Math 9  
Section 9.2 – Potential Problems when Collecting data  

Learning Outcomes Covered:

9B: I can identify and address problems related to data collection.

How are statistics such as 4 out of 5 dentists recommend X-brand of gum collected? Many statistics such as these are collected by the use of a survey - generally compiled as a questionnaire. When forming a questionnaire, it is very important to follow guidelines so that the results you collect actually represent true opinion.

**HOW TO WRITE A QUESTIONNAIRE**

- A questionnaire should contain questions that are **fair**.
- A question should not influence a person’s answer. If it does, the question is **biased**.
- Each person asked should be able to answer the question.

To find out whether her classmates prefer watching reality shows or sitcoms, a student asks: Do you like watching **hilarious sitcoms** or **waste** your time watching **reality shows** that are corny?

This question is worded in such a way that sitcoms are favoured over reality shows.  

So, the question is **biased**. The **use of language** in this question could lead people to give a particular answer even if it is not their true opinion.

A better question would be:  

Do you prefer to watch:

- □ news  
- □ Comedy  
- □ reality TV shows  
- □ other

Example 1: Does the following question show bias? If so, write a better question.

The administrators at Burnaby South have decided that any student who is found **text messaging** during a period will have their **cell phone taken away until the end of the day**. A survey done by some Math 9 girls is to be done. They ask the following question:

*“Don’t you agree that the new rule is a problem?”*

This question is **biased**. Do you agree or disagree with the school’s new **texting rule**?

- □ agree  
- □ disagree

Explain your choice:  

[Signature]
## POTENTIAL PROBLEMS WITH COLLECTING DATA

<table>
<thead>
<tr>
<th>Potential Problem</th>
<th>What is Means</th>
<th>Example</th>
</tr>
</thead>
</table>
| Bias & Use of Language     | The question influence responses in favour of or against the topic of the data collection. | “Don’t you think the price of a movie ticket is too high?”  
This person has a bias against the current ticket price, and the bias influences how the survey question is written. |
| Timing                     | When the data are collected could affect the results.                          | The results of a survey on ski jackets may differ if the survey is conducted in the summer instead of winter (a different season).  
The results of your favourite hockey team may differ if the survey is conducted during play-offs rather than at the beginning of the hockey season.  
Students may not want to share their school grades.  
People may not want to participate in a survey if it meant they had to weigh themselves in front of others.  
A solution: Make the survey anonymous. |
| Privacy                    | People may not want to share personal information.                             | A question about Christmas shopping may offend those who do not celebrate Christmas.          |
| Cultural Sensitivity       | The survey must not offend other cultures.                                    |                                                                                              |
| Cost                       | The cost of collecting data should be considered.                              | The cost of mailing a survey to a large number of people may be too expensive.  
The cost of printing a large questionnaire may also be too expensive. |
| Time                       | The amount of time needed to collect the data should be considered.            | A 30-minute survey conducted over lunch time may not interest students.  
A 15-minute survey asked at the Skytrain station at 8 am may not result in many people wanting to participate as they are in a rush to get to work/school. |
| Ethics                     | Ethics dictate that collected data must not be used for purposes other than those told to the participants.  
Otherwise, your actions are considered unethical. | You sign up for a facebook account and find out that they have been sharing your email with companies that they are associated with.  
You may receive more “spam” mail as a result. |
Example 2: A survey is conducted to determine the favourite computer game among students aged 13 to 16. Students are asked to participate in a 1-hour survey.

Problem: too much time!

How it could be corrected: make it only 10-15 min.

Example 3: Laura wants to determine the average annual income of each household in her neighbourhood. She plans to go door-to-door in her neighbourhood to ask this question, “What is your annual household income?”

Problem: privacy

A better question: What is your annual income? Choose 1 of the following ranges.

- less than $40,000
- between $40,000 and $60,000
- between $60,000 and $100,000
- more than $100,000

→ you get an idea without it being exact, people may be more willing to answer

Example 4: A survey is conducted to determine if citizens think that the local government should provide more money for youth activities. A surveyor asks, “Would you support an increase in taxes to create more skate parks?”

Problem: biased

A better question:

1) Would you support an increase in taxes to provide more youth activities?

2) If yes, what type of activities:

- [ ] gym
- [ ] basketball
- [ ] arts
- [ ] music
- [ ] sports
- [ ] skate parks
- [ ] other
Math 9  
Section 9.2 – Potential Problems when Collecting data

Example 5: A survey on holiday spending is conducted, the following question is asked, “How much money do you spend on presents during the Christmas Holidays?”

Problem:

Cultural Sensitivity

A better question:

1) Do you spend $  on gifts during the holidays?

2) If yes, how much do you spend
   □ $0 to $50
   □ $51 to $100
   □ over $100

Example 6: A survey is conducted to find out which part of a chocolate Easter Bunny students eat first.

The following question was asked:

Which part of a chocolate Easter Bunny do you eat first?

Ears ______  Tail ______  Foot ______  Other ______

Is there a problem with the survey question?  yes
Is there a problem with cost or time?  no
Is there a problem with privacy or cultural sensitivity?  yes

Explain your thinking:

How would you avoid the problem?

1) Do you eat chocolate Easter bunny?

2) If yes, <copy above question>