Journey to Africa: Rainfall or Drought

Students create box plots showing desertification.

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Grade Level	6-7
Duration	2 class periods

National Geography Standards

ELEMENT ONE: THE WORLD IN SPATIAL TERMS

1. How to use maps and other geographic representations, tools, and technologies to acquire, process, and report information from a spatial perspective.

ELEMENT THREE: PHYSICAL SYSTEMS

7. The physical processes that shape the patterns of Earth's surface.

ELEMENT SIX: USES OF GEOGRAPHY:

18. How to Apply Geography to Interpret the Present and Plan for the Future

Arizona Geography Strand

Concept 1: The World in Spatial Terms

PO 1. Construct maps, charts, and graphs to display geographic information.

PO 3 Interpret maps, charts and geographic databases using geographic information.

CONCEPT 6 Geographic Applications

PO 3 Use geographic knowledge and skills when discussing current events.

Other Arizona Standards

Mathematics Common Core Standards

The Number System

6.NS.C.6. Understand a rational number as a point on the number line. Extend number line diagrams and coordinate axes familiar from previous grades to represent points on the line and in the plane with negative number coordinates.

c. Find and position integers and other rational numbers on a horizontal or vertical number line diagram; find and position pairs of integers and other rational numbers on a coordinate plane.

Statistics and Probability

6.SP.A.2. Understand that a set of data collected to answer a statistical question has a distribution which can be described by its center, spread, and overall shape.

6.SP.B.4. Display numerical data in plots on a number line, including dot plots, histograms, and box plots.

6.SP.B.5. Summarize numerical data sets in relation to their context, such as by:

a. Reporting the number of observations.
b. Describing the nature of the attribute under investigation, including how it was measured and its units of measurement
c. Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered.

7.SP.A.1. Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population. Understand that random sampling tends to produce representative samples and support valid inferences.

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Strand 2 World History
Concept 9 Contemporary World
Grades 7

PO 3. Analyze how world events of the late 20th century and early 21st century (e.g., terrorism, globalization, conflicts, interdependence, natural disasters, advancements in science and technology, environmental issues) affected, and continue to affect, the social, political, geographic, and economic climate of the world.

Overview

Students can compare many sets of data at once. Desertification is difficult to visualize, but with stem-and-leaf and box plots correlations between data are easily recognized.

Purpose

In this lesson, students will learn how to make stem-and-leaf and box plots and how to analyze data from them. Students should be able to see the relationship between the Sahel, desertification, and the area around the equator by comparing the rainfall.

Materials

- African Regions map
- African Regions and 7 Cities map
- Tables of monthly temperature and precipitation
- Self-adhesive notes
- Stem-and-Leaf Instructions
- Journey to Africa: Stem-and-Leaf Diagrams and answer key
- Stem and Leaf for Bamako
- Questions and Answers about the Stem-and-Leaf Charts
- Number lines for 7 Cities for Box Plots and key
- Guided Practice for Box Plots Student Worksheet
- Analysis Questions for Box Plot and key

Objectives

The student will be able to:

1. Construct stem-and-leaf and box plots from data about rainfall in different African cities.

2. Analyze stem-and-leaf and box plots by answering various questions.

3. Understand the effects of rainfall on regions of Africa.

Procedures

Prior to this lesson, students can complete the lesson Desertification: Cause and Effect , a GeoLiteracy lesson.

Prerequisite knowledge: students should have understanding of how to find median and mode.

SESSION ONE

1. Distribute the Tables of monthly temperature and precipitation data for 7 cities in Africa and the African Regions map that shows the Sahel.
2. Have students place the cities on the map using the longitude and latitude coordinates of each city.
3. Draw a stem (vertical line on the board) and give each student 3 self-adhesive notes and see Stem-and-Leaf Teacher Instructions.
4. Write the precipitation data for Bamako on the board including all 0's. (Total of 12 numbers) Have a student put the data for Bamako in descending order.

5. Have each student write each digit of the given numeral on separate notes. Have the students place the notes on the stem according to the tens place in ascending order until all 12 pieces of data is placed. Then place all the ones on the leaf side.
6. Remove the extra "stems" (tens digits) until one is left to visually demonstrate that only one is needed. Leave all the ones (leaves). (Do not take them off.)
7. Create a title and key for stem and leaf plot. Title: Bamako's Rainfall Over 12-Month Period. Key 2/1 = 21. Have students complete the rest of the cities in terms of stem and leaf plots.
8. End with a discussion using Questions and Answers about the Stem-and-Leaf Charts.

SESSION TWO
8. Distribute the step-by-step Guided Practice for Box Plot Student Worksheet and Number lines for 7 Cities for Box Plots to students.
9. Project Guided Practice for Box Plots Student Worksheet and work the Accra example with the students. Keep the stem and leaf (from Session One) on the board so students can refer to it as you work your box plot.
10. Have students work on the other cities in groups. When students are finished distribute the Analysis Questions on Box Plots.

Assessment

Grade students' box plots for each of the cities and grade the stem-and leaf practice for math correctness. A score of 80% or higher is considered mastery.

Grade the Analysis Questions on Box Plots. Questions 3B, 6, 7, 8, and 9 measure geography concepts. Questions 1, 2, 3A, 4, and 5 measure math concepts. A score of 80% or higher is considered mastery.

Extensions

Students can make a climograph of each of the 7 cities.

Students should be able to see the relationship between the Sahel, desertification, and the area around the equator by comparing the rainfall. Have students complete a paragraph describing this relationship.

Sources

http://mecometer.com/topic/average-yearly-precipitation/