



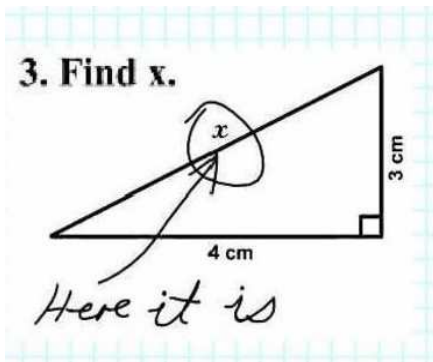
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Answer from a student  
on a math exam.

# Teachers Workshop

*“Information for everyday teaching”*

## Math in Motion: Origami For the Classroom K-8 *Every Child Counts!*

by Barbara Pearl, M.A.

### *Folding to Learn - Teaching Mathematics with Manipulatives*

*In reality, no one can teach mathematics. Effective teachers are those who can stimulate students to **learn** mathematics. Educational research offers compelling evidence that students learn mathematics well only when they **construct** their own mathematical understanding (Everybody Counts: A Report to the Nation on the Future of Mathematics Education National Research Council 1989, 58).*

Educational research findings from cognitive psychology and mathematics education indicate that learning does not occur by passive absorption and imitation (Lampert & Cobb, 2003). Rather, learning occurs as students actively assimilate new information and experiences and construct their own meanings. As parents and educators, we are always looking for ways to teach and improve basic reading and math skills, develop critical thinking and problem solving skills, foster cooperation and socialization, and introduce our students to different cultures. An ideal lesson might strive to achieve all of these goals and take a form so appealing that children of all ages are eager to learn. Origami, (paper folding) is a manipulative that helps children understand math concepts. Hands-on learning or learning by doing keeps the students' attention as they naturally want to play with and explore objects. When children can touch and move paper models when learning new skills, their senses are involved in the learning experience. Learning with understanding is essential to enable students to solve the new kinds of problems they will inevitably face in the future (National Council of Teachers of Mathematics, Principals and Standards for School Mathematics [NCTM] 2000).

In Japan, children learn origami at home and in kindergarten. When I was invited to Japan to present Math in Motion workshops, I observed the teacher supply room was stacked with origami paper squares the way our rooms are filled with construction paper. Friedrich Fröbel, a German educator who founded the kindergarten system in the 1800s, used origami to familiarize children with geometric shapes. Some other famous European paper folders include Leonardo da Vinci and Lewis Carroll. Today, many schools in the West integrate origami into the classroom. Research has shown that paper folding, particularly in the elementary school years, is a unique and valuable addition to the curriculum (Sze, 2005). Origami is not only fun, it accommodates a variety of learning styles that helps children understand math and is an innovative method for developing educational, cultural, and social skills.

Visit [www.teachersworkshop.com](http://www.teachersworkshop.com)



Barbara Pearl is an award winning educator, international speaker, and the author of *Math in Motion: Origami in the Classroom* and *Whale of a Tale*. She graduated with honors and a 4.0 GPA from LaSalle University with a Masters in Education.

Ms. Pearl developed Math in Motion while working as a classroom teacher. As a former elementary, middle and high school teacher, her background in mathematics and education inspired her to explore "active learning" techniques and strategies that accommodate a variety of learning styles and get teachers, students and families excited about mathematics and learning.

Barbara's work has received international recognition and she is recognized around the country for her *inspiring* and *motivational* programs that promote a "positive message" about mathematics and learning.

**To arrange for Barbara Pearl to present at your school please contact the Teachers Workshop at 800-991-1114.**

## Wacky Definitions

- Egotist: someone me-deep in conversation
- Antique: An item your grandparents bought, your parents got rid of and you're buying again
- Handkerchief: cold storage
- Committee: a group that keeps minutes and wastes hours
- Mosquito: an insect that makes you like flies better
- Heroes: what a guy in a boat does

## Feel Important? Read This

Paleontologist Stephen Gould puts human life in perspective. Extend your arm and index finger completely. Imagine that the end of your nose is the beginning of Earth, and the present is your fingertip. If you pass a nail file over your fingernail once, you would erase all of human history!

Origami is a relatively painless way to have children realize the importance of sequencing and other critical skills. As with stories, with origami there needs to be a beginning, middle, and end, origami and mathematics rely on the same concept of the "first things first" principle. Students have immediate assessment when they can see that their model they are folding doesn't get where they wanted to go (when a 3-dimensional Sonobe cube looks more like a squash) and they need to back up and try the sequence of steps with more respect and care.

Origami can be used to introduce, practice, or remediate a concept. From an early age, children are familiar with paper from drawing on it to practicing writing their name. During these early years, children form attitudes about learning that will last a lifetime. Folding paper manipulatives provides an exciting and meaningful way to engage students in creative, active, and hands-on learning of mathematics that can develop a positive attitude towards mathematics. Origami can be used in all areas of math instruction: teaching place value, number sense and operations, spatial-visual skills, fractions, geometry, measurement, problem solving and more across all grade levels.

According to NCTM, "students need to investigate, explore, and manipulate everyday objects to be able to describe relationships in a multi-dimensional world using mathematical language." Math in Motion is a math-oriented program developed to provide the K-8 classroom teacher or specialist with a general framework to support research and national and state standards-based curriculum requirements.

Professor Susan Sze of Niagara University (2005) states, "Origami stimulates more parts of the brain than the traditional teacher-lecture format. . . Teachers can apply the knowledge to involve students in a total learning experience which enhances the students' ability to think critically, to create a class dialogue, and to pose questions to encourage a higher level of thinking."

By constructing and deconstructing paper manipulatives, activating prior knowledge, and experiencing it first hand, children find learning becomes more meaningful. The shapes and forms kids create with paper folding exercises help them apply math concepts and build vocabulary concretely, retain information longer, and bridge the gap between words and their meaning. Through guided observations and open-ended questions, teachers can encourage scientific investigation by asking students to think about how many ways we can fold a piece of paper.

## Why Is It Important?

*Children have real understanding only of that which they invent themselves and each time we try to teach them something too quickly, we keep them from reinventing it themselves. – Jean Piaget*

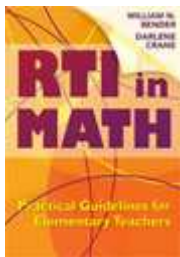
Concrete models can help students represent numbers and develop number sense; they can also help bring meaning to written symbols and can be useful in building place-value concepts. As students work with concrete materials teachers can ask questions that elicit their thinking and reasoning. In this way, teachers can get a better sense of what students know and don't know, along with identifying misconceptions, thereby developing a basis for intervention strategies (RTI). You should also choose interesting tasks that engage students in mathematical thinking and reasoning, which builds their understanding of numbers as well as relationships among numbers (NCTM).

For example, when learning geometric shapes, students can use the patterns on the paper model to explore and investigate the properties of a square or rectangle. After practicing with these, they can progress to finding patterns, represented by pictures (pictorial level). Over time, they will develop strategies and apply geometric algorithms to what they did and explain what they were thinking when they used manipulatives to solve a problem.

## Featured Book:

### **RTI in Math**

by William N. Bender and Darlene Crane



RTI in Math describes how this three-tiered system of interventions, which has proven effective in reading instruction, can be applied to primary and elementary mathematics education. Authors Dr. William N. Bender and Darlene Crane offer an accessible, detailed map of the RTI process to help all students succeed in mathematics.

\$29.95

To order this book contact Teachers Workshop  
At 800-991-1114

### **Brain Teaser...**

What is Eyjafjallajökull?

*(See bottom of page for the answer.)*

### **Quotes:**

Not everything that counts can be counted. Not everything that can be counted counts.

**-Albert Einstein**

None of us is as smart as all of us.

**-Japanese proverb**

### **Scrabble Changes It Up**

Scrabble rules are changing in the UK, allowing place names, people's names and brands. The idea is to introduce some pop culture and get younger players involved. OK, how many points for Harry Potter's school "Hogwarts"?

### **Keep Your Feet In Shape**

Want a fun way to strengthen the muscles in your feet? Spread some marbles on the floor. Sit in a chair and use your toes to pick them up and put them in a bowl. Have a competition with your kids!

### **Brain Teaser Answer:**

It's the name of the Icelandic volcano whose eruption caused travel chaos in April. By the way, it's pronounced "AY-uh-fyat-luh-YOE-kuutl-uh."

Origami is built of paper folded into fractions. Therefore, "exactly one half" has a more real feel to it after a child sees what happens when they fold the paper into quarters or eighths. Many children who have had no personal reason for filing these facts away may still be clueless. True learning only occurs when children feel that the subject has importance to them in a direct and personal way. It is easier to see the need for learning fractions or geometry or how to bisect an angle if your origami jumping frog works. Basic geometry concepts are painlessly learned and by analyzing an origami diagram, it encourages problem solving and critical thinking skills.

After attending a Math in Motion inservice workshop, Dr. Janice Showler, Chair of Arts and Communication at Holy Family University stated, "I was delighted to discover a fun-filled, kinesthetic method of teaching mathematics and language arts that engages both children and adults. The innovative ways in which you incorporate language, vocabulary, and math terms with origami should be utilized in every classroom. Tapping into multiple intelligences that students bring with them, your workshop encourages success from each participant by building upon his/her strengths."

### **Put Math in Motion – Create an Action Plan**

*What we want is to see the child in pursuit of knowledge, and not the knowledge in pursuit of the child.*

**-George Bernard Shaw**

Develop Professional Learning Communities to build teacher support and create a plan of action. Effective teachers incorporate the use of manipulative instruction and understand it is fundamental to learning. Good teaching has to do with being sensitive to the needs of students and finding ways to help students make the necessary connections for learning to occur in the best possible way. Looking for ways to develop less disruptive and more on-task behavior in the classroom and reach the at-risk student? When I present student and family workshops, many teachers inform me they are prepared to remove disruptive students from the program. However, they are often pleasantly surprised to discover such students are successful and actively engaged in the lessons. There is something very special about transforming a piece of paper into a work of art that nurtures children's minds as well as their spirits. Many teachers report origami enhances motivation, reinforces concentration and encourages perseverance. Students feel a sense of accomplishment and it can create a sense of joy and peace in the classroom. When children feel successful, they are more likely to transfer that experience to other areas of learning.

In the past thirty years, origami, math, and science have come together in exciting and unexpected ways and have many practical applications. Origami, has helped science and technology to develop more efficient ways to figure out how to design the telescopes for NASA engineers, create heart stents in medicine and to fold airbags in automobiles (World Science, 2007). In these challenging economic times, origami offers a budget-friendly option for teachers—all it takes is a piece of paper. Children can be taught to be socially and environmentally responsible by recycling paper materials from magazine covers to gift wrapping paper through origami.

Using origami activities in the classroom gives students tools with which to increase their existing framework of knowledge (Cipoletti & Wilson, 2004). My vision is that Math in Motion will be a part of every grade child's educational experience to create a more positive attitude towards mathematics and help *all* children succeed. This successful program demonstrates proven, practical and non-threatening ways to bring out the best from your most reluctant, "I-HATE-MATH" to gifted students so that every child counts! For the Educational Benefits of Origami and a sample lesson plan, visit [www.mathinmotion.com](http://www.mathinmotion.com).

Visit [www.teachersworkshop.com](http://www.teachersworkshop.com)

Our presenter that was featured in our March 2010 newsletter, Ms. Esther Williams, not only does workshops on Bipolar Disorder but also on How to prevent Bullying!

We are THRILLED to announce that Teachers Workshop is on FACEBOOK. Please join us there and help us make it a place for teachers to go for the latest information and help.

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#### References:

- Cipoletti, B., and Wilson, N. (2004) Turning origami into the language of mathematics, *Teaching in the Middle Grades*, 10 (1), 26-31.
- Lampert, M. & Cobb, P. (2003) Communication and learning in the mathematics classroom. In J. Kilpatrick & D. Shifter, Eds. *Research Companion to the NCTM Standards*. Reston, VA: National Council of Teachers of Mathematics, pp. 237-249.
- Pearl, B. (2005) *Math in Motion: Origami in the Classroom, K-8*, PA: Crane Books.
- Piaget, J and Inhelder, B. (1956) *The Child's Conception of Space*, Routledge & Kegan Paul.
- Mathematical Sciences Education Board (MSEB) and National Research Council (1989) *Everybody Counts: A Report to the Nation on the Future of Mathematics Education*. Washington, D.C.: National Academy Press.
- National Council of Teachers of Mathematics (NCTM) *Principles and Standards for School Mathematics*, Reston, VA.
- Sze, S. (2005) "An Analysis of Constructivism and the Ancient Art of Origami," *Innovations in Inclusive School Development*, Conference Proceedings.
- World Science*, Origami Technology (2007). Retrieved from [http://www.world-science.net/othernews/070207\\_origami.htm](http://www.world-science.net/othernews/070207_origami.htm)
- Van Hiele Levels of Geometric Reasoning. Retrieved from [http://images.rbs.org/cognitive/van\\_hiele.shtml](http://images.rbs.org/cognitive/van_hiele.shtml)

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