

Intro to Earth Science

Section 3: Scientific Research & Tools

Science is a way of gathering information and analyzing data about the world around us. It is based on **observations**, which is the process of gathering information about processes or events in an orderly way. Scientists use evidence to provide possible explanations for something. That evidence is called **data** which is the information gathered from those observations.

Scientists draw upon **inferences**. Inferences are logical interpretations based on prior knowledge, experience, and collected data. These inferences can lead to a hypothesis or a guess for observations that can be tested.

There are two main scientific research types: quantitative and qualitative.

Quantitative research is research in which the data collected is numerical. Thermometers, balances, and stopwatches are all tools used to collect this data. **Qualitative research** is descriptive and based on observations. Binoculars, cameras, and a tape recorder are used to present this type of data.

SI Base Units		
Quantity Measured	Unit	Symbol
Length	meter	m
Mass	gram	g
Time	second	s
Electric current	ampere	A
Temperature	Kelvin	K
Amount of substance	mole	mol
Intensity of light	candela	cd

The standard measurement system used by scientists worldwide is known as the International System of Units (SI). SI units are easy to use because this **metric system** is a decimal system of units based on a scale of multiples of ten. Each unit is ten times larger than the next smallest unit and one-tenth the size of the next largest unit.

Standard tools used by earth scientists include binoculars, a compass, a wind vane, an anemometer, and a streak plate. **Binoculars** allow us to view faraway objects more clearly, like incoming weather or landforms. A **compass** shows magnetic north and is used by earth scientists to navigate and determine direction. A **wind vane** is a device that rotates to show the direction of the wind. An **anemometer** is a tool used to measure the speed and force of the wind. Finally, a **streak plate** is a piece of hard, unglazed porcelain that helps earth scientists identify minerals.

Review:

1. What is an inference?
2. Compare quantitative and qualitative research.
3. What is an anemometer used for?