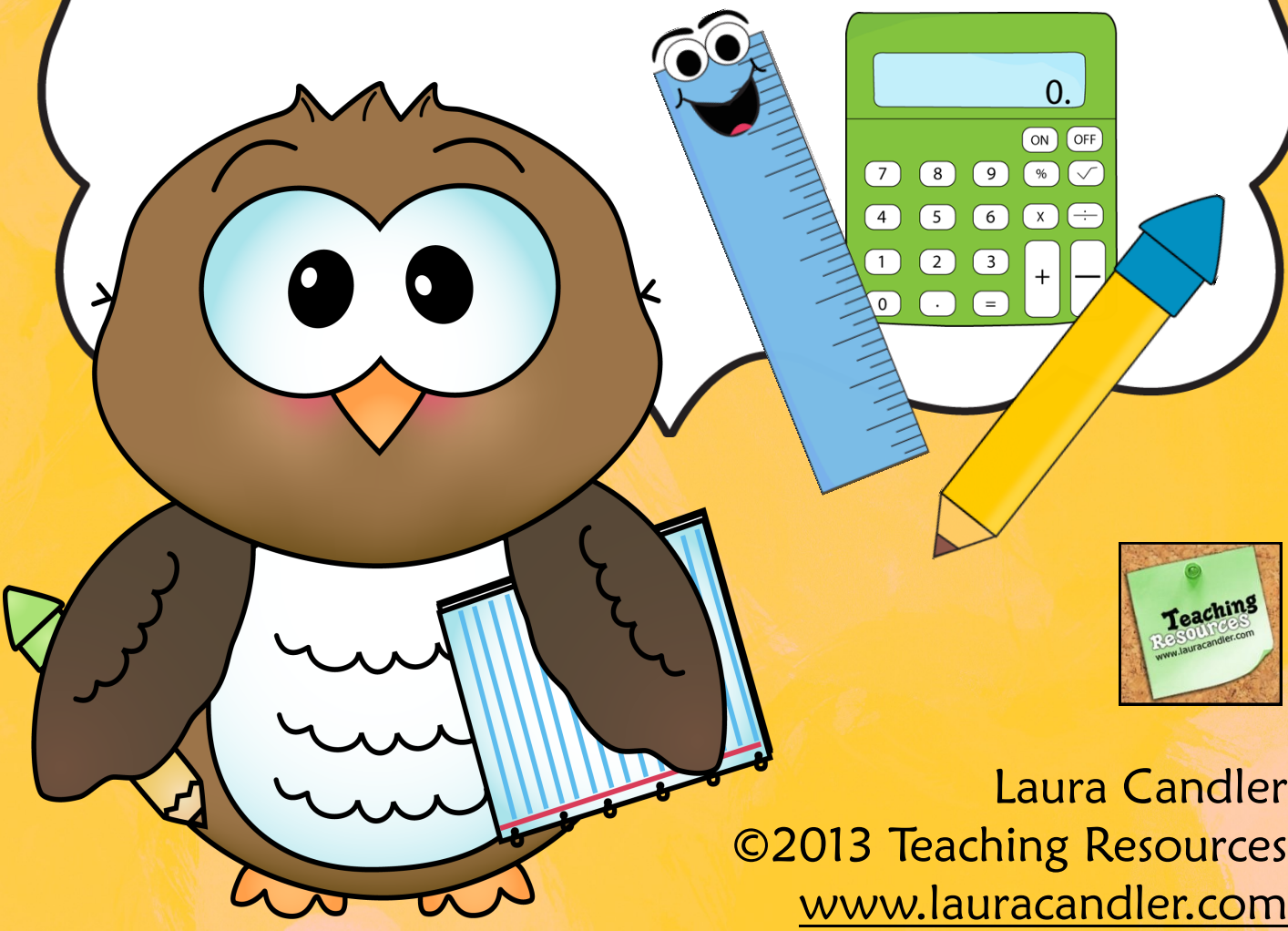
Grades 2 - 6

Problem Solving Assessment

Math Pretest, Posttest, and Scoring Guide

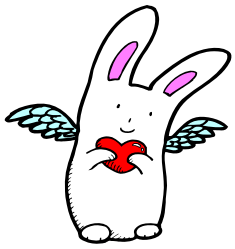


Laura Candler

www.lauracandler.com

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!



Sharon Sensenich's Class
Green Cove Springs, Florida

Suzann Falgione's 3rd Grade Class
Fayetteville, North Carolina

Laura Candler's 4th Grade Class
Fayetteville, North Carolina

Stacy Lloyd's 2nd Grade Class
Fayetteville, North Carolina

Kathy Sovine's 5th Grade Class
Fayetteville, North Carolina

Sharyn Powell's 3rd Grade Class
Lincolnshire, Illinois

Jill Slayton's 5th Grade Class
Farmington, Connecticut

Susie Highley's 6th Grade Enrichment Class
Indianapolis, Indiana

Stacy Kasse's 3rd Grade Class
Medford, New Jersey

Jo-Ann Mumford's 4th Grade Class
Brookfield, Nova Scotia

Robin DiMartino's 3rd Grade Class
Westminster, Maryland

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

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

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

Denice Dodge's 6th Grade Class
Bethel, Pennsylvania

Problem Solving Assessment

Power Pack Overview

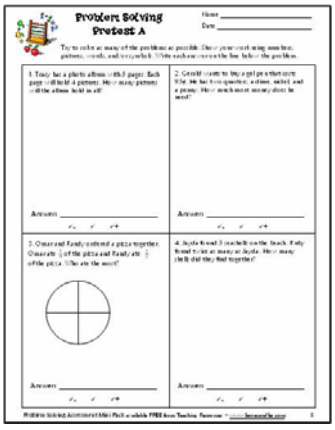
Power Pack Contents

Assessment Pack Overview

Assessment Level	Grade Level
A	3
B	4
C	5
D	6

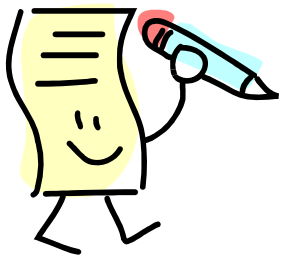
The Problem Solving Assessment Pack consists of two tests, a pretest and a posttest, designed to help you assess your students' problem-solving abilities. The pretest data will enable you to determine where to begin with your problem-solving instruction; the posttest data will help you track their progress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

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 levels may be too easy. Students gain confidence as they progress through the levels, and they won't be as upset by missing some problems on Level C or 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.

Solve and Write

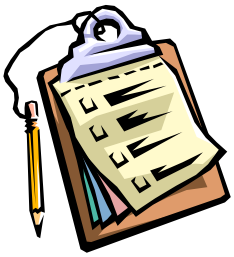
Decide whether you will allow your students to use calculators on the test, and provide them if necessary. If your state assessments allow calculators, it's recommended that you allow students to use calculators on these tests.

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

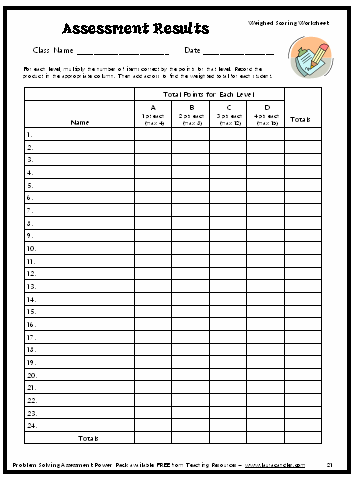


Scoring the Assessments

You'll find Answer Keys directly following each test. When you score each student's test, simply mark each item as correct or incorrect. However, it's often the problems students miss that offer the most insight about their mathematical understandings. Analyzing how your students attempted to solve the problems is frequently more useful than simply obtaining a raw percentage score of correct answers.

Analyzing the Data

You can compile and analyze the results of your tests using one of the two Assessment Results forms (pages 19 - 20).The first Assessment Results form uses the Basic Scoring System which allows you to record the total number of problems correct on each level. However, you may want to use the slightly more complex "weighted" system on page 20. On the Weighted Scoring System, the problems on different levels are worth different amounts of points. In this system, Level A problems are worth just 1 point each, while Level D problems are worth 4 points each. Using this system, students receive more credit for being able to complete more complex problems. Completing 3 problems on Level A results in a score of just 3 points, but completing 3 problems on Level D earns a student 12 points because those problems are much more difficult.



Assessment Results

Weighted Scoring Worksheet

Class Name _____ Date _____

Total Points for Each Level

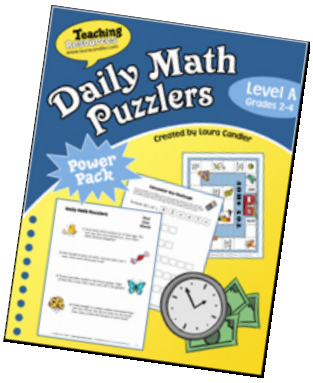
Name	A (1 point each)	B (2 pts. each)	C (3 pts. each)	D (4 pts. each)	Totals
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					
13.					
14.					
15.					
16.					
17.					
18.					
19.					
20.					
21.					
22.					
23.					
24.					
Totals					

Problem Solving Assessment Power Pack available FREE from Teaching Resources – www.lauracandler.com 21

After you record the results, 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? These questions will help you determine each student's ability to apply problem solving skills and strategies.

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.

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. Start on a level where the math content seems appropriate, even if your students made careless errors on the pretest. **In most cases, the appropriate instructional level for your students will be the level at which they are answering about 50 - 75% correctly on the Pretest.** This level is challenging enough to keep them interested, but not so challenging that students are frustrated. Kids love tackling the Daily Math Puzzler problems as long as they are able to solve at least some of them correctly.

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!

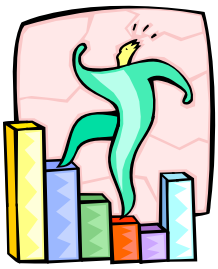
Daily Math Puzzler Program

DMP Program Levels

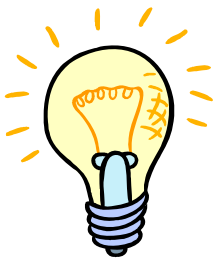
The Daily Math Puzzler books are labeled with the letters A - D according to difficulty . Using a system of letters instead of grade levels gives you great flexibility when implementing the program. Each student activity page is coded with a letter and a number, so you always know which worksheet set 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 Math Stations for Middle Grades at www.lauracandler.com for more information 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.

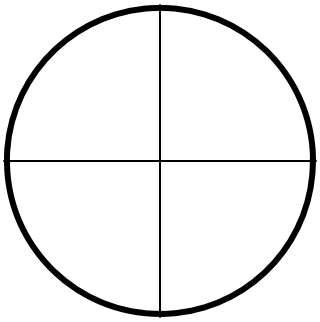
1. Tracy has a photo album with 5 pages. Each page will hold 4 pictures. How many pictures will the album hold in all?

Answer: _____

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

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: _____

4. Jayda found 5 seashells on the beach. Ruby found twice as many as Jayda. How many shells did they find together?

Answer: _____

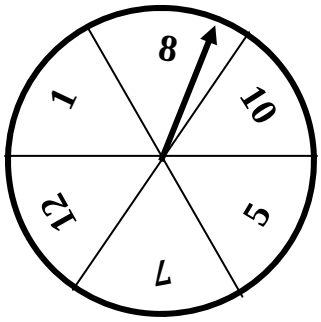
Problem Solving Pretest B

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?



Answer: _____

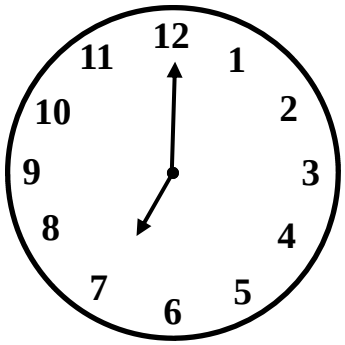
2. For her 8th birthday, Portia's mother took Portia and her two friends to the movies. What was the total cost of all four tickets?

Movie Tickets

Adult	$6.25
Children	$4.50

Answer: _____

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



Answer: _____

4. On Saturday, Reggie had 16 minutes remaining on his cell phone plan. He used $\frac{1}{2}$ of those 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: _____

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 and their 6 teachers will be taking a field trip. The school needs to rent buses for the trip. If each bus holds 42 passengers, how many buses does the school need to rent?

Answer: _____

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: _____

3. Jeremy created a small garden that measured 5 x 7.5 feet. How many 10-foot rolls of fencing will he need to completely surround the garden?

Answer: _____

4. Maia mixed a batch of punch for the class party. Her recipe called for 3½ cups of orange juice, 2½ cups lemonade, and 2 quarts of ginger ale. How many 1-cup servings does the recipe make?

Answer: _____

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.

1. Gala Farms sells a 3.5 pound bag of apples for $4.20. Golden Orchard sells a 5 pound bag for $5.25. Which brand of apples is the better buy? What is the cost per pound of the cheaper brand?

Brand: _____ **Cost:** _____

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
48.5 lbs	39.6 lbs
62 lbs	75.3 lbs
53.65 lbs	42.6 lbs
60.09 lbs	67.3 lbs

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?

Answer: _____

4. Sofia is buying lace to sew around the edge of a round tablecloth. The radius of the tablecloth is 2¼ feet. If lace is sold by the yard, what's the smallest number of whole yards she can buy to have enough lace for the tablecloth?

Answer: _____

Pretest Answer Key

Assessment Level	Test Item	Answer	Math Concepts
Level A	1	20 pictures	Repeated Addition or Multiplication
	2	34¢	Money; Subtraction
	3	Randy	Fractions
	4	15 shells	Addition; Multiplication
Level B	1	3/6 or 1/2	Probability
	2	$19.75	Multiplication; Money
	3	1 hour 45 min	Elapsed Time
	4	3 minutes	Fractions; Subtraction; Time
Level C	1	4 buses	Division with Remainders
	2	24 songs	Multiplication; Logical Thinking
	3	3 rolls	Geometry; Measurement, Decimals
	4	14 servings	Measurement, Fractions
Level D	1	Golden; $1.05	Money; Division
	2	Team 2; 56.2 lbs	Decimals, Data & Statistics
	3	45%	Percents
	4	5 yards	Geometry, Measurement, Fractions

Problem Solving Posttest 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.

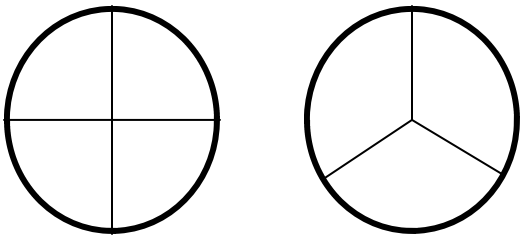
1. Taylor has a photo album with 4 pages. Each page will hold 6 pictures. How many pictures will the album hold in all?

Answer: _____

2. Bob wants to buy a gel pen that costs 87¢. He has one quarter, two dimes, nickel, and a penny. How much more money does he need?

Answer: _____

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?



Answer: _____

4. Megan found 3 seashells on the beach. Emily found 4 more than Megan. How many shells did they find together?

Answer: _____

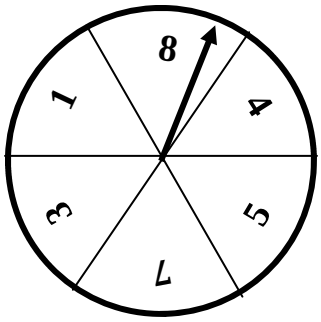
Problem Solving Posttest B

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



Answer: _____

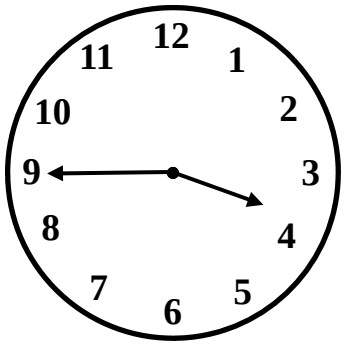
2. For her 9th birthday, Ashley's father took her and her little brother to the movies. What was the total cost of the three tickets?

Movie Tickets

Adult	$7.25
Children	$3.50

Answer: _____

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



Answer: _____

4. On Saturday, Ryan had 18 minutes remaining on his cell phone plan. He used $\frac{1}{2}$ of those 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: _____

Problem Solving Posttest 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 175 fifth graders at Thompson Elementary and their 7 teachers will be taking a field trip. The school needs to rent buses for the trip. If each bus holds 52 passengers, how many buses does the school need to rent?

Answer: _____

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: _____

3. Zachary created a garden that measured 7 x 6.5 feet. How many 8-foot rolls of fencing will he need to completely surround the garden?

Answer: _____

4. Lily mixed a batch of punch for the class party. Her recipe called for 2½ cups of orange juice, 1½ cups lemonade, and 3 quarts of ginger ale. How many 1-cup servings does the recipe make?

Answer: _____

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.

1. Bargain Deli's 1.5 pound package of sliced ham sells for $4.80. Deli Market's 2 pound package of sliced ham sells for $5.80. Which brand of ham is the better buy? What is the cost per pound of the cheaper brand?

Brand: _____ **Cost:** _____

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
37.5 lbs	26.4 lbs
59 lbs	68.3 lbs
32.65 lbs	45.6 lbs
40.05 lbs	28.46 lbs

Team: _____ **Average:**_____

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?

Answer: _____

4. Alexa is buying lace to sew around the edge of a round tablecloth. The radius of the tablecloth is 2¾ feet. If lace is sold by the yard, what's the smallest number of whole yards she can buy to have enough lace for the tablecloth?

Answer: _____

Posttest Answer Key

Assessment Level	Test Item	Answer	Math Concepts
Level A	1	24 pictures	Repeated Addition or Multiplication
	2	36¢	Money; Subtraction
	3	Gary	Fractions
	4	10 shells	Addition; Multiplication
Level B	1	2 out of 6 or 2/6	Probability
	2	$14.25	Multiplication; Money
	3	1 hr 30 min	Elapsed Time
	4	5 minutes	Fractions; Subtraction; Time
Level C	1	4 buses	Division with Remainders
	2	25 songs	Multiplication; Logical Thinking
	3	4 rolls	Geometry; Measurement, Decimals
	4	16 servings	Measurement, Fractions
Level D	1	Deli Market; $2.90	Money; Division
	2	Team 1; 42.3 lbs	Decimals, Data & Statistics
	3	20%	Percents
	4	6 yards	Geometry, Measurement, Fractions

Solve and Write

Name _____

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: _____

Explanation

#___ Answer: _____

Explanation

#___ Answer: _____

Explanation

#___ Answer: _____

Explanation

Assessment Results

Basic Scoring System

Class Name _____ Date _____

Write the number of items correct at each level next to each student's name. Then add across to find the total score for each student.

	Number Correct at Each Level				
Name	**A**	**B**	**C**	**D**	**Total Score**
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					
13.					
14.					
15.					
16.					
17.					
18.					
19.					
20.					
21.					
22.					
23.					
24.					
Totals					

Assessment Results

Weighed Scoring System

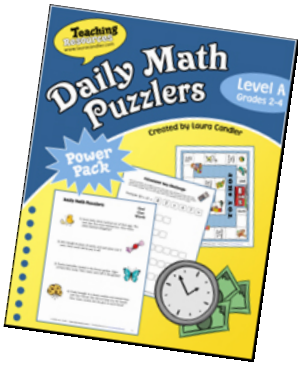
Class Name _____ Date _____

For each level, multiply the number of items correct by the points for that level. Record the product in the appropriate column. Then add across to find the weighted total for each student.

	Total Points for Each Level				
Name	**A** 1 pt each (max 4)	**B** 2 pts each (max 8)	**C** 3 pts each (max 12)	**D** 4 pts each (max 16)	**Totals**
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					
13.					
14.					
15.					
16.					
17.					
18.					
19.					
20.					
21.					
22.					
23.					
24.					
Totals					

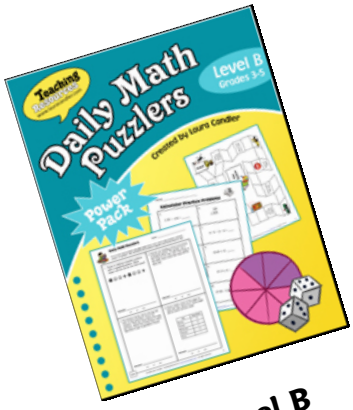
Daily Math Puzzler Program

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

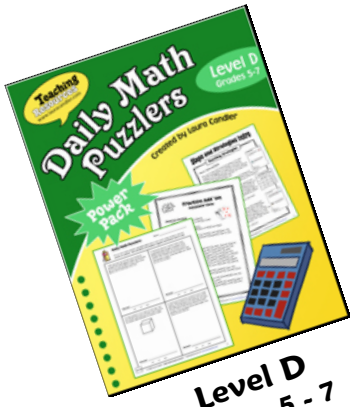


I love the Daily Math Puzzler Power Pack! The Puzzlers set the tone for our day by helping to focus and organize our minds. I honestly think that my students would be lost without a Daily Math Puzzler. Problem solving is not as "scary" to my sixth graders as it once was. I am grateful to you for prompting 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

Level B
Grades 3 - 5

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.
~ Donna Casino, New York

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

Level D
Grades 5 - 7

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 TeachersPayTeachers.com by clicking the links below or by visiting my Teaching Resources website: www.lauracandler.com.

Laura Candler

- Classroom Book Clubs
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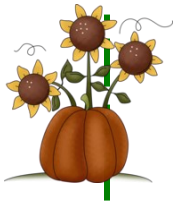
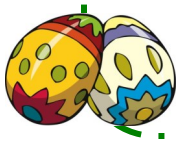
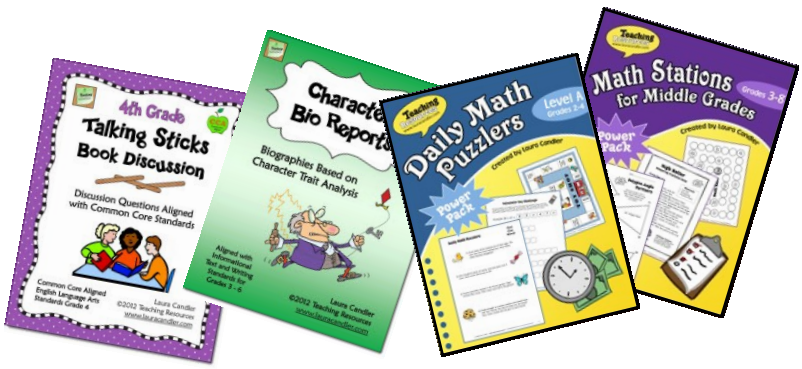
Seasonal Teaching Packs



- October
- November
- December
- January
- February (Free!)
- March
- April



- Geometry: Exploring the Basics
- Math Stations for Middle Grades (3-8)
- Polygon Explorations
- Talking Sticks Discussions (CCSS Aligned)
- Teaching Multiple Intelligence Theory
- Place Value Spinner Games
- Fraction Spinner Games
- Simplify and Snap Fraction Game
- Order of Operations Bingo



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