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| ***INTRODUCTION***  In second grade, my family moved to our current house. Before we sold our previous house, my dad decided to rejuvenate our lawn. He added a chemical to the lawn area, and soon the lawn grew rapidly and more green. As a second grader, this seemed odd, but I never figured it was from the chemical. After we moved, we went from a tiny backyard, to a huge area behind our house. My dad began to landscape our house, and decided he wanted to plant several trees, shrubs, and other plants. We added a big lawn area in the front and back of our house. Several times, he asked my uncle, a typical Italian who knows everything about gardening, to come help him with the growth of the plants. My uncle generally knew what he was doing, and soon our backyard was like a forest, rain forest, and fruit orchard all in one.  A few years ago, heavy rains began to fall. All the plants in our yards suffered greatly. Our fruit trees never bloomed, our pine trees developed a bacterium that killed them all, and our lawns began to brown. My dad became very concerned, and telephoned my uncle. My uncle suggested using fertilizer on the lawn. My dad, the following Friday, decided to ask our gardeners to add fertilizer to the lawn. The gardeners suggested against it, warning it was only a quick fix. The real problem was our family clayed soil. Despite their warnings, my dad decided to have them fertilize the lawn. The gardeners used sulfate of ammonium, and soon our lawn began flourishing. It was bright green, and grew at a faster rate. The newly rejuvenated lawn lasted for about a month and a half, then returned to its� previous state. My dad decided to fertilize again, and the thought "Too much good stuff?" went through my mind. At the start of the year, when we were able to begin choosing our projects, I wanted to research how the chemicals helped the lawns to improve, and also, to investigate whether or not too much fertilizer would be detrimental to the plant.  **FERTILIZER**  Fertilizers are commonly used to help plants grow. Farmers, gardeners, and other agricultural workers use fertilizers. They help to distribute more nutrients to the plant, and help promote stronger roots, darker green color to leafy plants (such as grasses), and faster growth (3). Fertilizers are added to plants to supply additional nutrients that may help to promote growth. There are several categories of fertilizers. In this experiment, nitrate fertilizer was used, specifically, sulfate of ammonium.  SULFATE OF AMMONIUM  Components:  Ammonium: 21-0-0  Total Nitrogen (N) 21.0%  Sulfur (S) 24.0%  Arsenic 1.2 PPM Mercury 0.05 PPM  Cadmium 0.1 PPM Cobalt 0.1 PPM  Molybdenum 1.0 PPM Nickel 1.3 PPM  Lead 1.2 PPM Selenium 2.5 PPM  (4)  Plants require several inorganic nutrients, which are either macronutrients (plant needs large amounts) or micronutrients (plant requires trace amounts). There are nine macronutrients: carbon, hydrogen, oxygen, nitrogen, potassium, calcium, phosphorous, magnesium and sulfur. Nitrogen, phosphorous and potassium need to be added to the soil to promote better growth. There are seven micronutrients which make up less than one to several hundred parts per million by dry weight in plants. These are iron, chlorine, copper, manganese, zinc, molybdenum, and boron. (1)  Nitrogen plays an important role in plant growth. Its is a component of amino acids, proteins, nucleotides, nucleic acids, chlorophyll, and coenzymes. All living organisms need to have nitrogen fixation in order to synthesize proteins, nucleic acids, and other necessary nitrogen compounds, like chlorophyll and nucleotides. Nitrogen is only found in small amounts in soil, 0.03%, although it constitutes 78% of the atmosphere. (1) This is the reason which it must be added to the soil to help plants grow. Sulfur is a component of some amino acids and proteins, and coenzymes. Coenzymes play a big role in oxidation-reduction. Coenzymes are electron receptors. They are inorganic substances that complete the shape of an enzyme. A very important coenzyme is NAD+. Its� job is to pick up Hydrogen atoms and carry them. This creates energy in the form of ATP, which fuels cellular respiration and many other processes. Without ATP, plant growth would be compromised greatly (6). Amino acids are considered to be the building blocks of life. From amino acids, proteins are built, nucleic acids, and nucleotides are also built. (1) Nitrogen and Sulfur in the fertilizer give the plants these essential nutrients for growth (3).  **RYEGRASS**  Rye grass is native to Europe and Asia, but was introduced to the US at an early date. Rye grass is noted for its quick germination and rapid establishment. It is commonly used as a temporary lawn in the south, and as a lawn in the north and west. There are several types of Rye grass, two that are most well known. Annual rye grass is a rougher looking grass. It is commonly seen growing on the sides of roads or perhaps cultivated. It has the appearance of wheat- like plant (3). Perennial grass, or the turf grass, is commonly used on golf courses and athletic arenas. It does not spread very well, so large quantities of seed are used in one area. Rye grass has good wear resistance, and has a uniform, medium texture. Its ideal pH ranges from 6.0 to 7.0 (2).  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