## Fiddle Dee Diddle - It's Time For A Riddle

Summary
Students use the story problem process to solve math riddle problems.
Main Core Tie
Mathematics Grade 3
Strand: OPERATIONS AND ALGEBRAIC THINKING (3.OA) Standard 3.OA.8
Materials

- Arithme Tickle
- Riddle Problems pdf
- Riddle Time pdf
(10 copies)
Scissors
Glue
Additional Resources
Books
- Arithme-Tickle: An Even Number of Odd Riddle-Rhymes
, by J. Patrick Lewis; ISBN 0152164189
- Math Potatoes
, by Greg Tang; ISBN 0439443903
- Each Orange Had 8 Slices
, by Paul Giganti; ISBN 068813985X
Articles
The Answer Is 20 Cookies. What is the Question?, Teaching Children Mathematics; January 2007, Volume 13, Issue 5, Page 252


## Background for Teachers

Students need to have a basic understanding of addition, subtraction, and multiplication operations. They must be aware of the math vocabulary that relates to each of these operations. Students should to be familiar with the story problem process. First, they must understand what the problem is asking. Second, they must locate all the facts within the word problem. As students look for the facts they need to pay particular attention to the vocabulary that is being used. Finally, students must decide upon a plan of attack. This is the time when a student chooses what facts are vital, what operation is needed, and if their solution makes sense.

## Intended Learning Outcomes

2. Become effective problem solvers by selecting appropriate methods, employing a variety of strategies, and exploring alternative approaches to solve problems.
3. Reason logically, using inductive and deductive strategies and justify conclusions.
4. Communicate mathematical ideas and arguments coherently to peers, teachers, and others using the precise language and notation of mathematics.

Instructional Procedures
Invitation to Learn
Students are placed into groups of four or five. Each group is given five numbered cards. The
numbers on the cards will range from 0 to 99 . Write any number between 0 and 99 on the overhead. Instruct students that this number will be the answer and each group must use their number cards to get this answer. They can add, subtract, multiply, or divide these numbers any way they want. When a group has reached the answer they must ring the bell that will be located by the overhead.
Instructional Procedures
Use the book Arithme Tickle to introduce what a math riddle is and how to solve one. After reading each page, solve the riddles together by using the Riddle Time worksheet. Hand out a copy of Riddle Problems to each student. Have students cut one riddle out. Hand out a copy of Riddle Time to each student. Have students glue the riddle they previously cut out in the correct place on this paper.
Students need to be assigned a partner. Each partnership must read and discuss the riddle together. They need to work together to fill out the top two boxes on the Riddle Time worksheet. Students will return to their individual seats to complete the Riddle Time worksheet on their own. Once the whole class completes a riddle, have students share why they feel their answer is correct and the steps they took to come to that conclusion.
When all ten riddles are completed then the papers are bound together to form a riddle book.

## Extensions

Advanced learners can write math riddles for the class to solve. These can be added to the math riddle book.
Special needs learners can draw a picture to show their plan on the Riddle Time worksheet. They can describe to another student why they feel the answer is correct.
Here is the answer so what is the question? Give students an answer, for example, eight snowmen. Instruct students to come up with a question that has the answer of eight snowmen. Use the book Each Orange Had 8 Slices to create challenging problems. For every page create one to two story problems. After the story problems have been produced have your students read this book. Once the story has been read, students need to start working on the problems. Family Connections

Give students a challenging riddle to do at home with their parents.
Have students write a riddle about their family.

## Assessment Plan

As students work together on the Riddle Time worksheet observe their conversations. Ask questions about the thoughts they're sharing with each other. This type of assessment will show a student's true understanding of math concepts.
Have students pick one of the riddles they feel the most confident about. Create a math rubric that will help assess the riddle that they did.

## Bibliography

## Research Basis

Hiebert, J., Carpenter, T.P., Fennema, E., Fuson, K., Human, P., Murray, H., Olivier, A., \& Wearne, D. (1996). Problem Solving as a Basis for Reform in Curriculum and Instruction: the Case of Mathematics. 25(4), 12-21.
The authors examine the benefits of applying John Dewey's notion of reflective inquiry into mathematics. This theory encourages students to identify problems, study out the problem, and then come to a conclusion. By following these steps students can potentially gain a greater understanding. To apply this theory in the classroom, tasks need to be picked that allow students to use prior knowledge and wrestle with key concepts.
DeYoung, M.J., (2001). Challenge Problems: Love Them or Hate Them, but Learn from Them.

Mathematics Teaching in the Middle School, 6(8), 484-488.
Challenging math problems give students valuable experience. Students learn how to communicate mathematical ideas to their peers as they discuss problems. Questioning skills are enhanced as they start asking why a solution might be correct. Students start to recognize how math concepts are connected with each other.

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