Patterns Around Us

Summary

Life contains patterns all around us consisting of three characteristics--a motif, repetition, and organization. In this unit students will learn about how patterns are used in Spanish, Science, Art, and Math.

Time Frame

10 class periods of 60 minutes each

Group Size

Small Groups

Life Skills

Thinking & Reasoning, Communication, Social & Civic Responsibility, Employability

Materials

Math

- Mini-lab of 3 computers. Each computer is setup on the Virtual Patterns hotlist website. Students will choose three different websites to explore.

Science - Teachers will need to print the Science Activity Station instructions. Students will need access to a computer. They will also need the associated worksheets--temperature tracking handout and world map.

Spanish - Teacher will prepare the Verb Conjugation flashcards located as an attachment. These will need to be laid out, face down at the station. Teacher must also print out the station instruction sheet,(see attachment), and place it at the station for the students to follow.

Art - Each student will need a cardstock square to make a tessellation pattern, 8 1/2 x 11 grid paper, scissors, pencil, crayons, and tape. The tessellation instructions will be available for reference at the learning station.

Background for Teachers

Math

- Teachers should preview the hotlist websites to make sure the plugins for Java, Flash, and Quicktime work correctly.

Science - Teachers should be familiar with using the internet to find weather information from different locations around the world. A very simple way to do this is type in "weather:location" in the Google search engine.

Spanish - Teachers should understand the concept of conjugating in English (the verb "to be" best illustrates this, i.e. I am, you are, he is, etc.). The teacher should also know how to conjugate regular "ar" verbs in the present tense.

Art - Teachers should understand the concept of tessellating with a slide and nibbling technique.

Student Prior Knowledge

Math

- Students should know how to navigate a website and use a mouse to drag and drop, rotate, highlight, and move objects.

Science - Students should have basic internet browsing skills. They should be able to read a map and plot cities theron. Students should also be able to add two and three digit numbers and find the

average of a group of numbers.

Spanish - The students have previously learned what a verb conjugation is in English, and the pattern for conjugating regular "-ar" verbs in Spanish.

Art - Students should have previous experience with tracing a pattern, taping objects together, cutting and coloring.

Intended Learning Outcomes

Math

- Students will be able to use problem solving techniques to organize colors, numbers, or geometric shapes to form a pattern.

Science - Students will recognize the pattern associated with the location of a city, its temperature, and its distance from the equator.

Spanish - Students will correctly conjugate regular AR verbs in the present tense.

Art - Students will be able to change a simple geometric shape (square)by using a slide and nibbling technique into another shape, and then organize the new shape into a tessellating design.

Instructional Procedures

Math

- Teacher: Open the hotlist and have the students select at least three different websites that demonstrate how to make patterns.

Science -

Instruct students how to use Google to find out the temperature of a location. Give them some time to have fun with this Google function (weather:location) and allow them to find the weather of their favorite destinations;

Pass out the temperature tracking worksheet (Temperature Tracking Handout). Inform students that we will be tracking the weather of ten different cities for ten consecutive school days. Instruct students to record their findings on their worksheet. Be sure to make sure they are consistent in their use of measurement (always use Celsius or always use Farenheit). At the end of ten days, help students find the average temperature for each location.

Teacher will pass out a copy of the world map (see handouts);

Help students locate and mark on their maps the following locations:

Calgary, Canada Moscow, Russia, Osorno, Chile, Fargo, North Dakota, Miami, Florida, Nairobi, Kenya, Hobart, Tasmania, Wichita, Kansas, Beijing, China, Gaborone, Botswana.

Help students draw in the equator on their map;

Instruct students two write the average temperature next to each city;

Lead a discussion about their findings, using questions/prompts such as:

What do you notice about the temperatures of the cities?

Is their a relationship between location of the city and the temperature? What patterns do you notice?

Spanish

- Students will divide into two teams and play "Memory" with the flashcards. The objective is to match the subject with its correctly conjugated verb form. See the Flashcard Instruction sheet under materials above.

Art - Using the square of cardstock, students will follow the instructions and diagrams on the instruction sheet to create a tessellation pattern. After creating the pattern, students will trace the pattern onto the grid paper making a tessellation.

Strategies for Diverse Learners

Math

- Students should practice patterns on only one section of the website.

Science

- Advanced Learners

Students can choose the cities that they will track. The teacher can give them a handout with blank spaces for the cities;

Students can graph their results;

Students can find locations that seem to break the "pattern" (cities near the equator that are unusually cold, or cities far from the equator that are unusually warm), and develop a hypothesis as to why these cities don't follow the pattern

- Challenged Learners

Work in small groups;

Give a smaller amount of cities to track;

Allow the use of a calculator to find out the average temperature.

Spanish

- The teacher can adjust the number of cards to be used and the difficulty of the verbs to target advanced students or struggling students.

Art Students can make a tessellation with more than one slide transition.

Extensions

Math

- Students could use virtual manipulatives for learning fractions and algebra.

Science - Students can graph their findings on graph paper; this can tie into the math lesson on taking an average;

Spanish - For an extension activity, the station can also be provided with blank flashcards. The students must prepare their own "Memory" cards and play again using these cards.

Art - Students could make tessellations using reflection or rotation techniques. Students could also make the tessellation shape into a picture by drawing in details.

Assessment Plan

Science

- Students' worksheets will be completed, averages conducted, and maps filled out.

Art - Students will be provided with a rating scale and checklist and asked to give themselves a grade (1-4)for how well they understood the concepts related to tessellations.

Spanish -

Teacher writes the verb "cominicar" and the sentence "Nosotros ______ (hablar) espanol." on the board.

Each student must write a full conjugation for the single verb, and fill in the blank of the sentence with the correct conjugation, on their own paper.

Teacher picks several students to write their answers on the board, and gives them markers. Teacher also verifies that each student is correct by roaming the room and looking at their answers.

Rubrics

Patterns Activity Participation Assessment

Bibliography http://nlvm.usu.edu http://mathcentral.uregina.ca http://www.exploratorium.com

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