Northview Collegiate

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Identify each case as an observational or experimental study. Indicate what relationship is being studied.

a) People are asked if they have had magnetic therapy and whether their pain is reduced.

b) As part of a study to gain information regarding travel to Mars, NASA is paying subjects $18 000 to lie in bed for 70 days.

c) Two randomly selected groups of 100 students are studied. One group has all left-handed students while the other has right-handed students. Their math grades are collected and analysed.

Average Domestic Fares for Canada and 10 Major Cities

Geography	2008	2009
Canada	196.30	173.00
Halifax	197.20	170.80
Montréal	194.30	177.80
Ottawa	205.80	189.30
Toronto	219.80	194.40
Winnipeg	191.50	169.90
Saskatoon	184.00	160.50
Regina	x	160.00
Calgary	185.20	156.40
Edmonton	180.50	154.20
Vancouver	209.10	182.60

Symbol legend: x Suppressed to meet the confidentiality requirements of the *Statistics Act*

Source: CANSIM Table 401-0004, Average domestic fares for Canada and ten major cities, Statistics Canada, February 18, 2014

One of the tables that was used to collect the above data was CANSIM Table 401-0004. A condensed version of the table is shown.

a) Can you see any patterns in the data?

b) What kinds of comparisons could be made between 2008 and 2011?

A student drops a ball from various heights and measures the height of the bounce. The table shows the results.

a) Is this a study or an experiment? Explain.

b) What is being controlled and what is being changed in this activity?

c) What is the relationship between the drop height and the bounce height?

d) Create a graph of the data. Describe the relationship in the graph.

e) If you dropped the ball from a height of 130 cm, could you use this information to predict its bounce height? If so, explain how.

Drop Height (cm)	Bounce Height (cm)
0	0
10	7
20	14
30	21
40	30
50	38
60	46
70	51
80	60
90	62
100	70

Give an example of a variable that could be measured using each type of data.

a) numerical, discrete
b) numerical, continuous
c) categorical, ordinal
d) categorical, nominal

Determine the type of sampling.

a) Your favourite social networking site asks what your favourite band is.

b) The Pelee Island Bird Observatory does its annual bird count every December. Researchers set up traps in the trees in three locations to gather the birds.

For each survey question, identify the problem with the question and rewrite it.

a) How old are you?
   ■ 15 and below   ■ 15–20
   ■ 20–35   ■ 35–60   ■ Above 60

b) Violence in video games could cause people to be violent in real life. How do you feel about a violence rating system for video games?
   ■ Strongly agree   ■ Agree
   ■ Agree a little   ■ Don't agree

c) Do you like the new logo for the school?
   ■ Yes   ■ No

Determine whether each study is observational or experimental.

a) In 2006, a research team asked nearly 5000 households for charitable donations to see which methods produced higher amounts. When the solicitor was an attractive female, the average donation increased by 50–135%, especially if a male answered the door.

b) A teacher looks at class averages over the last 10 years and sees that the smaller the class size, the higher the class average.
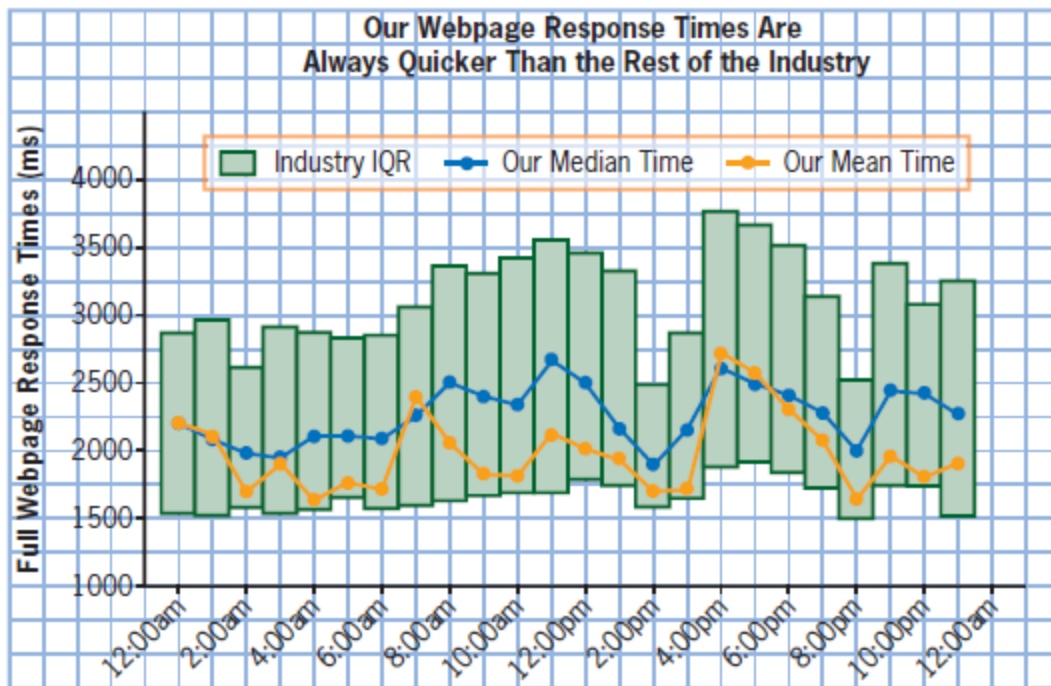
Give an example to show each type of bias.

a) sampling   b) measurement

c) response   d) non-response

A group of children were asked how many hours a day they spend playing video games. The table shows the data.

a) Determine the estimated mean, median number of hours, and modal interval for the above distribution.

b) Discuss any skewing of the data with respect to the measures of central tendency.

Number of Hours	Number of Children
0–2	3
2–4	11
4–6	7
6–8	2
8–10	1

The graph below was included in a report by an Internet service provider.

Our Webpage Response Times Are Always Quicker Than the Rest of the Industry

a) What statistical measures does the graph show?

b) Which measures of central tendency are used in the Internet service provider's analysis?

c) Discuss whether the Internet service provider's claim is accurate.