Travel to school

A good part of our day is spent travelling from one place to another. How much time do we spend travelling to school?

Deciding to walk or take the car may depend on the distance. But after choosing the method of transportation, does everybody spend about the same amount of time to get to school?

Do those who take the bus to school spend less time than those who walk or ride their bicycles?

Does the time it takes to get to school depend on where you live?

To better understand the situation, we will study the "time to get to school" variable. We will then analyze the data based on the method of transportation used. Finally, it will be interesting to see if this situation varies from one region to another in Canada.

Time to get to school

We will enter the class data in a table, grouping them in intervals of ten minutes, for example.

First we write down the numbers as we collect them. Then we put them in ascending order to create a **stem and leaf plot**, where the tens are the "stems" and the units are the "leaves". For example, a time of 15 minutes is recorded by adding a "5" to the row in the Units column that corresponds to the "1" in the Tens column.

Time to get to school Raw data	
Tens	Units
0	4, 6, 6, 8, 9,
1	0, 0, 3, 4, 4, 5, 5, **5**
2	0, 0, 2, 4, 4, 4, 7, 9, 9
3	...
…	…

Now, let's try to get an overview.

1. Look at all the ordered data. Half the class takes less than how many minutes to get to school? This number is called the **median;** it's the central value that divides the list of ordered data into two equal sections.

2. What the **average** time that students in your class spend to get to school?

3. Which row contains the most data? What does this mean in your opinion?

4. What is the shortest time? What is the longest? What is the difference between them?

5. What can you say about the time that students in your class spend to get to school?

To get a better picture of the situation, it would help to add a column to your table that shows the number of students.

| Time to get to school Raw data		
Tens	Units	No. of students
0	4, 6, 6, 8, 9,	5
1	0, 0, 3, 4, 4, 5, 5, **5**	8
2	0, 0, 2, 4, 4, 4, 7, 9, 9	9
3	…	...
…	…	...
	Total	27

6. Now, can you create a graph that shows how much time the students in your class spend getting to school?

As you can see, everybody does not spend the same amount of time to get to school. We can now examine whether this time changes with the method of transportation.

Time spent by method of transportation

First, group together the students who use the same method of transportation. You can quickly determine the distribution of students by transportation method by creating a **circular chart** with a spreadsheet program. Your chart might look something like this:

Methods of transportation used by students in the class

Legend:
- Car
- Bus
- Walk
- Bicycle
- Train
- Subway
- Other
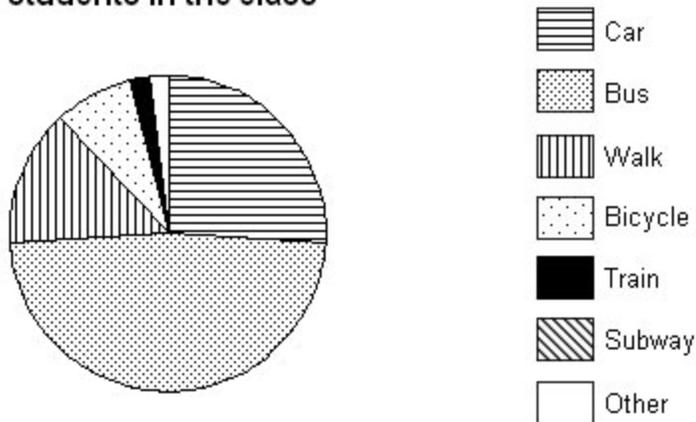
Approximately what fraction of the students in your class walks to school? What are the most popular methods of transportation?

Now, for each method of transportation:

- **sort** the time spent getting to school, from the shortest to the longest time.
- determine the total time spent, which lets you calculate the **average**.
- find the number of minutes or less that the fastest **half** of the students spent. This is the **median** or the value of the middle item of the ordered data.
- add the **minimum** and **maximum** amount of time spent getting to school.

You can create a descriptive table that will look like this:

Method of transportation	Time to get to school (in minutes)	No.	Total	Average	Median	Min.	Max.
Car	5, 12, 12, 22, 32	5	83	83/5	12	5	32
Bus							
Walk							
Bicycle							
Train							
Subway							
Other							
All		30					

We can now examine the time by method of transportation.

- Do you notice any significant differences?
- Which method of transportation takes the longest?
- Which method of transportation shows the biggest difference between the shortest time (minimum) and the longest time (maximum)? What might explain this?
- Can you describe the overall situation for your class and present your point of view? What type of transportation do you think we should encourage? Under what conditions? Why?

Now, use the data you have to create a **chart** that properly conveys the information you feel is important.

Comparing your class to a sample of Canadian students

Do you think the situation of your class resembles that of most Canadian students?

Obtain a **sample** of 50 Canadian students at www.censusatschool.ca, under "Data and results". Then redo the same analysis that you did for your class.

Is the time spent getting to school approximately the same for both groups? If not, how does it vary?

To help you better compare the data, create two tables side-by-side for each group.

Time to get to school					
Raw data for Canadian sample			Raw data for our class		
Students	Units	Tens	Units		Students
		0	4, 6, 6, 8, 9,		5
		1	0, 0, 3, 4, 4, 5, 5, 5,		8
		2	0, 0, 2, 4, 4, 4, 7, 9, 9		9
		3	...		…
		4	...		…
		5	...		…
50	Total	TOTAL		Total	50

"A picture is worth a thousand words" and can certainly make it easier to read all these numbers. Create appropriate **charts** to easily compare the time spent getting to school for both groups.

You can also compare the methods of transportation used.

For each group:

- create a **circular chart** to illustrate the distribution of students for the different methods of transportation used to get to school;

- use a descriptive **table** to examine the time spent by method of transportation used.

Do you arrive at the same observations for both groups? Are there any **significant** differences? If yes, what are they? Can you explain the differences taking into account the characteristics of your region?

Create a visual representation that properly illustrates and conveys your main conclusions.

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