a WOW Lab BLUEPRINT

Glowing Veggies

Achievements and Competencies

Learning Outcomes

Grades 11-12
From structures to properties
Solutions and stoichiometry
Waves

Achievements and Competencies are based on the Common Framework of Science Learning Outcomes (K-12) set by the Canadian Council of Ministers of Education (1997).

Specific Expectations

Grade 11 & 12

CHEMISTRY

From structures to properties

212-5 Identify the theoretical basis of an investigation and develop a prediction and a hypothesis that are consistent with the theoretical basis (e.g., use bond theory to predict properties of compounds).

Glowing Veggies allows the students to use vegetables to emit radiation according to the emission spectrum of the metal ion present in different solution. The students will be able to investigate and develop a prediction about the various metal ions, based on the emission colours of the glowing vegetables.

321-7 Identify and describe the properties of ionic and molecular compounds and metallic substances.

Different metal ions will be identified and described based on the emission spectrum of that particular metal. Each element has a unique emission spectrum, analyzing this radiation allows the students to identify what elements are present in the solutions.

322-7 Compare electrochemical and electrolytic cells in terms of energy efficiency, electron flow/transfer, and chemical change.

Supplying a current to the vegetables that were soaked in the metal ion solutions, causes these vegetables to emit radiation according to the emission spectrum of the metal ion present in the solution. This is because the electricity excites one or more valence shell electrons to jump to a higher energy level. When these electrons fall back to their original levels, they release light at a certain frequency.

Grade 11 & 12

PHYSICS

Waves

212-5 Identify the theoretical basis of an investigation and develop a prediction and a hypothesis that are consistent with the theoretical basis (e.g., state predictions and hypotheses when investigating black body radiation and the photoelectric effect).

The students can make a prediction about the emission spectrum and the metal ions present in the various solutions. The samples are varied enough that the dominant emission colour will provide enough information to identify each type of metal ion.

327-10 Explain qualitatively and quantitatively the photoelectric effect.

Vegetables are used to demonstrate the photoelectric effect. Metals are in the form of soluble halides dissolved in water and vegetables are then soaked in these solutions until they become saturated with the salts. Supplying a current, via electrodes, causes the vegetables to emit visible light.