# Cities of the Aurora Math Essay

## *Overview:*

Students continue to develop the self-questioning process involved in writing a math essay, reading a sample math essay and identifying the transition within the essay.

## *Objectives:*

The student will:

- use the self-questioning process involved in writing a math essay;
- read a math essay;
- identify transition words in a math essay; and
- use self-questioning to determine what she/he knows and what she/he has been asked to find.

## *Materials:*

- Highlighters (one per student)
- REVIEW SHEET: "Calculation"
- REVIEW SHEET: "Location"
- STUDENT WORKSHEET: "Cities of the Aurora Math Essay"

## *Activity Procedure:*

1. After studying the REVIEW SHEETS: "Calculation," and "Location" as a class, distribute highlighters and the STUDENT WORKSHEET: "Cities of the Aurora Math Essay."
2. Remind students that a self-questioning process can be used to explain how math problems are solved. Ask students to complete the self-questioning process portion of the worksheet (questions 1-3) and then to discuss the two important questions: What do I already know? and What was I asked to find?
3. Explain that when completing a math essay, students must describe how they used what they already knew to find the answer. Transition words like first, second, and final can be helpful. Ask students to fill in the blanks within the math essay and highlight the transition words.

## *Answers to Student Worksheet:*

1. *percentage*
2. *365*
3. *How I found the number of nights the aurora was visible from each city.*
4. *The first step is to divide the percentage of nights the aurora was visible by 100. The second step is to multiply that number by 365 days. The final step is to round up to the next whole day.*
5. *The words first, second and final should be highlighted in the math essay.*

 

# Calculation

1. Complete the sentence by filling in the blank with one of the choices listed below.

   The number of nights people can see the aurora depends on the _____ at which they live.

   A) elevation B) latitude C) longitude

2. For each city listed below, translate the percentage of nights on which the aurora may be visible from a certain location into the number of nights the aurora is visible each year. Remember, the aurora is visible only when the sky is dark and there are no clouds.

| | City | Percentage of nights aurora is visible | Number of nights aurora is visible |
|---|---|---|---|
| A. | Chicago, Illinois | 4 | 15 |
| B. | Barrow, Alaska | 93 | _____ |
| C. | Churchill, Canada | 100 | _____ |
| D. | Fairbanks, Alaska | 85 | _____ |
| E. | Anchorage, Alaska | 40 | _____ |
| F. | Montreal, Canada | 10 | _____ |
| G. | Edmonton, Canada | 40 | _____ |
| H. | Winnipeg, Canada | 20 | _____ |
| I. | Arkhangel'sk (Archangel), Russia | 15 | _____ |
| J. | Ayanka, Russia | 10 | _____ |
| K. | Boston, Massachusetts | 5 | _____ |
| L. | Denver, Colorado | 3 | _____ |
| M. | Houston, Texas | 0.5 | _____ |
| N. | Los Angeles, California | 0.5 | _____ |
| O. | Tromso, Norway | 90 | _____ |
| P. | Kiruna, Sweden | 65 | _____ |
| Q. | Oslo, Norway | 10 | _____ |

**Note:** The complete "Cities of the Aurora" activity can be found in Unit 5 of the *Aurora Alive* Teacher's Manual.

 

# Location

1. Circle the answer: How did Elias Loomis figure out that auroral displays circle Earth's North Pole?

   A) He reviewed satellite images.

   B) He watched the night sky, recorded where he saw the aurora, and pinpointed those places on a map.

   C) He flew around the aurora oval in a plane.

2. Like Elias Loomis, use the color key and STUDENT WORKSHEET: "Calculation" to create four rings around the North Pole. Each ring should connect cities from which the aurora can be seen the same number of nights each year.


| Number of nights aurora is visible | Color |
|---|---|
| over 250 | green |
| 50-250 | orange |
| 5-49 | blue |
| below 5 | pink |

**Note:** The complete "Cities of the Aurora" activity can be found in Unit 5 of the *Aurora Alive* Teacher's Manual.

 

**Name: _____** **Student Worksheet**

# Cities of the Aurora Math Essay

**Directions:** Words can be used to explain how math problems are solved. This skill is helpful when solving difficult math problems. The exercises below will guide you in writing a math essay. Fill in the blanks below with the appropriate words or numbers. In the Math Essay, highlight the transition words: first, second and final.

## *Question:*

How did you find the number of nights the aurora was visible from each city?

## *Answer:*

*What do I already know?*

**I know:**

1. The _____ of nights the aurora is visible.
2. There are _____ days in a year.

*What was I asked to find?*

**I was asked:**

3. How I found the _____ of nights the _____ was visible from each city.

## *Math Essay:*

4. Complete the Math Essay below by filling in the blanks.

The first step was to divide the _____ of nights the aurora was visible by _____. The second step was to multiply that number by _____ days. The final step was to round up to the next whole day.

5. Highlight the transition words in the Math Essay above.

 