



Anchorage School District

TTL 4

Unit of Instruction

Unit Overview

<b>Title:</b>	Where on Earth is the sun?		
<b>Author:</b>	Sarah Petersen	<b>Grade Level:</b>	Third Grade

<b>Subject(s) Addressed:</b> Please check all that apply			
<input type="checkbox"/> Arts (Visual and Musical)	<input type="checkbox"/> Library/Information Literacy	<input checked="" type="checkbox"/> Mathematics	
<input type="checkbox"/> Communication	<input checked="" type="checkbox"/> Science	<input type="checkbox"/> Skills for a Healthy Life	
<input type="checkbox"/> English/Language Arts	<input checked="" type="checkbox"/> Technology	<input type="checkbox"/> World Language	
<input type="checkbox"/> Employability	<input type="checkbox"/> Other:		
<input checked="" type="checkbox"/> Geography			
<input type="checkbox"/> Government and Citizenship			
<input type="checkbox"/> History			

<b>Duration:</b>	This unit is on-going through the school year.
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<b>Synopsis:</b>	The purpose of this unit is for students to form an understanding of how and why the position of the earth and sun affect lives'. We will explore science and math concepts in an authentic setting and use technology as the tool to communicate understandings.
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Desired Results

<b>Enduring Understandings:</b>	The Earth's position to the sun effects peoples' lives.
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<b>Essential Question:</b>	How do daylight hours affect natural resources, environment, and people?
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**Standards:** Content, Cultural, Performance, &/or Grade Level Equivalents

<b>Standard:</b> Text & Reference Number (if applicable)	<b>Method of Assessment:</b> Written Product, Quiz, Model, etc.
<b>History B – A student should understand the historical themes through factual knowledge of time, place, ideas, institutions, cultures, people and events.</b> b. Human communities & their relationship with climate, subsistence base, resources, geography and technology.	KWL chart Final product-groups of four will create an iMovie demonstrating how daylight hours affect natural resources, environment, and people. Some suggested topics for discussion/movie topic: agriculture, fish cycle, subsistence living, seasonal affective disorders, and tourism.
<b>Math (3) PS 5 The student demonstrates the ability to apply mathematical skills and processes across content strands by using real world contexts</b>	On-going graph of sunrise/sunset times-see Excel template and example
<b>Math (3) MEA-2 A student should demonstrate the understanding of measurable attributes by comparing and ordering objects according to measurable attributes.</b>	Interpreting sunrise/sunset graph –see student interview questions
<b>Math (3) MEA – 7 &amp; 8 The student demonstrates the ability to use measurement techniques using pictorial representations in real world context by telling time to the nearest ¼ hour, and determining elapsed time.</b>	1. Creation of Sunrise/sunset graph 2. students will compute elapsed time and check answer with an preset equation in Excel.

<b>Science (3) SA1.1</b> The students demonstrates an understanding of the process of science by asking, predicting, observing, measuring, classifying, making generalizations, inferring, and communicating.	<ol style="list-style-type: none"> <li>1. KWL chart</li> <li>2. Vocabulary prediction</li> <li>3. sunrise and sunset data collection</li> <li>4. answering graph comprehension questions</li> </ol>
<b>Science (4) SD3.1</b> The student demonstrates an understanding of cycles influenced by energy from the sun and by the Earth’s position and motion in our solar system by recognizing changes to length of daylight over time and its relationship to the seasons.	1. Simulation of sun/earth relationship using Styrofoam balls while applying vocabulary concepts. (Homework assignment)
<b>Technology (4)Technology communication tools (National Educational Technology Standards for Students)</b>	creation of movie see rubric from Project Learning with Multimedia. <a href="http://pblmm.k12.ca.us/index.html">http://pblmm.k12.ca.us/index.html</a> (rubric included PDF)

**Knowledge & Skills:** Knowledge & skills students will need in order to successfully complete the Culminating Task

**Students Need to Know:**

- Define rotate, revolve, and axis
- Record sunrise and sunset times
- Describe how the Earth depends on the sun.

**Students Need to be Able to:**

- Demonstrate the sun/Earth relationship using rotate, revolve and axis
- Apply rotate, revolve and axis to simulate sunrise and sunset.
- Report about how Alaska’s geographical position creates drastic changes in sunrise and sunset times by analyzing data.
- Evaluate how sunlight effect peoples’ lives.

**Evidence of Understanding**

**Culminating Performance Task:**

Students will answer the EQ in an iMovie.

Scoring Guide Attached

**Types of Understanding Culminating Performance Task Emphasizes:**

- |   |  |
|---|--|
| <input checked="" type="checkbox"/> Application | <input type="checkbox"/> Interpretation            |
| <input type="checkbox"/> Empathy                | <input type="checkbox"/> Perspective               |
| <input checked="" type="checkbox"/> Explanation | <input checked="" type="checkbox"/> Self-Knowledge |

**Student Self-Assessment, Logs, and Peer Reviews:**

KWL

**Written, Oral, or Visual Products:**

iMovie project-see Project Based Learning Rubric

**Formal Observations or Interviews of Students:**

Homework assignment-vocabulary words  
Graph comprehension questions(designed to be guided instruction questions with a gradual shift to independent)  
Excel checklist

**Quizzes & Tests:**

BrainPop online quiz (informal assessment)

**Public Performances, Exhibits, &/or Models:**

Demonstration of seasons/uniqueness of Alaska’s light.

**Learning Experiences & Instruction**

Handouts Attached

<b>Activity:</b>	<b>Timeline:</b>
<p><b>Guiding Question:</b> How does the rotation/revolution and tilt of the Earth effect daylight hours?</p> <p><b>Activity:</b> As a class, students will complete a KWL chart based on the question, how does the sun affect the earth?</p> <p><b>Assessment:</b> In groups of four, students will complete the KW sections. A class discussion will be held to complete a class KW chart. Each student must have an item to place on the chart.</p>	On-going throughout the unit
<p><b>Guiding Question:</b> How does the rotation/revolution and tilt of the Earth effect daylight hours?</p> <p><b>Activity:</b> vocabulary</p> <ol style="list-style-type: none"> <li>1. Students will be asked to independently define revolve, rotate, and axis.</li> <li>2. Each students will be given a Styrofoam ball to place on the end of his/her pencil. The teacher will model the vocabulary and students will practice acting vocabulary concepts.</li> </ol> <p><b>Assessment:</b> Homework-students will be asked to define the vocabulary concepts to parents.</p>	45 minutes
<p><b>Guiding Question:</b> How does the rotation/revolution and tilt of the Earth effect daylight hours?</p> <p><b>Activity:</b>Brainpop movie Seasons Students will watch this movie as a class. A discussion about the movie will be held and the teacher will question the students about vocabulary is subsequent lesson.</p> <p><b>Assessment:</b> As a class, using the Smart Board, students will take the on-line quiz about the movie. We will also return to the KWL chart to document what we have learned.</p>	45 minutes
<p><b>Guiding Question:</b> Why are math concepts important when measuring daylight hours?</p> <p><b>Activity:</b> researching and documenting sunrise/sunset times for Anchorage, AK. Student roles: Recorder, investigator, calculator and Brain</p> <p><u>Investigator</u>-documents sunrise/sunset data from website. <u>Brain</u>-calculates elapsed time by hand (can use Judy clock) <u>Calculator</u>- checks the brain's answer using a tool. (calculator, excel algorithm, pencil and paper, and Judy clocks) <u>Recorder</u>-records information from website into excel</p> <p><b>Assessment:</b> Students will complete an on-going graph of sunrise and sunset times. Information may be obtained through the US Naval Observatory Applications Department at <a href="http://aa.usno.navy.mil/data/docs/RS_OneDay.html">http://aa.usno.navy.mil/data/docs/RS_OneDay.html</a></p>	<p>Year-long project group project. Five groups with four students per group. We will document sunrise sunset times for the previous year. We will complete summer months at the beginning of the school year to practice using Excel.</p> <p>As this unit progresses, students will be asked questions based on the graph. Please note that in the beginning, the questions are designed for guided instruction with a gradual movement to independent. These questions are designed for students to analyze the graph and construct meaning based on the data.</p>

<p>Essential Question: How do daylight hours affect natural resources and communities?</p> <p>Activity:</p> <ol style="list-style-type: none"> <li>1. As a class, we will define natural resource.</li> <li>2. students will refer back to KWL chart.</li> <li>3. Students will form groups of four and choose a topic from our KWL chart to research for a short (3 minute) i-movie. Students need to answer the question how do daylight hours affect us? Suggested topics will be fishing, agriculture, tourism, and SAD (seasonal affective disorders)</li> </ol> <p>Assessment: Students will be assessed on the final product (movie). See rubric.</p>	<p>16 one-hour class periods</p>
<p>Other Considerations</p>	
<p><b>Accommodations to be Inclusive of All Students:</b></p>	<ol style="list-style-type: none"> <li>1. a variety of learning modalities will be used to meet students individual needs</li> <li>2. diads or peer partners for peer teaching</li> <li>3. student interest for final product / flexible grouping</li> <li>4. learning centers</li> <li>5. tiered assignments</li> </ol>
<p><b>Author's Reflection:</b> <i>Why is this a good Unit?</i></p>	<p>A basic understanding of these concepts is important for future studies. These are reoccurring themes when studying many aspects of earth and physical sciences, not only in k-12 education, but at a collegiate level as well. A solid understanding at a young age of our Earth and sun and their relationship to one another, will assist students in building upon knowledge in order to construct knowledge on more difficult concepts about the relationship between the sun and earth.</p>
<p><b>Materials Needed:</b></p>	<ul style="list-style-type: none"> <li>• student computers</li> <li>• LCD projector</li> <li>• Smart board (for KWL)</li> <li>• Styrofoam balls</li> <li>• flashlight</li> <li>• Excel graphing template</li> <li>• Push pins</li> <li>• Subscription to Brainpop</li> <li>• Internet access or newspaper subscription</li> <li>• Community resources: example Ag in the classroom</li> </ul>
<p><b>Resources:</b></p>	<ul style="list-style-type: none"> <li>• US Naval Observatory Astronomical Applications Department <a href="http://aa.usno.navy.mil/data/docs/RS_OneDay.html">http://aa.usno.navy.mil/data/docs/RS_OneDay.html</a></li> <li>• Alaska Agriculture in the classroom <a href="http://www.alaskafb.org/~akaitc/index.html">http://www.alaskafb.org/~akaitc/index.html</a></li> <li>• Fish life cycles commercial and sport fishing information <a href="http://www.adfg.state.ak.us/pubs/notebook/notehome.php">http://www.adfg.state.ak.us/pubs/notebook/notehome.php</a></li> <li>• Unique Alaska resources for tourists <a href="http://www.commerce.state.ak.us/oed/student_info/learn/outdoors.htm">http://www.commerce.state.ak.us/oed/student_info/learn/outdoors.htm</a></li> <li>• Seasonal affective disorders (facts and myths) <a href="http://www.hss.state.ak.us/amhb/docs/Myths_and_Facts.pdf">http://www.hss.state.ak.us/amhb/docs/Myths_and_Facts.pdf</a></li> </ul>



K (what do I know?)	W (I want to know...)	L (What did I learn?)

Homework

Date:

Dear Parents,

We have been working on a sunrise and sunset graph for Anchorage, Alaska. As we document sunrise and sunset times, we have been learning about why Alaska has such drastic changes in light during the different seasons. Your child's homework assignment is to explain to you the following vocabulary concepts below using Styrofoam balls. Please initial each vocabulary word that your child can demonstrate and explain to you.

1. \_\_\_\_\_ rotate
2. \_\_\_\_\_ revolve
3. \_\_\_\_\_ axis

Thank you!

Sarah Petersen

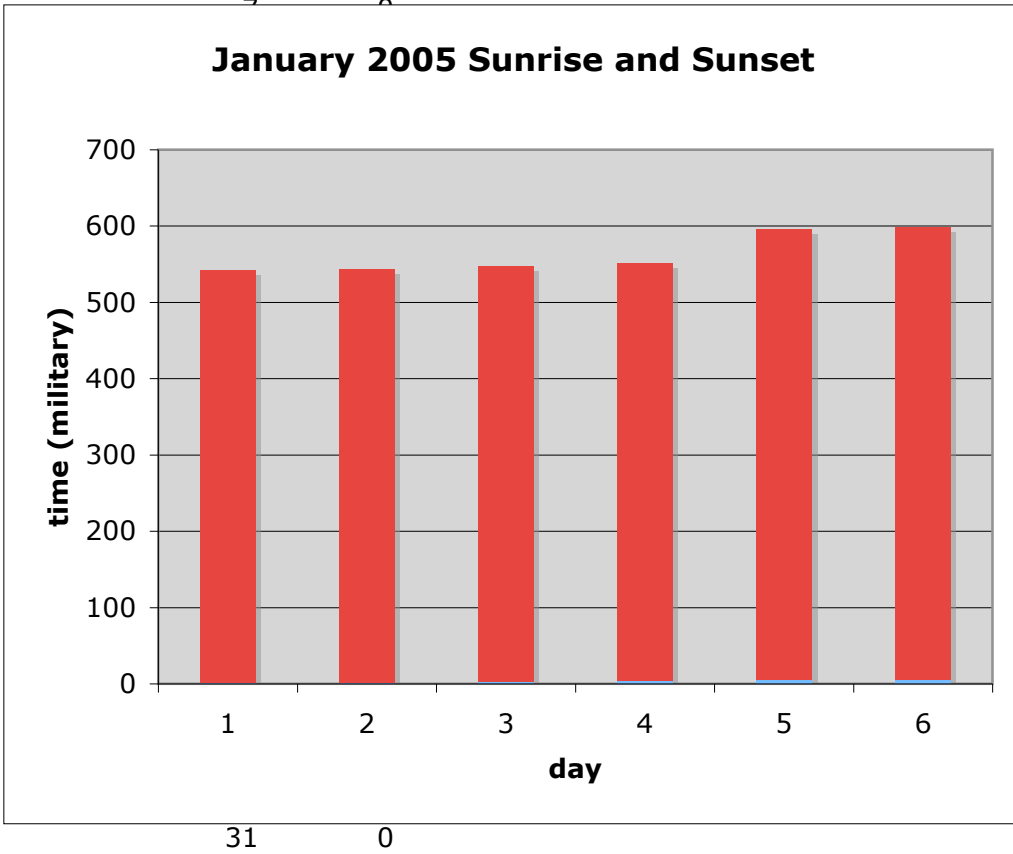
# Month

Day of Month	Length of Day	Sunrise	Sunset
1	0		
2	0		
3	0		
4	0		
5	0		
6	0		
7	0		
8	0		
9	0		
10	0		
11	0		
12	0		
13	0		
14	0		
15	0		
16	0		
17	0		
18	0		
19	0		
20	0		
21	0		
22	0		
23	0		
24	0		
25	0		
26	0		
27	0		
28	0		
29	0		
30	0		
31	0		



# Month

Day of Month	Length of Day	Sunrise	Sunset
1	541	1013	1554
2	542	1013	1555
3	545	1012	1557
4	548	1011	1559
5	591	1010	1601
6	593	1009	1602



# computer checklist

Name \_\_\_\_\_

Date \_\_\_\_\_

<b>Task</b>	<b>The student was able to....</b>	<b>Yes</b>	<b>No</b>
Log on the computer			
Open existing Excel template			
Create a new file from the template			
Insert data into Excel			
Save new information			
Create graph from Excel			
Add titles and important information to the graph			
Log off the computer			

# Graph comprehension questions

## Student interview questions

Student name \_\_\_\_\_

**Display only one month of data for students to answer the following questions.**

Date answered \_\_\_\_\_

Prediction:

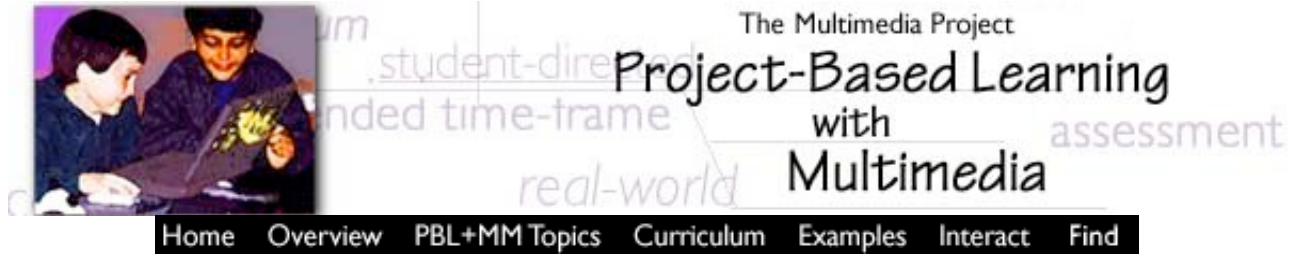
How much longer is the longest day of the year than the shortest?

1. In this month, which day had the least amount of sunlight? \_\_\_\_\_
2. Why do you think this was the shortest day?
  
3. Does the sun rise at the same time everyday? Why or why not?
  
4. Which day had the most daylight? \_\_\_\_\_
5. Why do you think this day was the longest?
  
6. Calculate the length of the longest day (student may use Judy clock). \_\_\_\_\_



**End-of-the-year graph data analysis. These questions can be asked in conjunction to previously asked questions.**

1. How much longer was the longest day of the year than the shortest day.
  
2. How does this compare to your estimate?
  
3. What is the shortest day of the year?
  
4. What was the longest day?
  
5. Is there a day that is equal in light and darkness? Is there more than one day?
  
6. Can you explain why days of equal light and dark occur?
  
7. Do you agree or disagree with the following statements and why or why not.
  - a. When it summer in the Northern Hemisphere it is winter in the Southern Hemisphere.
  
  - b. It is possible to see the sun at midnight in some parts of Alaska.
  
  - c. The sun affects peoples' lives.
  
  - d. I like all of the sun in the summer.



**Multimedia Project Scoring Rubric: Scoring Guidelines**

Score Levels	Multimedia	Collaboration	Content
	<i>The integration of media objects such as text, graphics, video, animation, and sound to represent and convey information. Videotapes which include sound and images fit this definition.</i>	<i>Working together jointly to accomplish a common intellectual purpose in a manner superior to what might have been accomplished working alone.</i>	<i>The topics, ideas, concepts, knowledge, and opinions that constitute the substance of the presentation.</i>
<b>5</b>	Students have used multimedia in creative and effective ways that exploit the particular strengths of the chosen format. All elements make a contribution. There are few technical problems, and none of a serious nature.	Students were a very effective team. Division of responsibilities capitalized on the strengths of each team member. The final product was shaped by all members and represents something that would not have been possible to accomplish working alone.	Meets all criteria of the previous level and one or more of the following: reflects broad research and application of critical thinking skills; shows notable insight or understanding of the topic; compels the audience's attention.
<b>4</b>	Presentation blends 3 or more multimedia elements in a balanced, attractive, easy-to-follow format. Elements include original student work. With minor exceptions, all elements contribute rather than detract from the presentation's overall effectiveness.	Students worked together as a team on all aspects of the project. There was an effort to assign roles based on the skills/talents of individual members. All members strove to fulfill their responsibilities.	The project has a clear goal related to a significant topic or issue. Information included has been compiled from several relevant sources. The project is useful to an audience beyond the students who created it.
<b>3</b>	Presentation uses 2 or more media. There are some technical problems, but the viewer is able to follow the presentation with few difficulties.	Students worked together on the project as a team with defined roles to play. Most members fulfilled their responsibilities. Disagreements were resolved or managed productively.	The project presents information in an accurate and organized manner that can be understood by the intended audience. There is a focus that is maintained throughout the piece.
<b>2</b>	Presentation uses 2 or more media, but technical difficulties seriously interfere with the viewer's ability to see, hear, or understand content.	Presentation is the result of a group effort, but only some members of the group contributed. There is evidence of poor communication, unresolved conflict, or failure to collaborate on important aspects of the work.	The project has a focus but may stray from it at times. There is an organizational structure, though it may not be carried through consistently. There may be factual errors or inconsistencies, but they are relatively minor.
<b>1</b>	Multimedia is absent from the presentation.	Presentation was created by one student working more or less alone (though may have received guidance or help from others).	Project seems haphazard, hurried or unfinished. There are significant factual errors, misconceptions, or misunderstandings.
	Multimedia score =	Collaboration score =	Content score =

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