



MIDDLE SCHOOL | UNIT 5

Making Major Financial Decisions

Title

Not All Cell Phone Plans Are Created Equal

LEARNING OBJECTIVES

Students will:

- **brainstorm** a list of questions they should consider before choosing a cell phone plan.
- **collect** data on the cell phone plans of family members and other adults.
- **develop** a research question given the data collected by the class.
- **calculate** measures of center and spread.
- **create** a graph to show the shape of the data.
- **analyze** data.

Content Area

Math

Grades

6–8

Overview

How do you know which cell phone plan is best? Students learn that there are many different factors that influence the amount people pay for cell phone plans. The activity begins with students watching a video on making informed financial decisions. Students then conduct a “question storm” in which they brainstorm features a person might consider when selecting a cell phone plan. Each student is asked to collect data on the cell phone plans of three adults they know and report back with the data. In groups, students review the data and identify questions they can answer using the results. Each group selects a question to answer and analyze. Groups share and discuss the results. The activity concludes with students revisiting the items on their initial “question storms” and adding to their lists.

Themes

Personal Finance: Comparison shopping

Math: Data collection, measures of center and spread, data analysis

Common Core Math Standards

MP1 Make sense of problems and persevere in solving them.

MP2 Reason abstractly and quantitatively.

6.SPA.1 Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers. For example, “How

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old am I?" is not a statistical question, but "How old are the students in my school?" is a statistical question because one anticipates variability in students' ages.

6.SP.A.2 Understand that a set of data collected to answer a statistical question has a distribution which can be described by its center, spread, and overall shape.

6.SP.A.3 Recognize that a measure of center for a numerical data set summarizes all of its values with a single number, while a measure of variation describes how its values vary with a single number.

7.SP.A.1 Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population. Understand that random sampling tends to produce representative samples and support valid inferences.

Connect

How does this connect to the student?

Selecting a cell phone plan is a very relevant topic as nearly every student will likely encounter this exercise in real life someday. While there may be other considerations such as network coverage, reliability, and phone compatibility/offerings, costs should be a major consideration when selecting a plan.

How does this connect to careers?

Retail Sales Associate:

If you go to a store or kiosk to purchase a cell phone or make changes to your plan, you will likely encounter a retail sales associate. Individuals who work in these jobs should have good communication skills and be adept with technology. According to the [Bureau of Labor Statistics](#), most retail sales workers do not require specific education. Rather, they receive on-the-job training to perform their duties.

How does this connect to technology?

If you had to guess, which do people across the world have greater access to: clean water, electricity, or cell phones? If you answered cell phones, you are correct. [Experts](#) suggest that access to mobile phones may help lift people in developing countries out of poverty with uses including mobile banking, providing access to educational materials for children, and matching farmers with buyers for their goods.

Key Terms

Personal Finance: pay-as-you-go plan, prepaid plan, contract plan

Math: statistical question, center, spread, shape, data, mean, median, mode, minimum, maximum, range, measures of central tendency

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Prepare

Background: Deciding which cell phone plan to purchase can be an overwhelming process. There are numerous factors to consider. For some people, the reliability or coverage provided by the network may be more important. For others, they may wish to have a specific type or brand of phone. Some might argue the most important factor to consider is the cost.

The price of cell phone plans can vary widely. The type of plan can also impact the cost.

- **Pay-as-you-go plans:** With these plans you pay for minutes or data as you use them. With some plans, you can pay by the day with an unlimited amount of use on each day that the phone is used. These tend to work well for people who mostly need a phone for occasional use or in emergency situations.
- **Prepaid plans:** With a **prepaid plan**, there is no ongoing contract or commitment. You pay upfront for the service you plan to use for the month. Because there is no contract, the price can change from one month to another. However, parents sometimes like these plans because they prevent teens and others from using too many minutes or too much data.
- **Contract plans:** These plans (which are sometimes called **postpaid plans**) allow customers to lock in a price for an extended period. While prices are guaranteed, there may be early termination fees for customers who cancel their contracts before the end of the contract period.
- **Individual versus Family Plans:** Within the various plans there can also be options for individuals and for families. With a **family plan**, members of the family share time or data and there is one bill.

In addition to the type of plan, other factors can also influence the price. These include the number of minutes you can talk, the number of texts you can send or receive, and the amount of data you can relay. Most carriers offer unlimited plan options, but consumers should investigate whether these plans come with any special provisions. For example, after reaching a specific data usage point, some plans slow down the data speed.

In this activity, students will collect **data** on the cell phone plans of family members and other adults. The questions they ask will be **statistical questions** because they anticipate variability in the answers. They will be expected to analyze the data collected by the class and describe some aspect of its **center**, **spread**, and overall **shape**. Students should have a basic understanding of measures of center (including median, mean, and mode) and spread (range).

Materials:

- **So Many Plans Student Capture Sheet**—one copy per student
- **Spreadsheet software** (such as Excel or Google Sheets)—optional
- ["To Buy or Not to Buy" That is the Question Unit 5 Student Video](#)

Engage

- Show the ["To Buy or Not to Buy" That is the Question](#). Discuss how the factors addressed in the video (i.e., seeking information from trustworthy sources, comparing their options, and being cautious about advertising) might apply to a person's decision about which cell phone plan to select.
- Invite the students to participate in a "question storm." Divide students into small groups and challenge each group to come up with at least five questions they might ask a salesperson about a potential cell phone plan. To keep students focused, be sure to emphasize that their questions should focus on the plan rather than the device.
- Allow each group to share some of their questions and discuss their responses. Keep track of their questions on flip chart paper or in a document that can be referenced again later.

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Teach

- Ask student how many different types of cell phone plans there might be.
- Let students know that they will be investigating this topic by asking family and friends about their cell phone plans and sharing that information with the class.
- Provide a copy of the **So Many Plans Student Capture Sheet** to each student. Let them know that they should ask adults in their lives (parents, aunts/uncles, coaches, neighbors, etc.) about their cell phone plans. Remind students that they can ask for this information in person or in other ways such as through an email, text, or social media.
- Review each section of the handout to make sure students understand the information they are supposed to gather. Be sure they know the difference between pay-as-you-go, prepaid, and contract plans. Inform students that some people may not be able to give them details on their cell phone plans. Ask that they get as much information as possible and to let people know that an estimate for the amount they pay each month is fine.
- Discuss that the goal of the activity is to collect information from a broad sample of people. Encourage students to consider asking people with different demographic characteristics, including age. Challenge students to consider how asking people who are all similar in age might influence their results. For example, senior citizens might have different needs in a cell phone plan than a family with multiple teenagers.
- Advise students when the handout should be completed and brought back to class.
- Compile the results of the data collected by all the students by creating a large table on the board or using a spreadsheet. Ask students if they notice any immediate trends.
- Divide students into small groups and challenge them to identify questions they could answer using the data. Anticipated responses might include:
 - What was the average (mean) monthly cell phone cost of all the people surveyed?
 - What was the least (minimum) and the most (maximum)?
 - Is there a mode?
- Invite each group to select at least one question to answer. Let them know the following expectations:
 - They must determine the best way to graph their responses.
 - They must include at least one measure of central tendency (median, mean, or mode).
 - They must be able to explain their approach.
- Allow time for students to complete their work and then share their findings with the entire class.
- Facilitate a reflective discussion with students about the following question: Is there anything they would do differently if they were to collect similar data again (ask other questions, gather demographic data, etc.)?
- Challenge students to hypothesize how their data might be different from data collected using a random sampling technique. Which do they think is more relevant to them and why?

Conclude

- Revisit the results from the “question storm” at the beginning of the activity. Knowing what they do now, would the students add additional questions? Which do they think are most important to ask and/or consider when deciding which plan to select?
- Direct students to submit an exit ticket completing this sentence: My friend and I might select completely different cell phone plans when we are older because_____.

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Extend

- **Mathematics:** Explore how the costs of some cell phone plans are considered linear functions while others might be considered piecewise or step functions.
- **Mathematics:** Some researchers estimate that today's teens could spend more than \$100,000 over the course of a lifetime on cell phones if they replace them frequently. Encourage students to dive into [those calculations](#) and then use an investment calculator to determine how much that money could be worth if it was invested instead of spent. Is the difference enough to forgo the cost of a cell phone?
- **Research:** Invite students to explore cell phone plan comparisons from a variety of online sources. How do these comparisons vary from their research? What data was collected? Were the questions asked of each provider statistical questions?
- **Writing:** Challenge students to write a persuasive essay in which they convince people to be informed consumers when selecting a cell phone plan. Alternatively, ask students to be creative and develop an infographic with the same goal of encouraging people to ask questions and understand their options when selecting a cell phone plan.

So Many Plans

Directions: Ask three adults for information on their cell phone plan. Record their responses in the table below.

	1	2	3
Carrier/Company What company do you use for your cell phone?			
Monthly Fee How much do you pay each month?			
Type of Plan Is it a pay-as-you-go, prepaid, or contract plan? Is it an individual or family plan?			
Number of Minutes Do you have a specific number of minutes or is it unlimited?			
Number of Texts Do you have a specific number of texts or is it unlimited?			
Amount of Data Do you have a specific amount of data or is it unlimited?			
Other Fees Are you charged any other fees?			
Satisfaction On a scale of 1 (low) to 5 (high), how satisfied are you with the cost of your cell phone plan?			