Graphin' and Glyphin' Utah Weather

Summary

Students will use glyphs as a way to visually represent information about Utah weather.

Materials

- Rubric for Glyphs and Graphs
- Utah Weather Glyphs worksheet
- Weather Glyph Questions transparency
- Utah Weather Map Cities

 <u>Utah Weather Map transparency</u> Crayons/colored pencils and scissors for each student Tape

Optional:

Large topographic Utah map Additional Resources Book

- Weather Detectives
- , by Mark Eubanks; ISBN 1-58685-412-7

Organizations

Agriculture in the Classroom has many lessons that correlate with the core. They send a seasonal newsletter that includes new lessons to anyone who registers., www.agclassroom.org/ut

Background for Teachers

Utah's climate is variable. In the southwestern regions crops like cotton can be grown, while in the higher elevations of northern Utah, only grasses and cereal grains are cultivated. We experience almost every weather phenomena with the exception of hurricanes. The climate in the most populated parts of the state is generally temperate, with daytime temperatures that are warm and not too hot in the summer. Winter temperatures are cold but seldom extreme. Snowfall in the valleys does not accumulate extensively, while in the mountains snow builds to great depths, providing water for domestic use. Most of Utah is considered a desert with less than 10 inches of precipitation a year, while the mountainous regions receive significantly more.

The Great Basin is a region between rivers and lakes that is bordered on the west by the Sierra Nevada and the Cascade Mountain Ranges and on the east by the middle Rocky Mountains and the Colorado Plateau. The basin encompasses most of the state of Nevada, while Utah is dominated by the Wasatch Mountains and the Colorado Plateaus of the central portion of the state. The Great Basin is cut off from the westerly flow of Pacific moisture by the Sierra and Cascade Mountains. As the moist air masses from the ocean move west, they cool and lose much of their precipitation before they cross Nevada. As a result, Nevada is the driest state in the nation. The dry steppe climate is typical of large basins, where the potential for evaporation exceeds precipitation throughout the year. Utah's distinct geography defines its unique climate. Utah is the second driest state. By the time the air masses reach the Basin's eastern edge they get another lift, creating extra moisture and highland climates that support Utah's most populous region along the Wasatch Front. High-level, low pressure systems affecting our state's weather in the spring and fall are often referred to as "Great Basin" or "Nevada" lows. These lows bring the most significant amounts of precipitation every year. Glyphs are a way to pictorially represent information. These nonverbal representations help students collect and interpret data in a visual format. The idea of glyphs comes from ancient hieroglyphics.

They bring a creative and fun method to data collection and analysis into the classroom. This activity uses glyphs as a way to visually represent information about Utah weather. Modified and used with permission of Utah Agriculture in the Classroom, Utah State University, [online] <u>www.agclassroom.org/ut</u>.

Intended Learning Outcomes

- 5. Make mathematical connections.
- 6. Represent mathematical situations.

Instructional Procedures

Invitation to Learn

Ask students to draw a picture of themselves enjoying an outdoor activity in July and in January. "How will I know which picture is January and which picture is July?" Share and discuss with the class possible indicators of these seasons. Clarify any confusion that may exist. Invite individual students to share their drawings.

Instructional Procedures

This activity requires advanced preparation. The day before you make the glyphs with your students, complete the first step of this activity.

Using the *Utah Weather Map*, invite the students to select a specific city from across the state. You may choose to assign these locations to assure that a statewide representation is available for analysis. You may also wish to print a transparency of the <u>Utah Weather Map</u> for use on an overhead projector.

Glyphs (symbols used to convey meaning) are easy to create and help students with step-bystep process skills. To introduce glyph-making use an overhead projector and model what you want students to do. Post the selected glyph shape for students to see. Read aloud each survey question, adding your own picture detail to the glyph shape after each question. Seeing the glyph being made will help students understand the construction process. After students have heard all the survey questions and watched you use your answers to create a glyph, they will be ready to begin their own glyphs.

Provide each student a copy of the <u>Utah Weather Glyph</u> worksheet and each pair of students the Utah Weather Map. Post the <u>Weather Glyph Questions</u> transparency on an overhead projector.

Review the background information with the students. You may wish to emphasize that this activity will allow them to see the differences in the types of weather throughout the state. Have the students cut out the pattern following the directions on the *Weather Glyph Questions* transparency. Students should check with the teacher before cutting the line for the size of the sun in question one. It is recommended that students use a black marker to add the glyphs for average January temperature.

Invite students to add the remaining details to their glyphs to show their answers to the questions. Students can also personalize their glyph if it does not interfere with the interpretation of the data.

Once the glyphs are complete, have the students display them in a central location. Ask them to describe how these glyphs could be sorted to collect the data from them. You may choose to write these suggestions on a chalk or white board. As an extension, students can create displays using their own ideas.

Display the *Utah Weather Map* on the overhead projector. Have the students organize the glyphs by their locations on the map and tape them to the wall.

Review the *Weather Glyph Questions* with students and have them verbally describe what information is available from the glyphs to provide an overview of Utah weather patterns. Ask

the students to describe what physical geographic features may be influencing the climate at various locations.

Using another wall (or white board), form a basic outline for a bar graph. Ask the students to organize the cities with a 50-60° range in high and low temperature in one bar, those with 61-70° ranges on the second bar, and those locations with 71° or higher degree ranges in high and low temperatures in the third bar.

Ask the following questions: What similarities do they notice about the cities that are in the same category? Does the geography of the locations determine the climate? Does the weather define what kinds of jobs are available in that community? Why would someone consider the weather of a particular area when deciding to start a business or move their business to a new area?

Ask students to determine if their city's climate would encourage or discourage them from certain types of agriculture and activities. Why would it be possible to grow apples in some parts of Utah, but not others? What types of risks do farmers face with regard to the weather? What things can farmers do to work with the weather? Can you ski everywhere in Utah? How about hiking in March? How does the weather affect our daily choices about activity? How does it affect wildlife? Record these answers on a chart in a journal.

Relate to students the importance of determining the climate before planting a garden or crop, raising livestock, planning outdoor activities, and dressing.

Have pairs of students present their glyph information in another graphical form not previously shown, such as a pie chart or line graph or pictograph.

Extensions

Place the glyphs in a basket. Ask each student to select one glyph from the basket, and using the data from the glyph, list the items s/he would pack if traveling to that city today. What activities would s/he be able to do? For example, if the weather is 50°F (10° C) and rainy, a student might list a jacket, blue jeans, a sweatshirt, and an umbrella. S/he may suggest indoor activities. If it's 80°F (27°C) and sunny, the list might include shorts, a T-shirt, a tennis racket, and a bathing suit, and going for a swim. Remind students to consider the daytime and evening temperatures when packing for their trips.

Ask students to gather data about the city they live in for a oneweek period of time. They may use the <u>Weather Data Analysis</u> and <u>Data Charts for Weather Forecasting</u> handouts to record their data. Challenge them to create line graphs using their data.

Invite students to research weather conditions for cities in other parts of the world. Have them create glyphs for these cities, and then list what types of advantages and disadvantages that area may have if they were trying to grow a crop or raise livestock.

Students can create displays with the glyphs using their own ideas about graphing and charting. Family Connections

Students create a chart in which they draw their own glyphs for the day's weather over a week. Then record how the weather affected their choices for after school activities and how it may have affected their family in any way. Students can find weather information on the television news, computer, or newspaper.

Assessment Plan

- <u>Rubric for Glyphs and Graphs</u> Teacher observation

Bibliography Research Basis Heidorn, P.B. (1999). Image Retrieval as Linguistic and Nonlinguistic Visual Model Matching. *Library Trends*, 48(2), pp.303-325.

The article reviews the research on how people use models of images in an information retrieval environment. The article describes the human use of images (nonverbal representations) as predating human language and explains that language evolved out of a need to communicate about the world. Verbal language is limited in that it is dependant on a shared experience or shared vocabulary. Some aspects of our mental models are not easily described using words. For example, our brains perceive millions of color indexes and we only have relatively few color names. Some iconic representations are simple and some can be more complex. Our mental models have many aspects including color and shape. These images can be more complex than verbal representations. Some images are content- based, while others are concept-based. It has been suggested that nonlinguistic representations may be used in conjunction with linguistic representations as determined by the task.

Authors

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