

$$\frac{1}{6} \times \frac{1}{2} = \frac{1}{12}$$

Questions What is the probability when you roll a dice and flip a coin...



Event	Fraction	Decimal	Percent
1) Rolling a 4 and getting heads			
2) Rolling a 6 and getting tails			
3) Rolling an even number and getting heads			
4) Rolling an odd number and getting a heads or a tails			
5) Rolling a 1 and getting a heads or tails			
6) Rolling a 1 or a 2 and getting a tails			
7) Rolling a 1, 2, 3, or 4 and getting a heads			
8) Rolling a 1, 2, 3, 4, 5, or 6 and getting a tails			

Calculating Probability – Venn Diagram

At a wedding reception, the guests had 2 options for dinner – steak or vegetarian. Of the 50 guests at the reception, 30 are having steak, 20 are having vegetarian and 6 hungry guests are having both.

Part 1

Fill in the Venn diagram with the data above



Steak

Vegetarian



Part 2

Answer the questions below

Questions – What is the probability that a randomly selected guest...		Fraction	Deci	Percent
1)	ordered steak			
2)	ordered vegetarian			
3)	ordered steak or vegetarian but not both			
4)	ordered steak and vegetarian			
5)	didn't order a meal			
6)	ordered steak but not vegetarian			
7)	ordered vegetarian but not steak			

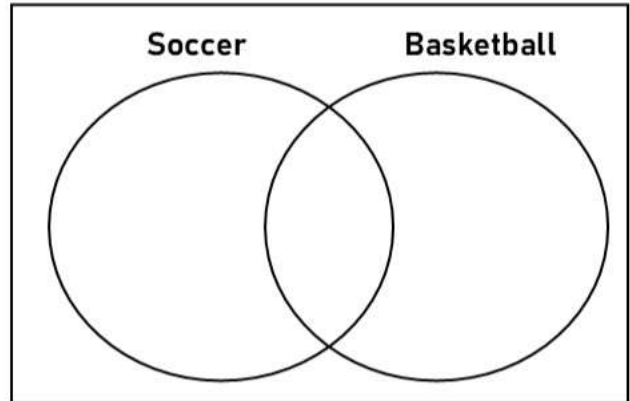
Exit Cards

Cut Out

Cut out the exit cards below and have students complete them at the end of class

Name: _____

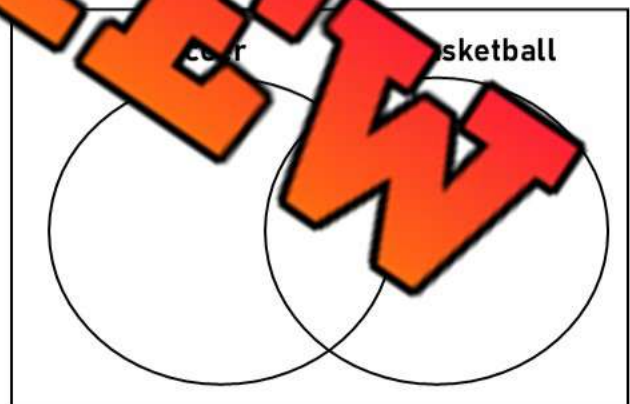
At a local sports event, participants had two options for activities – soccer or basketball. Out of the 60 participants, 35 are playing soccer, 25 are playing basketball, and 10 participants are playing both sports.



2) What is the probability that a randomly selected participant...	Fraction	Decimal	Percent
a) played soccer?			
b) played basketball?			
c) played soccer or basketball but not both?			
d) played both soccer and basketball?			
e) didn't participate in any activity?			

Name: _____

At a local sports event, participants had two options for activities – soccer or basketball. Out of the 60 participants, 35 are playing soccer, 25 are playing basketball, and 10 participants are playing both sports.



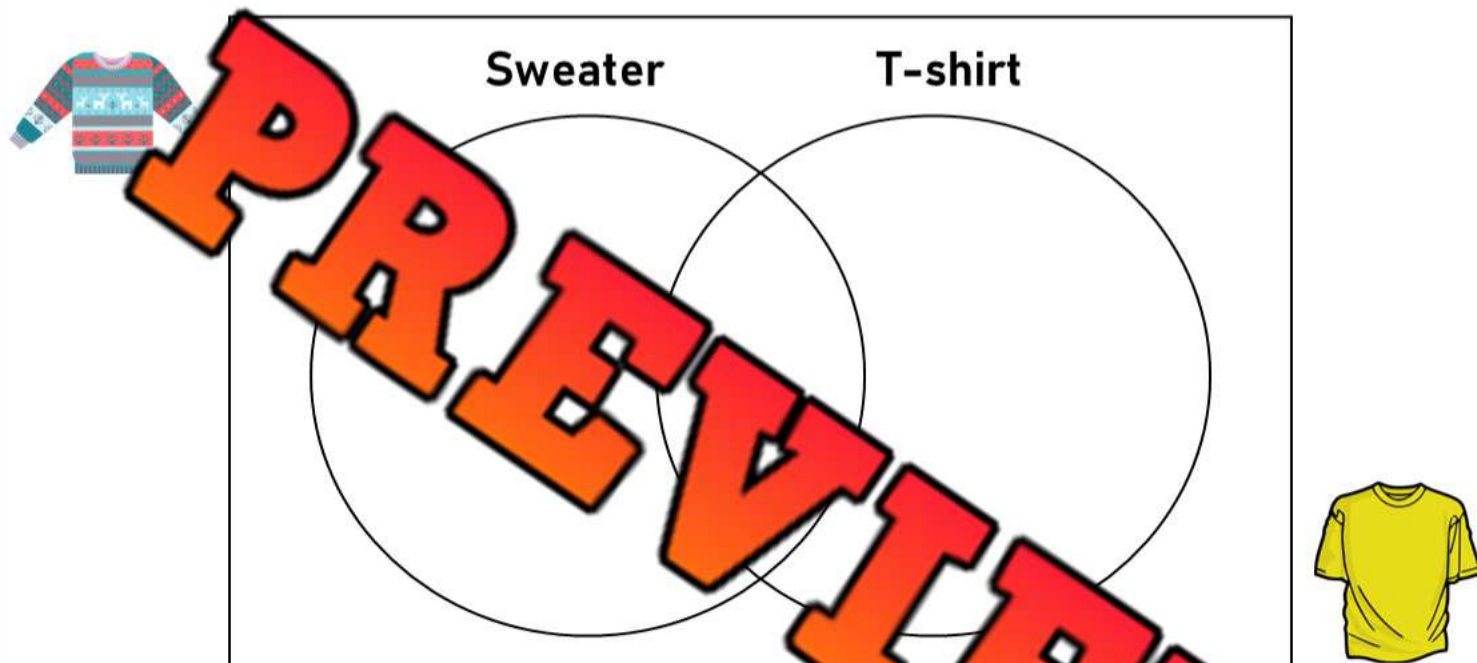
2) What is the probability that a randomly selected participant...	Fraction	Decimal	Percent
a) played soccer?			
b) played basketball?			
c) played soccer or basketball but not both?			
d) played both soccer and basketball?			
e) didn't participate in any activity?			

Calculating Probability – Venn Diagram

In a class of 30 students, 14 are wearing a sweater, 16 are wearing a t-shirt and 7 are wearing both.

Part 1

Fill in the Venn diagram with the data above



Part 2

Answer the questions below

What is the probability that a randomly selected student is wearing...		Fraction	Deci	Percent
1)	a sweater			
2)	a sweater but not a t-shirt			
3)	a t-shirt			
4)	a t-shirt but not a sweater			
5)	neither a sweater nor a t-shirt			
6)	a sweater and a t-shirt			
7)	a sweater or a t-shirt but not both			

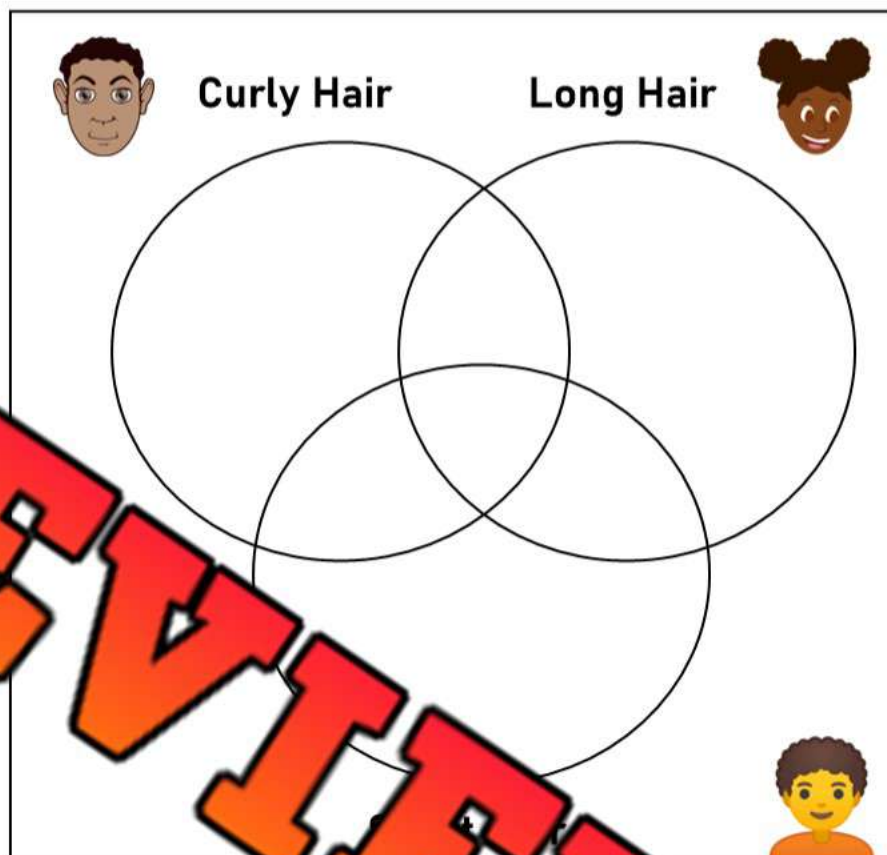
Calculating Probability – Venn Diagram

Part 1

Fill in the Venn diagram with the data below

21 students were surveyed about their hair

Curly	Long	Short
Elle		Logan
Henry		Henry
Luna		Luna
Sofia	Lily	
Nova	Luna	Sofia
Riley	Nova	Riley
Julian	Julian	Luna
Nora	Nora	David
	Elena	Ben
	Owen	Eddie
	Violet	



Part 2

Answer the questions below

What is the probability that a randomly selected student...		Fraction	Decimal	Percent
1)	has curly hair			
2)	has long hair			
3)	has short hair			
4)	does not have curly hair			
5)	has curly short hair			
6)	has curly long hair			
7)	has short hair that isn't curly			
8)	has long hair that isn't curly			

Calculating Probability – Venn Diagram

Questions

Answer the questions below using Venn diagrams

1) In a class of 24 students:

- 12 play the guitar
- 13 play the piano
- 5 play both the guitar and the piano



What is the probability that a randomly selected student...		Percent
a)	plays the piano	
b)	plays just the guitar and not the piano	
c)	plays neither the guitar nor the piano	

2) In a company, there were 80 workers

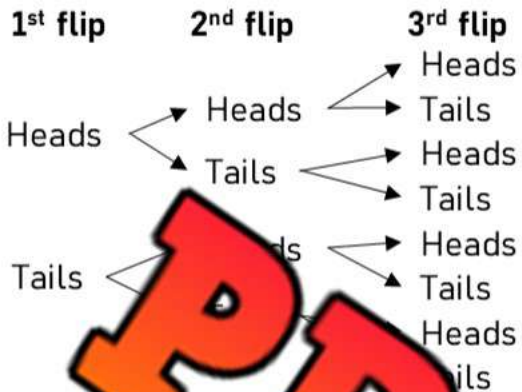
- 50 workers like coffee
- 41 workers like tea
- 20 workers like both coffee and tea



What is the probability that a randomly selected worker...		Percent
a)	likes coffee and tea	
b)	likes just tea and not coffee	
c)	likes neither coffee nor tea	

Theoretical Probability of Two Events – Tree Diagrams

A tree diagram is used to show the probability of an outcome happening when we have more than one event



Combinations

HHH

HHT

HTH

HTT

THH

THT

TTH

TTT



If you flip a coin three times, you could have 8 different combinations of outcomes.

HHH, HHT, HTH, HTT, THH, THT, TTH, TTT
This means you have a $\frac{1}{8}$ probability of flipping three heads or tails in a row.

Questions Draw a tree diagram to show how many different combinations you could have

Rebecca was allowed to choose one candy and one drink at a Halloween party. The types of drinks and candy are listed below.

Combinations

Candy

- Chocolate
- Gummies

Drinks

1) How many combinations could Rebecca have? _____

2) What is the probability she will choose...

Fraction

Decimal

Percent

a) chocolate and soda

b) chocolate and juice

c) gummies and soda

d) gummies or chocolate and juice

Drawing Tree Diagrams

Questions

Draw a tree diagram to help you find the probability of different combinations

You are having a surprise dessert at a party you are having. Your parents said it is either cookies or brownies. They also told you the options for the treats and icing. What is the probability of them choosing a specific combination of baked good, treat, and icing.

Baked Goods	Treats	Icing
Cookies (C)	Chocolate Chips (CC)	Vanilla (V)
Brownies (B)	Smarties (S)	Chocolate (CH)
	Raisins (R)	Caramel (CA)

PREVIEW

1) How many combinations of food could you have? _____

2) What is the probability of your parents choosing...	Fraction	Decimal	Percent
a) Cookies with chocolate chips and vanilla icing			
b) Brownies with raisins and caramel icing			
c) Cookies or brownies with smarties and vanilla icing			
d) Cookies or brownies with raisins or smarties and vanilla or chocolate icing			
e) Cookies with chocolate chips, smarties or raisins and vanilla or caramel icing			

Independent Events – Dice Challenge

Part 1 Find the probability of each sum when two dice are rolled



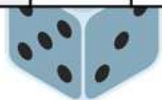
- 1) What is the probability of you rolling two six-sided dice and getting a sum of the two dice greater than 7?
- 2) What is the probability of you rolling two six-sided dice and getting a sum of the two dice greater than 10?
- 3) What is the probability of you rolling two six-sided dice and getting a sum of the two dice less than 7?

+	1	2	3	4	5	6
1						
2						
3						
4						
5						
6						



Part 2 Find the probability of each product when two dice are rolled

x	1	2	3	4	5	6
1						
2						
3						
4						
5						
6						



- 1) What is the probability of you rolling two six-sided dice and getting a product of the two dice greater than 12?
- 2) What is the probability of you rolling two six-sided dice and getting a product of the two dice less than or equal to 15?
- 3) What is the probability of you rolling two six-sided dice and getting a product of the two dice greater than or equal to 24?

Independent Events – Money Bag

Wow, it's your lucky day! A millionaire walks up to you and gives you 3 chances at pulling out a \$100 bill from a bag of money. Each time you pull money out, you will put it back.

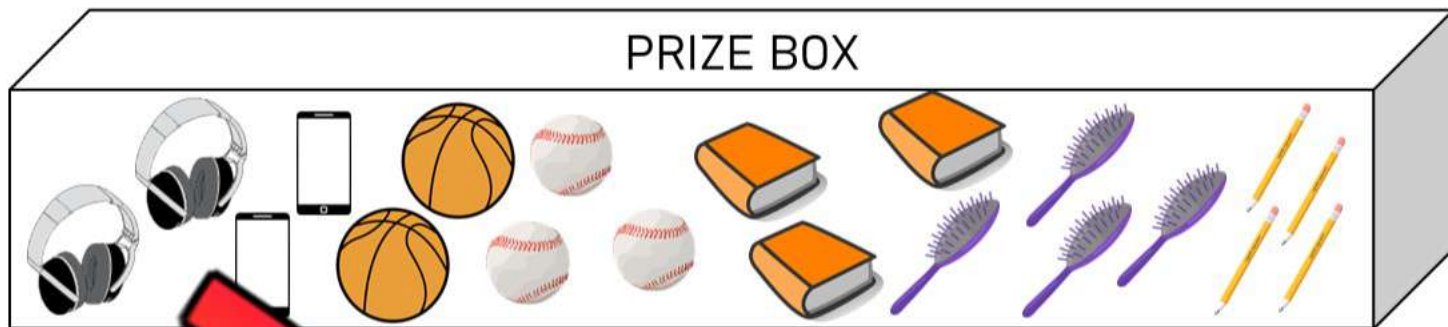
Inside the bag, there is 1 of each Canadian currency denomination (\$0.05, \$0.10, \$0.25, \$1, \$2, \$5, \$10, \$20, \$50, \$100)



Question: What is the probability of the following scenarios

	Scenario	Probability	Answer – Show Your Work
1)	Selecting a Toonie on your first pull?		
2)	Selecting a \$100 or a \$50 bill on your first pull?		
3)	Selecting a Quarter then a Loonie in your first two pulls		
4)	Having terrible luck and selecting a Nickel, then a Dime, and then a Quarter in your 3 pulls?		
5)	Selecting a \$20, then a \$50, then a \$100 bill in your 3 pulls		
6)	Selecting a \$100 bill 3 times?		

Independent Events – Prize Box



Question: If you pick the prize each time you choose, what are the probabilities below?

	Scenario	Answer – Show Your Work
1)	You get one pick. What is the probability of getting stuck with a book?	
2)	You get one pick. What is the probability of getting a phone?	
3)	You get two picks. What is the probability of picking a set of headphones and then a phone with your two picks?	
4)	You get one pick. What is the probability of picking a phone or a set of headphones?	
5)	You get three picks. What is the probability of picking a basketball, then a set of headphones, then a phone with your 3 picks?	
6)	You are picking from the prize box fifth. One phone, one hairbrush, and two baseballs are already gone. You get three picks. What is the probability of you picking a phone, then a headset and then a hairbrush?	

Theoretical vs Experimental Probability

Theoretical Probability

What should happen

Example - The theoretical probability of flipping a heads is 1 time out of 2 or $\frac{1}{2}$.

Experiment Probability

What did happen after the event (experiment)

Example - You flipped a coin 10 times and got 7 heads. The experimental probability is $\frac{7}{10}$.

Part 1

Write the theoretical probability of the events happening below

Question	Fraction	Decimal	Percent
1) What is the theoretical probability of flipping a heads?			
2) What is the theoretical probability of flipping a tails?			
3) What is the theoretical probability of flipping a heads if you flipped the coin 10 times?			
4) What is the theoretical probability of flipping a heads and then rolling a dice and getting a 2?			
5) What is the theoretical probability of getting an odd number and then flipping a heads?			

Part 2

Experimental Probability - Flip a coin 20 times and record your results

- 1) How many heads and tails do you think you will flip? Record your predictions in the boxes below.
- | | |
|-------|-------|
| Heads | Tails |
| 20 | 20 |
- 2) Perform the experiment by flipping a coin 20 times. Record how many heads and tails you get.

	Tallies	Frequency	Fraction	Decimal	Percent
Heads					
Tails					

- 3) Was the theoretical probability and experimental probability the same? Should it be the same? Explain.
- _____
- _____

Theoretical vs Experimental Probability

Examples of Theoretical and Experimental Probability

Theoretical: You should roll a 3 once every 6 rolls = $1/6$

Experimental: You rolled a 3 twice when you rolled a dice six times = $2/6$



Part 1

Circle if the example is theoretical or experimental

Example	Theoretical	Experimental
1) There is a 30% chance of rain today	Theoretical	Experimental
2) You flipped a coin 10 times and got heads 3 times	Theoretical	Experimental
3) You have a $1/4$ chance of drawing a heart from a deck of cards	Theoretical	Experimental
4) A scratch card gives a 1 in 10 chance of winning a prize	Theoretical	Experimental
5) Your batting average is $1/4$ so you should get a hit 1 in 4	Theoretical	Experimental
6) You made 4 of 10 three pointers	Theoretical	Experimental
7) Seabiscuit won the race even though he was only $1/3$ the size of the other horses	Theoretical	Experimental
8) The Toronto Raptors won $4/7$ games	Theoretical	Experimental
9) You have a $1/80$ chance of winning a giveaway by buying a bag of M&M's	Theoretical	Experimental
10) You won a cross-country race with 90 people in it	Theoretical	Experimental

Part 2

Is the example theoretical or experimental? What is the probability of winning?

Example	Theoretical or Experimental	Fraction	Decimal	Percent
1) You should make 8 in 10 free throws				
2) You buy one raffle ticket out of 90 that are sold.				
3) You rolled a dice 10 times and got a 3, 4 times.				
4) You pulled 20 cards from a deck of cards and got 5 red ones.				
5) There is a 35% chance of precipitation				

Rolling Doubles

Part 1 What is the theoretical probability of rolling doubles when rolling 2 dice

1) Fill in the table to help discover the theoretical probability of rolling doubles when rolling two dice.

Tip: $\frac{\text{favourable outcomes}}{\text{total possible outcomes}}$

2) What is the theoretical probability of rolling a 6 on a 6-sided die and perceiving it as a 6?

Second Throw

	1	2	3	4	5	6
1	(1,1)	(1,2)	(1,3)	(1,4)	(1,5)	(1,6)
2						
3						
4						
5						
6						



Part 2 What is the probability of rolling doubles when rolling 2 dice

1) Roll 2 six-sided dice 24 times. Keep track of the sum of the two rolls you complete using the table below. Put a tally every time you get a sum of 7.

Number of Rolls	Doubles

2) Was your experimental probability the same as the theoretical probability? Explain.

3) Was your experimental probability the same as the other students in your class? Explain why or why not.

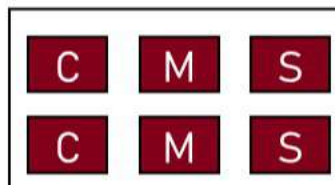
4) If you performed 1000 rolls, do you think your experimental probability would be closer or further from the theoretical probability? Explain.

Tree Diagrams – Independent Events

Questions Draw a tree diagram to help you find the probability of different combinations

There is a bag full of the following different flavoured chocolates:

- 2 coconut (C)
- 2 mint (M)
- 2 salted caramel (S)



Draw a tree diagram for the following scenario:

You pull 1 chocolate and then put it back in the bag before pulling another chocolate

Tree Diagram		Combinations
1 st Draw	2 nd Draw	

1) How many combinations of chocolates could you draw? _____

2) What is the probability of drawing...	Fraction	Decimal	Percent
a) coconut and then mint			
b) mint and then coconut			
c) salted-caramel and then coconut or mint			
d) coconut, mint, or salted caramel and then mint			

Tree Diagram – 4 Events

Questions

Draw a tree diagram to help you find the probability of different combinations

Lane flips a coin 4 times. Draw a tree diagram that lists all the possible outcomes she could get as she flips the coins.



PREVIEW

2) How many combinations could Lane get? _____

3) What is the probability that she flips the following...	Fraction	Percent
a) 2 heads and 2 tails		
b) 1 heads and 3 tails		
c) 1 tails and 3 heads		
d) 4 heads		
e) 4 tails		

Number Simulation – Independent Events

Part 1

Theoretical Probability – Answer the questions below

Pretend you are drawing two numbers from 1-15. Since these are independent events, you can select the same number more than once.

If you picked 3 numbers, what is the theoretical probability of...

1) Picking all odd numbers?

2) Picking all even numbers?

3) Picking a 2, 5, and a 10?

If you completed 100 trials (100 = draw 3 numbers)

4) 10 trials, how many times would you expect all odd numbers?

5) 30 trials, how many times would you expect all odd numbers?

6) 100 trials, how many times would you expect all odd numbers?

Part 2

Experimental Probability – Perform the experiment below

Set up the experiment by cutting the numbers out from the grid below and putting them in a bag. Perform the number of trials below by selecting 3 numbers from the bag. After you select a number, you put the number back in the bag before selecting the next number.

Complete...

1) 10 trials – how many times did you get all odd numbers?

2) 30 trials – how many times did you get all odd numbers?

3) 100 trials – how many times did you get all odd numbers?

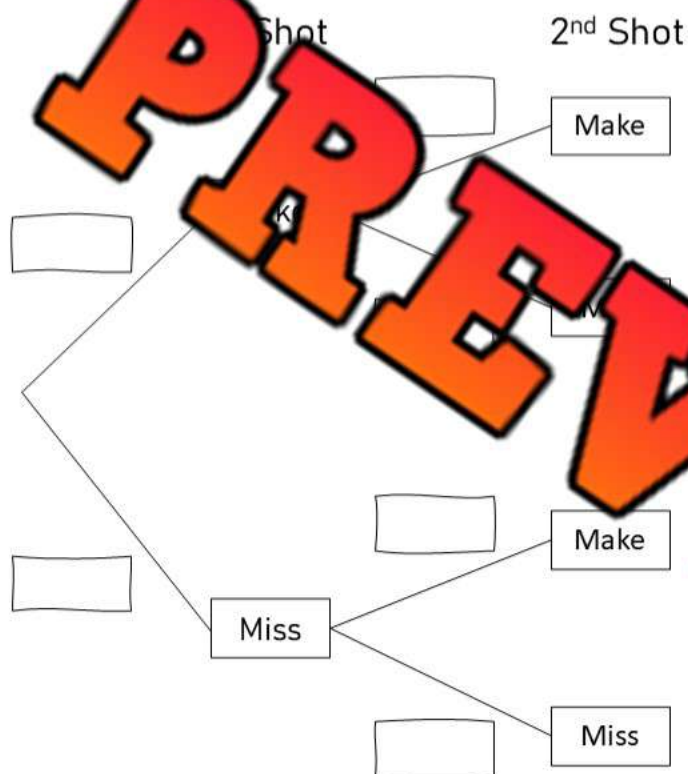
1	2	3	4	5	6	7	8
9	10	11	12	13	14	15	

Tree Diagram – Free Throws

Part 1 Draw a tree diagram to help you find the probability of different combinations

Roger is a 72% free throw shooter. When he goes to the free throw line to shoot two free throws, he has a 72% chance at making the first shot and a 72% chance at making the second shot.

Fill in the blanks on the tree diagram below.



Part 2 Answer the questions below

What is the probability that Roger...	Decimal	Percent
1) makes the first free throw and misses the second		
2) misses the first free throw and makes the second		
3) makes both free throws		
4) misses both free throws		

Tree Diagram – Dunk Contest

Questions Draw a tree diagram to help you find the probability of different combinations

Ryan is in his first dunk contest. He will try to perform 3 different dunks in the contest. He has practiced each dunk and has an 80% chance of completing each dunk.

Draw a tree diagram below to show Ryan's chances at completing dunks.

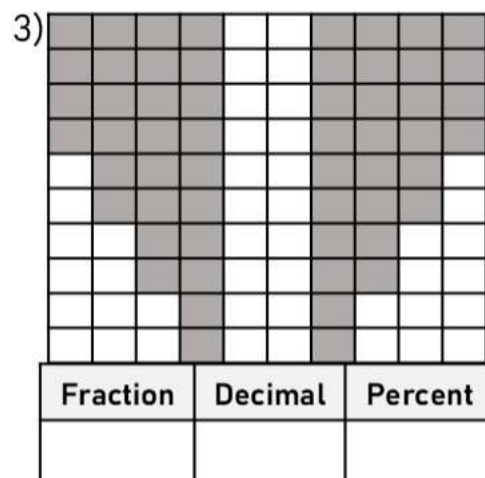
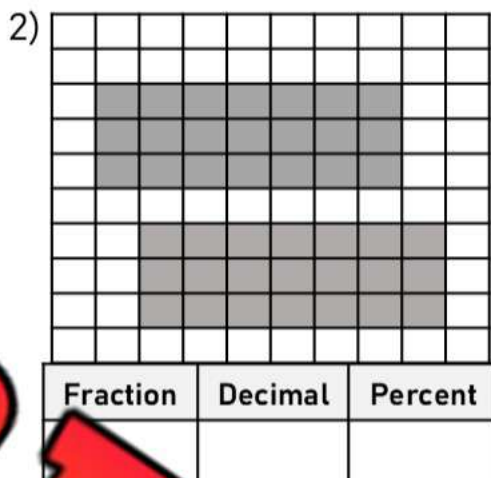
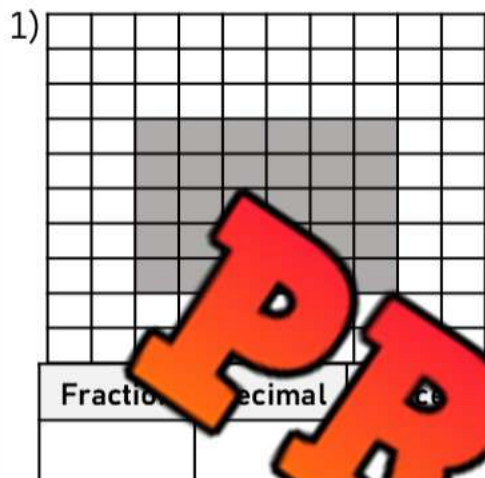


PREVIEW

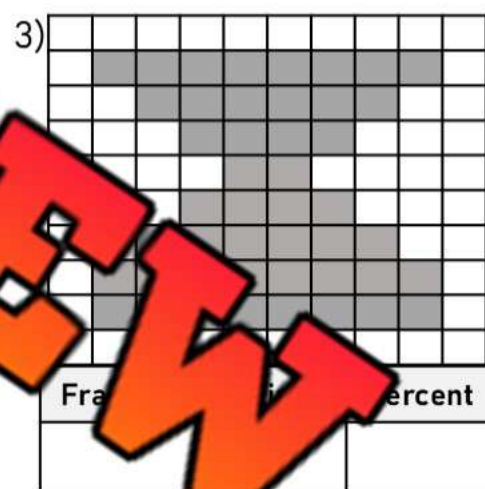
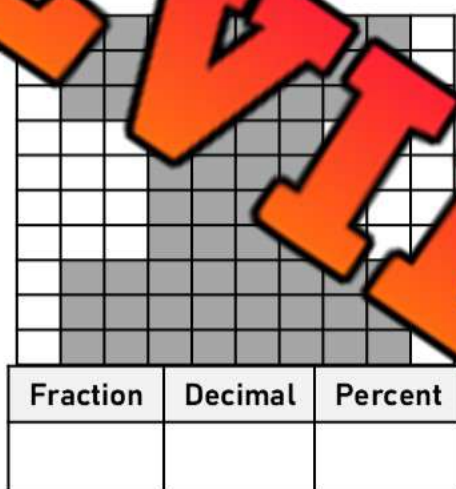
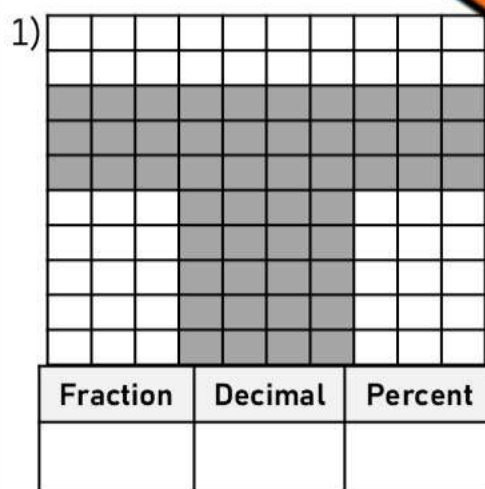
What is the probability that Ryan will...	Decimal	Percent
1) make all three dunks		
2) make his first dunk and miss his next two		
3) miss his first dunk and then make his next two		
4) miss his first and second dunk and make his third		
5) make his first and second dunk and miss his third		

Unit Quiz - Probability

Part 1 Represent the probability of hitting the target using a fraction, decimal and percent



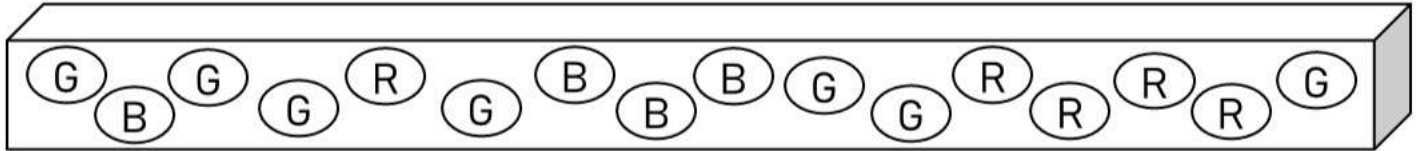
Part 2 What is the probability of hitting the target if you get 2 throws?



Part 3 What is the probability of...

1) Rolling a 1?	Fraction	Decimal	Percent
2) Rolling a 5 or 6?	Fraction	Decimal	Percent
3) Rolling an odd number?	Fraction	Decimal	Percent

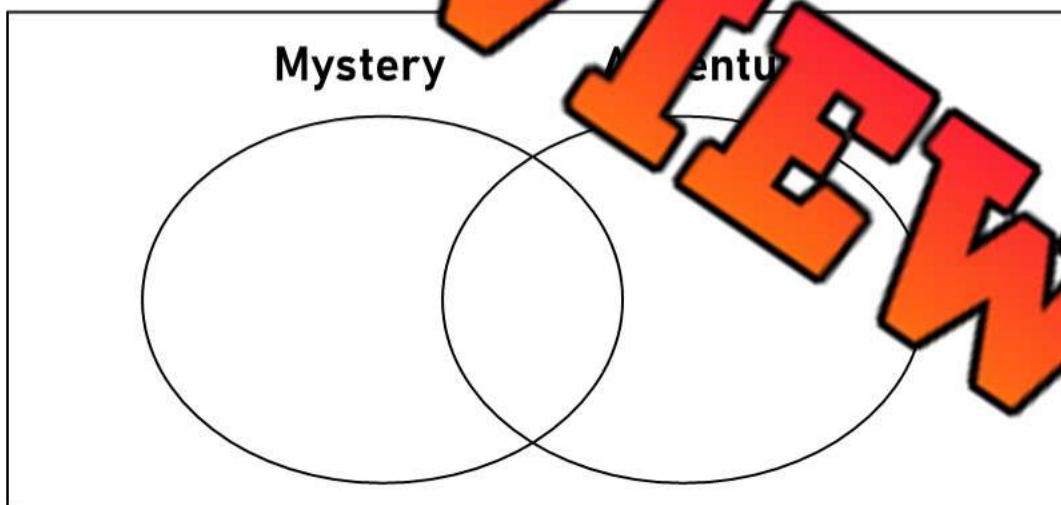
Part 4 Assuming you put the candies back in the box, determine the probabilities below



	Scenario – Probability of 4 candies and getting...	Answer – Show Your Work
1)	4 blue candies	
2)	2 blue candies and 2 red candies	
3)	1 green, 2 blue, and 1 red candy	

Part 5 Fill in the Venn diagram with the data below

In a class of 30 students, 10 like mystery books, 17 like adventure books, and 15 like both types of books.



	What is the probability that a student...	Fraction	Decimal	Percent
1)	likes mystery books and not adventure books			
2)	likes adventure books			
3)	likes neither adventure nor mystery books			

Part 6 Draw a tree diagram to help you find the probability of different combinations

For high school, you will be given 1 arts course, 1 math course, and 1 science course. The school will choose which courses you get at random. Draw a tree diagram to understand the probability of getting different courses.

Math	Science	Arts
Algebra (A)	Chemistry (C)	Music (M)
Statistics (S)	Biology (B)	Drama (D)
Geometry (G)	Physics (P)	Visual Arts (V)

PREVIEW

1) How many combinations of courses could you have? _____

What is the probability of you getting...	Fraction	Decimal	Percent
2) algebra or geometry, chemistry, and drama			
3) statistics, physics or biology, and drama or music			
4) geometry or algebra, biology or chemistry, and drama			
5) algebra or statistics, chemistry or physics, and drama or visual arts			