

### **Acknowledgements**

I would like to thank all the students and teachers listed below who field tested the word problems used in the Problem Solving Assessment Power Pack. Together we have created a wonderful tool for math teachers everywhere!



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Kathy Brewer's 6th Grade Math Classes Petersburg, New Jersey, USA

Donna Casino's 6th Grade Class Schenectady, New York, USA

Kathy Renfrew's Grade 5/6 Class Peacham, Vermont, USA

Denice Dodge's 6th Grade Class Bethel, Pennsylvania, USA

Pamela Reid's 2nd to 4th Grade Class Renfrew, Ontario, Canada

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#### **About the International Version**

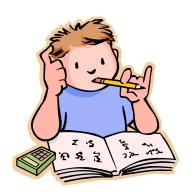
This version of the Problem Solving Assessment Power Pack is almost identical to the United States version. However, these math problems use metric measurements and spelling conventions commonly used outside of the United States.

# Problem solving Assessment

## Power Pack Overview

### **Power Pack Contents**

•	Assessment Overview	Page	3
	How To Use the Assessments	_	
•	Pretest	Page	8
	Pretest Answer Key	_	
•	Posttest	Page	13
•	Posttest Answer Key	Page	17
	Solve and Write Page	_	
	Assessment Results Form	_	
	Daily Math Puzzler Program	_	



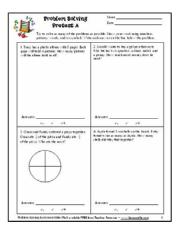
### **Assessment Pack Overview**

The Problem Solving Assessment Pack consists of two tests, a pretest and a posttest, designed to help you assess your students' problem-solving abilities. The pretest data will enable you to determine where to begin with your problem-solving instruction; the posttest data will help you track their progress later.

Assessment Level	Grade Level
A	3
В	4
С	5
D	6

Not only will you be able to assess the problem-solving abilities of each student, you'll get an overall picture of your class's capabilities as a whole.

**Test Format** - Each form of the test consists of four pages leveled A - D according to difficulty. Those letters correspond to the grade levels



displayed in the chart above, and they also correspond to the levels identified in the **Daily Math Puzzler (DMP)** program available from **Teaching Resources**. The test page layout is similar to the DMP activity page layout, with four problems to a page allowing plenty of room for students to show work and record their answers. Each problem includes an answer blank and a unique checkmark system for assessing the quality and correctness of each student's response.

# Problem Solving Assessment

## Test Administration

### **Test Page Selection**

It is not necessary to administer all four pages of the test. You only need to use the two or three pages that are appropriate for your students. In some cases you may need to administer the entire test, but most teachers find a few pages to be sufficient. On the other hand, if you teach older students you may want to duplicate all four pages even though the first two are too easy. Students can gain confidence as they move through the levels, and they won't be so upset by missing the ones on Level C and D.

## **Preparation**

Duplicate one copy of the test for each student. If you want them to write explanations for each solution, you'll also need to duplicate a Solve and

Write blackline for each page. However, you may find students to be overwhelmed by having to write narrative responses for every problem. Another alternative would be select just one or two problems and ask students to write out an explanation for those test items.



Decide whether you will allow your students to use calculators on the test, and provide them if necessary. If your curriculum permits calculator use, it's recommended that you allow students to use calculators on these tests.



**Solve and Write** 

## **Test Administration**

When introducing the first assessment, remind kids that this is just a pretest and some of the problems may get very difficult. If they have some idea of how to work the problem, they should give it a try. If they have no idea, they can leave it blank. Allow a large block of uninterrupted time for students to take the test. If students have difficulty reading the test items, provide test modifications as you normally would based on individual student needs.

# Problem Solving Assessment

# Interpreting Results

### **Scoring the Assessments**

You'll find Answer Keys directly following each test. When you score each student's test, you can simply mark each item as correct or incorrect. However, you may want to circle the check minus, check, or check plus to give you a more detailed record of student performance. Analyzing how your students attempted to solve the problems is frequently more useful than simply obtaining a raw percentage score of correct answers.

0	√_	✓	<b>√</b> +
Did not attempt to solve the problem	Attempted to solve problem, but the answer was incorrect	Answer was correct, but work was not shown or written explanation was confusing	Answer was correct, and labeled properly; work was shown or written explanation was clear

### **Analyzing the Data**

No matter what method you use, the Assessment Results form on Page 19 will provide a convenient place to compile and analyze your results. You'll need one copy for every two test levels you administer. Just fill in your students' names and circle the levels at the top of the columns. Then record a check or check plus for each problem they solved correctly.

To determine individual performance, tally the results by recording the number that each student solved correctly at the end of each row. To assess overall class performance, count the number of checks and check plusses in each column to see how many students solved each problem correctly.

Look for trends in the data. What level of performance is indicated by your overall results? At which level are most students scoring about 75% of the problems correctly on their own? Do most of your students miss the same problem? What strategies do they use when confronted with unusual problems or challenging math concepts?

# Problem Solving Assessment

# Data-driven Instruction

Now what? After administering the Pretest, you have a clearer picture of your students' problem-solving abilities. By analyzing the methods they attempted to use, you can determine where to begin your problem-solving instruction. But where do you go from here?

## The Daily Math Puzzler Program

In order to learn to solve problems effectively, students need daily exposure to a wide variety of math word problems. They also need explicit instruction in how to use a calculator effectively and how to apply appropriate strategies to math problems. The **Daily Math Puzzler (DMP)** program offers all three components. The books are available on four instructional levels, A - D, which correspond to the grade levels shown. The program is

designed to be used just 15 minutes a day, yet it can result in dramatic gains in student achievement. (Note: International Versions are not yet available for all Daily Math Puzzler books. However, the others include MS Word templates so that problems with Imperial System measurements can be modified. More International Versions are on the way!)

Puzzler Pack	Grade Levels
Level A	2, 3 and 4
Level B	3, 4 and 5
Level C	4, 5, and 6
Level D	5, 6 and 7

Using the Pretest will help you determine the appropriate instructional level for individual students as well as your class as a whole. In most cases, the appropriate instructional level for your students will be the level at which they are answering about 50% correctly on the Pretest. This level is challenging enough to keep them interested, but not so challenging that students are frustrated.

#### **Administer the Posttest**

At the end of the year, administer the Posttest and compare the results to student performance on the Pretest. You'll be amazed at how much progress they can make with just 15 minutes a day of instruction!

# Daily Math Puzzler Program

# DNP Program Levels



The Daily Math Puzzler Power Packs are leveled according to difficulty (A - D). Using a system of letters instead of grade levels gives you great flexibility when implementing the program. Each student activity page is coded with a letter and a number, so you always know which worksheet set you are currently using. Each Power Pack also comes with different calculator lessons, quizzes, enrichment games, and a unique problem-solving introduction. You can mix and match the lessons and activities to meet the needs of your students.

### How can you use the different levels to your advantage?

1. **Gradual Implementation** - When you first introduce the program, start with the lowest level that's appropriate for your grade level. For example, a 4th grade teacher may want to start with Level A for the first few weeks to ensure that students are successful as they learn the basics. Then move them up to Level B and later to Level C.



2. **Differentiation** - Even though the Daily Math Puzzler program was designed for whole class instruction, it can be used in small groups or stations to differentiate instruction. One method is to pair students with a buddy performing at the same instructional level and use one of the cooperative learning strategies described in the books. Within one class



you might have several students on Level A, a few on Level C, and the majority on Level B. If your math class is structured around small group instruction and stations, you have even more options for using different levels. Have students complete the worksheets while at a station, and use small group instruction time to work with each level. See <a href="Mathstations">Mathstations</a> on math stations.



## Problem Solving Pretest A

Name	 	 	
Date _	 	 	

Try to solve as many of the problems as possible. Show your work using numbers, pictures, words, and/or symbols. Write each answer on the line below the problem.

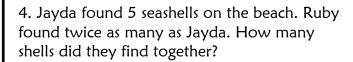
1. Tracy has a photo album with 5 pages. Each
page will hold 4 pictures. How many pictures
will the album hold in all?

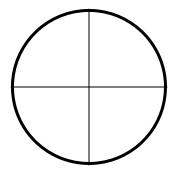
2. Gerald wants to buy a gel pen that costs  $95\phi$ . He has two quarters, a dime, and a penny. How much more money does he need?

Answer: _				
_				
	/	/	/.	

Answer:

3. Omar and Randy ordered a pizza together. Omar ate  $\frac{1}{4}$  of the pizza and Randy ate  $\frac{1}{2}$  of the pizza. Who ate the most?





Answer:

Answer: \_\_\_\_\_\_

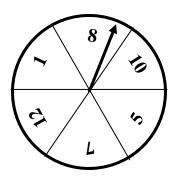


# Problem Solving Pretest B

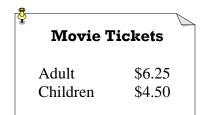
Name	? 		 
Date			

Try to solve as many of the problems as possible. Show your work using numbers, pictures, words, and/or symbols. Write each answer on the line below the problem.

1. On the game spinner below, what is the probability of spinning a number less than 8?



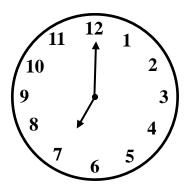
2. Portia's mother took Portia and her two friends to the movies. What was the total cost of all four tickets?



Answer:		
	 _	



3. Lizzy started babysitting at quarter after five. She went home at the time shown below. How long did she babysit?



4. On Saturday, Reggie had 16 minutes remaining on his cell phone plan. He used  $\frac{1}{2}$  of his minutes calling his mother. He talked to his friend for another 5 minutes. After he made those two calls, how many minutes did he have left?

Answer:

Answer:



## Problem Solving Pretest C

Name		
Date _		

Try to solve as many of the problems as possible. Show your work using numbers, pictures, words, and/or symbols. Write each answer on the line below the problem.

1. The 145 fifth graders at Wayne Elementary will be taking a field trip. The school needs to rent buses for the trip. If each bus holds 42 students, how many buses does the school need to rent?	2. Cynthia downloaded some songs from the Internet. Brenda downloaded 18 songs, which was three times as many as Cynthia. How many songs did both girls download together?
Answer:	Answer:
<b>√</b> - <b>√ √</b> +	<b>√</b> -
3. Jeremy created a garden that measured 5 x 7.5 metres. How many 10-metre rolls of fencing will he need to buy to completely surround the garden? ?	4. Maria mixed a batch of punch for the class party. Her recipe called for 3.5 litres orange juice, 750 mL lemonade and 4 litres ginger ale. How many 250-mL servings does the recipe make?
Answer:	Answer:
<b>√-</b>	<b>√</b> -



## Problem Solving Pretest D

Name	
Date _	

Try to solve as many of the problems as possible. Show your work using numbers, pictures, words, and/or symbols. Write each answer on the line below the problem.

pictures, words, and/or symbols. White	e each answer on the line below the problem.
1. Gala Farms sells a 3 kg bag of apples for \$2.85. Golden Orchard sells a 5 kg bag for \$4.35. Which brand of apples is the better buy? What is the cost per kilogram of the cheaper brand?	2. Two teams of students grew pumpkins for the local fair. The weights of the pumpkins were recorded below. Which team had the higher average pumpkin weight? What was the average weight of their pumpkins?
	Pumpkin Weights
	Team 1 Team 2
	24.5 kg 21.6 kg
	36 kg 38.3 kg
	26.65 kg 25.6 kg
	30.09 kg 33.7 kg
Brand: Cost:	Team: Average:
3. In Wesley's class, 9 students ride the bus, 5 students walk to school, and 6 students are dropped off by their parents. What percent of the students ride the bus?	4. Sofia is buying lace to sew around the edge of a round tablecloth. The diameter of the tablecloth is 155 cm. If lace is sold by the metre, what's the smallest number of whole metres she must buy to have enough lace for the tablecloth?
Answer:	Answer:

# **Pretest Answer Key**

Assessment Level	Test Item	Answer	Math Concepts	
	1	20 pictures	Repeated Addition or Multiplication	
l aval A	2	34¢	Money; Subtraction	
Level A	3	Randy	Fractions	
	4	15 shells	Addition; Multiplication	
	1	3/6 or 1/2	Probability	
Level B	2	\$19.75	Multiplication; Money	
Level B	3	1 hour 45 min	Elapsed Time	
	4	3 minutes	Fractions; Subtraction; Time	
	1	4 buses	Division with Remainders	
Level C	2	24 songs	Multiplication; Logical Thinking	
Level C	3	3 rolls	Geometry; Measurement, Decimals	
	4	33 servings	Measurement, Fractions	
	1	Golden; 87¢	Money; Division	
Level D	2	Team 2; 29.8 kg	Decimals, Data & Statistics	
Level D	3	45%	Percents	
	4	5 metres	Geometry, Measurement, Fractions	





## Problem Solving Posttest A

Name	<u> </u>	 
Date		

Try to solve as many of the problems as possible. Show your work using numbers, pictures, words, and/or symbols. Write each answer on the line below the problem.

1. Taylor has a photo album with 4 pages. Each page will hold 6 pictures. How many pictures will the album hold in all?	2. Bob wants to buy a gel pen that costs 87¢. He has one quarter, two dimes, a nickel, and a penny. How much more money does he need?
Answer:	<b>A</b> nswer:
3. Shelton and Gary each ordered a pizza. Shelton ate $\frac{1}{4}$ of his pizza. Gary ate $\frac{1}{3}$ of his pizza. Who ate the most pizza?	4. Megan found 3 seashells on the beach. Emily found 4 more than Megan. How many shells did they find together?

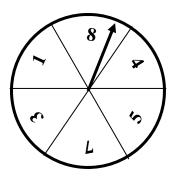


# Problem Solving Posttest B

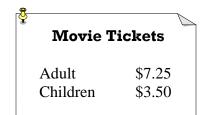
Name	2		
Date			

Try to solve as many of the problems as possible. Show your work using numbers, pictures, words, and/or symbols. Write each answer on the line below the problem.

1. Ronald needs to spin a number greater than 5 to win. On the game spinner below, what is the probability of him winning?



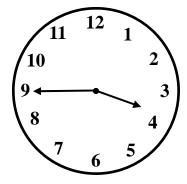
2. Ashley's father took her and her brother to the movies. What was the total cost of the three tickets?



Answer:				
	./	1	./_	



3. Sarah started reading her book at quarter after two. She finished it at time shown below. How long did it take her to read the book?



4. On Saturday, Ryan had 18 minutes remaining on his cell phone plan. He used  $\frac{1}{2}$  of his minutes calling his friend. He talked to his dad for another 4 minutes. After he made those two calls, how many minutes did he have left?

Answer:

Answer:



# Problem Solving Posttest C

Name <sub>.</sub>	
Date _	

Try to solve as many of the problems as possible. Show your work using numbers, pictures, words, and/or symbols. Write each answer on the line below the problem.

1. The 175 fifth graders at Thompson Elementary will be taking a field trip. The school needs to rent buses for the trip. If each bus holds 52 students, how many buses does the school need to rent?	2. Victoria downloaded some songs from the Internet. Olivia downloaded 20 songs, which was four times as many as Victoria. How many songs did both girls download together?
Answer:	Answer:
√-	√- √+
V- V V+	V- V V+
3. Zachary created a garden that measured 7 x 6.5 metres. How many 8-metre rolls of fencing will he need to buy to completely surround the garden?	4. Lily mixed a batch of punch for the class party. Her recipe called for 2.5 litres orange juice, 750 mL lemonade and 3 litres ginger ale. How many 250-mL servings does the recipe make?
Answer:	Answer:
<b>√</b> - <b>√ √</b> +	<b>√</b> -



## Problem Solving Posttest D

Name	
Date _	

Try to solve as many of the problems as possible. Show your work using numbers, pictures, words, and/or symbols. Write each answer on the line below the problem.

pictures, words, and/or symbols. Write	e each answer on the line below the problem.
1. Bargain Deli's 1.5 kilogram package of sliced ham sells for \$6.30. Deli Market's 2 kilogram package of sliced ham sells for \$7.70. Which brand of ham is the better buy? What is the cost per kilogram of the cheaper brand?	2. Two teams of students grew pumpkins for the county fair. The weights of the pumpkins were recorded below. Which team had the higher average pumpkin weight? What was the average weight of their pumpkins?
	Pumpkin Weights
	Team 1 Team 2
	27.5 kg 16.4 kg
	49 kg 58.3 kg
	22.65 kg 35.6 kg
	30.05 kg 18.46 kg
Brand: Cost:	Team: Average:
<b>√</b> - <b>√</b> +	√- √ √+
3. In Adrian's class, 7 students ride the bus, 4 students walk to school, and 9 students are dropped off by their parents. What percent of the students walk to school?	4. Alexa is buying lace to sew around the edge of a round tablecloth. The diameter of the tablecloth is 125 cm. If lace is sold by the metre, what's the smallest number of whole metres she must buy to have enough lace for the tablecloth?
Answer:	Answer:

✓-

# Posttest Answer Key

Assessment Level	Test Item	Answer	Math Concepts	
	1	24 pictures	Repeated Addition or Multiplication	
Level A	2	36¢	Money; Subtraction	
Level A	3	Gary	Fractions	
	4	10 shells	Addition; Multiplication	
	1	2/6 or 1/3	Probability	
Lavel D	2	\$14.25	Multiplication; Money	
Level B	3	1 hr 30 min	Elapsed Time	
	4	5 minutes	Fractions; Subtraction; Time	
	1	4 buses	Division with Remainders	
Level C	2	25 songs	Multiplication; Logical Thinking	
Level C	3	4 rolls	Geometry; Measurement, Decimals	
	4	25 servings	Measurement, Fractions	
	1	Deli Market; \$3.85	Money; Division	
Level D	2	Team 1; 32.3 kg	Decimals, Data & Statistics	
Level D	3	20%	Percents	
	4	4 metres	Geometry, Measurement, Fractions	





## Solve and Write

Use the space below to write an explanation of how you solved each Daily Math Puzzler problem. Be sure to use complete sentences and explain your answer clearly!

# Answer:	# Answer:
Explanation	Explanation
<b>√</b> - <b>√</b> +	<b>√-</b>
# Answer:	# Answer:
# Answer: Explanation	# Answer:Explanation
	Explanation
	Explanation
	Explanation
	Explanation

# Assessment Results

Class Name	Date	



	Level: A B C D			Level: A B C D					
Name	1	2	3	4	1	2	3	4	Totals
1.									
2.									
3.									
4.									
5.									
6.									
7.									
8.									
9.									
10.									
11.									
12.									
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16.									
17.									
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19.									
20.									
21.									
22.									
23.									
24.									
25.									
26.									
Totals									

## Daily Math Puzzler Program

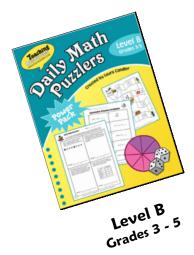
#### Teacher Testimonials

In my 28 plus years of teaching the upper grades (4-8) in rural, suburban, and urban settings, I have not found a collection of word problems that actually appealed to my students. The Daily Math Puzzlers have challenged my students without frustrating them. They feel successful even if they do not achieve the correct solution; yet they strive to meet success with the next day's problem. Bravo to Laura Candler!

~ Kathy Brewer, Seaville, New Jersey



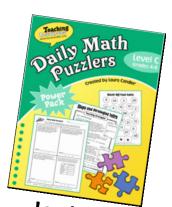
Level A Grades 2 - 4



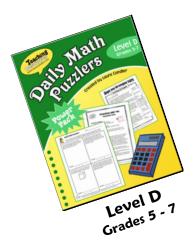
I love the Daily Math Puzzler Power Pack! The Puzzlers set the tone for our day by helping to focus and organize our minds. I honestly think that my students would be lost without a Daily Math Puzzler. Problem solving is not as "scary" to my sixth graders as it once was. I am grateful to you for prompting me to tell my students to think of word problems as brain teasers or puzzles. I don't know why I hadn't thought of that before! ~ Betsy Clark, Evant, Texas

The Daily Math Puzzler program is easy to implement in any classroom. The directions are easy for students to read. The problems have an area for the solution to be worked out, and there is a quick assessment at the bottom. When reviewing the answers with my students, they begin to ask questions that lead to higher order thinking skills. I believe that these will help my students improve their state test scores. My students enjoy working on these puzzles and look forward to them.





Level C Grades 4 - 6



I just implemented Laura's Math Puzzlers, and after two weeks I can already see changes in my class. They are picking up good habits like underlining key words, and writing complete answers already! Each day when we take out the sheet, they know what to do and enjoy doing it. I think part of the fun comes from the program's title "Math Puzzlers". Somehow, they seem to think puzzles are way more fun than math word problems. I also have to say that the breadth of topics and strategies covered in just one weekly sheet is impressive. It is a great way to keep math topics fresh, and have kids apply them to real situations. Each problem could be solved using different strategies, so it has been great for my kids to see all the different ways they could have approached the problem.

~ Dawn, Minnesota

Learn more about Daily Math Puzzlers online at www.lauracandler.com/dailymathpuz.htm





## Laura Candler's TpT Store

If you enjoyed the materials in this teaching resources pack, you might also enjoy these ebooks and lessons. You can purchase them from my store on <u>TeachersPayTeachers.com</u> by clicking the links below or by visiting my Teaching Resources website: <u>www.lauracandler.com</u>.

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**Analyzing Character Traits** 

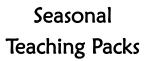
Powerful Poetry Combo

Plural Noun Showdown

Sentence Go Round

Writing Powerful Poetry

Customary Measurement
Conversions



October

**November** 

December

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March

April



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