



EDIBLE ELEMENTS

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Annotation

In this activity, students will discover, through research of a particular element, the many uses of chemicals in the growth, harvest, processing, preparation, contamination, and preservation of food. As a class students will construct a periodic table displaying the chemical symbol, atomic number, atomic mass, and electron configuration of each of the first 36 elements.

Primary Learning Outcomes:

Students will be able to identify on the periodic table the chemical symbol, atomic number, and atomic mass of an element.

Students will be able to determine the electron configuration of a given element and construct a valence diagram for the element.

Students will be able to classify elements as metals, non-metals, or metalloids.

Students will be able to describe the role of elements in food and nutrition.

Assessed QCC:

Grade: 9-12

Science

Physical Science/Chemistry

2 Topic: Inquiry, Process and Problem Solving

Standard: Uses traditional reference materials to explore background and historical information regarding a scientific concept.

2.1 Uses current technologies such as CD-ROM, Internet, and on-line data search to explore current research related to a science concept.

Physical Science

7 Topic: Atomic Theory and Patterns of Reactivity in the Periodic Table

Standard: Describes the basic structure of the atom as protons, neutrons, and electrons in specific arrangements.

8 Topic: Atomic Theory and Patterns of Reactivity in the Periodic Table

Standard: Identifies the symbol, atomic number, and mass of each of the first 20 elements in the periodic table.

Chemistry

4 Topic: Inquiry, Process and Problem Solving



Standard: Gives examples of industrial processes that have been derived from scientific research and describes the impact on society.

5 Topic: Atomic Structure and Patterns of Reactivity

Standard: Describes the fundamental parts of the atom.

5.1 Uses the periodic table to identify atomic number and mass.

6 Topic: Electron Configuration

Standard: Describes electron orbital configuration of common elements.

Duration:

Preparation: 60 minutes

Introduction: 10 minutes

Student Assignment: Adaptable to class schedule.

Student Presentations and Discussion: 90 minutes

Total Class Time: 100 minutes

Materials and Equipment:

For Teacher Preparation:

1. Attachment: [Edible Elements Poster.pub](#) or [Edible Element Poster.pdf](#)
2. Colored Copy Paper (yellow, pink, blue, red, orange, light blue, green, brown, and purple)

Per Student:

1. Draft Edible Element Poster
2. Color Coded Edible Element Poster

Safety:

There are no significant safety concerns associated with this activity.

Technology Connection:

Students may use all available information resources (*e.g.* internet search, library research, online databases books, periodicals) to complete the assignment.

Procedures:

Teacher Preparation:

The class will construct a periodic table covering the first 36 elements. Posters for Li, Be, Si, Sc, Ga, and Kr have been provided and should not be assigned to students. The provided posters should be included in the color-coded set. The roles of these elements in food and nutrition are less significant or less obvious than the assigned elements. Use the attached blank poster template to print the remaining color-coded Edible Element Posters according to the following key. Numbers in parentheses will cover the first 36 elements. Hydrogen has been provided as an example; however, the element should be assigned to a student.

Hydrogen – yellow (1)



Alkali Metals – pink (3: Li and 2 templates)
Alkaline Earth Metals – blue (3: Be and 2 templates)
Transition Metals – red (10: Sc and 9 templates)
Other Metals – light blue (2: Ga and 1 template)
Metalloids – orange (4: Si and 3 templates)
Non-Metals – green (6)
Halogens – brown (3)
Noble Gases – purple (4: Kr and 3 templates)

Estimated Time:
60 minutes

Introduction:

Explain to students that everything we see, touch, and eat is chemical. These chemicals, which we encounter on a daily basis, are composed of the elements of the periodic table. Inform students that in the following exercise, they will be assigned one element to research. Following this research, students will complete the Edible Elements Poster and share this information with the class during a two minute presentation. Explain that the following information is required: chemical symbol, atomic number, atomic mass, valence diagram, electron configuration, classification of metal, non-metal, or metalloid, and a paragraph describing the element's importance in food and nutrition. Explain the grading procedure based on the rubric provided below. Assign each student one element.

Estimated Time:
10 minutes

Student Assignment:

Students should use all available information resources to complete an Edible Element Poster and prepare a two minute presentation for the assigned element. Research may be conducted in or out of the class time at the teacher's discretion.

Estimated Time:
Adaptable to class schedule.

Student Presentation and Discussion:

Each student should give a two minute presentation summarizing the information contained on the Edible Element Poster. Following student presentations, discuss with the students any trends observed (*e.g.* atomic mass, electron configuration) as well as the variety and importance of roles played by the elements in food and nutrition.

Estimated Time:
90 minutes

Assessment:



Assessment should be based on preparation and presentation of the Edible Element Poster. The following rubric may be used as a guideline.

Total Points = 100

1. Edible Element Poster:

- Chemical Symbol (5 points)
- Atomic Number (5 points)
- Atomic Mass (5 points)
- Valance Diagram (10 points)
- Electron Configuration (10 points)
- Classification as Metal, Non-metal, or Metalloid (5 points)
- Importance to Food and Nutrition (20 points)

2. Presentation (40 points)