



El Dorado County Career Technical Partnership

In Partnership: Folsom Lake College • El Dorado Union High School District • El Dorado County Office of Education

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Title: Candy is dandy...but what about its density?		
Content Area: Physical Science	Grade: 8	Duration: Three periods
Career Technical Industry Sector:	X	Agriculture and Natural Resources
	X	Hospitality, Tourism, and Recreation
Standards and Benchmarks:	<p>Science Content Standards for California Public Schools</p> <p>Physical Science – 8.0 All objects experience a buoyant force when immersed in a fluid. As a basis for understanding this concept:</p> <p style="padding-left: 40px;">8a, Students know density is mass per unit volume.</p> <p style="padding-left: 40px;">8b, Students know how to calculate the density of substances (regular and irregular solids and liquids) from measurements of mass and volume.</p> <p style="padding-left: 40px;">8c, Students know the buoyant force on an object in a fluid is an upward force equal to the weight of the fluid the object has displaced.</p> <p style="padding-left: 40px;">8d, Students know how to predict whether an object will float or sink.</p> <p>Physical Science – 9.0 Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept and addressing the content in the other three strands, students should develop their own questions and perform investigations. Students will:</p> <p style="padding-left: 40px;">9a, Plan and conduct a scientific investigation to test a hypothesis.</p> <p style="padding-left: 40px;">9b, Evaluate the accuracy and reproducibility of data.</p> <p style="padding-left: 40px;">9c, Distinguish between variable and controlled parameters in a test.</p> <p>English-Language Arts Content Standards for California Public Schools</p> <p>English/Language Arts</p> <p>Writing Applications (Genres and Their Characteristics) –</p> <p>2.0 Using the writing strategies of grade eight outlined in Writing Standard 1.0, students:</p> <p style="padding-left: 40px;">2.4 Write persuasive compositions:</p> <p style="padding-left: 80px;">a. Include a well-defined thesis (i.e., one that makes a clear and knowledgeable judgment).</p>	



b. Present detailed evidence, examples, and reasoning to support arguments, differentiating between facts and opinion.

c. Provide details, reasons, and examples, arranging them effectively by anticipating and answering reader concerns and counterarguments.

2.5 Write documents related to career development, including simple business letters and job applications:

a. Present information purposefully and succinctly and meet the needs of the intended audience.

b. Follow the conventional format for the type of document (e.g., letter of inquiry, memorandum).

Career Technical Education Foundation Standards

1.0 Academics

1.2 Science – 1.a, Students know how to relate the position of an element in the periodic table to its atomic number and mass.

1.d, Students know how to use the periodic table to determine the number of electrons available for bonding.

2.0 Communications

2.2 Writing – 2.5 Write business letters:

a, Provide clear and purposeful information and address the intended audience appropriately.

b, Use appropriate vocabulary, tone, and style to take into account the nature of the relationship with, and knowledge and interests of, the recipients.

c, Highlight central ideas and images.

7.0 Responsibility and Flexibility

Students know the behaviors associated with the demonstration of responsibility and flexibility in personal, workplace, and community settings:

7.1 Understand the qualities and behaviors that constitute a positive and professional work demeanor.

7.2 Understand the importance of accountability and responsibility in fulfilling personal, community, and workplace roles.

7.3 Understand the need to adapt to varied roles and responsibilities.

7.4 Understand that individual actions can affect the larger community.

Pathway Standards – Food Science, Dietetics, and Nutrition Pathway

A8.0 Students understand the basic principles of chemistry and physics related to changes in foods and food products during preparation, processing, and preservation:



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	<p>A8.3 Practice safe laboratory and equipment use and maintenance procedures.</p> <p>A8.4 Conduct scientific experiments using the scientific method. A8.5 Document experiments and maintains laboratory records.</p> <p>SCANS Occupational Competencies – Resources: Identifies, plans, and allocates resources:</p> <p>C1, Time: Selects goals-relevant activities, ranks them, allocates time, and prepares and follows a schedule.</p> <p>C3, Materials and Facilities: Acquires, stores, allocates, and uses materials or space efficiently.</p> <p>Interpersonal: Works with others.</p> <p>C9, Participates as a member of a team: Contributes to group effort.</p> <p>Technology: Works with a variety of technologies.</p> <p>C18, Selects Technology: Chooses, procedures, tools, or equipment, including computers and related technologies.</p> <p>C19, Applies Technology to Task: Understands overall intent and proper procedures for setup and operation of equipment.</p> <p>SCANS Occupational Foundations – Thinking Skills: Thinks creatively, makes decisions, solves problems, visualizes, knows how to learn, and reasons.</p> <p>F12, Reasoning: Discovers a rule or principle underlying the relationship between two or more objects and applies it when solving a problem.</p> <p>Personal Qualities: Displays responsibility, self-esteem, sociability, self-management, integrity, and honesty.</p> <p>F13, Responsibility: Exerts a high level of effort and perseveres toward goal attainment.</p> <p>F16, Self-Management: Assesses self accurately, sets personal goals, monitors progress, and exhibits self-control.</p> <p>F17, Integrity/Honesty: Chooses ethical courses of action.</p>
Objectives:	<p>In response to a simulated business inquiry, the student will use the scientific method to conduct a laboratory experiment to determine if there is a relationship between the density and caloric value of a candy bar. The investigation and data collection will be done collaboratively in a lab group. Each student will formulate a response in the form of a business letter which will cite the findings of the experiment, analyze the results, and offer</p>



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	recommendations.
Resources and Materials:	<p>Prentice Hall – Focus on California Physical Science</p> <p>Lab materials – candy bars, calorie information, lab equipment</p> <p>Business Letter template</p>
Differentiation:	Provide a specific lab procedure and data collection chart for students. The high level groups will be asked to develop their own procedure and data collection chart based on the scientific method.
Preparing Students for the Lesson: <ul style="list-style-type: none"> • Transitions • Expected Behaviors 	<p>Previously learned material to be applied to this lesson</p> <ul style="list-style-type: none"> • Laboratory practices • Use of the scientific method • Lab write up procedure • Concept of density and how to calculate density with the formula <p>Expected Behaviors</p> <ul style="list-style-type: none"> • Cooperative group work conducting lab • Responsible collection and recordation of data • Sharing of data for the different types of candy bars • Accountable reporting and recommendations to candy bar client
Teaching the Lesson (Lesson Sequence/ Activities): <ul style="list-style-type: none"> • Motivation/ Anticipatory Set • Pre-Assessment/ Activating • Background Knowledge • Teacher Input, Modeling, & Checking for Understanding 	<p><u>Day 1</u></p> <ol style="list-style-type: none"> 1. “We have been asked to determine if there is a relationship between the density of a candy bar and its caloric value. The candy company wants to know the feasibility of making a dense, low calorie candy bar. Does anyone have any suggestions as to how we might determine this relationship?” Allow the students to suggest ideas and plans for how to answer this problem. As a review, lead the discussion around the scientific method, so that the students come up with a problem statement and a suggestion as to how that problem might be tested. <p>Explain that they will be working in their lab groups to conduct an experiment to determine if there is a relationship between the density of a candy bar and its caloric value. The lab groups must determine the density, using the formula $d=m/v$. The caloric value will be reported on the candy wrapper, and the ingredients can be determined from the wrapper and observation.</p> <p>In addition, remind the students that the company is requesting this information so they can determine if they need to change the ingredients of their candy bars. So, as the students collect their density data, they also need to make observations as to the content of each of the candy bars. Then in the final assessment find a correlation between the density of the bar and its content.</p> <ol style="list-style-type: none"> 2. Introduce the experiment. Review the available equipment. Establish ability



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<ul style="list-style-type: none"> • Guided Practice • Independent Practice • Closure 	<p>groupings.</p> <ol style="list-style-type: none"> 3. Students conduct experiment, collect, record, and share data, clean up lab area, and eat the candy bars 😊. 4. At the end of the period the students will have collected and recorded all data. Homework will be to finish the lab write up that will include all aspects of the scientific method: Problem, hypothesis, materials list, procedure, data tables and graphs, and conclusion. <p><u>Day 2</u></p> <ol style="list-style-type: none"> 1. “Yesterday’s lab was designed to collect data regarding the relationship between the density of a candy bar and its caloric value and observe a correlation between the density of the bar and its contents. The candy bar company is awaiting your recommendations.” Introduce the concept of a business letter. Discuss with the students the importance of communicating with their client. The letter will summarize the scope of the project, serve as a report of the findings, and suggest recommendations. 2. Show the students the letter template. Discuss each area of the template and share ideas about what information will fit into each area. Such as: in the Reference Section list the nutritional values on the candy wrapper as a source of information. With class, model how to begin writing the letter with the heading, subject, reference, and salutation. Each student is responsible for writing their own letter using the data collected from the group. <p><u>Day 3</u></p> <ol style="list-style-type: none"> 1. Go to computer lab. Students are to finish writing letter, edit, and complete typed final draft. Letter and lab write up are due at the end of the period.
<p>Assessment:</p>	<p>Lab: See rubric</p> <p>Letter: See rubric</p>
<p>Notes & Reflections:</p>	

<p>Externship Sites:</p>	<p>Youngdahl Consulting Group</p>		
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