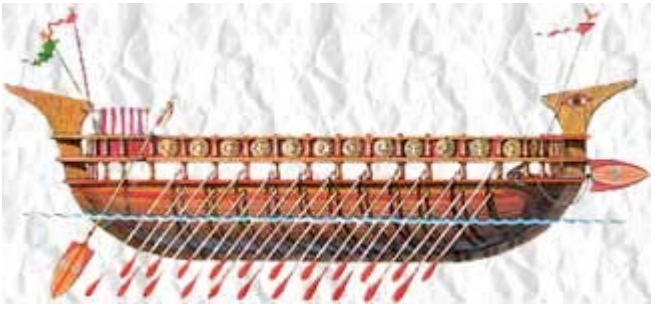
I've Seen the Light!



A Phoenician boat captain was enjoying the cool Mediterranean breeze as his boat sailed from Tyre to Carthage with another shipment of purple dye for the king. The 1200-mile voyage was not easy. The captain smiled to himself as he thought of the many boats from other nations that became lost at sea attempting to make this journey. He and his Phoenician counterparts had a leg up on the competition- they knew how to use the stars to navigate. The captain looked up at the night sky, noticing the stars to make sure he was on course. He was always amazed by the variety of stars, some blue and white, some yellow and red. Some bright, some faint.

We know today that the brightness of a star depends on several factors. One factor is the distance between the Earth and the star. These distances are difficult to measure, so they must be calculated. In order to calculate these distances, astronomers must first know the relationship between the intensity of starlight and the distance between the Earth and the star.

To solve this problem, we can use the problem-solving strategy of "solving a simpler problem." To do so, use a flashlight to simulate a star and use a light-intensity sensor to measure the intensity of the light for varying distances.

Attach a light sensor to your data collection device and graphing calculator. Run a program, such as the DataMate APP, that measures intensity of light to collect data. One person in the group should hold the light sensor as another person walks towards the sensor with the flashlight.

1. Use the light sensor to collect data in intervals of 0.1 meter. See ***Technology Tutorial: Using the CBL2 to Collect Light Data*** for detailed instructions if necessary. Record your data in the table.

Distance (*D*) (m)	**Intensity (*I*) (mW/cm^2)**	**Distance (*D*) (m)**	**Intensity (*I*) (mW/cm^2)**

2. Using an appropriate technology, generate a scatterplot of your data. Sketch your scatterplot.

3. Find an appropriate function rule to model your data. Test the rule over your scatterplot. Sketch your graph.

4. A plant will be placed 275 centimeters from the light source. What intensity of light will it receive? Justify your answer.

5. A particular solar cell needs to receive at least 0.4 milliwatts per square centimeter of light to generate enough electricity to power a small toy. How far from the light source should the solar cell be placed in order to begin powering the toy? Justify your answer.

I've Seen the Light!: Intentional Use of Data

TEKS		
Question(s) to Pose to Students	**Math**	
	Tech	
Cognitive Rigor	Knowledge	
	Understanding	
	Application	
	Analysis	
	Evaluation	
	Creation	
Data Source(s)	Real-Time	
	Archival	
	Categorical	
	Numerical	
Setting	Computer Lab	
	Mini-Lab	
	One Computer	
	Graphing Calculator	
	Measurement-Based Data Collection	
Bridge to the Classroom		