

# 1 Potential Problems in Data Collection (9.2)

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## Math 9 Section 9.2 – Potential Problems when Collecting data

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### 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 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 boring?” – biased

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:

Which of the following do you prefer to watch?

☐ comedy

☐ reality TV shows

☐ news

☐ sports

☐ romance

☒ 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?” → biased







Do you agree or disagree with the school’s new texting rule?

☐ agree

☐ disagree

Explain your choice.

POTENTIAL PROBLEMS WITH COLLECTING DATA

Potential Problem	What it Means	Example
<b>Bias &amp; Use of Language</b> 	The question <b>influence responses</b> in favour of or against the topic of the data collection.	<p><i>"Don't you think the price of a movie ticket is too high?"</i></p> <p>This person has a bias against the current ticket price, and the bias influences how the survey question is written.</p>
<b>Timing</b> 	<p>When the data are collected could affect the results.</p> <p><i>wrong time</i></p>	<p>The results of a survey on <b>ski jackets</b> may differ if the survey is conducted in the <b>summer</b> instead of <b>winter</b> (a different season).</p> <p>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.</p>
<b>Privacy</b> 	People may not want to share personal information.	<p>Students may not want to share their school grades.</p> <p>People may not want to participate in a survey if it meant they had to weigh themselves in front of others.</p> <p>A solution: Make the survey <b>anonymous</b>. <i>→ no one knows your name</i></p>
<b>Cultural Sensitivity</b> 	The survey must <b>not offend other cultures</b> . <i>or religions</i>	A question about <b>Christmas shopping</b> may offend those who do not celebrate Christmas.
<b>Cost</b> <b>\$\$\$</b>	The cost of collecting data should be considered.	<p>The <b>cost of mailing a survey</b> to a large number of people may be too expensive.</p> <p>The cost of printing a large questionnaire may also be too expensive.</p>
<b>Time</b> 	<p>The amount of time needed to collect the data should be considered.</p> <p><i>too long!</i></p>	<p>A <b>30-minute survey</b> conducted over lunch time may not interest students.</p> <p>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.</p>
<b>Ethics</b> 	<p>Ethics dictate that <b>collected data</b> must <b>not be used for purposes</b> other than those told to the participants.</p> <p>Otherwise, your actions are considered <b>unethical</b>. <i>↳ wrong</i></p>	<p>You sign up for a <b>facebook account</b> and find out that they have been <b>sharing your email</b> with companies that they are associated with. You may receive more <b>"spam"</b> mail as a result.</p>

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: Time (too long!)

How it could be corrected: make it 2-5 minutes (shorter!)

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 \$40 001 and \$60 000
- ☐ between \$60 001 and \$100 000
- ☐ more than \$100 000

OR do an anonymous mail-in survey

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: bias + use of language

A better question:

1. Would you support an increase in taxes for youth activities?

- ☐ yes
- ☐ No

2. If yes, what type of activities?

☐ skate boards

☐ playgrounds

☐ basket ball courts

☐ soccer fields

☐ pools

☐ other

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 celebrate Xmas?

☐ yes

☐ no

2. If yes, how much do you spend on gifts?

☐ \$0 to \$5

☐ \$6 to \$20

☐ \$20 to \$40

☐ over \$40

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?

Is there a problem with cost or time?

timing?

Is there a problem with privacy or cultural sensitivity?

Explain your thinking:

1. Do you celebrate Easter?

☐ yes ☐ no

2. If yes,

How would you avoid the problem?