

Collect and Display Data

Chapter

12

Big Idea

Collecting and displaying data helps me describe the world around me and solve problems.

Learning Goals

I can create and label a line graph.

I can interpret line graphs to help me draw conclusions.

I can choose an appropriate method of collecting data and justify my choice.

I can graph data that I have collected.

I can analyze graphs to help me solve problems.

Essential Question

How can collecting data and creating graphs help me solve problems?

Important Words

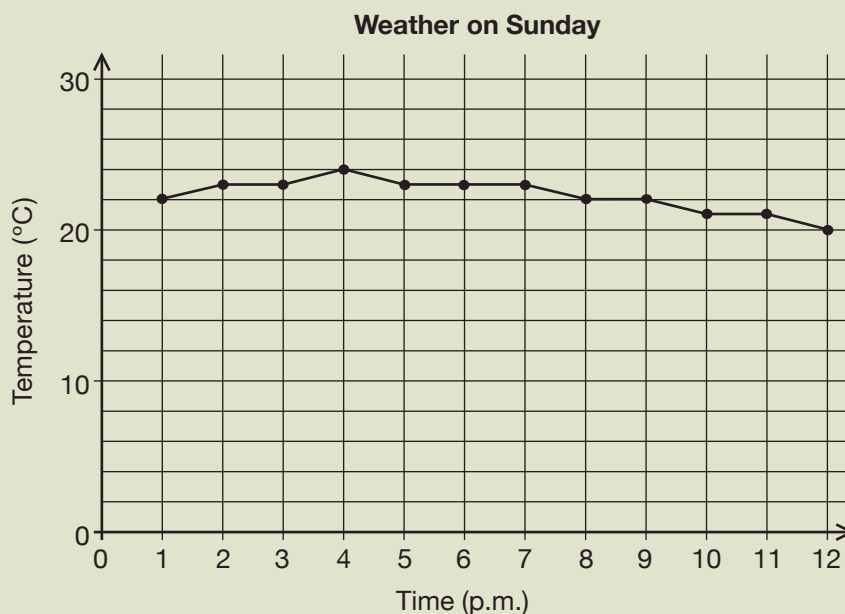
continuous data
discrete data





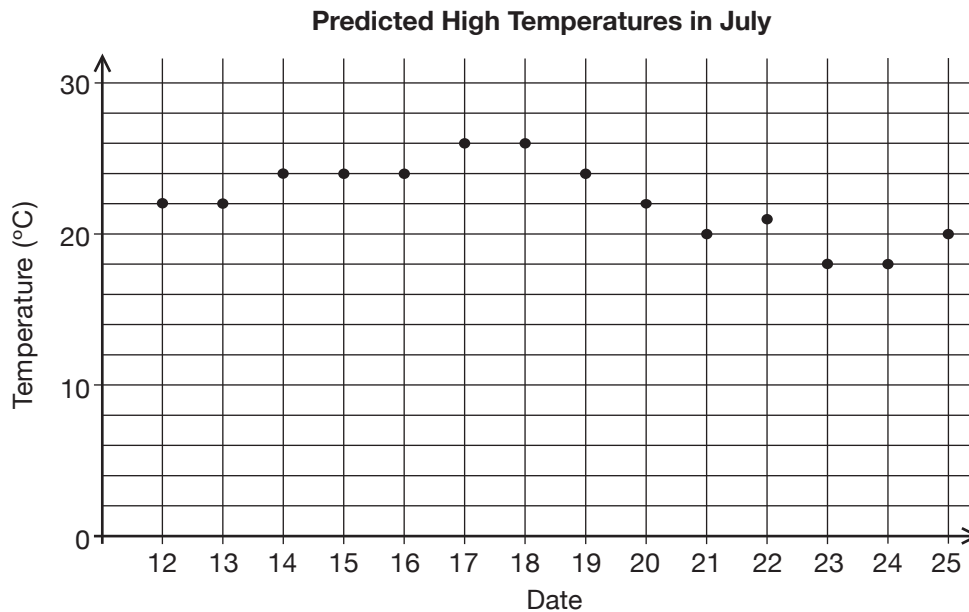
Use your knowledge of graphs and data to answer the questions.

Example:



- a. At what time will it be the hottest?
4 p.m.
- b. What is the temperature range for this afternoon?
Between 22 and 24 degrees.
- c. Your friend wants to go swimming at the outdoor pool this afternoon. Is this a good idea? How do you know?
Yes, because the temperature is nice.
- d. Explain the change in temperature over time.
As the day goes on, the temperature gets higher, reaching its peak at 4 p.m. and then dropping toward the end of the day.

1. George used data from the Environment Canada website and drew the graph below to help him plan what to do on his summer vacation.

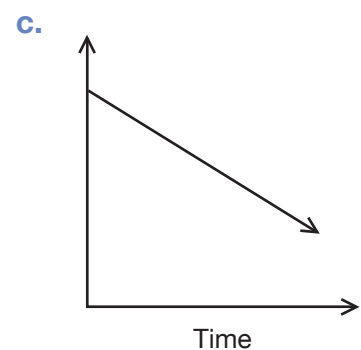
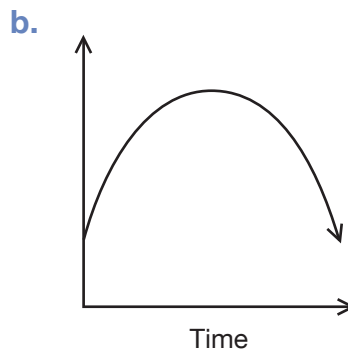
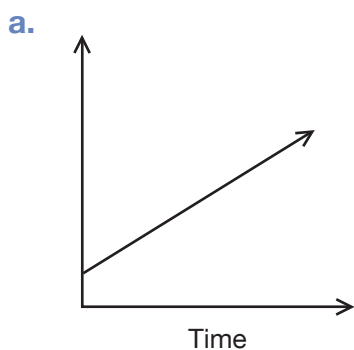


- a. What is the daily high temperature predicted to be on July 19?
- b. On which days will the temperature be above 22°C?
- c. On which day(s) should George go to the outdoor pool? Why?
- d. Where else could George have found this data?
- e. Is this **discrete data** or **continuous data**?
How can you tell?

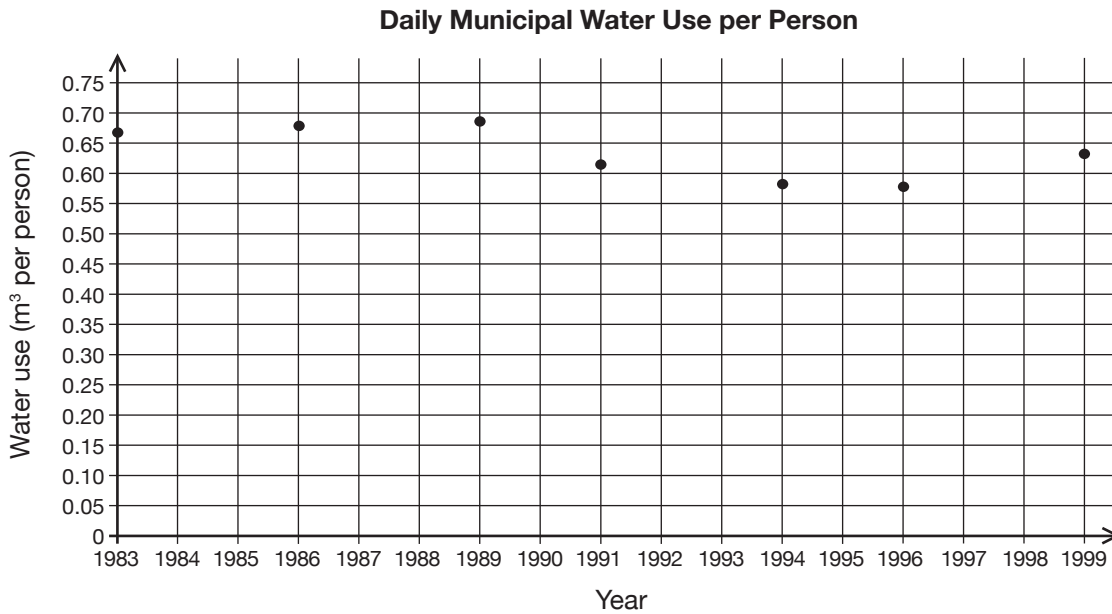
Discrete data is data that can only be some specific numbers, such as a whole number of people.

Continuous data is data that could be any number, such as a height of 2.58 metres.

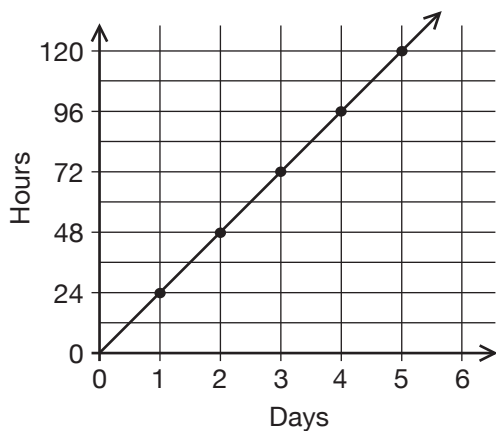
2. What could each graph below be showing?



3. Georgia saw the graph below on display when she was visiting the waste water treatment plant.

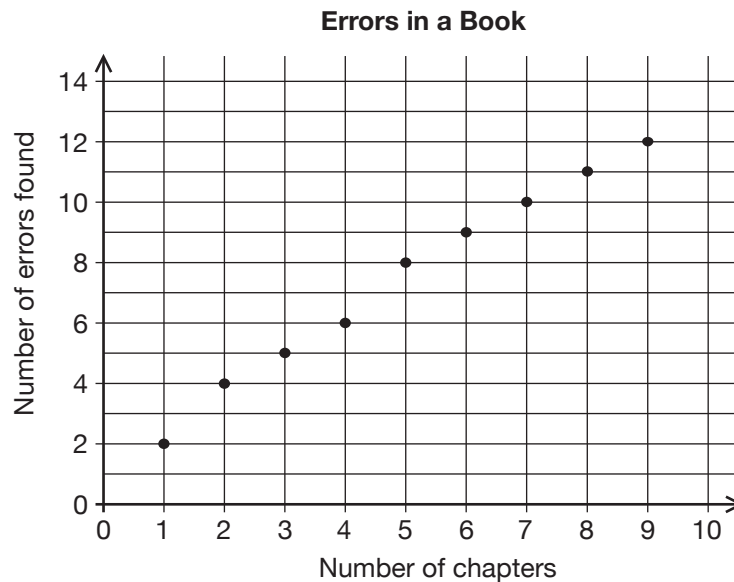


- How much water did the average person use each day in 1991?
 - In which year was water usage the highest?
 - Georgia’s city wants to reduce water usage. What year should they use as an example of smart water use?
 - Could Georgia have drawn a line to connect the points on this graph? Why or why not?
 - What could influence the trend in this data?
4. Hazel made the graph below to compare the number of hours to the number of days.



- What kinds of predictions can you make from the data?
- Why did Hazel use a line to connect the points on this graph?
- How many hours are there in three days?
- About how many days are there in 100 hours?
- How could you improve this graph?

5. Harrison found the graph below on a website.



- a. Explain any trend(s) the graph shows.
 - b. Identify the labels on the x - and y -axes on the graph.
 - c. Why might someone make a graph like this?
6. Identify whether each of the following examples is discrete data or continuous data.
- a. The number of questions on your weekly spelling tests over the course of the year.
 - b. The height of a sunflower plant over the course of the summer.
 - c. The weight of a grizzly bear over the course of the winter.
 - d. The number of grizzly bears in one particular area over the course of the summer.



7. Which graphs show a change over time?
8. What type of data was used to make this type of graph?

I can interpret line graphs to help me draw conclusions.
 I can analyze graphs to help me solve problems.

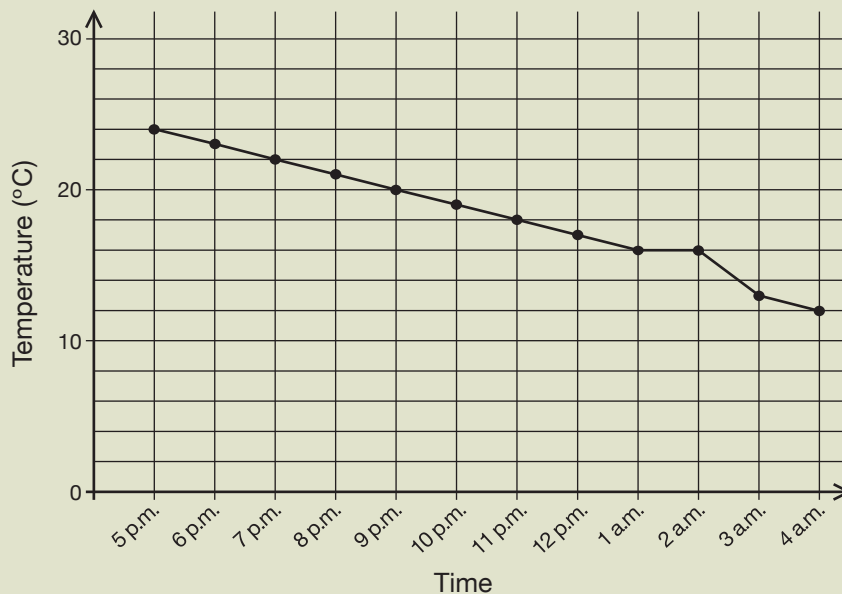


Use your skills with displaying data to interpret line graphs to solve the problems.

Example:

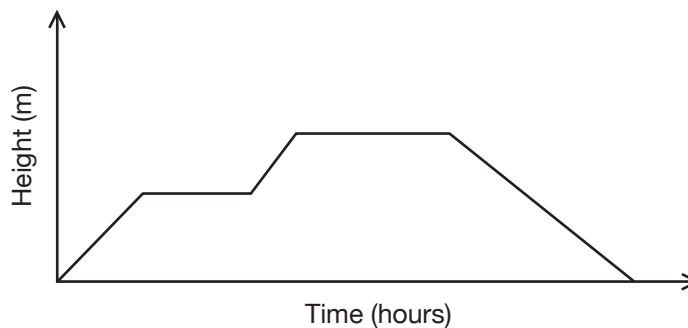
Xia looked at this graph online and thought it indicated that it was going to get cool in the afternoon. Is she correct?

Temperature Overnight

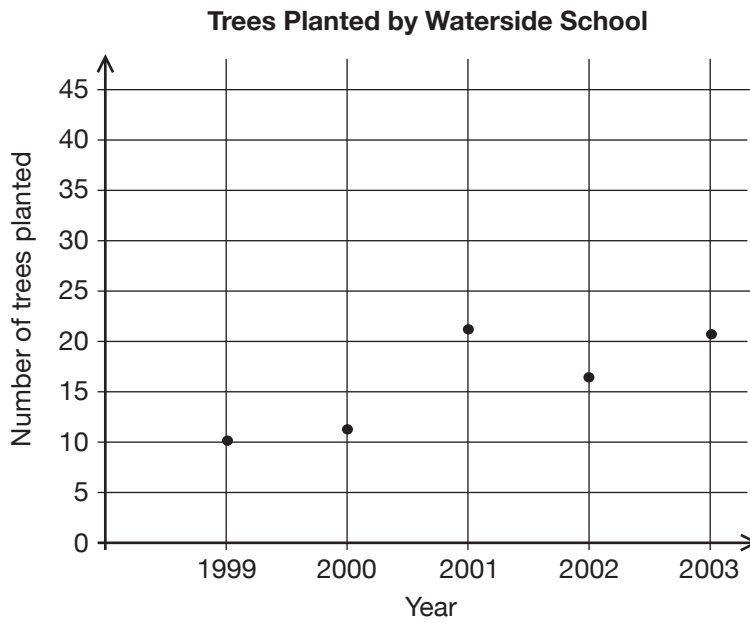


No, the graph shows the weather beginning at 5 p.m. It is going to get cool overnight, not in the afternoon. Xia needs to pay more attention to the labels of the graph.

1. Tell a story that the graph below could represent.

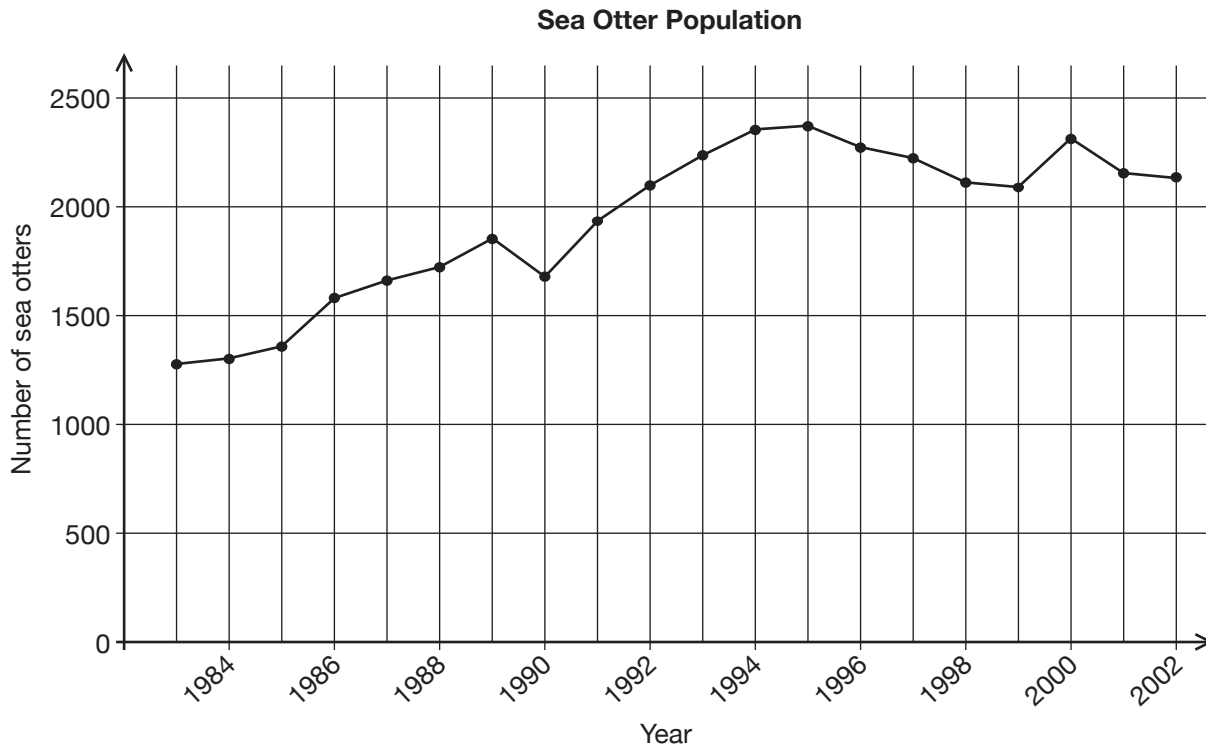


2. Ivan is part of the Eco-team at Waterside School. He made the graphs below to compare the trees planted at his school with the trees planted at Main Street School.

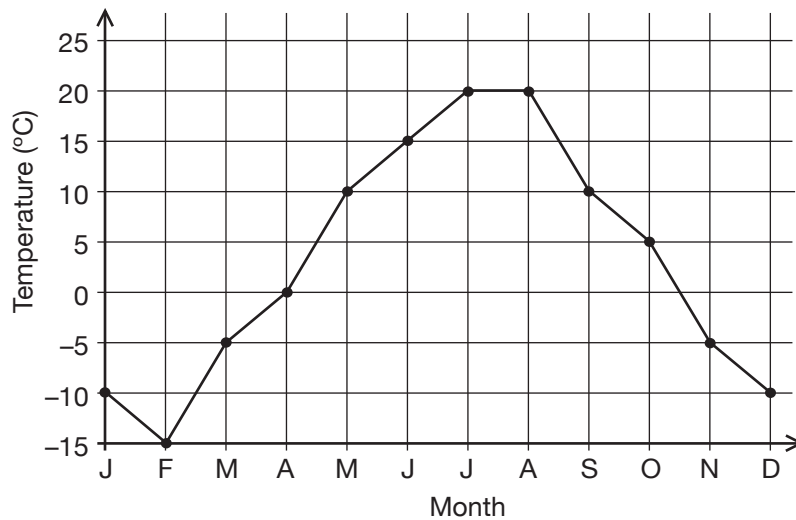


- About how many trees did Waterside School plant in 2002?
- In what year did Main Street School plant 30 trees?
- Explain how you can tell which school has planted more trees.
- How else could Ivan have displayed this data?

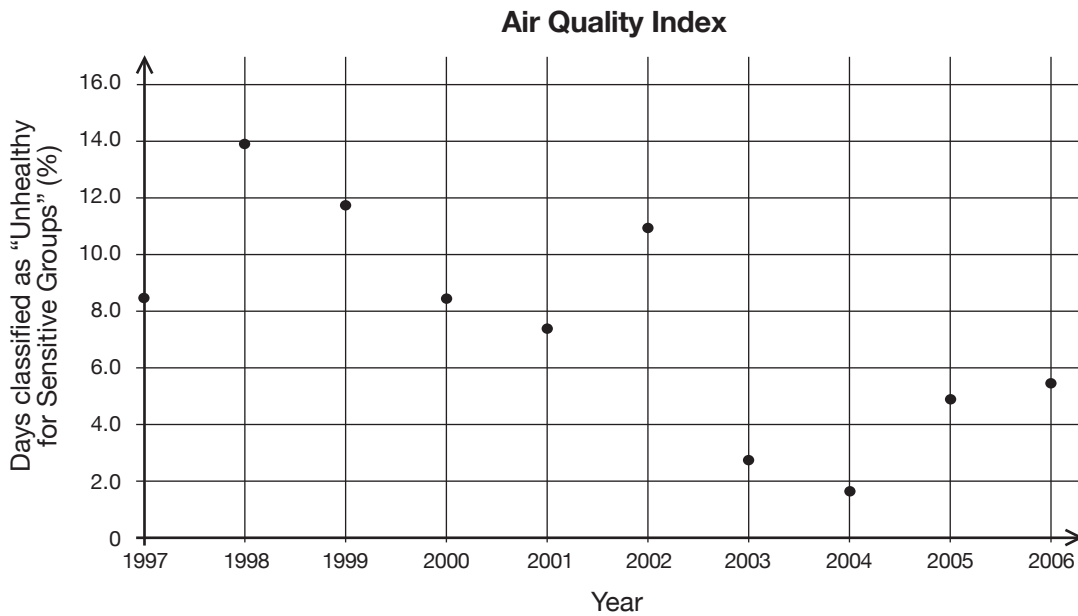
3. Scientists have been keeping track of the sea otter population because they are worried about the effect of environmental pollutants on sea otters.



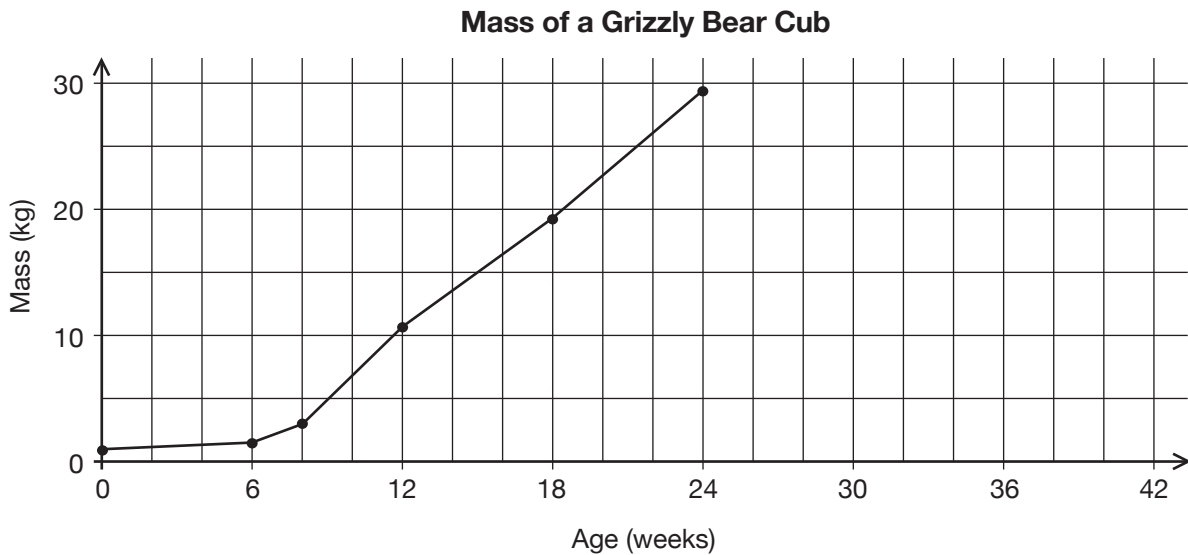
- a. Explain whether you think the scientists need to be worried about the sea otter population.
- b. Should the points on this graph be connected by a line?
4. Explain how you could improve this graph.



5. The provincial government says they are not worried about air quality. Use the data in the graph below to explain whether you agree with them.



6. Write three questions you could answer using the graph below.



7. Exchange questions from question 6 with a partner and answer each others' questions.
8. Where in real life have you seen graphs such as these?

I can interpret line graphs to help me draw conclusions.
 I can analyze graphs to help me solve problems.



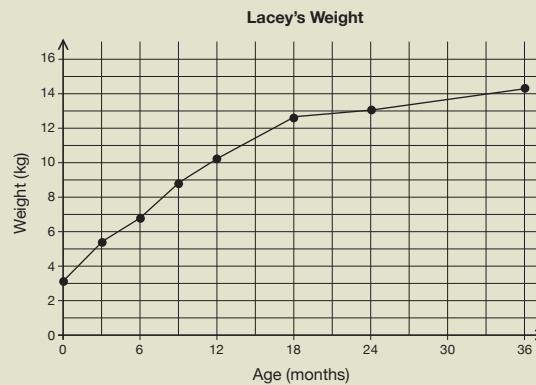
Use your knowledge of graphing to critique the given graphs and suggest ways to improve them. Compare different representations of the same data.

Example:

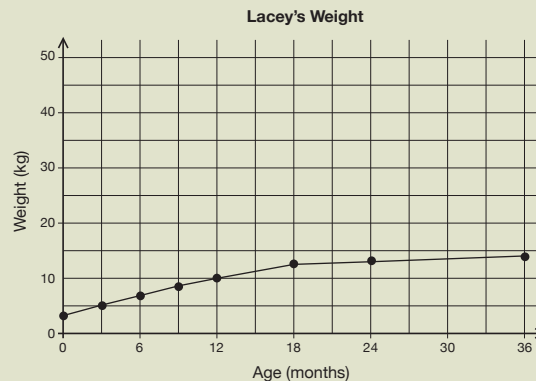
Lawrence and Leon have a baby sister, Lacey. The boys collected data about Lacey’s weight, and each of them made a graph to show how fast she is growing.

Age (months)	birth	3	6	9	12	18	24	36
Weight (kg)	3.2	5.4	6.8	8.8	10.2	12.6	13	14.2

Lawrence’s graph:



Leon’s graph:



Which graph do you prefer? Explain why.

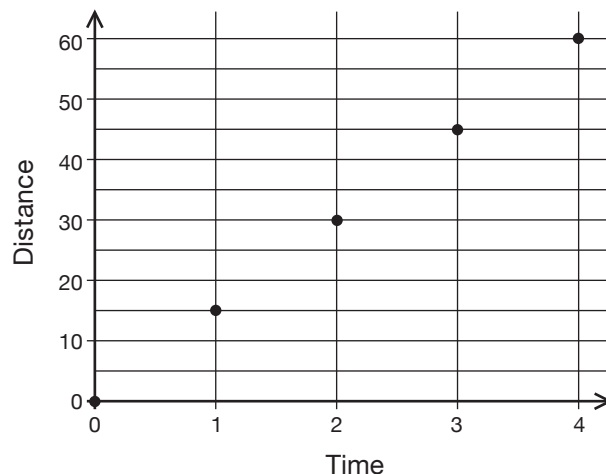
Leon's graph makes it look as though Lacey isn't growing very fast, because he used a scale on the y-axis that goes up to 50 Kg. He might have been comparing Lacey to himself, because 50 Kg is how much an older boy weighs. I don't think this really shows how well Lacey is growing, because she is only three years old. I prefer Lawrence's graph. It is also easier to read.

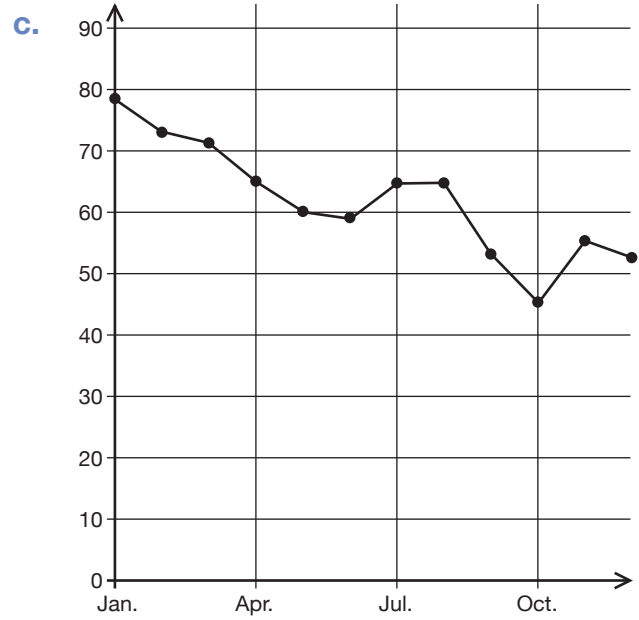
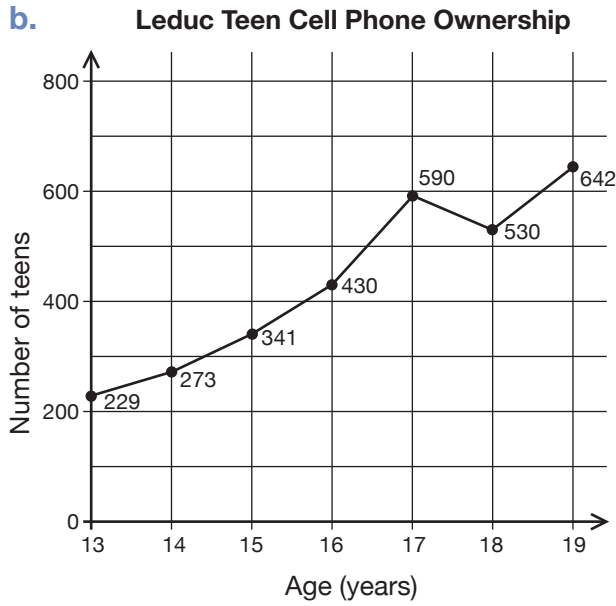
- Lawrence found this graph that his mom made to show how he grew during his first three years.



- Use the graph to create a table of values, like the one in the example, to show Lawrence's weight during his first three years.
 - What challenges did you face when making the table of values?
 - Compare the growth of Lawrence and of his sister, Lacey, during their first three years.
 - Explain whether it was easier to compare the data in the graphs or in the tables of values.
- Make suggestions to improve each of the following graphs.

a. Biking Distance



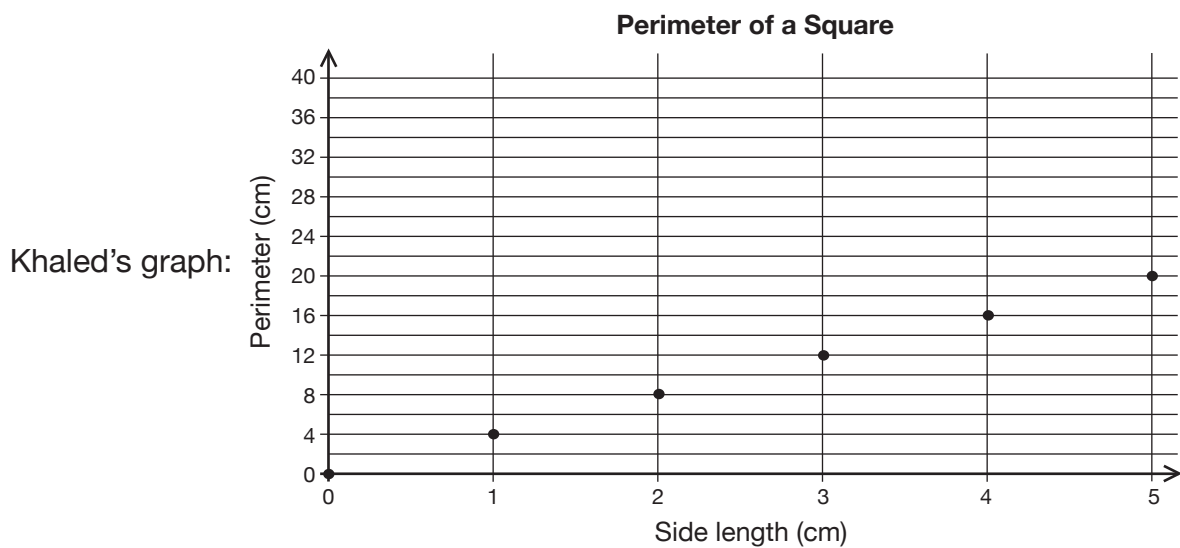
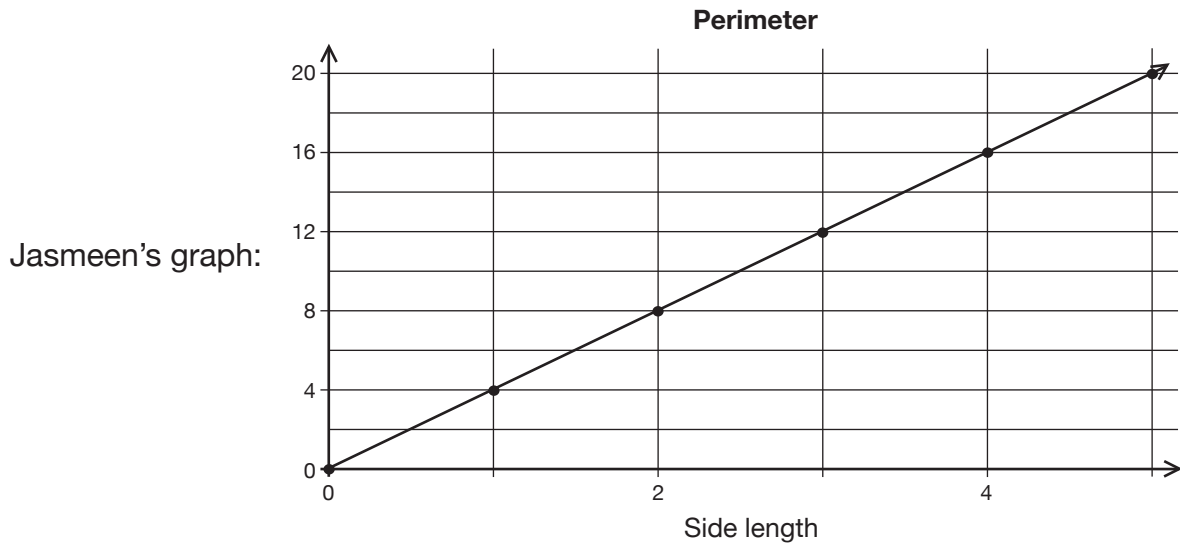


3. Geneva created the table below to help her understand discrete and continuous data.

Discrete Data	Continuous Data
<ul style="list-style-type: none"> • month born • how many kids in family • eye colour • gender • waist circumference • hair length 	<ul style="list-style-type: none"> • weight • shoe size • hand span • length of legs • arm length • birthday

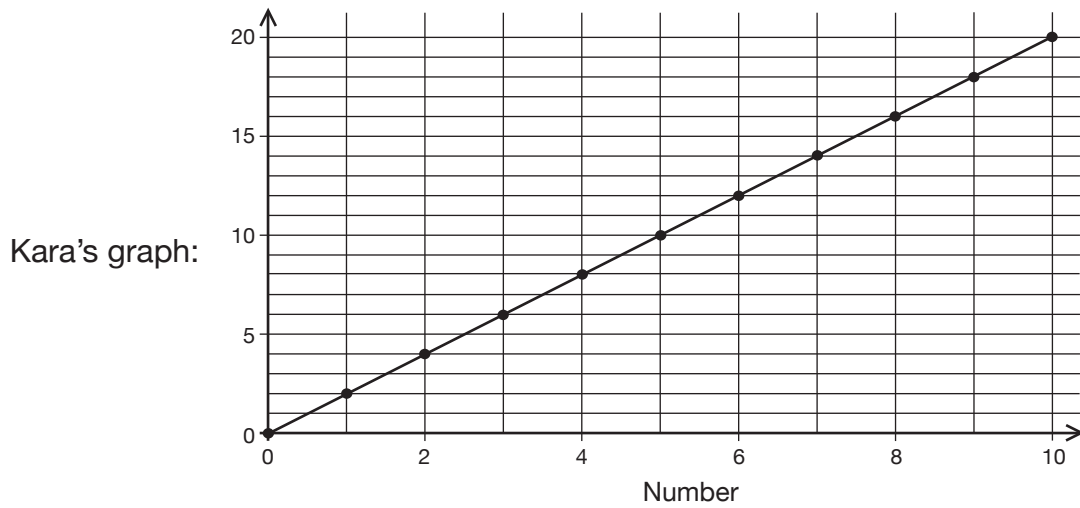
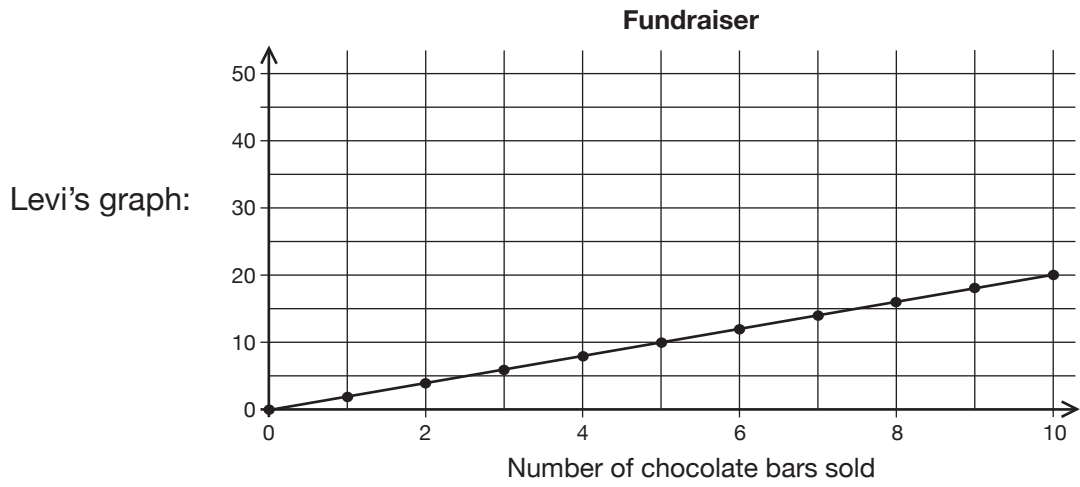
- Identify any errors Geneva made in her table.
- List two more examples of each type of data.

4. Jasmeen and Khaled were exploring the perimeter of squares and each created a graph of their findings.



- Do these two graphs show the same data? How can you tell?
- How could Jasmeen improve her graph?
- How could Khaled improve his graph?
- Which graph do you prefer? Explain why that is your preference.

5. Levi was helping his cousin, Kara, keep track of the number of chocolate bars she sold and the profit she made. They each drew a graph to show their data.



- Do these two graphs show the same data? How can you tell?
- How could Kara improve her graph?
- How could Levi improve his graph?
- Which graph do you prefer? Explain why that is your preference.



6. Why might you see a line on a graph of discrete data?

I can create and label a line graph.

I can interpret line graphs to help me draw conclusions.

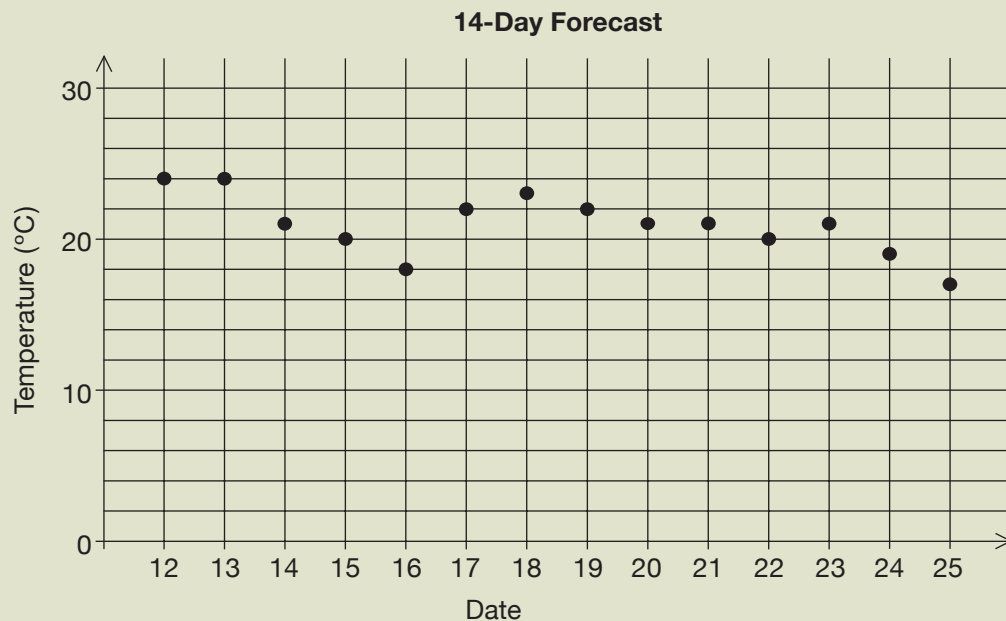
I can analyze graphs to help me solve problems.



Create line graphs and dot plots (a series of points) to solve real-world problems.

Example:

Cherise wants to go camping for a week, and she wants to take best advantage of the weather conditions. The drive to the campsite takes about five hours. When should she leave? When should she come back?



I think Cherise should leave on the 16th and come back on the 22nd. That way, she is in her car on the coldest day, and it will be warm for most of her camping trip.

1. Joey waits at the same bus stop every morning and has noticed a mess of cigarette butts. He and his family decided to put on latex gloves and pick up the butts every Friday night. Joey kept track of how many butts they picked up every week to see if what they were doing was deterring people from throwing their cigarette butts on the ground. His data is shown below.

Week 1	Friday night pick-up:	158 butts
Week 2	Friday night pick-up:	149 butts
Week 3	Friday night pick-up:	102 butts
Week 4	Friday night pick-up:	105 butts
Week 5	Friday night pick-up:	95 butts
Week 6	Friday night pick-up:	60 butts
Week 7	Friday night pick-up:	43 butts
Week 8	Friday night pick-up:	30 butts

- a. Make a graph of Joey's data.
- b. Do you think his work is making a difference? Explain why you think this.
2. Xander is planting a vegetable garden with his Dad. Xander keeps track of the growth of the green carrot tops. The carrots will be ready to eat when the green tops are about 35 centimetres tall.

Day	1	2	3	4	5	6	7	8	9	10
Height (cm)	0	0	0.1	0.5	1	2	2.5	4	6	8

- a. Make a graph of Xander's data.
- b. When do you think the carrots will be ready to eat?

3. Jane started training in an attempt to improve her long distance running times. As she trained, she kept track of her best times each week and recorded them in the table shown below.

Week	Time (hours)
1	02:48
2	02:43
3	02:38
4	02:32
5	02:28
6	02:24
7	02:20
8	02:17
9	02:14
10	02:12

- Create a graph using Jane's data.
- What trends do you see in the data?
- Explain how you decided whether or not to connect the points on the graph.



4. How do graphs help you solve problems?

I can create and label a line graph.

I can interpret line graphs to help me draw conclusions.

I can analyze graphs to help me solve problems.

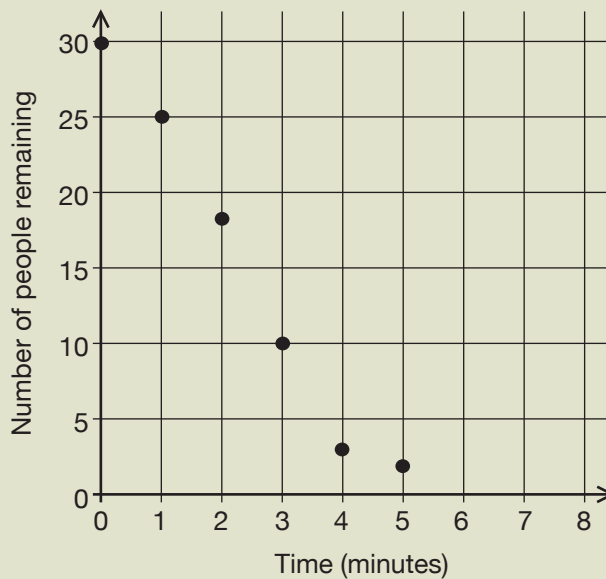


Using the given graphs, answer questions about the types of graph to use, and about collecting data to graph.

Example:

Time (minutes)	Number of people remaining
0	30
1	25
2	18
3	10
4	3
5	2

Classroom Freeze-Dance Competition



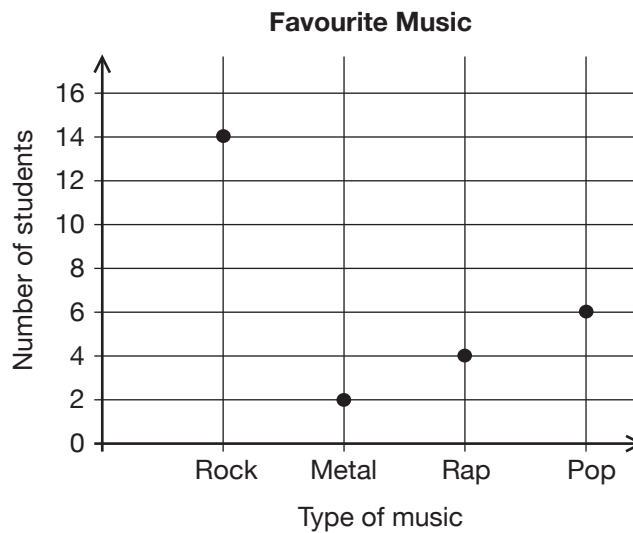
What does this graph show?

This graph shows the amount of time that has passed in the freeze-dance competition, and how many people are still in the competition with each minute that passes. If this trend continues, I think it will take six or seven minutes before there is only one person left.

1. Lily collected the data below about music preferences in her class.

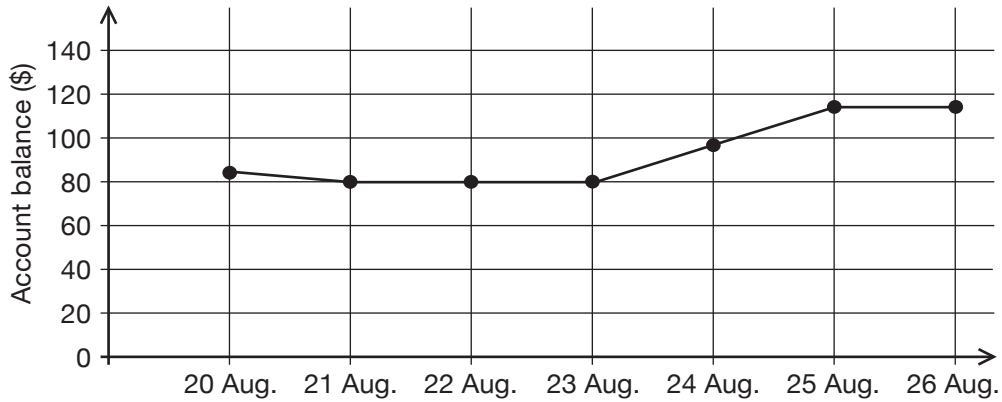
Type of music	Number of students
Rock	14
Metal	2
Rap	4
Pop	6

She created the following graph to show the data she collected.



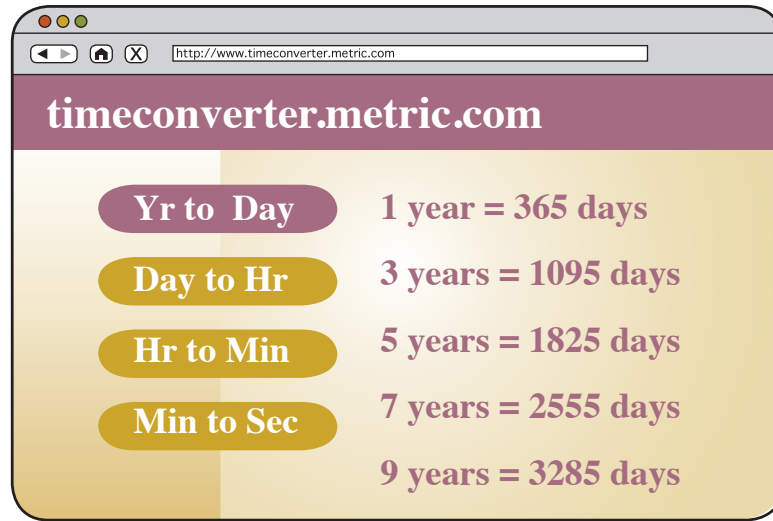
- a. What is the most popular type of music?
 - b. How might have Lily collected this data?
 - c. Create a graph to show this data in a more appropriate way.
2. Describe the method you would use to collect data to answer each of the following questions.
- a. Who won the Tour de France this year?
 - b. How many medals has Canada won in the Winter Olympics?
 - c. What types of shoes do your classmates prefer?
 - d. How many times can you hop without falling?

3. Mateo created this graph to show the balance in his bank account.

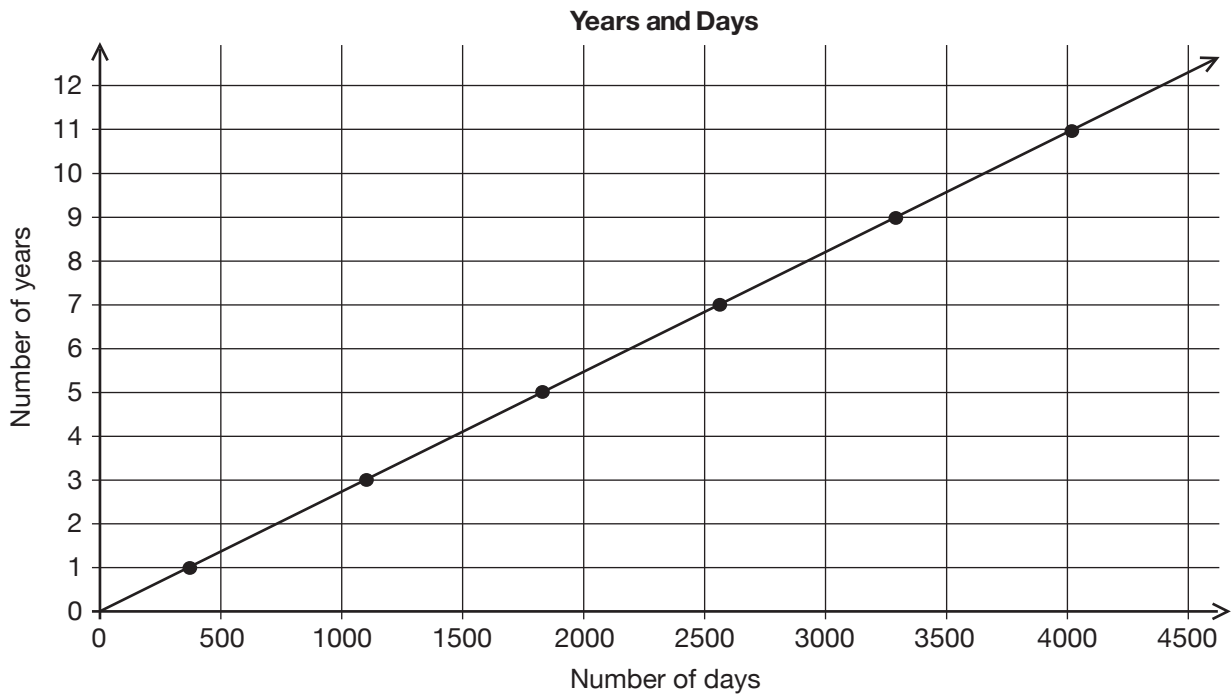


- a. Is Mateo saving money or spending it?
 - b. Where do you think Mateo got his data?
 - c. How could Mateo improve this graph?
4. Explain the type of graph you would use to display each of the following sets of data.
- a. The five favourite books of our class, by gender.
 - b. The number of erasers in most students' desks.
 - c. The distance you travelled on your skateboard each day this week.
 - d. Your height throughout elementary school.
5. List three topics that you think would be interesting to research.
- a. Choose one of the topics and write a questionnaire you could administer to collect data about the topic.
 - b. Choose one of the topics and plan an experiment you could conduct to collect data about the topic.
 - c. Choose one of the topics and find a database you could use to collect data about the topic.

6. Maeve found a website, shown below, that converts a number of years to a number of days, as well as showing several other conversions.



Maeve created the graph below using the data.



- About how many days old are you?
- What relationship does this graph show?
- Why might Maeve have chosen to show this data in a graph?

7. Paxton designed a questionnaire and gave it to the Grade 6 students in his school.

What do you want to be when you grow up?

Doctor/Dentist

Nurse

Teacher

Lawyer

Coach

When 50 of the questionnaires were returned, Paxton organized the data in the table below.

	Boys	Girls
Doctor/Dentist	10	6
Nurse	2	11
Teacher	13	7
Lawyer, etc.	5	1

Paxton concluded that most students will become doctors or dentists.

- a. Do you agree with his conclusion? Explain.
 - b. Describe how he might have improved his questionnaire.
8. Write a question for which the best method by which to collect data and answer the question is:
- a. a questionnaire.
 - b. an experiment.
 - c. using a database.
 - d. using electronic media.



9. What kinds of data are line graphs best for displaying?

I can choose an appropriate method of collecting data and justify my choice..
 I can interpret line graphs to help me draw conclusions.
 I can analyze graphs to help me solve problems.



Use appropriate methods for collecting and displaying data in a graph. Choose the type of graph that best represents the data.

Example:

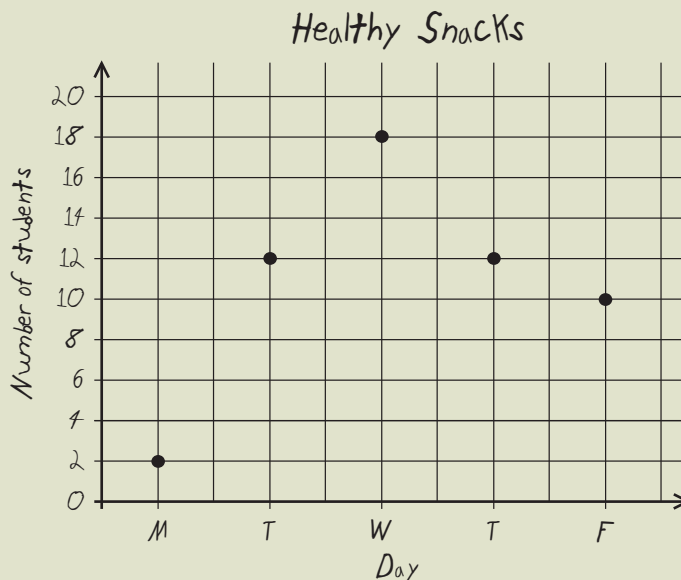
Nixon wanted to know how many of his classmates chose healthy snacks. How could he collect this data?

He could do an experiment in which he counted the number of students who chose healthy snacks each day for a week.

Collect data and create a graph to answer Nixon's question.

I counted who chose a healthy snack each day.

Day	M	T	W	T	F
Number of students	5	12	18	12	10



My graph shows the data for one week. The points are not connected because the data is discrete. A point where six-and-a-half students brought snacks between Monday and Tuesday wouldn't make any sense.

1. Geneva lost the binder in which she kept the data and graphs for her presentation. Someone found the data samples outside on the playground, but they were all mixed up and the graphs were missing. Choose which set of data best answers each question and create a graph to show the data.

- a. When are my classmates' birthdays?

Age	Number of students
9	0
10	0
11	5
12	20
13	4

Questionnaire		
Name		
<u>Jenny</u>	When were you born?	<u>December</u>
<u>Jack</u>	When were you born?	<u>June</u>
<u>Jaswinder</u>	When were you born?	<u>April</u>
<u>Dora</u>	When were you born?	<u>May</u>
<u>Reese</u>	When were you born?	<u>February</u>
<u>Nick</u>	When were you born?	<u>October</u>
<u>Toby</u>	When were you born?	<u>October</u>
<u>Anabelle</u>	When were you born?	<u>August</u>
<u>Cathy</u>	When were you born?	<u>August</u>
<u>Romiro</u>	When were you born?	<u>August</u>

- b. How many people in Room 1 take the bus?

Travel mode	Number of students
Bus	6
Walk	6
Car	9
Bike	0

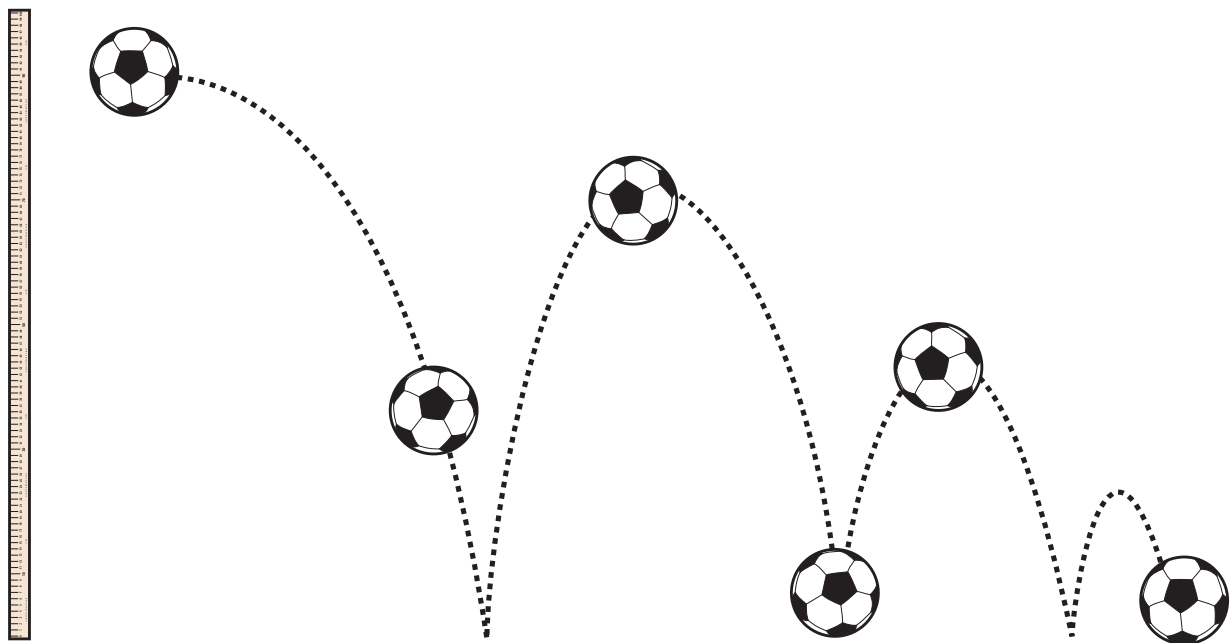
City	Number of busses
Edmonton	900
Calgary	850
Vancouver	2300
Saskatoon	120
Regina	100

- c. Is there a relationship between age and bedtime?

Bedtime	Number of students
8:15 p.m.	HHH I
8:30 p.m.	HHH IIII
8:45 p.m.	IIII

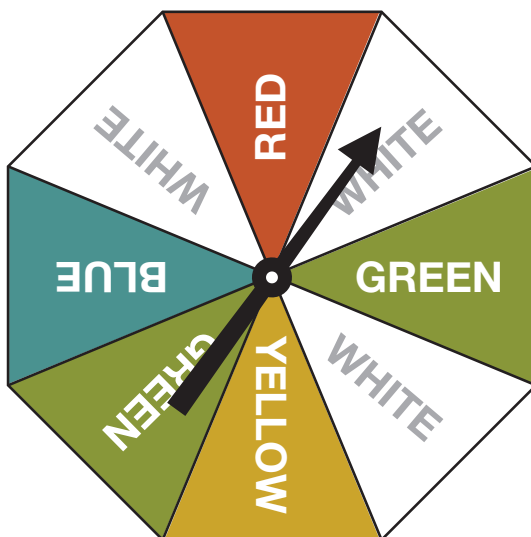
Age (years)	Bedtime
9	8:15
10	8:30
11	8:45
12	9:00

2. How might you find out who was the first figure skater to successfully perform a quadruple jump in competition?
3. Research a sport you know very little about by using a database or electronic media. Gather data and construct a graph to represent some of the data you found. Keep track of the databases and the websites you used.
4. Grow fast-growing grass seeds in empty frozen juice containers. Measure the height of the grass to the nearest millimetre each day over a period of two weeks. Record and graph the data.
5. Conduct an experiment to answer the following question: Is there a relationship between the height from which a ball is dropped and the height to which it bounces? Graph the data you collect and answer the question.



6. Research the speeds of the fastest roller coasters and present the data you find in a graph.

7. Perform an experiment where you roll a die 25 times.
- Record the results.
 - Represent the results in a graph.
 - Explain how you chose which type of graph to use.
 - What conclusions can you draw from the graph?
8. Design and conduct an experiment to answer one of the following questions. Graph your results.
- When you roll a pair of dice 20 times, how many times will you get doubles?
 - If you spun the spinner below 15 times, how many times will you land on a white section?



- If you flipped a coin 50 times, how many times would it land on heads?



- What do you think is the easiest method to collect data? Explain.
- Explain how you decide which type of graph best represents a particular set of data.

I can create and label a line graph.

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I can choose an appropriate method of collecting data and justify my choice.

I can graph data that I have collected.

I can analyze graphs to help me solve problems.