What do news stories about space travel, technology, or energy production have in common?

Well, one way to answer this question is to look at special **prefixes** that are often used with measurements in science and industry. These prefixes are especially important to people studying in the STEM fields of science, technology, engineering, and math.

Let's start with some important terms and ideas.

What are prefixes?

Prefixes are additions to the beginnings of words.

When we add a prefix to a word, it changes the meaning of the existing word, and the result is a new word.

Let's take an example to clarify the point. We have the prefix "un-," meaning not. Then we have the full word "happy." When we add the prefix "un-" to the beginning of the word "happy," we get the word "unhappy."

There are many kinds of prefixes. For today's lesson, we will pay attention to one kind of prefix: prefixes related to large amounts.

Measurements

The National Institute of Standards and Technology (NIST) is a U.S government agency that works on measurement science.

NIST has a public list of prefixes used for amounts, or quantities, and their meanings. The list is long. But there are only a few of these prefixes that are important for everyday uses in the sciences and industry.

The prefixes that mean one thousand, one million, one billion, and one trillion are useful to know for most kinds of science, energy, and technology stories. Here is how NIST defines these prefixes:

Kilo- means thousand.

Mega- means million.

Giga- means billion.

Tera- means trillion.

In science and industry, we often use large number prefixes to express measurements of distance, energy, or weight. An example of a distance measurement is a meter. An example of a power measurement is a watt.

Examples

Let's take an example that everyone knows: one kilometer. We have the prefix kilo-, meaning one thousand, and the **unit** of distance, a meter.

Let's listen to how Bryan Lynn uses the term "kilometer" in a recent [science story](#) on our website:

> *NASA [estimates](#) the moon sits an average of about 382,500 kilometers from Earth. The exact distance changes because of the moon's orbit around Earth. The average distance from Earth to Mars is 225 million kilometers.*

Our example shows an important point about agreement. Note that in our example, we make the measurement of distance plural. We add an –s to the end of kilometer, and so we get the term "kilometers."

So, we say one kilometer, two kilometers, and 300,000 kilometers.

The idea is that the prefix changes the meaning of the word, but the word must still agree in terms of being singular or plural. So, do not forget about the plural markers we use at the ends of words.

Energy

We can carry this same idea to an energy story. A watt is a unit of power. When we use prefixes to change the meaning, we arrive at a term such as a megawatt – meaning a million watts – or a gigawatt – meaning a billion watts.

Let's listen to part of a [recent report](#) about wind energy development in 2023.

> *The Global Wind Report, published recently by the Global Wind Energy Council (GWEC), a trade group, said the world developed 117 gigawatts of new wind power **capacity**, a 50 percent increase from 2022.*

Note that in our example, the power capacity measurement is expressed in gigawatts. Once again, we add the –s ending to gigawatt because it is plural: 117 gigawatts.

Practice

Let's take some time to work with these ideas. Imagine you want to describe the amount of data that a hard drive can hold.

Use the prefix "tera-" and the unit of computer information, a byte, to describe the storage capacity of the hard drive.

Pause the audio to consider your answer.

Here is one possible answer:

This hard drive has one terabyte of data storage capacity.

Here is another possible answer:

This hard drive has two terabytes of data storage capacity.

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Words in This Story

prefix – *n.* a letter (or group of letters) that is added to the beginning of a word to change its meaning

unit –*n.* one of something

capacity –*n.* the largest amount that can be contained by something