PROBLEM SOLVING

Set A

There are many commercial resources available to challenge students to become better problem solvers. This is a collection of some of our favorite problems.

You might consider allowing students to work with partners. Many of these problems are best solved with calculators.   All of these problems lend themselves to students telling and writing about their thinking.

Consider expanding this problem-solving deck by adding your own problems on the backs of the cards or photocopying the blank master we have included for you.

We hope you will share your great problems with us. Send them to :
Mathematics Section
Department of Public Instruction
301 N. Wilmington St.
Raleigh, NC 27601-2825

Problem
Solving Strategies

1. Act out the problem
2. Use models and manipulatives
3. Make a picture or a diagram
4. Make a table or chart
5. Make an organized list
6. Work backwards
7. Use logical reasoning; deduction
8. Guess and check
9. Use or look for a pattern
10. Solve a simpler problem
11. Write an equation
12. Brainstorm ideas

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You have the following digits…
7, 5, 2, 4, 6, 3. What is the largest 2-digit number you can make? What is the smallest 2-digit number?

What is the largest 2-digit number you can make with the digits that are left over? the smallest?

Card 1   **Set A**

•How can you use a calculator to help you count by twos backwards from twenty?

•How many ways can you use a calculator to add three fives?

•How can you use a calculator to add two numbers?

Card 2   **Set A**

Mary likes to dress up her dogs. One wears a hat, one wears a coat, and one wears a scarf. Their names are Spot, Tag, and Barney. Tag loves to wear a scarf. Spot won't wear the coat. Match each dog with what it wears. Explain your thinking.

Card 3   **Set A**

I have 6 coins worth 51¢. What coins do you think I have? Is there more than one answer?

Card 4   **Set A**

Five children are playing on the playground. The teacher called the children in for a snack. She had 20 cookies. How many cookies did each child get?
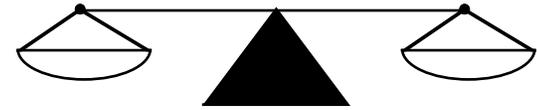
Which is heavier…
- 15 large nails or 12 Unifix cubes?
- 5 large sea shells or 16 small seashells?
- 15 large beans or 5 old keys?
- 8 Unifix cubes or 8 acorns?

Find what will balance…
- One milk carton (filled with water)
- a half cup of beans
- 10 keys
- a dozen nuts

Mr. Brown has opened a shoe store. The graph shows the kinds of shoes he sold the first month. It is time to order shoes for the store. What should he order the most of? the least?

The Shoe Store

	Sneakers	Dress Shoes	Sandals

13
12
11
10
9
8
7
6
5
4
3
2
1
0
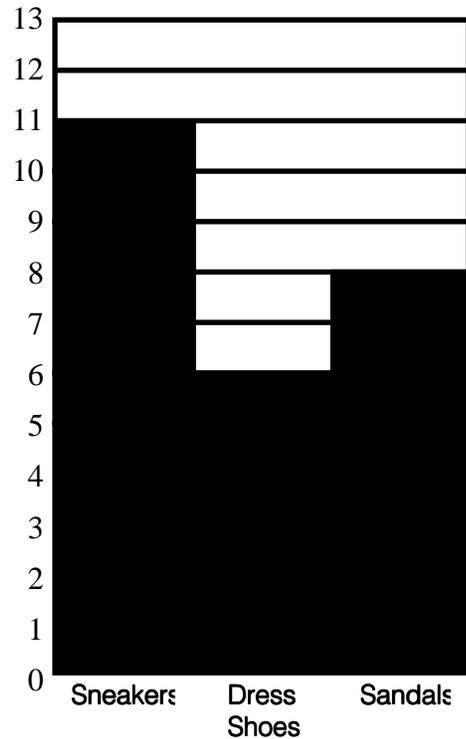
Beauty is trying to tell the Beast about apples. He knows only about oranges. What would you tell the Beast about ways an orange is like an apple and how they are different. He knows about grapes, but not bananas. Compare grapes and bananas for the Beast.

Faye has 2 nickels and 15 pennies. Her brother has lots of nickels and dimes. Faye trades equal value for different coins. What could she have traded? She trades once more with her mother. What do you think she has now?

Card 9

Set A

This morning you got out your socks and sneakers. You had a pair of blue sneakers and a pair of black sneakers. You had a pair of red socks and a pair of green socks. What different ways could you have worn them?

Card 10

Set A

Our class is working on a program to present to the school. Half the children will stand, half will sit. How can we arrange the children?

Card 11   Set A

Bill is at the zoo. He sees 14 legs. How many storks? He sees 4 giraffes. How many legs? Then he sees 8 legs, how many elephants?   If he sees 6 zebras, How many legs? Explain your answers.

Card 12   Set A

What is the question?

1. The answer is 2. What is the question?

2. The answer is 5. What is the question?

3. The answer is 10. What is the question?

Card 13   Set A

Kevin has earned 10 stickers for reading books. He can trade the stickers for items in the class store.

1 sticker - bookmark
2 stickers - eraser
3 stickers - pencil
4 stickers - notepad

What can Kevin get with his 10 stickers?

Card 14   Set A

Solve the double riddles:

1. My double is more than 16._____
2. My double is less than 4._____
3. My double is between 12 and 16. _____
4. Double me and get 12._____
5. My double has 2 digits. One of them is 4. I am less than 9._____
6. My double rhymes with gate.
7. Double me and you will have half of 20.

Jermane said, "I think the number of legs in this room is more than a hundred."

a. Could this be true? Explain.

b. How many legs are in this classroom?

If 4 children are sitting at a table, how many feet are under the table?

If there are 6 children- how many feet?

Explain how you got your answers.

Card 17   **Set A**

Mom is baking a cake for Erin's birthday party. She needs 8 eggs. She has 6. Grandma gave her 1. How many more does she need?

Card 18   **Set A**

•How can you use the calculator to find how many twos are in sixteen?

•How can you change twenty into thirty without using the clear key?

•How can you change twelve into eleven without using the clear key?

My Favorite Color
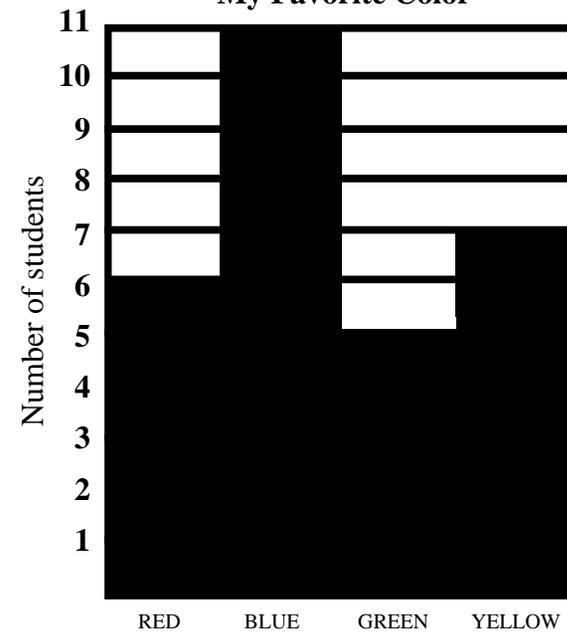
1. What do the numbers on the side of this graph mean? Explain what the colors mean.
2. How many children are in this class?
3. Tell as many things as you can about this graph.

On a farm, a worm came out of his hole. He saw 10 legs. How many chickens and horses did he see?

Card 21   **Set A**

Donna is playing an addition game with her brother. She must find 2 cards that show 7 hearts all together. Here are her cards. Can she go out this turn? What pairs can she play?

| 1 ♡ | 2 ♡ ♡ | 3 ♡ ♡ ♡ |
| 4 ♡ ♡ ♡ ♡ | 5 ♡ ♡ ♡ ♡ ♡ | 6 ♡ ♡ ♡ ♡ ♡ ♡ |
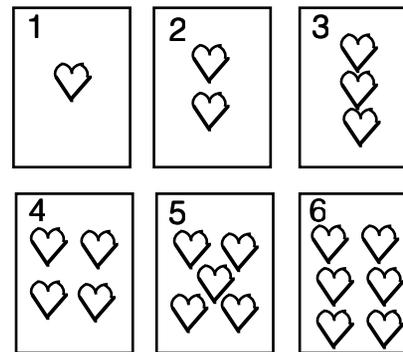
Card 22   **Set A**

Use red, yellow, brown, green, and blue Unifix cubes and make 5 sticks of different lengths. Your sticks should have **more than 2** cubes but **fewer than 20** cubes.

Now solve these puzzles and tell how many.

1. The difference between yellow and brown.
2. The sum of blue and brown.
3. The difference between green and blue.
4. The sum of red, brown, and blue.
5. Which is longer, red plus yellow or brown plus green?

Write 5 different puzzles for your friend to solve.

Find two things that cost the same amount as a ball. Are there other possible answers?

pencil	5¢
ball	10¢
eraser	3¢
hat	8¢
gum	2¢
candy	7¢

If you have 15¢, what could you buy?

Ten alligators went down to the river. Three of them laid eggs. They laid 5 eggs each. A snake ate 8 eggs. How many eggs are left?

Ned

Jed

Fred
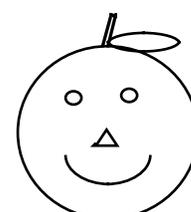
Ted

1. I have a leaf.

2. I have a smile.

3. I have a circle nose.

Who am I?

Four children are lining up for lunch. Their names are Lin, Bill, Jon, and Mary. Lin is first. Bill is last. Mary is behind Lin and in front of Jon. Who is third in line?

Card 27   **Set A**

Cover your library book with Unifix cubes. The cubes must touch and cover the entire book. How many cubes did it take? Find someone who used the same number of cubes as you did. Snap your cubes into tens and ones. Find someone who used 10 more or 10 fewer cubes than you did.

Card 28   **Set A**

Kim is 7 years old.

Marcus is 2 years older than Kim.

Joe is 3 years older than Marcus.

How old are Marcus and Joe?

Card 29   **Set A**

You have a sphere, a cube, a cylinder, a cone, a rectangular prism and a pyramid. Which shapes will stack? Which shapes will roll? Explain your reasons for each answer.

Card 30   **Set A**

Josef gets 50¢ for allowance each Saturday. On Monday, he bought a pencil for 10¢. On Tuesday, he spent 15¢ on candy. On Wednesday, he wanted to buy a ball that cost 30¢. Did he have enough money? Explain.

Some students have birthdays in these months: 4 in March, 5 in April, 3 in May and 1 in June.

Make a graph to show this information.

Use your graph to write questions for the following answers:

1.   The answer is 8.
2.   The answer is 1.

Use a calendar to answer these questions:

1. Mom goes to the store every Thursday. How many times will she go this month?
2. Dad works every Monday, Tuesday, Wednesday, and Thursday. How many days will he go to work this month?
3. The bowling alley has a "Free Game" night every second and fourth Wednesday nights. What are the dates for the "Free Game" nights this month?

Card 33   **Set A**

"What's My Name?"

1. I'm greater than 10.

2. I'm an even number.

3. I'm less than 25.

4. When you count by 5's, you say my name.

Card 34   **Set A**

Start at 5. Count on 6 more. What is the number? Count on 2 more. What is the number? Count on 10 more. What is the number? Count on 4 more. What is the number?

Do this again and write your answers at every step.

Now repeat this starting with 15. Repeat again with 25. What do you notice?

Card 35   **Set A**

Pete has two puppies and 10 puppy treats to give them. How many will each puppy get if Pete passes them out equally?

If Pete doesn't pass them out equally, what are some other ways the treats could be shared?

Card 36   **Set A**

A dragon blows fire for two hours everyday. How many hours would he blow fire in a school day? in a school week? Explain how you got your answer.

Card 37   Set A

Mrs. Jones was lining up her class to get their pictures taken. Listen to the names she called and find the pattern she used: John, Sarah, Tom, Judy, Bill, Laura. Write the names to show what Mrs. Jones might have said if she helped 10 children from your class line up.

Card 38   Set A

Our worm, Boogie, can crawl three inches in one minute. How many inches can he crawl in two minutes? five minutes? How did you figure this out?

Card 39   **Set A**

A bag of shapes fell behind a chair. When Mom reached behind the chair, she felt two shapes that had no corners. She felt some other shapes that had corners. If there was a total of 26 corners, what shapes do you think she found?

Draw a picture to explain or write about your answer.

Card 40   **Set A**

Sam has 4 tables for his birthday party. His mother puts the same number of things at each table. He has 16 plates, 8 horns, 4 flowers, and 16 chairs.

Draw the four tables. Then draw the things at each table. How many things are at each table?

Tonya has 4 coins. How much money could she have?

Are there any other possible answers?

Six dinosaurs had a race. Two dinosaurs tied for second. Speedy was one of them.

Little T was ahead of Goofy. Goofy beat Little Dino.

Sleepy came in last. Steggy was beaten by only one other dinosaur. Who won the race?

Show the order in which the dinosaurs crossed the finish line.

Joe bought 7 green lollipops.

There are 3 fewer yellow lollipops than green lollipops.

There are 2 more red lollipops than yellow lollipops.

How many lollipops are there? Show how you got your answer.

Judy and Mary are at the fair. They have ten more minutes before they have to leave. They have three tickets each to ride three rides each. What three rides could they take before they have to leave?

Roller Coaster - 6 minutes
Ferris Wheel - 2 minutes
Bumper Cars - 5 minutes
Swings - 1 minute
Tea Cups - 4 minutes
Merry-Go-Round - 3 minutes

Card 45   **Set A**

What Time Is It?

- The little hand is on the hour.

- It is an odd number.

- It is between 2 and 4 o'clock.

Write a time puzzle for a friend.

Card 46   **Set A**

Fold a sheet of paper in half two times. Punch one hole with a hole punch. When you unfold the paper, how many holes will be in it?

Unfold the paper. Were you right? Can you fold a paper so that when you punch one hole, you will have three holes when you unfold the paper?

Use the picture and the clues to find the number.
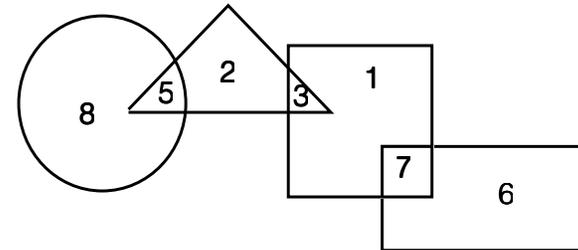
1. I am in the rectangle. I am not in the square.
2. I am in the square. I am not in the triangle or rectangle.
3. I am in the circle and the triangle.

Write two different number riddles.

Farmer Brown and his wife planted vegetables each day for a week. The table shows how many they planted on the first three days.

Day	1	2	3	4	5	6	7
Vegetables Planted	5	10	15				

How many vegetables did they plant by the end of the week?

Card 49　　　　　　　　　**Set A**

Will the teacher's desk fit through the classroom door? If we cannot move the desk from where it is, how can we find out?
Explain what you need to do step by step.

Card 50　　　　　　　　　**Set A**

Betty and Kim went shopping. Use your calculator to find out what items they might have bought.

Hat - $4   Shoes - $12   Coat - $7
Shirt - $6   Jacket - $15   Belt - $2

$27 _____ $10 ____

$11 _____ $16 ____

If you had $30, what items would you buy? Would you have any money left over? Explain your answers.

Rod
11 years old

Judy
9 years old

Donna
6 years old

1. Who is 5 years older than Donna?
2. Who is 2 years younger Rod?
3. What is the difference in the girls' ages?

What else can you tell about the children's ages?

What would the 15th letter be in this pattern?

ABAABAAAB. . .
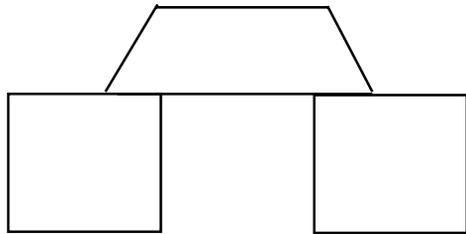
Arches are made with two squares and one trapezoid. If the builders have six trapezoids, how many squares do they need to make arches?

Lilly played the bean bag toss game at the fair.
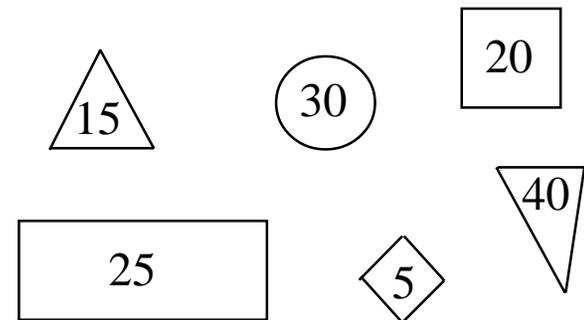
She could throw 2, 3, or 4 bags at a board with holes in it. Each hole was worth a different number of points. What are some ways to score 65 points to win a prize?

Sad

Happy

Mad

Goofy

Sleepy
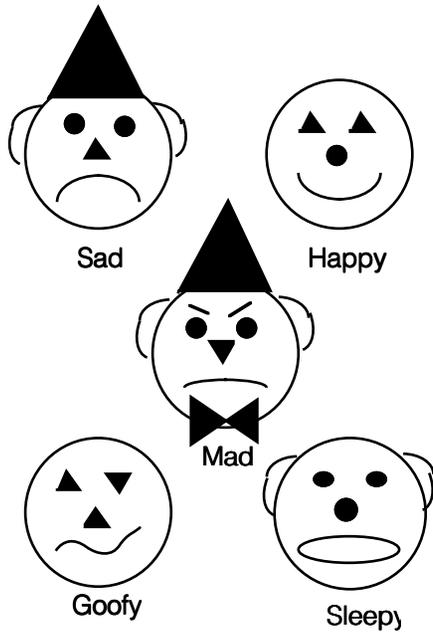
Who Am I?

1. I have ears.
2. My nose is a triangle.
3. I have a hat.
4. I have a bow tie.

Do all snack boxes of raisins have the same number of raisins? Do all bags of M & M's have the same number of candies? Do all boxes of teddy bear crackers have the same number of crackers? Why or why not? Make a plan to prove your ideas.

What are the next three numbers in this pattern?

77, 66, 55, 44, 33,

_____, _____, _____.

What is the pattern?

3, 8, 13, 18, 23, . . .

What would be the tenth number in this pattern?

I have some pennies, nickels, and dimes in my pocket. I put three coins in my hand. How much money do you think I have in my hand?

On the way to the park, Tim saw three flowers. Each flower had two leaves. On each leaf was a ladybug. Each ladybug had three spots.

Tim saw ___ flowers.
Tim saw ___ leaves.
Tim saw ___ ladybugs.
Tim say ___ ladybugs spots.

Draw a picture to show how you found each number.

Draw the next sequence in this pattern.

♥♥oooo♥♥ooo♥♥oo

The song "Old MacDonald" has a pattern. How is that pattern like or different from the hearts and ovals pattern?

The students each had a nickel, a dime, a penny, and a quarter. The teacher said, "Put these coins in order from the smallest to the largest." Students did not agree how to to this. What are two ways they might have ordered the coins? Explain.

Card 61

Set A

Sarah Squirrel hid some nuts for the winter. She sent Sammy Squirrel out to gather them. "How many did you hide?" he asked Sarah. "I hid more than six. I hid less than 9. I hid a number that can be divided between us equally." How many nuts did she hide?

Card 62

Set A

There are four second-grade teachers. Ms. Jolly has a rabbit and a fish. Mrs. Woo has three hamsters. Ms. Hunt has eight fish. Mr. Hill has two rabbits and six birds. Make a graph to show the pets in the second grade. What are two things you could tell from this graph?

Look at this picture.
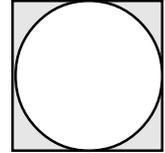
Draw what you will see if you move the circle to the left.

Look at this design.
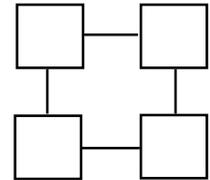
What would you see if you left off the squares?

Draw a triangle inside a circle that is sitting on a rectangle.

How many squares do you see?
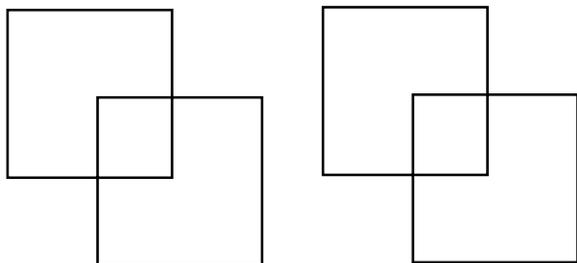
How many triangles do you see?
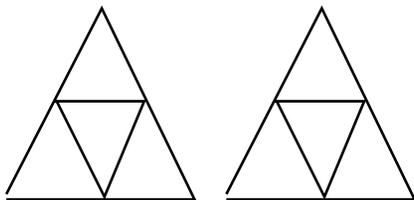
All of these are waggies.
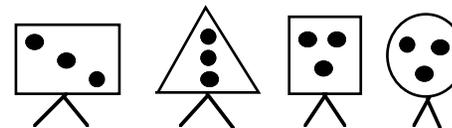
None of these is a waggie.

Draw four new waggies.

Set A

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