Hello everyone!

This week we will finish with a lesson on critiquing data and understanding tessellations.

To start, let's look at <mark>critiquing data</mark>:

Critiquing data is about recognizing the strengths and weaknesses (limitations) of a presentation, allowing one to make an educated determination of the best presentation to use.

It is important to remember that there are many ways to represent data. In this, <u>different formats may lead to misrepresentation</u> of the data.

Let's take a look at some examples to help us understand how this can happen:
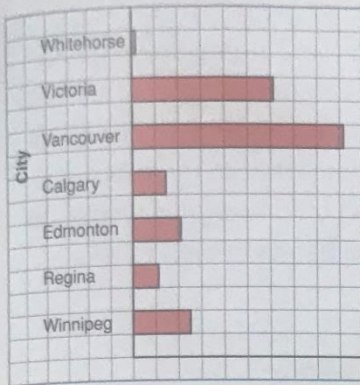
Watch the following video first:

On the following pages, read through each of the examples indicated by the blue stars. Pay close attention to the highlighted points, for explanation on how each of the graphs is misleading and which ones accurately show the data.

(see next page)

Average Annual Precipitation

⭐ This bar graph is misleading. It suggests that Vancouver has more than 30 times as much precipitation as Whitehorse. This graph has no measurements of the amount of precipitation.
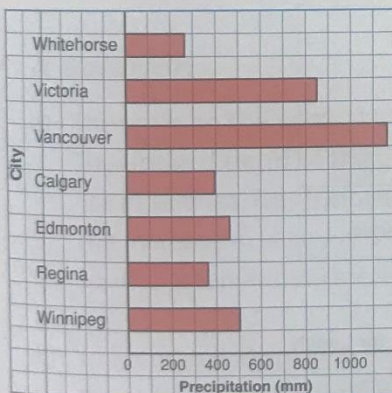
⭐ Visually, this graph shows the same information as the first graph. However, the horizontal scale is labelled with the amount of precipitation, and the scale does not start at 0.

The scale shows that Vancouver has about 1170 mm of precipitation and Whitehorse has about 270 mm.

**Average Annual Precipitation**
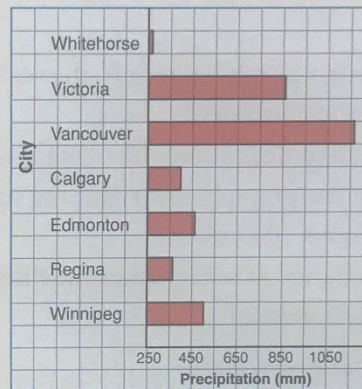
Average Annual Precipitation

⭐ This graph accurately shows the data. The horizontal scale starts at 0.

The lengths of the bars are shown in the correct ratio. Vancouver has between 4 and 5 times as much precipitation as Whitehorse.

There are many ways in which graphs can be drawn to **misrepresent data**. Graphs like these may be found in the media to create false impressions.

⭐ In this bar graph, the wider bar creates the impression that many more boys than girls scored higher than 80%. In fact, the number of girls who scored higher than 80% is greater than the number of boys.
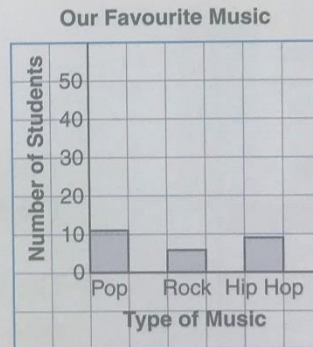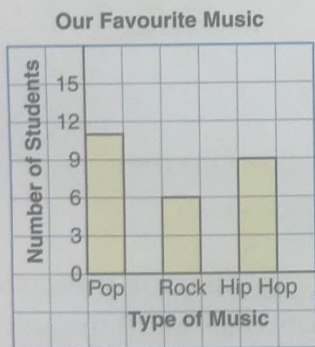
**Grade 8 Students Who Scored Higher than 80% on a Math Test**
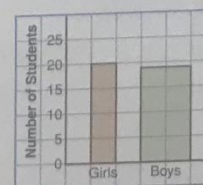
In this pictograph, the symbols have different sizes.
The three large ice-cream cone symbols give the impression
that bubble gum is the favourite flavour.
When the key is used, chocolate is the favourite flavour.

Our Favourite Ice Cream Flavours

Chocolate

Vanilla

Bubble Gum
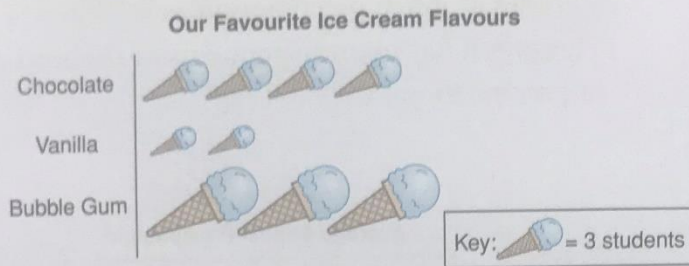
Key: = 3 students

In the bar graph below left, the scale on the vertical axis is 1 square
represents 3 students.
The differences among the heights of the bars are easily seen.
In the bar graph below right, the scale on the vertical axis is 1 square
represents 10 students.
This change in scale makes the differences among the heights of the
bars less evident.

Our Favourite Music

Number of Students

15
12
9
6
3
0

Pop   Rock Hip Hop
Type of Music

Our Favourite Music

Number of Students

50
40
30
20
10
0

Pop   Rock Hip Hop
Type of Music

A part of a graph may be treated
differently to draw attention to it.
A milk company uses this circle graph
to draw attention to the milk sector.
The sector for milk is not as large as
the sector for water,
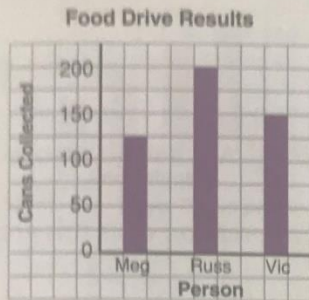but the special treatment makes
it seem larger.

Favourite Drinks for Lunch

Milk

Water

Juice

Pop
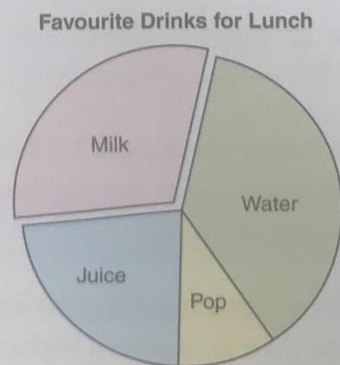
Based on what we've read and heard, let's try some of the circled questions on our own.

Check

3. These graphs display the same data. Which graph is misleading? Why?

Graph A
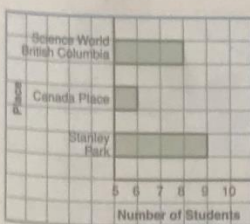
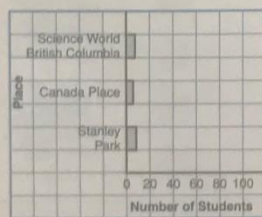**Food Drive Results**

Graph B

Food Drive Results
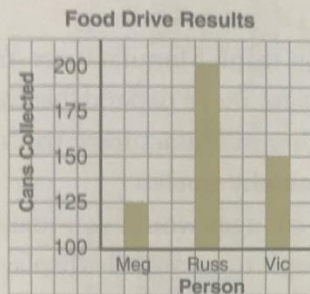
4. A Grade 8 class in Vancouver was surveyed to find out where they would like to go for an end-of-year trip. The results were graphed by two students.

Where We Would Like to Go

Graph A   Graph B


a) What impression does each graph give?

b) How is each graph misleading?

c) Where do you think the creator of Graph A would like to go? Why do you think so?

d) Where do you think the creator of Graph B would like to go? How was the graph drawn to give this impression?

e) What changes would you make to graph these data accurately?

Apply

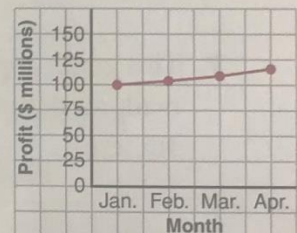**5.** Graphs A and B display the Read Books Company's profits for a four-month period.
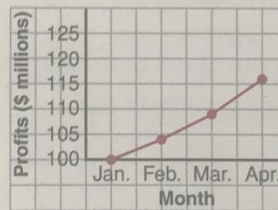
Graph A   Graph B

**Read Books Co. Profits**   **Read Books Co. Profits**

Which conclusions are incorrect?

a) The profits have tripled in 3 months.

b) The profit in March is double the profit in January.

c) The profit in March is about $10 000 000 more than the profit in January.

d) The profit in April is $16 000 000 more than the profit in January.

Explain how each incorrect conclusion may have been made.

6. The pictograph shows the number of students in a Grade 8 class who have different types of pets.
From this graph, Nick concluded that the most popular pet is a bird.
   a) Is Nick's conclusion correct? If yes, justify his conclusion. If not, explain his misinterpretation.
   b) If your answer to part b was no, what changes would you make to accurately display these data?
   c) Which type of pet do you think the creator of this pictograph has? Why do you think so?

Types of Pets

Dog	🐟🐟🐟🐟🐟
Cat	🐟🐟🐟
Bird	🐟🐟🐟🐟
Fish	🐟🐟

Key: 🐟 = 2 students
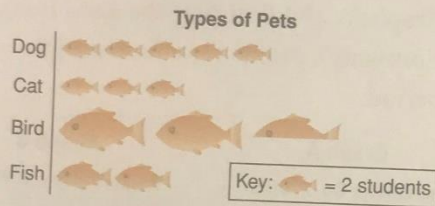
7. This graph appears to show that Paige's math mark dropped greatly in the 4th term.

**Paige's Math Marks**
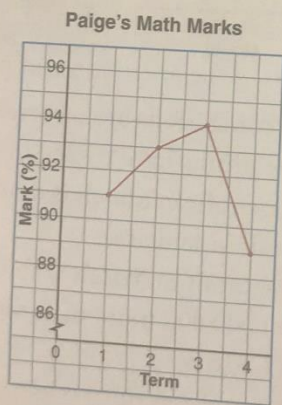
   a) Do you think Paige should be very concerned about this drop? Why or why not?
   b) What changes could you make to graph these data more accurately?

8. Manufacturer A uses this graph to advertise that more than 98 out of 100 of its trucks sold in the last 10 years are still on the road.

Number of Trucks Still on the Road
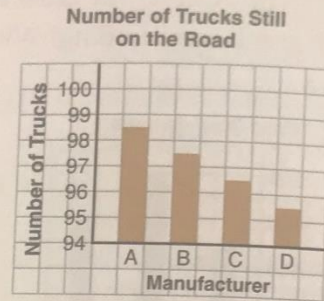
   a) What impression does this graph give?
   b) How many trucks, out of 100, are still on the road for Manufacturer B? C? D?
   c) Do you think Manufacturer A's trucks are more dependable than the other manufacturers' trucks? Why or why not?
   d) What changes would you make to the graph to accurately display these data?

9. Four students conducted a science experiment to see who could grow the tallest plant over a given period of time. This pictograph shows the results.

Plant Height

Kathy   Arlene   Derry   Mike

Key: 🌿 = 2 cm
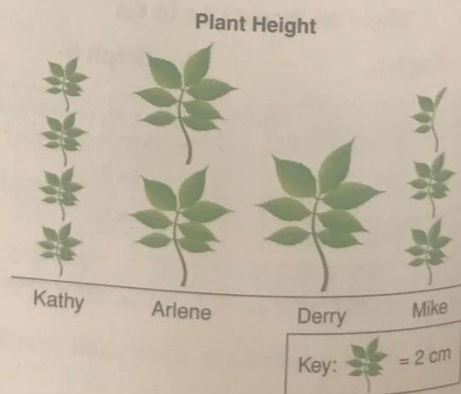
a) Whose plant grew the most?
b) How does the graph misrepresent these data?
c) How could the graph be changed to present the data accurately?
d) Do you think Kathy drew this pictograph? Why or why not?

10. **Assessment Focus** Giada surveyed her classmates to find out which sports they participated in. She drew these graphs.

Boys' Participation


Girls' Participation
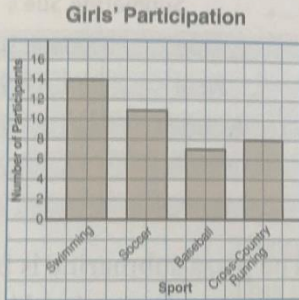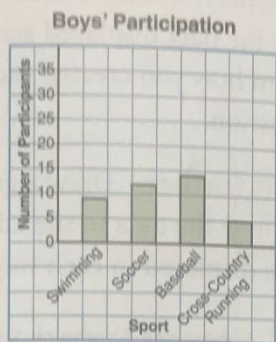
a) What impressions do these graphs give?
b) Describe how the graphs create a false impression.
c) What features of the graphs make it seem that the girls participate in sports more than the boys?
d) How could the graphs be changed to present the data accurately?
e) Suggest a different graph that could be used to accurately display these data.

14. The graphs show how two students spend their allowance. From these graphs, a student concluded that Mark spends more money on movies than Tina does.

a) From the graphs, can you tell which student spends more money on movies? Why or why not?

b) Which type of graph could you use to display these data accurately?

How Students Spend Their Allowance

Movies
Food
Music
Clothes

Mark
Graph A

Food
Movies
Clothes
Music

Tina
Graph B

TICKETS
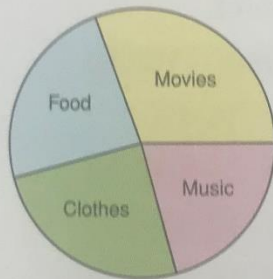
(see next page)

Now let's look at understanding tessellations.

When congruent (equal) copies of a shape cover a plane with NO overlaps or gaps, the shape is said to tesselate. We call the design a tessellation.
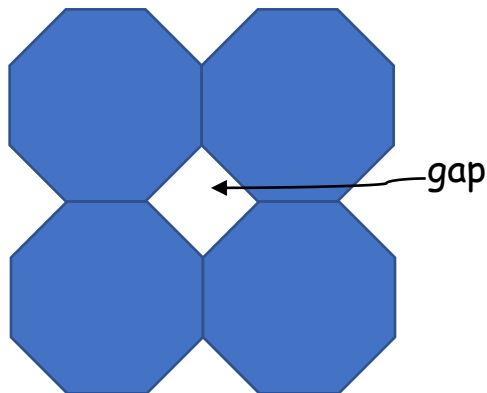
For copies of a design to tesselate, the sum of the angles at any point where vertices meet must be 360°, that is, the polygons surround a point.

For example:

Notice here, there are no gaps or overlaps, so the triangle tessellates.
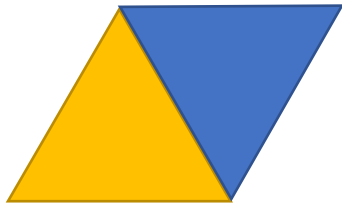
Below, what looks like a start to a tessellation will have gaps, therefore the octagon does not tesselate.

gap

Some shapes that do not tesselate alone, can be combined with one or more shapes to make a new shape that does tesselate. This new shape is called a composite shape. The octagon and square above, together make a composite shape.

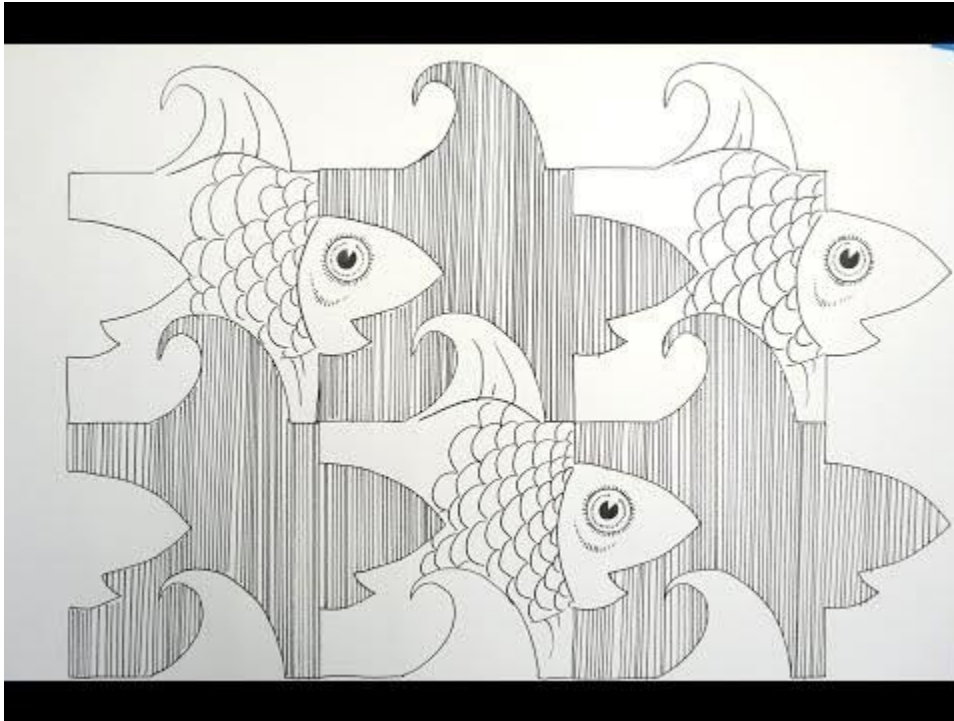Watch the following video on tessellations:
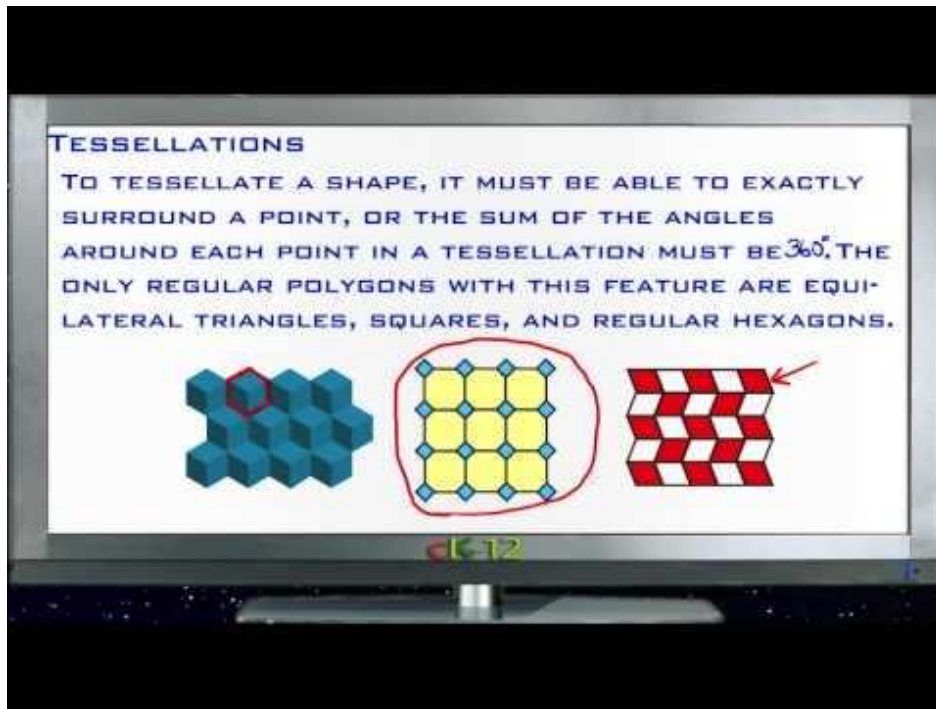
The next video provides some examples:
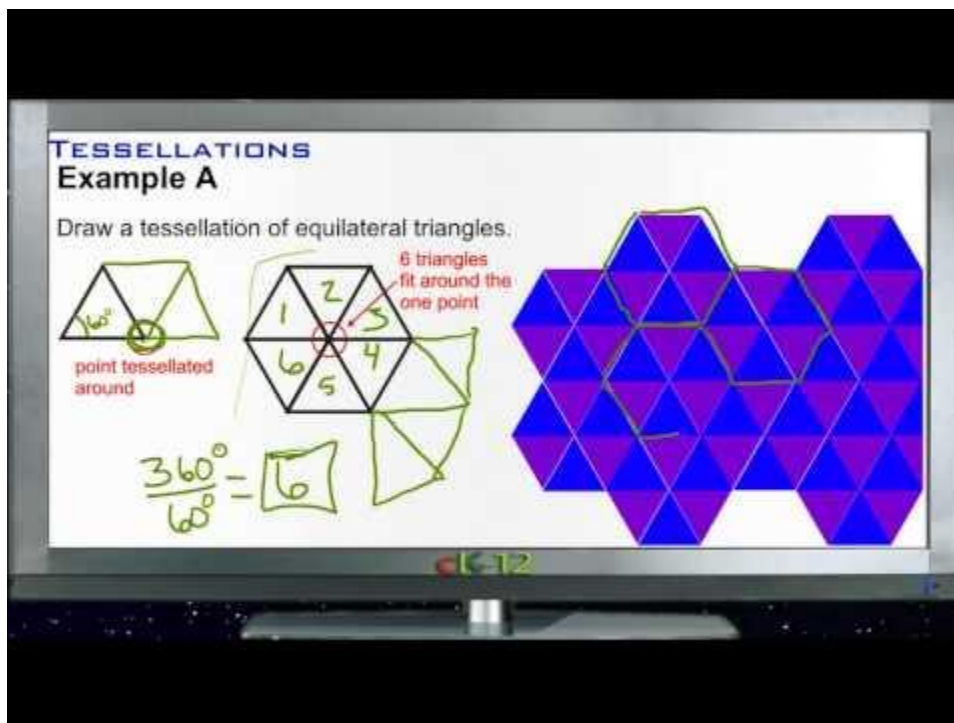
Can you make a tessellation?

On Netmath at www.netmath.ca, you can practice with the exercise "Observing and producing tessellations using reflections".

If you want to create some more, the following video gives some help. Have fun!

This is your last lesson for the year! As always, take your time, space out the work and do your best. Have a fantastic week and an amazing summer! I will miss you all, have a blast at JMH!

😊