

**Pennsylvania Governor's Institute
for Mathematics Educators
2004**

Names of Group Members: Diane Clark, Michele Huey, Betsy Neal

Topic/Theme: Origami Frogs

Level: 5

Time Element: 5 days

NCTM Standards Addressed:

Grades 3-5 Geometry: 1. identify, compare, and analyze attributes of two- and three-dimensional shapes and develop vocabulary to describe the attributes;

Grades 3-5 Geometry: 4. explore congruence and similarity;

PA Math Standards Addressed:

2.3.5.B Select and use standard tools to measure the size of figures with specified accuracy, including length, width, perimeter and area.

2.3.5.C Estimate, refine and verify specified measurements of objects.

2.9.5.D Describe in words how geometric shapes are constructed.

2.9.5.L Identify properties of geometric figures (e.g., parallel, perpendicular, similar, congruent, symmetrical).

Math Assessment Anchors Addressed: ASSESSMENT ANCHOR

M5.B.1 Demonstrate an understanding of measurable attributes of objects and figures, and the units, systems and processes of measurement.

M5.B.2.1 Use appropriate tools to determine measurements.

M5.C.2.1 Analyze transformations and/or use symmetry to analyze mathematical situations.

Reference: 2.9.5.K, 2.9.5.L

Reading Assessment Anchors Addressed:

R5.A.2 Demonstrate the ability to understand and interpret nonfiction texts including informational, e.g., textbooks and print media (magazines, brochures, etc.); autobiography; biography appropriate to grade level.

Objectives: Students will be able to create an origami frog and estimate as well as measure the distance it jumps. Students will develop and share a PowerPoint presentation based on research information about frogs.

Instructional Strategies and Plan (include strategies used to help different types of learners, i.e. auditory, visual, etc.):

- As an introduction to this topic, teacher will display a completed origami frog and discuss this Japanese art.

- Students will receive a square paper and will follow step-by-step directions necessary to make an origami frog. (See web site for “enchantedlearning” below)
- As the presentation progresses, the following review vocabulary will be discussed at the appropriate times; square, diagonal, opposite, perpendicular, similar, congruent, intersecting lines, line of symmetry, bisect, half, acute, obtuse, isosceles, triangle, right triangle and trapezoid.
- Students will receive another piece of paper to demonstrate their ability to individually create an origami frog. (For challenged students there will be picture representation of each step in the process.)
- Each student will develop a PowerPoint presentation based upon rubric criteria using their researched information. Teachers can create their own rubrics using “rubricmaker.com” based on student’s needs and abilities.
- An assessment rubric for the PowerPoint presentation will be given to assist the students to meet the criteria for the project.
- Students will research (independently or with a partner) various types of frogs from different mediums, including but not exclusively; internet sources, magazines, and factual books.
- PowerPoint presentations will be shared with the class.
- Experimenting with different paper sizes, weights, and colors, the students will develop new origami frogs in order to compete in the Big Frog Race.
- On the day of the race, students will first estimate how far their frog can jump in five hops. After practicing a few frog hops, they may revise their estimations. Next, the competition will proceed. Finally, the students will measure the total distance that their frogs hopped in five consecutive hops using both standard and metric units.

Materials/Resources:

Paper of different sizes, weights, textures and colors, standard and metric rulers, PowerPoint on computers, research factual books, magazines and internet sites, origami frog directions:

<http://www.enchantedlearning.com/crafts/origami/frog/index.shtml>

Interdisciplinary Connections:

- **Reading:** Research nonfiction text, such as; textbooks, magazines, brochures and internet web sites to find information on different types of frogs for their PowerPoint presentations.
- **Technology:** Creating a PowerPoint presentation on various types of frogs. Web sites to visit include:
<http://www.seagrant.wisc.edu/search/sgsearch.asp>

<http://www.frogsonice.com/froggy/origami/index.shtml>
<http://www.froggyville.com>

- **Other:** Science-What's Inside- (virtual dissecting of frogs) [URL:](http://curry.edschool.Virginia.EDU/go/frog/menu.html)
<http://curry.edschool.Virginia.EDU/go/frog/menu.html>
- <http://www.atozteacherstuff.com/go/jump2.cgi?ID=1188>

Assessment Strategies:

- **Formative Evaluation (checking student understanding during the lesson):** Teacher observations will include correct frog construction and following directions. Teacher will also examine student's abilities to reasonably estimate and measure the distance that the frogs moved. Through oral questioning, teacher will assess correct usage of vocabulary terms.
- **Summative Evaluation (how will it be determined that the objectives were achieved?):** Students will present their origami frog, PowerPoint presentation, revised estimations and final measurements in standard and metric units.

Correctives/Remediation:

- Teacher could provide a pre-folded origami frog for students to reconstruct the folds.
- The folds could be labeled, numbered, or color coded to provide success for the struggling student.
- Teacher could provide a sequenced set of picture cue cards that are easily downloaded from the recommended website in the resource section.
- Teacher could allow students to work with a buddy throughout the entire project.

Extensions/Enrichment:

- Create a table or graph displaying the results of the distance that their frog jumped
- Find the mean, median, mode and range of the jumps
- Read **Grandfather's Tangs Story** by Ann Tompert
- **Origami Math** by Karen Baicker from Scholastic
- Create other origami objects
- Visit the virtual dissecting web site previously listed

Special Accommodations (special needs students)

- **Description of the Special Needs Student Selected:**
Case Study #1
- **Difficulties in:**
 - Language comprehension
 - Event sequencing
 - Working memory
 - Following directions
 - Three years below grade level
 - Vocabulary
- **Accommodations to Use with this Student:**
 - * Preview vocabulary
 - * Chunk and model step-by-step directions
 - * Pictorial visual aid
 - * Work with a buddy
 - * Individual word wall including pictures