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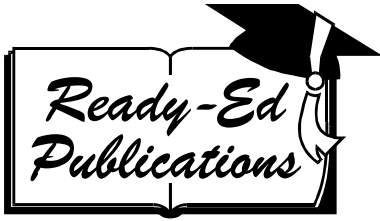
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Fishing for Answers

Problem Solving Math for Primary Students

**Stimulating problem solving
activities for students aged
6 to 8 years.**

Written by Aylene Quartermaine. Illustrated by Annette Edgar.

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FISHING FOR ANSWERS

*Creative Enrichment Mathematics Activities for
6 to 8 Year Olds.*

The activities in '**FISHING FOR ANSWERS**' are designed to encourage young students to extend and apply mathematical concepts they have already learned.

To assist teachers in planning math sessions and assigning activity pages background Teaching Notes are provided on pages 4 to 10.

These outline the following:

* **Relevant Mathematical Concepts**

* **Standards** - These detail understandings and skills students should display in successfully completing the activity page.

* **Suggestions For Use** - Most of the activities are self-explanatory. However, many may easily be extended by teachers and adapted to meet the needs of the students.

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Teaching Notes and Standards

Page 11: Fishy Squares

Relevant mathematical concepts

- * Addition of whole numbers.
- * Multiplication of whole numbers.
- * Subtraction of whole numbers.

Standards for the page

Children use combinations of operations with numbers.

Children use said combination to create own grid.

Suggestions for use

1. Look at Example 1 and have children suggest an appropriate combination of numbers for the top row.
2. Point out that numbers need to be also used in a vertical fashion so that the answers displayed can be achieved. Children should work in pencil as it is quite likely that they will need to make several substitutions for chosen numbers.
3. With number 3 encourage children to submit their creations for others to attempt. These could be stored in a puzzle box on the math table.

Page 12: Change a Fish Shape

Relevant mathematical concepts

- * Shape and space.
- * Number combinations.

Standards for the page

Children explore activities involving the manipulation of concrete materials (toothpicks or match sticks) to solve puzzles

Suggestions for use

1. Allow experimentation and free play with toothpicks, encourage the changing of defined shapes, e.g. change a square to two triangles by adding one tooth pick.
2. Children attempt the problem as set out. See if they can devise more of their own.

Page 13: Swimming Like a Fish

Relevant mathematical concepts

- * Using numbers on a number line.
- * Counting by 2s and 3s.

Standards for the page

Children confidently manipulate whole numbers.

Suggestions for use

1. The first two number lines are self explanatory. Children need to write in the number and indicate the size of the leap for number 1, and complete the number line for number 2. They are then required to calculate the size of the leaps.
2. Example number 3 is best done by the children completing firstly the number line and secondly drawing in the remainder of the leaps according to the given calculation of $5 - 1$.

Page 14: Dot to Dot

Relevant mathematical concepts

- * Using the four operations.

Standards for the page

(This is an extension of the work with operations.)

Children will work out the given problems, determine the starting point of the puzzle and then complete the shape by drawing in the relevant lines.

Suggestions for use

The activity is self-explanatory. Perhaps children could extend their knowledge of cetaceans by doing further research on whales, dolphins, and porpoises.

Page 15: Scaling the Fish

Relevant mathematical concepts

* Number problems involving the recognition of number combinations that equal 10.

Standards for the page

Children use combinations of operations with numbers to arrive at a required answer.

Suggestions for use

1. Chalkboard some number combinations which equal another number, e.g. $5-0=5$, $1 \times 5=5$, $1+2+2=5$.
2. When students have completed the activity using the number 10, photocopy the master fish for use with other numbers at another time.

Page 16: Which Fish Eats Most?

Relevant mathematical concepts

* Using measurement to make suppositions.

Standards for the page

The activity of determining which fish would eat the most is related to the relative sizes of the fish on the supposition that bigger fish would eat more.

Children make visual interpretations of size in determining relative sizes.

Children use their understanding of relative sizes to order fish from the smallest to the largest.

Suggestions for use

1. Discuss the food needs and possible intakes of animals of various sizes. In normal circumstances the energy requirements of larger animals means that they eat more food. Working on that assumption discuss the likely largest food eater of those shown.
2. For the activity involving 'smallest to largest' discuss the concept of 'large.' Does this mean surface area or length? According to the surface area of those shown what would the rankings be?

Page 17: Crabbing

Relevant mathematical concepts

* Number operations using addition, multiplication, and subtraction.

Standards for the page

Children recognize various number combinations that may equal a given answer.

Children create problems involving subtraction.

Suggestions for use

1. Just as crabs move sideways the children are to move sideways in determining what the possibilities are for each problem. Note that they should look for more than one possible number sentence.
2. Repeat the activity in the empty grid by inserting numbers that can be written as number sentences involving subtraction.

Page 18: Underwater Trail

Relevant mathematical concepts

* Working with number sentences involving operations.

Standards for the page

Children add and subtract numbers to provide answers less than 15.

Suggestions for use

1. Discuss instructions with children as outlined on activity page.
2. Review the idea of a 'trail' being developed as the answer to one problem is used as the problem number of the next.
3. Have the children apply this idea to the second part of the page in making up their own trail.

Page 19: Tangrams

Relevant mathematical concepts

* Shape and space concepts.

Standards for the page

Children use tangrams to construct given shapes.

Suggestions for use

1. Provide materials for constructing tangram shapes – scissors, card, glue, colored pens, and pencils.
2. When sets of shapes are completed encourage free play to see the various shapes children can create.
3. Direct children towards constructing fish shapes as indicated

Page 20: Food of an Octopus

Relevant mathematical concepts

* Using multiplication, addition, and subtraction.

Standards for the page

Children work with number sentences involving operations and use codes to provide answers.

Suggestions for use

The procedures required to decode the clues may need to be explained. The mathematical calculations are self-explanatory.

Page 21: Count the Fish

Relevant mathematical concepts

* Using multiplication tables incorporating visual clues and arrays.

Standards for the page

Children determine the number of objects being presented in an array.

Suggestions for use

1. Using the idea of a fruiterer with a box of oranges to introduce the concept. How can he find how many oranges he has without counting individually?
2. Encourage children to attempt similar activities using the idea of multiplying the number of objects in a row by the number of rows. How can these be stated as mathematical problems?

Page 22: Seahorse Problems

Relevant mathematical concepts

* Number activities recognizing that multiplication is a function of repeated addition.

Standards for the page

Children multiply numbers ending in zero by single digit multipliers.

Suggestions for use

1. Have children consider the meaning of the opening problems to determine the nature of the page, i.e. if we know that 1 sea horse can store 250 babies and we want to find out how many 5 can store, what number process should be used?
2. The activity at the base of the page requires the children to use the division process to calculate the number of sea horses. They can then draw them in the empty box.

Page 23: A Number Maze

Relevant mathematical concepts

* Identifying patterns in numbers.

Standards for the page

Children use number concepts and recall of basic facts related to addition.

Suggestions for use

1. Children are attempting to reach a given answer through adding numbers consecutively. The opposite corner of the square is the target.
2. Encourage children to examine the various pathways they could take by moving horizontally, vertically, or diagonally.
3. A pencil should be used as it is likely that several trail paths will be taken.

Page 24: Sardine Sums

Relevant mathematical concepts

* Adding 3 digits less than 10.

Standards for the page

Children understand the concept that addition is a process involving the combination of numbers to get a total; and that the process can be shown diagrammatically.

Suggestions for use

The activity as presented is self explanatory and provides a opportunity for children to convert symbols into a number sentence.

Further extension could be provided by having children place the dots only and then exchanging sheets with a neighbor so that each can complete the other's number sentences.