Name _____
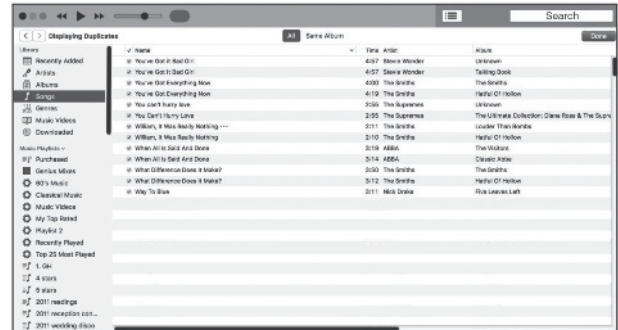
Big Data

Data is information that can be counted and used to make decisions. Before people used numbers, they counted by matching objects to fingers, piles of stones, or tally marks.

Data scientists estimate that people have created one *exabyte* of data from the beginning of time to the year 2003. An exabyte is one billion billions. It is written as a 1 followed by 18 zeros.

Today, an exabyte of data is created every two days. The massive amounts of data that are created and collected are called *big data.* Pressing a key on a digital device makes one bit of data. A combination of keystrokes creates more data. Combining combinations of keystrokes creates an exponential amount of data.

Suppose that you listen to music on a digital device every day as you do homework. You create data that include the names of each song that you listen to, the length of each song, who performed the song, and what you listened to next. There are thousands of pieces of information for everything you do on a digital device.

Your Project Make Line Plots for Data

Think about one hour of your day. Write down a list of everything you do in that hour, and use the information to create data. Your data can be about you, other people, pets, objects, activities, dates, times, or places. If the data is not in one of those categories, call it Other Data.

For instance, if you spend an hour watching TV with a friend, data that you might collect are the name of the movie, your name, your friend's name, the type of TV, and what channel the movie is on. Be as detailed as you wish to create greater amounts of data.

Use the data to make a line plot that shows what kind of data you create in one hour of your day, and how much of each type is created using the categories above. Show your line plot to a group of students and explain why you think each piece of information is data. Remember, data is information that can be counted and used to make decisions.

Old Cents

The first penny to be minted and used in the United States is known as the Fugio cent. It was issued by the Continental Congress. One side of the coin shows 13 rings linked around the words "WE ARE ONE."

The penny is known as the Fugio cent because the word fugio is on the reverse side of the coin. It means "I fly" in Latin and was used as a symbol for freedom. It has an image of the sun beaming down on a sundial. The motto on the coin is "MIND YOUR BUSINESS," and is believed to be a quote from Benjamin Franklin.

Your Project Design a Coin

Look at several coins that people use today. Notice the images on them as well as how heavy they are and how large they are. Design your own coin and make a model of it using clay, cardboard, or some other material. The diameter, or distance across your coin, should be 1 inch or less. Measure the diameter of your coin and record it as a fraction, such as $\frac{3}{4}$ inch.

Work with your classmates to make a line plot of the coin diameters. Show diameter measurements across the bottom of the plot. Determine the most common sizes of the coins. Then discuss how the size of a coin affects its usefulness. Present your coin and describe how you came up with the design. Provide an argument to explain why you think your coin design should be used to make a real coin.

Name _____

Giant Sequoias

Giant sequoias are evergreen trees that can live for more than 3,000 years. The bark of these trees has a high amount of a chemical called tannin, which helps sequoias resist rot, boring insects, and fire. That means giant sequoias are not killed by the same things that kill many other trees.

Scientists study the bark, rings, and branches of giant sequoias. They measure the amount of water absorbed by the trees and their growth patterns over time. This information helps scientists understand how climate change affects these big trees.

Scientists also measure the height, circumference (or distance around), and volume of giant sequoias. The largest sequoia in the world is the General Sherman Tree located in Sequoia National Park in California. While other trees in the world are taller, the General Sherman has the largest volume of 52,508 cubic feet.
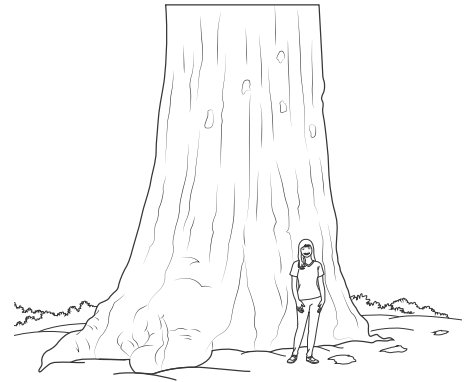
Your Project Measure Trees

Create a line plot of the circumference of a certain type of tree. First, choose the kind of tree you want to measure. If you live in an area where there are plenty of trees, you can gather the data yourself. To find the circumference of a tree, wrap a measuring tape around the tree at about head height and record the measurement. Gather data on 10-25 trees.

1.3 m

If there are not enough trees near where you live, you can find the circumference of many record-setting trees online.

Next, organize your data. It is unlikely that two trees will have exactly the same circumference, so you will need to round your measurements to the nearest inch or foot depending on the size of the trees you measure.

Finally, create your line plot. Decide what scale to use along the horizontal axis, and remember to label the axis. Then give your line plot a title.
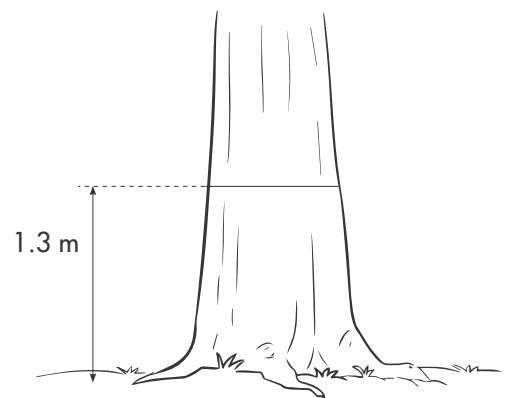
Name _____

Plant Leaves

Sunflower plants, rose bushes, and oak trees. What is one thing these plants all have in common? They have leaves. A leaf is a plant part that gathers energy from sunlight to make sugars. The plant uses some of that energy to carry out its life processes, such as growing and making new plants. It stores the rest of the energy. When an animal eats the plant, it gets the stored energy.

Leaves come in all shapes and sizes. The characteristics of a leaf depend on the plant and where it grows. The tall, thick trees in a rainforest block much of the sunlight from reaching the ground. Large, flat leaves help plants growing along the ground to collect more sunlight. The Giant Taro plant has leaves that can be 6 feet long and 4 feet wide! Pine trees grow in much colder forests. The needles of pine trees are actually their leaves. Their thin shape helps them survive ice, snow, and wind.

Your Project Make a Leafy Line Plot

Work with a partner to find leaves on the ground or on a plant. Do not remove the leaves from living plants. Use a ruler to measure the length of each leaf in inches, using fractions for accuracy. Create a table to record your measurements.
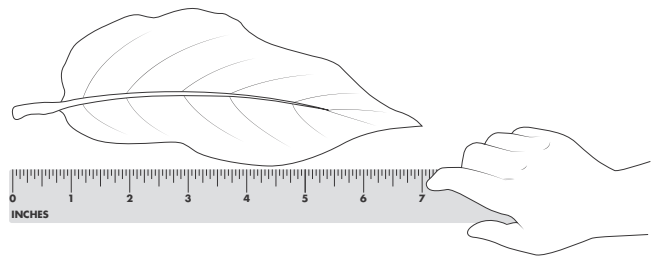
Make a line plot to represent the data you collected. Compare your line plot with another group. Determine how they are alike and different. Then combine your results to make one larger line plot. Discuss how combining the data affects the shape of the line plot.