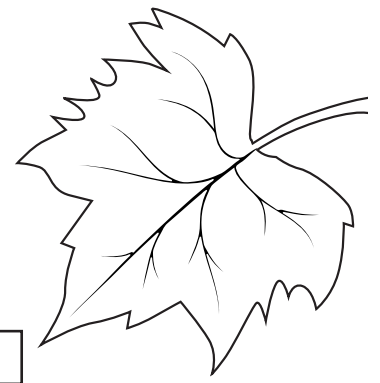


*Jefferson Lab*

FEALL



*for Science*

## Jefferson Lab Vocabulary Words

**accelerator** - Something that speeds something else up. Jefferson Lab's CEBAF accelerator accelerates electrons to nearly the speed of light.

**atom** - The smallest piece of an element. Atoms are made up of a nucleus, containing protons and (usually) neutrons, surrounded by electrons.

**cavity** - At Jefferson Lab, a cavity is a hollow, metal device that is used to accelerate electrons. Jefferson Lab's cavities are made from the element niobium.

**CEBAF** - The Continuous Electron Beam Accelerator Facility. Formerly the name of Jefferson Lab itself, CEBAF now refers to the lab's large electron accelerator.

**CHL** - Central Helium Liquefier. A large refrigerator located in the middle of Jefferson Lab's accelerator. The CHL supplies super-cold liquid helium to CEBAF's LINACs.

**cryogenics** - The science of very low temperatures, far below the freezing point of water.

**cryomodule** - Large, tank-like devices found in Jefferson Lab's LINACs. Cryomodules contain CEBAF's acceleration cavities. The cryomodules are very well insulated and are filled with liquid helium in order to keep the cavities cold.

**electron** - A tiny particle with a negative charge which orbits the nucleus of an atom. Electrons are much less massive than either protons or neutrons.

**experimental hall** - One of four large 'rooms' at Jefferson Lab where physicists conduct experiments using the CEBAF accelerator. The four experimental halls are known as halls A, B, C and D.

**gluon** - Carrier of the strong force. Gluons hold quarks together inside protons and neutrons and hold protons and neutrons together to form the nucleus.

**Kelvin** - A temperature scale that's based on absolute zero, the coldest possible temperature. On the Kelvin scale, water freezes at 273 K and boils at 373 K.

**lepton** - One of the two basic building blocks of matter. Scientists have discovered six different kinds of leptons: electrons, muons, tau leptons, electron neutrinos, muon neutrinos and tau neutrinos.

**LINAC** - Short for linear accelerator, a LINAC is an accelerator that accelerates things in a straight line. Jefferson Lab's CEBAF accelerator has two LINACs which are connected by magnetic arcs.

**liquid helium** - Helium that has been cooled enough to be a liquid. At room temperature, helium is a gas. Helium needs to be cooled to about  $-452^{\circ}\text{F}$  (about 4 Kelvin) for it to become a liquid.

**meson** - A particle made from a quark and an antiquark.

**neutron** - A neutral particle found in the nuclei of most atoms. Neutrons contain three quarks: one Up quark and two Down quarks. Neutrons are slightly more massive than protons.

**niobium** - Element number 41 on the Periodic Table of Elements. Niobium is a gray metal that becomes superconductive around 9 K and is used to make the cavities found in Jefferson Lab's CEBAF accelerator.

**nucleus** - The central part of an atom. Made from protons and (usually) neutrons, the nucleus contains most of an atom's mass.

**physics** - The study of matter and energy and how they interact.

**proton** - A positively charged particle found in the nucleus of an atom. Protons contain three quarks: two Up quarks and one Down quark.

**quark** - One of the two basic building blocks of matter. Scientists have discovered six different kinds of quarks: Up, Down, Strange, Charm, Top and Bottom.

**SRF** - Superconductive Radio Frequency. This describes the basic operation of Jefferson Lab's acceleration cavities. They are superconductive (they do not resist the flow of electricity) and are powered with radio waves (with a frequency of 1.497 GHz).

