# Frieze Patterns from Around the World

By Rebecca Bursott

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| **Description:** | Students will use http://www.loc.gov to research and analyze frieze patterns from around the world. |
| **Subject:** | Mathematics |
| **Duration:** | 50 min |
| **Grade Levels:** | 9-10 |

**Standards:**

| Standards | |
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| **IL-9.A** | STANDARD: Demonstrate and apply geometric concepts involving points, lines, planes and space. |
| **IL-9.A.5** | > Use geometric figures and their properties to solve problems in the arts, the physical and life sciences and the building trades, with and without the use of technology. |
| **IL-9.A.4b** | > Make perspective drawings, tessellations and scale drawings, with and without the use of technology. |
| **IL-9.B** | STANDARD: Identify, describe, classify and compare relationships using points, lines, planes and solids. |
| **IL-9.B.4** | > Recognize and apply relationships within and among geometric figures. |
| **IRA-5.6** | ...promote the integration of language arts in all content areas |
| **IRA-8.1** | ...provide opportunities to locate and use a variety of print, nonprint, and electronic reference sources |
| **NCTM-S-COM.9-12.8.1** | STANDARD: Organize and consolidate their mathematical thinking through communication [Communication] |
| **NCTM-S-COM.9-12.8.2** | STANDARD: Communicate their mathematical thinking coherently and clearly to peers, teachers, and others [Communication] |
| **NCTM-S-COM.9-12.8.4** | STANDARD: Use the language of mathematics to express mathematical ideas precisely [Communication] |
| **NCTM-S-CON.9-** | STANDARD: Recognize and use connections among mathematical ideas [Connections] |

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| **12.9.1** | |
| **NCTM-S-CON.9-12.9.2** | STANDARD: Understand how mathematical ideas interconnect and build on one another to produce a coherent whole [Connections] |
| **NCTM-S-CON.9-12.9.3** | STANDARD: Recognize and apply mathematics in contexts outside of mathematics [Connections] |
| **NCTM-S-GEO.9-12.3.1** | STANDARD: Analyze characteristics and properties of two- and three-dimensional geometric shapes and develop mathematical arguments about geometric relationships [Geometry] |

| **Resources** | |
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| | **www.loc.gov**<br><br>Library of Congress website |

| **Details** | |
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| **Objectives:** | Students will be able to identify frieze patterns in art and architecture from around the world.<br><br>Students will learn how distinct civilizations are linked by their use of geometry to express themselves and to beautify their world.<br><br>Students will create their own frieze pattern to express their individuality. |
| **Activities:** | Ukrainian painted eggs, dollar bills, Native American pottery, Japanese kimonos, automobile tire treads, and African cloth are products of vastly diverse cultures, but these things all have something in common. They contain strips of repeating patterns, called frieze patterns.<br><br>In the lesson, you will explore the underlying relationships among frieze patterns from around the world and create one of your own.<br><br>Go to http://www.loc.gov and click on *Especially for ...* |

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| | *Researchers*<br><br>click on *Researcher Centers* and follow links until at<br><br>http://www2.spsu.edu/math/tile/grammar/index.htm this is a website that has pictures of tilings from around the world with historical significance.<br><br>Choose a country, then choose a particular pattern.<br><br>Use the flow-chart in the after reading activity to analyze the type of frieze pattern it is. Then research further the significance of the pattern to the country's culture. Include other art forms found in that culture that relate to your frieze.<br><br>Next, use Geometer's Sketchpad software to create your own frieze pattern. Use the flow-chart to categorize your pattern and answer the question at the bottom of the page.<br><br>Students will then do reciprocal teaching with their parents explaining the types of transformations and how they relate to their project. This will reinforce their learning of the content by teaching someone else. |
| **Assessments:** | Students will present their frieze pattern from a different country. They will also present their findings on the type and significance to the culture based on their research.<br><br>Scoring will be based on attached rubric.<br><br>Student will display their projects in the classroom for parent-teacher conferences. |
| **Adaptations:** | Accommodations may be made for exceptional learners.<br><br>Students needing extra help may be paired with another student to work corroboratively.<br><br>Students needing more of a challenge may create a three-dimensional frieze pattern. |