



# El Dorado County Career Technical Partnership

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

**Author's Name: Jay Chopp**

<b>Title: Backyard Archaeology: Mapping Your Home Site</b>		
<b>Content Area: Math</b>	<b>Grade: 6</b>	<b>Duration: One Week</b>
<b>Career Technical Industry Sector:</b>	<b>X</b>	<b>Agriculture and Natural Resources</b>
<b>Standards and Benchmarks:</b>	<p><b>**Mathematics Content Standards for California Public Schools</b></p> <p><u>Number Sense</u></p> <p>1.0 Students compare and order positive and negative fractions, decimals, and mixed numbers. Students solve problems involving fractions, ratios, proportions, and percentages.</p> <p>2.0 Students calculate and solve problems involving addition, subtraction, multiplication, and division.</p> <p><u>Algebra and Functions</u></p> <p>2.0 Students analyze and use tables, graphs, and rules to solve problems involving rates and proportions.</p> <p><u>Statistics, Data Analysis, and Probability</u></p> <p>1.0 Students compute and analyze statistical measurements for data sets.</p> <p><u>Mathematical Reasoning</u></p> <p>1.0 Students make decisions about how to approach problems.</p> <p>2.0 Students use strategies, skills, and concepts in finding solutions.</p> <p>3.0 Students move beyond a particular problem by generalizing to other situations.</p> <p><b>**Science Content Standards for California Public Schools</b></p> <p><u>Investigation and Experimentation</u></p> <p>7. 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.</p> <p>Students will:</p> <p>b. Select and use appropriate tools and technology (including calculators, computers, balances, spring scales, microscopes, and binoculars) to perform tests, collect data, and display data;</p> <p>d. Communicate the steps and results from an investigation in written reports and oral presentations.</p> <p><b>**California Career Technical Education Model Curriculum Standards</b></p> <p>E. Forestry and Natural Resources Pathway</p> <p><i>E11.0 Students understand the basic concepts of measurement, surveying, and mapping.</i></p> <p><b>**SCANS Competencies</b></p>	



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	<p><u>Interpersonal:</u> <i>Participates as a Member of a Team</i> &amp; contributes to group effort.</p> <p><u>Information:</u> Acquires and uses information.</p> <p><u>Basic Skills:</u> <i>Arithmetic/Mathematics</i> — performs basic computations and approaches practical problems by choosing appropriately from a variety of mathematical techniques.</p> <p><u>Thinking Skills:</u> <i>Seeing Things in the Mind's Eye</i> — organizes, and processes symbols, pictures, graphs, objects, and other information.</p> <p><u>Personal Qualities:</u> <i>Self-Management</i> — assesses self accurately, sets personal goals, monitors progress, and exhibits self-control.</p>
<p><b>Objectives:</b></p>	<p>Students will effectively and accurately apply their knowledge of mapping skills using ratios, compass directions, and angle measurement to create a scale map of their back or front yard. Alternately, students may map a friend's, neighbor's, or other family member's yard or local park.</p>
<p><b>Resources and Materials:</b></p>	<p><u>Class needs:</u></p> <ul style="list-style-type: none"> <li>--100 meter measuring tape</li> <li>--Sidewalk chalk</li> <li>--Playground basketball courts</li> <li>--Plastic traffic cones or other playground markers</li> <li>--access to computer lab or mobile lab</li> </ul> <p><u>Student groups:</u></p> <ul style="list-style-type: none"> <li>--Pencils</li> <li>--Graph paper</li> <li>--clipboard</li> <li>--colored pencils</li> <li>--compass</li> <li>--digital camera</li> </ul> <p><u>Copies and samples:</u></p> <ul style="list-style-type: none"> <li>--Sample CA Parks and Recreation Archaeological Site Record for Slate Mountain, El Dorado National Forest.</li> <li>--CA Office of Historical Preservation Archaeological Site Record Blank (ohp.parks.ca.gov [OHP Publications and DPR 523 Forms])</li> <li>--CA Department of Parks and Recreation Sketch Map Blank (ohp.parks.ca.gov [OHP Publications and DPR 523 Forms])</li> <li>--CA Office of Historical Preservation Instructions Manual for Recording Historical Resources (p. 9, How to Prepare a Location Map; pp. 12-15, Preparing the Archaeological Site Record) (ohp.parks.ca.gov [OHP Publications and DPR 523 Forms])</li> </ul>
<p><b>Differentiation:</b></p>	<p><u>Higher Level Students:</u></p> <p>Lesson can be extended to include a larger area to be mapped. Students can locate and include scientific names for plants they encounter. Peer</p>



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	<p>teaching can be used to encourage higher level students to assist struggling students.</p> <p><u>Lower level students:</u>          Students work in pairs.          Parents can be invited to assist, especially with station learning.          Classroom aides are assigned to assist struggling students.</p>
<p><b>Preparing Students for the Lesson:</b></p> <ul style="list-style-type: none"> <li>• <b>Transitions</b></li> <li>• <b>Expected Behaviors</b></li> </ul>	<p><u>Transitions:</u>          Students already know and should be reminded of classroom procedures for obtaining materials in an orderly manner. For example, one member of each partnership will be responsible for acquiring clipboard, compass, and papers.</p> <p><u>Expected behaviors:</u>          Students are expected to follow Marina Village Road Rules when moving from classroom to playground: single file, walk silently on right side of designated walkways.</p> <p>Students have already received instruction on proper communication and participation expectations for working in pair or small groups: contribute, cooperate, and communicate.</p>
<p><b>Teaching the Lesson (Lesson Sequence/ Activities):</b></p> <ul style="list-style-type: none"> <li>• <b>Motivation/ Anticipatory Set</b></li> <li>• <b>Pre-Assessment/ Activating Background Knowledge</b></li> <li>• <b>Teacher Input, Modeling, &amp; Checking for Understanding</b></li> <li>• <b>Guided Practice</b></li> <li>• <b>Independent Practice</b></li> </ul>	<p><u>Assumptions:</u>          *Students will already have learned to measure angles using a protractor.          *Students can already divide and round to the nearest tenth.          *Parent volunteers are stationed at each location to assist students, while teacher monitors student progress and assists students.</p> <p><u>Motivation/Background discussion:</u>          Careers in history as an historian or archaeologist, as well as careers in science from geologist to volcanologist, require mapping skills. Everyday citizens who travel, buy property, or even ride public transportation need to read maps. Being able to read a map is a key skill in both history and science, yet being able to create a map requires math skills.</p> <p><u>Activating prior knowledge:</u>          What math concepts or skills are necessary to make a map?          Distances, symbols, compass directions, angle measurement</p> <p><u>Teacher Input/Guided Practice:</u>          Day 1: Strides and Angles: One-two periods.          Divide class into two work groups, one to begin at Station A, one at Station B. Rotate to opposite station when finished at first station.</p> <p>Station A: Stride:</p>



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- **Closure**

Prep: Measure out 100 meters using the tape measure. Mark the start and end with sidewalk chalk.

Task: Students walk the 100 meters using a normal stride. Count the number of strides. Walk the distance three times, then find the average number of strides. Find the average stride by using the formula

$$\frac{100\text{m}}{\text{\#steps}} = \frac{\text{m}}{\text{stride}}$$

Station B: Find the angles:

Prep: On two half-court areas, set up cones at pre-determined angles with the basketball stanchion as starting point. Mark the cone locations with sidewalk chalk in case the cones are inadvertently moved. Mark a chalkline on the court to show North. Copy diagrams of court for students to record cone locations.

Task: Students partner up. Using the compass, students find the angle from North to each cone, then determine distance to each cone in number of strides. They can determine distance in meters to each cone once they have completed the stride station (Station A).

Station C: Place the cones: *(Complete only after Stations A and B are successfully completed.)*

Prep: Cones are placed at the basketball stanchion. Parent volunteer is informed about proper cone placement.

Task: On two half-court areas, students use a pre-determined chart to place cones at proper angles from the baseline and distances from the stanchion. Parent volunteer checks locations for accuracy and assists students having difficulty properly placing cones.

Day 2: Orienteering: One-two periods.

Prep: Set course on field using cones and traditional objects from study of ancient history, e.g., ankh, canopic jar, sarcophagus model, necklace, funerary mask, stone tool, etc. Mark starting location using stationary object, such as home plate or a fencepost.

Task: Working with a partner, students use stride and compass to determine angles and distances to set objects. Objects must be sketched onto map, then described on the back of the map. Students use angle and distance information to create a scaled map of the course/site.

Day 3: Sample and Standards Review: One period.

Prep: Copy for review State of California Department of Parks and



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	<p>recreation Primary Record of Slate Mountain Archaeological Reconnaissance Report. Note: Students may view, but ALL copies must be returned to the teacher.</p> <p>Copy for review CA Office of Historical Preservation Instructions Manual for Recording Historical Resources (p. 9, How to Prepare a Location Map; pp. 12-15, Preparing the Archaeological Site Record)</p> <p>Task: Review the sample report. Read through the standards. Discuss with students the importance of standards for recording and reporting cultural heritage information. Discuss the ethics of whether artifacts should be removed from such a site. Point out that location details have been blacked out. Why? Brainstorm a list of standards students could follow for making a map of their own, based upon the samples and based upon their measurement of distances, angles, and recording the orienteering field on Day 2. Provide teacher input to complete the list of standards to match rubric.</p> <p><u>Independent Practice:</u></p> <p>Assign: Students are to complete a map of their own yard using the skills and techniques from Days 1 and 2. Provide and review the rubric.</p> <p>Day 4: Begin work on Final Home Map in class based upon measurements and data collected at home on Day 3. Students without data will be provided alternative mapping work.</p> <p>Day 5: Continue work on Final Home Map in class. Students who have completed the assignment can work with the teacher to compare their maps to the rubric standards and make adjustments, as needed. Final maps are due on Day 6.</p>
<p><b>Assessment:</b></p>	<p><u>Informal Assessment:</u></p> <p>Day 1, teacher will circulate among stations to ensure students measure and calculate properly.</p> <p>Day 2: Field maps will be reviewed and graded for accuracy and completeness compared to an original template and descriptions of the objects.</p> <p><u>Formal Assessment:</u></p> <p>Using a rubric, student Home Maps will be evaluated based upon provided standards. Rubric includes a category for neatness, organization, clarity, effort, and behavior during Stations and Orienteering activities.</p>



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<b>Notes &amp; Reflections:</b>	
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<b>Externship Sites:</b>	El Dorado National Forest, Amador District	Supervisor/Host: Doug Barber, District Ranger	Assisting: Karin Klemic, Archaeologist
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