Collecting Data

The main purpose of collecting data is to answer questions whose answers are not immediately obvious. Learn some tips on how to use data collection in your classroom.

What is it?

We collect, display, and analyse data to describe social or physical phenomena in the world around us, to answer particular questions, or as a way to identify questions for further investigation. Students' first experiences in gathering data are likely to be collecting and counting objects, such as stamps or coins, or taking simple surveys of their classmates. As students become more skilled, they also will collect data by observing or measuring, or they may use data that is a subset or compilation of information collected by someone else.

Why is it important?

The main purpose of collecting data is to answer questions whose answers are not immediately obvious. Students' natural inclination to ask questions must be nurtured. Students should learn through multiple experiences that how data are gathered and organised depends on the questions they are trying to answer (NCTM, 2000).

Of all the math skills taught, with perhaps the exception of computation skills, data analysis skills are the ones people have the most opportunity to use in their day-to-day lives. The better a person is at data analysis, the better he or she is equipped to understand and evaluate the barrage of statistical information encountered daily in the media in weather reports, product or service advertisements, sports broadcasting, health and environmental news, political advertisements, stock market reports, and so on.

When students participate in the steps of data analysis by formulating questions and collecting, displaying, and analysing data, they acquire a valuable skill that encourages their curiosity and helps them describe their world and make decisions about it. Also, when they know the inaccurate ways data can be collected, displayed, and analysed, they can evaluate the soundness of another person's data analysis.

How can you make it happen?

In the primary grades, students begin collecting data from their immediate surroundings. Help them formulate questions on topics that interest them, such as nature what kinds of leaves are in the school yard, in their backyard, or at a park and limit their number of responses.

Discuss how they will collect and record the data they need to determine an answer. At first they'll count or gather objects. Later on, they can do surveys; once they've learned to skip count by fives, they can use tally marks to record the data. In their initial experiences with data analysis, students should collect, display, and analyse the data in short, or even combined, steps.

For example, if they are choosing their favorite color from among red, blue, and yellow, have them choose a connecting block of their favorite color. Then, one by one, have students bring their blocks to the front of the class, connecting them to like-color blocks to build a tower of each color. As they collect their data, they're also displaying it. They then can analyse the data quickly by standing the block towers side-by-side to compare height.

As students gain experience with data analysis and move into the intermediate grades, they are ready to widen their scope and apply their skills to questions or concerns that have importance beyond the individual classroom. They might investigate a schoolwide question such as, "Should students wear uniforms?" A community-wide question such as, "Can the old railroad bed can be turned into a bike trail?" An environment-based question such as, "How much precipitation is there in October?"

Students' data-collection methods should expand to include observation and measurement as well as using a subset of data collected by others, such as statistics available in print or on the Internet from agencies. The length of time spent on investigations should vary from quick surveys to projects extending over many days or weeks.

Provide students with the opportunity to formulate questions and investigations that require them to collect different types of data, numeric, categorical, or longitudinal, and to design recording methods appropriate to that data.

Avoid collecting data for its own sake. Rather, you should start with a question that the data analysis will help to answer, or have students collect data that will raise some interesting questions. Here are some examples of questions that students can answer by collecting data:

1. Is it more likely to rain on the weekend than on weekdays?
2. Are there any interesting differences in the amount of space that different newspapers to different kinds of stories?
3. Which states have the most towns and cities? Do you notice any geographical patterns?
4. What is the average speed of the traffic going by the school? Do motorists obey the speed limit? Do men drive faster than women? If so, why do you think this is?

How can you stretch students' thinking?

Help students to think about who or what population their results represent. Discuss the idea of sampling a population. For example, if they found that chocolate milk is the favorite drink in their class, ask them whether they think they would get the same results surveying another classroom of the same grade, a lower-grade or upper-grade classroom, or a group of people at a coffee shop. What characteristics do groups have that would make it likely or unlikely to have the same results?

Discuss random as well as calculated ways of choosing a sample population from a target population, for example, using computer generated randomisation or identifying a focus group. Discuss how the selection methods, as well as the sample size, can affect the reliability of the results.