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| Graduate fellow Marianne Ames and Assistant Professor Wayne S. Johnson, of the University of Nevada, define growth as "an irreversible change in the size of a cell, organ or whole organism" (Ames). Growth is commonly known as an increase of living material, which leads to an increase in cell size. In living cells, growth occurs by metabolic processes involved in protein nucleic acids, lipids and carbohydrate synthesis. Photosynthesis and respiration provide the metabolic energy (Ames). Plants make food through a process called photosynthesis. During photosynthesis, plants use carbon dioxide, water, and light energy, normally from the sun, to produce glucose, oxygen, and water. Glucose and water are the plant�s food source, and allows the plant to grow. Oxygen is an essential element used by organisms to function properly through cellular respiration. In the process of cellular respiration, oxygen is consumed along with organic fuel to produce carbon dioxide, water, and energy. Energy is essential to the organism�s survival. Plants are beneficial to the earth and the other living organisms that live in it (Campbell 171). Plant growth is commonly measured as a change in area, length, volume, height, and weight. The growth and development patterns of plants are usually used to classify plants into groups. Determinate plants, such as sweet corn and bush tomatoes, have its main and secondary axes terminated in a flower bud. On the other hand, indeterminate plants, such as peas, "are those whose main axes remain vegetative and in which flowers form buds" (Ames). Different plants grow at different rates.  There are many factors that influence plant growth. First, hereditary factors that influence plant growth are passed on from generation to generation. The genetic structure of a plant is acquired when the zygote is formed from the male and female gametes. The genetic information is copied and passed on through cell division. As the plant becomes bigger to its mature size, some of the genes are activated, while others are inactivated. Some genes are codes for the synthesis of enzymes that catalyze specific biochemical reactions needed for growth and differentiation (Ames). Differentiation is when cells turn off or on certain genes to develop different functions. Structural genes are involved in protein synthesis. Regulatory and operator genes regulate the activity of the structural genes. Growth hormones are also involved in the genetic and environmental control of growth and differentiation. In a plant, growth hormone distribution is controlled by interactions between the genetic factors in the plant and the environment. The growth hormones may be either growth inhibitors or growth promoters depending on the site of the action and the concentration of the substance of the growth hormone.  Also, there are environmental factors that influence plant growth. All plants need a suitable climate, light, and a continuous supply of water. Each individual plant cell holds a large amount of water. Most growing plants contain 90 percent water. Without water, the plant cells could not continue many of the processes that take place within a plant. Most water enters the plant through its roots. The hairs on these roots absorb moisture and minerals from the soil by a process called osmosis. Osmosis is the diffusion of water. Water is the medium of transfer within the plant. It is also the solvent system within the cell (Ames). In many plants, fungi grow on the roots and help the plant absorb water and nutrients. Plants grow well only within a limited temperature range, which varies from plant to plant. A plant requires at least eight hours of light everyday (Ames). Some plants that grow without light are called etiolated plants. They lack chlorophyll. Chlorophyll absorbs light energy that is necessary for photosynthesis. Photosynthetic rates are determined by light intensity, carbon dioxide levels, and temperature. Light can have an effect on the morphology of a plant. For example, leaves that are in the sun tend to be thicker with extra layers than leaves that are normally in the shade. A plant�s response to light will defer depending on the intensity of the light. It also depends on the duration and wavelength of the light it receives. Light intensity is the concentration of light waves that are shown on the leaf�s surface. Another environmental factor is temperature. The temperature range that supports the plant growth is normally 40 to 97 degrees Fahrenheit. The optimum temperature for plant growth can defer within species and the stage of development the plant is in (Ames). As temperature increases, respiration rate increases also.  ([Intro1](http://docs.google.com/introduction.html))([Intro2](http://docs.google.com/intro2.html))([Intro3](http://docs.google.com/intro3.html))([Intro4](http://docs.google.com/intro4.html))  [[Home](http://docs.google.com/home.html)][[Introduction](http://docs.google.com/introduction.html)][[Hypothesis](http://docs.google.com/hypothesis.html)][[Procedure](http://docs.google.com/procedure.html)][[Data](http://docs.google.com/data.html)][[Conclusions](http://docs.google.com/conclusions.html)][[Bilio/Links](http://docs.google.com/biblio.html)]  [[2002 Projects](http://docs.google.com/AP2002/index.html)][[2001 Projects](http://docs.google.com/index.html)][[2000 Projects](http://docs.google.com/AP2000/index.html)][[1999 Projects](http://docs.google.com/AP99/index.html)][[1998 Projects](http://docs.google.com/AP98/index.html)] |