Lesson 9.1   Probability in Society   Practice (pages 435–437)

Check

3. **a)** Andrei's decision to order a medium hot chocolate is based on past experience. This is an example of experimental probability.

  b) Martha's decision to pool her money and increase her chances of winning is an example of theoretical probability; the more tickets she buys, the greater her chances of winning.

  c) Anita's decision to board the last car of a train is based on past experience. This is an example of experimental probability.

  d) Doug's decision to not travel by airplane is subjective judgment, since the decision is based on his feelings.

4. **a)** The assumptions are that Claudia will continue to perform at the same level, and the next math quiz will have the same difficulty.

  b) The assumptions are that Omar will leave work at the same time as other days, and the traffic patterns are the same every day.

Apply

5. If Winona doesn't go canoeing, her decision will be based on probability (it is likely that it will rain). If she does go, her decision will be based on subjective judgment (the feeling that it will not rain).

6. Lei's decision is based on both: Since many of his classmates entered, he has a low theoretical probability of winning. However, he's also basing his decision on his feeling unlucky today, which is subjective judgment.

7. **a)** The probability of not recovering a stolen vehicle was 44%. Politicians can use this fact to argue that more money should be allotted to searching for stolen vehicles, because more money should be spent to increase the probability of recovering a stolen vehicle.

  b) Politicians can use this fact to argue that more money should not be allotted, because the probability of recovering a stolen vehicle is so low, there are better ways of spending the money.

8. **a)** Vanessa made the assumption that the same types of birds visit her birdfeeder at different times of the day, every day.

  b) The percent of birds that are cardinals would change.

9. **a)** Kathryn assumes that the next 10 people she meets are a fair representation of the community.

  b) The next 10 people may favour one candidate very strongly over the other, making the number of those who support Choo greater than or less than 7.

10. One lawyer could argue that since there is such a small chance the blood was not the suspect's (1 in 7000), it is very likely the suspect committed the crime. The other lawyer could argue that there is still a chance the blood belongs to someone other than the suspect, so the jury should not convict a possibly innocent man.

11. a) The experimental probability may convince the teenager to try the treatment. He may also use subjective judgment about whether to try the treatment, depending on his personal beliefs of the effectiveness of acne treatment.

   b) He would be assuming that he will respond to the treatment in a way that is similar to the responses of most other people who tried the treatment. His response to the treatment may differ from most people's.

12. a) 1. In 2008, an online ad for Original HP inkjet print cartridges claimed its ink prints up to 50% more pages per cartridge than bargain inks.

   2. A Trident television ad claims 4 out of 5 dentists surveyed would recommend sugarless gum to their patients who chew gum.

   b) Advertisers use numbers in ads to show how much better one product is than some other product. I think using numbers in ads is more effective because they imply the products were tested or experts were surveyed.

   c) 1. I assume that the statistic is based on a test in which none of the cartridges were damaged before or during printing, and that all the cartridges were tested in the same printer and using the same test pages.

   2. I assume the dentists were typical dentists who had nothing to gain by answering one way or the other.

13. 1. While talking about a potential global freshwater shortage, the WWF Director General noted that 45% of the world's food supply comes from irrigation-fed agriculture. http://wwf.ca/newsroom/index.cfm?uNewsID=1389 [accessed Mar. 2009]

   2. In 2007, the mayor of Vancouver backed an initiative he hoped would reduce homelessness, aggressive panhandling, and the open drug market by at least 50% by 2010. http://www.mayorsamsullivan.ca/mayor-sullivan-backs-substitution-treatment.html [accessed Mar. 2009]

Take It Further

14. The student is assuming it is equally likely for Shaquille to miss as to make the shot, which ignores Shaquille's skill in making free throws.

15. An actuary may use probability to determine the life expectancy of a person applying for life insurance. A baseball coach may use probability (batting averages) to determine the batting order for an upcoming game.

16. The Farmer's Almanac assumes that long range weather patterns can be predicted from previous years' weather patterns.

17. a) The information gives the impression that it is much more dangerous to travel by car than by plane. This information could be misleading because there are more people travelling by road than by air.

   b) We need to know how many people travelled by plane and by car in 2004.

Lesson 9.2	Potential Problems with Collecting Data	Practice (pages 443–444)

Check

3. a) Privacy

   b) Use of language

   c) Cultural sensitivity

   d) Time

Apply

4. a) Part a: Since the survey is not anonymous, the students may hesitate to respond negatively (to the principal) or positively (to avoid seeming to flatter the principal in front of their friends).
Part b: The statement presents the most ethical option and no reasons for choosing another option, which may cause a greater proportion of people to say they would turn in the $20-bill.
Part c: Some people would not be aware of the cultural importance of head covering.
Part d: Carlos will probably run out of time before he asks every student.

   b) Part a: The principal should give students a written survey and ask them to return it anonymously to his/her office. The question should ask: "Are you enjoying school?"
Part b: The statement could be made into a question: "If you find a $20-bill, would you keep it or turn it in?"
Part c: Brenda should ask if students are aware of the cultural significance of someone covering her or his head, and then ask the question.
Part d: Carlos should choose a representative sample of the students to survey.

5. a) Students will think Parinder's question asks about how much time they spend on the computer at school and at home.

   b) "How much time do you spend on the school computers in a week?"

   c) The school administration could be interested in the results to plan the school's budget for new computers.

6. a) No; many students who are bullied are afraid to tell people, especially in a non-anonymous environment.

   b) An anonymous survey

7. a) On a warm August evening, the fans may not immediately see the point of building an indoor stadium, so many may respond negatively.

   b) On a very cold November evening, Trinity may receive many more responses in favour of an indoor stadium.

8. a) i) The use of the words "violent criminal"; bias toward using DNA tests

     ii) The use of the words "gas guzzling"; negative description of SUVs

     iii) The question emphasizes the positive aspect of spell checks.

b) i) "Do you think that DNA evidence should be allowed in courts?"
The question no longer links DNA tests to convicting violent criminals, so it does not influence responses in favour of DNA tests.

ii) "Are you in favour of banning SUVs?"
The question no longer provides a negative description of SUVs, so it does not influence responses in favour of banning SUVs.

iii) "Do you think students should be allowed to use spell check?"
The question no longer leads you to think spell check automatically improves spelling, so it does not influence responses in favour of spell check.

9. a) No. Rebecca asked which service provider was the most popular, not which one was most reliable, cheapest, or had the best features.

b) Rebecca should have asked if her friends had any problems with their service provider, what service providers they had in the past, and whether they are satisfied with their current service providers.

10. a) Ethics: The survey designers didn't tell Sasha that promotional emails might be sent to the email address he provided. This reflects poorly on the brands advertised and may lead recipients to avoid this Web site and its products in the future.

b) The survey designers can avoid this problem by telling people their email address may be used for future correspondence, and allow them to indicate whether they wish to receive such emails.

11. Finding the favourite ice cream flavour of Canadian teens by surveying each teen would take a lot of time and money, and it would be difficult, if not impossible, to reach every teen.

12. a) 1. Do you brush your teeth every morning?
2. How much do you earn?
3. What is your weight?

b) 1. Most people would say yes, even if it wasn't true
2. Some people might inflate their salaries or refuse to share how much they earn.
3. Some people would not want to say how much they weigh, or they would be tempted to give an incorrect weight.

13. a) Privacy: People may not want to admit how much or how little they spend on clothes.
Timing: Depending on the month in which Bridget interviews people, people may spend more because there may be clothing sales (a new season begins, or for holiday season shopping.)
Ethics: People may want to know why Bridget is asking them.

b) Privacy: Bridget could ask people to write a number on a slip of paper and leave it on her desk later (anonymously).
Timing: Bridget could ask at different months in the year.
Ethics: Bridget could tell people why she is doing this survey.

14. a) 1. Two weeks before Christmas: asking what percent of a person's income is typically spent on gifts.
2. In the middle of summer when mosquito populations are at their peak: asking residents whether they support spraying for mosquitoes.

b) 1. Ask the question in a month with no cultural or religious celebrations involving gift-giving.
2. Ask this question in March, before mosquitoes become a nuisance.

Take It Further

15. Personal interviews take a long time and can be costly.

Phone interviews are often seen as invasive and people may be reluctant to participate.

Email surveys are often returned by those with very strong opinions about the issue, or are ignored by many people.

16. a) Some people may not understand the cultural significance of the holiday.

    b) 1. Eating beef: Hindus and vegetarians may find a question on this topic offensive, distasteful, or not relevant since they do not eat beef.

        2. Organ donation: In some cultures, it is not considered appropriate to receive an organ from another person, especially if the donation occurs because the person has died.

        3. Easter: Some people do not celebrate Easter and may not even be familiar with it. Others may be offended if a question seems to show a lack of respect for the religious aspects of Easter.

    c) Do you eat beef? If so, do you prefer a hamburger or a steak? If someone responds "No" to the first question, then they do not have to answer the second question.

Lesson 9.3   Using Samples and Populations to Collect Data   Practice (pages 448–449)

Check

3. The population is the group about which you are getting information. In each case, the population is:
   a) Residents of Comox aged 13 to 25 years

   b) All 1-L juice cartons

   c) All schools managed by the board

   d) All First Nations people in Nunavut

4. a) Census, because data are collected from each member of the population, which is all the grade 9 students in the school.

   b) Sample, because data are collected from a small portion of the population.

Apply

5. The population I would sample would be:
   a) People who ride buses

   b) All residents of Canada over the age of 18

   c) Parents or guardians

   d) People who have required emergency care, or had relatives or friends in the emergency room

6. a) James's conclusion is more likely to be valid. Courtney only surveyed a small sample, whereas James surveyed the entire grade 9 population.

   b) Courtney's friends may not be representative of the grade 9 students.

7. a) Testing every AAA battery is not possible; it would mean they would all be destroyed—there would be no batteries left to sell.

   b) It would be difficult to find every single First Nations child in Canada; this requires a lot of time and people.

8. a) Sample. It would be impossible to determine and contact everyone who used the suntan lotion. Testing the lotion in each bottle would leave none left to sell.

   b) Sample. It would be too time-consuming and costly to ask everyone to try the yogurt.

   c) Census. It would not be difficult to ask all the grade 9 students if they have braces, and a census gives the most accurate results.

   d) Census. It is not difficult to ask each of your friends a single question.

9. a) Invalid. A sample of 20 people is not large enough to be representative of all students in Irina's school.

   b) Invalid. Further testing should be done to make sure results are not related to timing or location.

10. a) Students who regularly purchase breakfast or lunch from the cafeteria.

    b) Sample; it would take too much time to survey all of the students who use the cafeteria.

    c) Select a sample that is representative of the students in the high school. Include students of different grades, gender, ethnicity, and so on.

11. a) Collecting data from a population, rather than a sample, is more appropriate when deciding the toppings your family wants on a pizza.

    b) Collecting data from a sample, rather than the entire population, is more appropriate when deciding typical prices for a skateboard.

Take It Further

12. a) i) All students in several randomly selected classes are asked if they think the school day should end at noon on the last day of school.

    ii) The average height of students in a school is calculated by finding the average height of the basketball team.

    b) Select every 10th student in the school yearbook and ask them to come to the gym to get their heights measured during lunch (give them the option of coming on several different days).

13. It is important for the government to know the crop area so it can calculate how much food can be produced.

Lesson 9.1

1. a) The person is assuming that 90% of any person's lies will be detected, and not that 1 out of 10 people may be able to lie without detection.

    b) His reaction to the test may be different from most other people's.

2. 1 in 20 is a fairly small chance, so we probably don't need to worry about the WAIS collapsing. However, 1 in 20 is far from impossible, and considering the gravity of the situation if the WAIS were to collapse, we should do everything possible to avoid it.

Lesson 9.2

3. a) i) Do you find listening to music helps you relax while studying?

       ii) Do you find listening to music distracting when you're trying to study?

    b) Do you support listening to music while studying?
       This wording does not use subjective words like "relax" or "distracting."

4. a) Privacy: The survey is not anonymous, and some students may not be willing to admit that they smoke.

    b) Many student smokers might not admit that they smoke, so the data would show a lower number of student smokers than actually exist.

5. a) i) Privacy: People may not want to disclose how much they earn.

       ii) Cultural sensitivity: Parents who choose to stay home to raise children may feel that because they do not earn income (even though thy may have several years of post-secondary education), they are less valued by society.

       iii) Use of language: The phrase "years of post-secondary education" is vague. He might do better to be more specific by identifying levels of education and/or number of degrees completed at each level.

       iv) Cost and time: Surveying a large sample would take a lot of time and cost a lot of money. He would need to find a small, representative sample.

    b) i) People may lie about the amount of money they make.

       ii) People may be reluctant to answer or may answer dishonestly.

       iii) People's answers may not reflect their true situations if the questions are unclear.

       iv) Ahmed may not get as many results as he hopes for.

6. Asking students on a Monday morning if they enjoy going to school

Lesson 9.3

7. a) Students who regularly eat at the cafeteria

    b) Students enrolled in phys-ed classes

c) Students who drive to school

d) Students who go to or participate in football games

8. **a)** Too time-consuming

b) Too many DVD players to conduct a census. Moreover, DVD player prices change often.

c) It is probably not possible to catch all the Northern pike in Misaw Lake, and doing so could devastate the local ecosystem.

9. **a)** Census; the population of a grade 9 class is not very large, and is easily accessible.

b) Sample; it would be too costly and time-consuming to survey all the people in the province or territory impacted by the new laws.

Lesson 9.4   Selecting a Sample   Practice (pages 456–457)

Check

3. a) Not a representative sample: People who don't enjoy shopping are not likely to be in a mall.

   b) Not a representative sample: The majority of the cafeteria's customers are likely students, not teachers.

   c) Not a representative sample: The neighbourhood sampled has a high crime rate, and probably has a different police presence than neighbourhoods with lower crime rates.

   d) Not a representative sample: This survey targets those people (not necessarily teenagers) already interested in fitness and willing to take the time to participate.

Apply

4. a) Not appropriate. Only people who care deeply about the issue and are able to send text messages would text their opinion.

   b) Appropriate. This is systematic sampling, and since it is done throughout the day, this would cover service at different times of the day (including peak times and slow times).

   c) Appropriate. All students were equally likely to be surveyed.

   d) Appropriate. Each grade is represented and each student within a grade had an equal chance of being surveyed. Unless the grades have drastically different class sizes, the sample will be representative of all the students in the school.

   e) Not appropriate. A gym class is probably only made up of students in one grade, so the sample is not representative of all physical education students.

5. a) i) No, the selected sample does not represent the population. Only those people who read the board and have time to complete the survey or care deeply about the issue would respond.

   ii) Yes. The sample was fairly large and randomly selected from the population.

   ii) Yes. Since the parents will either pay for the uniforms or the league fees, they are an appropriate population to survey. However, they should be surveyed in a way that accounts for different cultural and socio-economic backgrounds.

   b) i) The arena should survey residents of the surrounding community who skate or want to learn to skate.

6. a) Stratified random sampling: Survey 100 Canadian citizens from each of the income tax brackets.

   b) Simple random sampling: Have a computer randomly select 300 student IDs and poll those students.

7. No. The results will only reflect the opinions of those who listen to the show and feel strongly enough to voice their opinions.

8. a) A sampling method that would not lead to valid conclusions is to survey 300 15-year-olds. They would likely wish to lower the driving age limit so they can drive sooner.

   b) Survey 300 randomly selected members of the population.

9. **a)** If the sample is people who work for companies that make fur coats, this would bias the survey results.

   b) If the sample is a group of people from homes where people always recycle, this would bias the survey results.

10. **a)** No, the number of people in the sample is probably too small to represent the entire Canadian population.

   b) The survey may have been conducted at a climate change rally.

   c) I would survey Canadian citizens using simple random sampling.

Take It Further

11. Self-selected sampling and convenience sampling often produce invalid conclusions. These methods are easy to use and may produce data that can be used to support a view or sell a product, which is probably why these sampling methods are still used.

12. **a) i)** Randomly select student ID numbers.

   ii) Inspect every 10th phone in the assembly line.

   iii) Randomly select a high school and then a grade within that high school and survey every student in that grade.

   iv) Divide the orchard into 8 equal plots of land and survey 5 apple trees from each plot.

   b) i) Course offerings

   ii) Making sure there are no defects in the cell phones

   iii) The most popular music artist among teenagers

   iv) The average number of apples produced per season

Developing a Project Plan

3. a) Topic: How much time do students at my school spend on the Internet each week?
Question: About how many hours do you spend on the Internet each week? ___ h

b) There is no bias in the question because I don't use any subjective words or phrases, and I don't limit options.

c) This topic is not sensitive to different cultures.

d) My friend pointed out that people will have many different answers, so I should group the answers to display the data more easily. I could also provide the groups as a part of my question:
About how many hours do you spend on the Internet each week? Less than 1 hour, 1 – 3 hours, 3 – 5 hours, 5 – 7 hours, more than 7 hours

4. a) The population is: students in my school.

b) Since there are many students in my school, I will use a sample. I will ask every 20th student in the yearbook.

c) Since I do not have many resources, I must keep the sample small and be able to directly contact all of the members of the sample.

5. I will ask students in my sample at lunch and after school this week. It is unlikely that most people will have used the Internet a lot or not much (compared to normal) since it's a normal week with no big events or exams to prepare for.
In case students are worried about appearing like a geek or like they aren't "in the loop," I will tape an envelope to my locker so they can drop off their responses anonymously, if they wish.

6. I will display my data in a circle graph to show the percent of students in each category.

Creating a Rubric for Your Project

7.

	Not Yet Adequate	Adequate	Proficient	Excellent
The survey question	the question is not well formulated	the question is somewhat well formulated	the question is well formulated	the question is very well formulated
The choice of sample or population	sample or population was not well chosen to produce the results needed	sample or population was somewhat well chosen	sample or population was well chosen	sample or population was very well chosen
How the data were collected	the method of collecting data is not clear or well thought out	the method of collecting data is somewhat clear	the method of collecting data is clear	the method of collecting data is very clear and well thought out
The display of data	the display is not clear or organized	the display is somewhat clear and organized	the display is clear and organized	the display is very clear and organized
The conclusions made	the conclusions made are not clear; they do not make sense	the conclusions made are somewhat clear	the conclusions made are clear	the conclusions made are very clear
Presentation	the presentation is not clear; at times confusing	the presentation is somewhat clear	the presentation is clear	the presentation is very clear

Assessing Your Plan

8. My partner told me I might have trouble finding all the people in my sample during lunch or after school. He suggested I put a note in their lockers, or let people email me their responses.

Reflecting on Your Plan

9. I predict that most students use the Internet 3–5 h each week. This seems reasonable because a lot of my friends use social networking sites a lot, but they're also busy with other things, so it's reasonable that they spend about 45 min each day on the Internet.

10. This topic is of interest to me because I use the Internet every day.
Clothing/advertising companies might be interested in the results, as well as social networking companies.

Lesson 9.1

1. a) Mustafa Abaz. He has the greatest number of votes.

   b) Assumptions: The sample surveyed is representative of the voting population.
   Nothing would happen before the election to change the popularity of the candidates.
   If the assumptions change, then Mustafa Abaz might not be the winning candidate.

2. Experimental probability: The players' past results indicate that they have a good team with a high probability of winning.
   Subjective judgment: Darrell strongly believes the winning streak cannot last, and the players on the team believe that since they have won all their previous games, they are going to win the next game.

3. a) The chance of winning (1 in 3) is relatively high for a lottery, so there is a good chance of winning

   b) The chance of winning is still less than 50%, so it's better to not risk money on what will likely be a loss.

4. An ad for Fruity Cheerios® claims it contains 25% less sugar than the leading fruity cereal. I assume that two cereals were tested, the same serving size (measured by mass or by volume) was used for each, and the mass of sugar in each serving was measured. I assume that the tests were repeated several times to ensure consistent results and that the same techniques and tools were used in each test.

Lesson 9.2

5. a) i) Use of language: The question is biased toward increasing the minimum wage.

   ii) Ethics: The student used the results of the survey for something other than what she had claimed.

   iii) Bias: It is not clear how the cars are tested.

   iv) Timing: During November, not many people in the northern hemisphere are likely to think about and to support outdoor pools.

   b) i) More people surveyed will be in favour of increasing the minimum wage.

   ii) It may not affect the data collection, but participants may feel frustrated or angry.

   iii) There could be a defect later on in the assembly that might not be discovered.

   iv) There would be fewer people in favour of building a new outdoor pool.

6. a) "Best buy" could mean the best quality camera for its price.
   "What do you think is the best digital camera for its price?"

   b) The question avoids bias by not leading the reader to answer one way or another.

7. a) Privacy: Pregnant teens may not want to reveal that they are pregnant.

   b) Cultural sensitivity: There could be different cultural opinions regarding teen pregnancy that should be taken into account.

   c) Use of language: Raheem must word the question in a way that does not support or condemn teen pregnancy.

8. **a)** "What is your favourite fruit: apple, orange, or banana?"
   b) "What is your favourite fruit: apple, orange, banana, or other?"

9. Determining the average height of Canadian grade 9 students by collecting data from each student would be too costly and time consuming.

Lesson 9.3
10. Census; if even one parachute is no longer working, a person could die.

11. **a)** Testing every brand of battery would be very time-consuming and expensive.

    b) A sample of randomly selected brands would most likely represent the population.

12. **a) i)** A census of all teens would be too time-consuming
       ii) A census would be time-consuming and difficult if people do not wish to share that information.

    b) Determining the brands of calculators used by students in your math class

Lesson 9.4
13. No; people who do not watch the TV show are excluded and only those who feel strongly about the competition would be likely to pay to vote.

14. **a)** Yes, this seems like a reasonable interval sample. If the company tested more vehicles, it would make less profit.

    b) This could be a reasonable stratified random sample. It depends on the size of the school and the proportion of students in each grade.

    c) No, this sampling method would not lead to valid conclusions. This is a self-selected sample. Only people at the mall who wish to participate are included in the sample, so it is not representative of all juice drinkers.

15. **a)** Simple random sampling of the entire country's voting population. The population size is known, so it's possible to use this sampling method. The method is random, so it is very likely that the sample will be representative of the population.

    b) Convenience sampling near several local tennis courts. It likely that a business is using the results of this survey to decide which brands to carry, and in what proportion. The business probably doesn't want to spend a lot of money on the survey and isn't worried if the sample is not exactly representative—it just wants an idea of which brands are the most popular. Its customers are probably made up of local tennis players, so surveying people at local tennis courts is reasonable.

Lesson 9.5
16. **a)** An appropriate survey question Adam could use would be: Which brand of chewing gum do you recommend most?

    b) To get an appropriate sample, get the membership list of the province's dental association and call every 10th dentist. Calling every dentist in the province would be too time-consuming.

    c) Adam could collect the data through phone interviews, and display the results in a bar graph.

    d) Adam could express his results as a probability by taking the total number of dentists who selected a particular brand, divided by the total number of dentists surveyed.

Practice Test   **(page 468)**

1. Shawnie: experimental probability, because her prediction is made on past experience.
   Owen: subjective judgment, because he thinks that since the coin already landed heads up 5 times, it must land tails up next time.
   Jovana: theoretical probability; theoretically, a coin is equally likely to land heads up as tails up.

2. **a)** Assumptions: The next team Hannah's hockey team plays is as skilled as the previous teams; her own team's skill level will not change

   b) If Hannah's team plays a team that is better than previous teams, or if Hannah's team loses a player, the chance of winning will be lower (a probability less than 0.875). If Hannah's team plays a team that is worse than previous teams, or if Hannah's team improves, the chance of winning will be higher (greater than 0.875).

3. **a)** If Manroop surveys people on a Monday morning at work, she would probably get a larger number of depressed people than if she surveyed people on a Friday night. Also, the time of the year may make a difference, since people are more likely to feel depressed in winter when daylight hours are shorter.

   b) People may not want to give such personal information to a stranger. Manroop should conduct an anonymous survey.

   c) Use of language: "Satisfaction with life" does not necessarily mean happiness. The data might not reflect how happy or depressed Canadians are, but how much satisfaction they feel.

4. **a)** Determining the typical cost of a new snowboard; it is too costly and time-consuming to compare the cost of every kind of snowboard available.

   b) Asking students in a grade 9 drama class to determine the most popular movie in a high school; students in a grade 9 drama class do not necessarily reflect what would be considered most popular in a high school. Students in grade 9 might not have the same tastes as students in other grades.

5. **a)** Collect vials of water from 3 water fountains and 3 taps that are randomly selected from around the school. This sample would be representative of the school's entire water supply, assuming that any contamination in the water supply would affect all water fountains and taps.

   b) Have the computer randomly select 50 student ID numbers and survey those students.

   c) Randomly select 10 students from each grade and weigh their backpacks.

6. Emile could have problems with language if he asks questions in a way that would lead toward a certain answer. He could also have cultural sensitivity problems if he asks groups that have religious objections to shopping on Sundays.

Unit Problem   What Can You Discover about the World around You?   (page 469)

Project Plan

Topic: How much time do students at my school spend on the internet each week?

Question: About how many hours do you spend on the Internet each week?
        Less than 1 h, 1 – 3 h, 3 – 5 h, 5 – 7 h, more than 7 h

There is no bias in the question because I don't use any subjective words or phrases, and I don't limit options. This topic is not sensitive to different cultures.
The population is the students in my school. Since I do not have the time or resources to ask every person in my school, I will use a sample. I will ask every 20th student in the yearbook.
I will display my data in a circle graph to show the percent of students in each category.

Part 1 **Collect and Analyze the Data**

I collected responses from 50 people in my school.

Hours spent on the Internet each week	Number of people	Percent of people
Less than 1	3	6
1 to 3	7	14
3 to 5	20	40
5 to 7	15	30
More than 7	5	10

Hours spent on the Internet each week
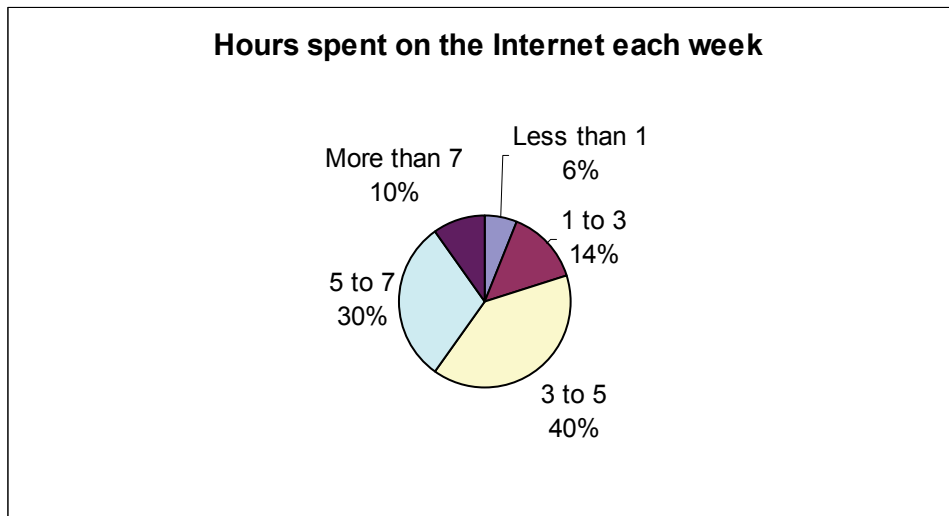
Conclusions

Based on the data, most people spend about 3 to 5 h each week on the Internet. Not many people spend less than 1 h on the internet a week (only 6%), or more than 7 h a week (only 10%).
I can also conclude that most people have access to the internet, either at school or at home, or both.

Parts 2 and 4 **Assess Your Data and Your Presentation**

	Not Yet Adequate	Adequate	Proficient	Excellent
The survey question	the question is not well formulated	the question is somewhat well formulated	the question is well formulated	the question is very well formulated
The choice of sample or population	sample or population was not well chosen to produce the results needed	sample or population was somewhat well chosen	sample or population was well chosen	sample or population was very well chosen
How the data were collected	the method of collecting data is not clear or well thought out	the method of collecting data is somewhat clear	the method of collecting data is clear	the method of collecting data is very clear and well thought out
The display of data	the display is not clear or organized	the display is somewhat clear and organized	the display is clear and organized	the display is very clear and organized
The conclusions made	the conclusions made are not clear; they do not make sense	the conclusions made are somewhat clear	the conclusions made are clear	the conclusions made are very clear
Presentation	the presentation is not clear; at times confusing	the presentation is somewhat clear	the presentation is clear	the presentation is very clear

Part 3 Present Your Findings

➤I chose my topic because I use the Internet every day, and I find that it is a powerful tool, particularly for research and communication.

➤I considered that it would be easier to present students with a choice of answers, rather than have them give me an exact number of hours. I also considered that maybe some students didn't use the Internet, or did not have access to it at home, so I put in the option "less than 1 hour."

➤I could not ask my survey question to the entire population of my school; there are just too many people to ask. So, I used a sample. I asked every 20th student in the yearbook, to fairly represent all grades, gender, and ethnicity.
Since I did not have many resources, I kept the sample small, to be able to directly contact all of the members of the sample.
I asked students in my sample at lunch and after school during the week. It was unlikely that most people would have used the Internet a lot or not much (compared to normal) since it was a normal week, with no big events or exams to prepare for.
I taped an envelope to my locker so students could drop off their responses anonymously, if they wished.

➤I chose to organize my data in a spreadsheet, and display it using a circle graph. I find the circle graph is the best way to show, at a glance, the percentage of students in each category.

➤I can conclude that most students (40%) spend about 3 to 5 hours each week on the Internet. The next most popular category is 5 to 7 hours a week (30%). Not many students spend less than 1 hour on the Internet a week (only 6%), or more than 7 hours a week (only 10%).

➤I am not surprised by the results; I predicted that most students would spend about 45 minutes a day on the Internet, which amounts to 3 to 5 hours a week.

➤ Marketing and advertising companies might be interested in the results, as well as social networking companies. These companies would gear their advertising to focus on these users.

➤If I were to repeat the project, I would try to improve on my choice of sample by asking more people. For example, I could do my survey for a week, and ask 20 people in each grade, one grade a day. That way my sample would be greater, and more representative of the entire population of the school.
I also found that it was too difficult to have students drop off their answers anonymously (not everyone did respond). So I would rather have students check off their answers when I ask them in person.
I would add some follow-up questions, so I could learn more about how people in my school use the Internet. For example, a follow-up question to my survey could be: What do you use the Internet for?

Part 4 Assess Your Presentation

I found that my presentation was clear, and people understood my topic, and why I chose it. My conclusions were easy to see from the circle graph.