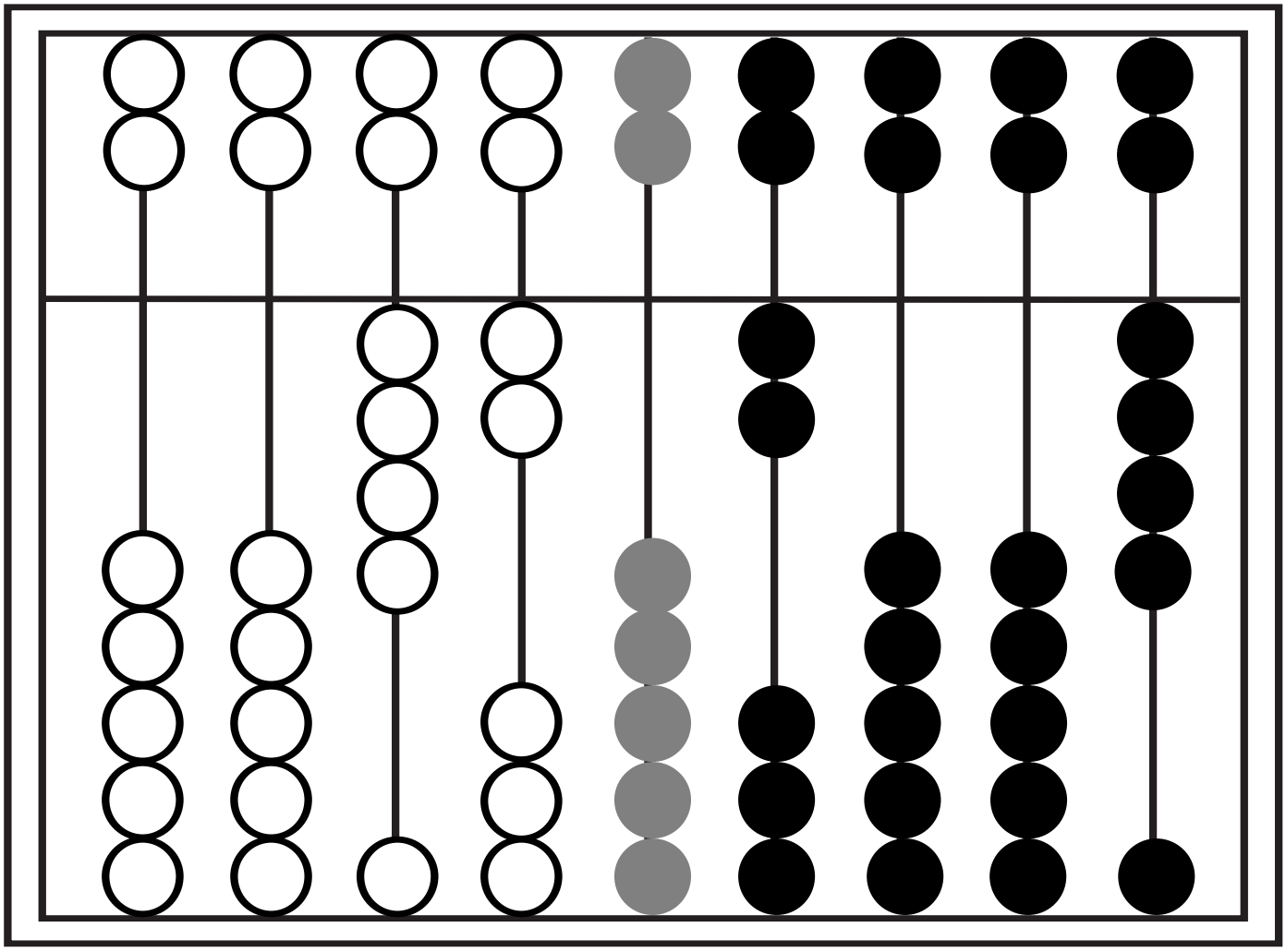
Abacus

Volume 42 2004



ONTARIO ASSOCIATION FOR MATHEMATICS EDUCATORS

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Edited by Frances Schatz

Al Abacus
Activities in this issue
www.alabacus.ca

From the Editor's Desk

Last November I spoke at the joint NCTM and Alberta Mathematics Teachers' regional conference. At supper one evening I met another speaker from Minnesota. *Abacus* was the common denominator of our dinner conversation. I had just met the person behind an abacus web site I had visited many times and this person wondered about a journal called *Abacus*.

Dr. Joan Cotter is the program developer of Right Start™ Mathematics, a home school and classroom program that incorporates visualization, the AL Abacus, and math card games. The mission is to help children understand, apply, and enjoy mathematics. For a great assortment of activities and a look at the Al Abacus, visit her web site www.alabacus.com. Thank you Joan for writing your visual fraction article for this issue of *Abacus*.

Tara Tasker has spent the past year at Queen's University to obtain her M.Ed. She is an avid resource writer and all her resources are available free on her web site www.bonfieldpublicschool.com including her math resource entitled "Math Wizards". Thank you Tara for your interesting way to use unwanted CDs as spinners so children can explore probability. In this issue of *Abacus*, complete instructions are given for making the CD spinners. A sample activity is also included (there are more on the web site).

Recall Mathman's (**Gill Dunn**) toothpick puzzles in previous issues. Recently, **Erica Wintjes**, a student in grade 4 at Gregory Drive Public School in Chatham sent 'My Own Toothpick Puzzle' with permission from her teacher, David Tubb. Thank you, Erica, for the great puzzle.

And now I will introduce our new *Abacus* editor who will start with the September, 2004 issue. **Trevor Brown**, a teacher who has experience as an editor of the *Abacus* from about fifteen years ago, will be looking for submitters and new ideas for *Abacus*. Trevor is formerly a mathematics consultant for the Toronto District School Board and is now course director, Intermediate Mathematics Additional Qualifications for OISE/University of Toronto. He has presented a number of interesting workshops at mathematics and leadership conferences. Please welcome Trevor who can be contacted at tbrown@edu.yorku.ca.

Since 1996 I've had a most enriching experience putting this journal together four times a year. Thank you to all who have contributed ideas, activities, advice and professional support during my term as editor. I will continue to work with OAME either as a workshop presenter and/or a writer/editor in the future. I look forward to a new endeavour, children's literature, that is calling me. I will close this last issue for me with a song 'Yellow is the Sun'. Dr. Joan Cotter (lyrics writer) and Rosine Hermodson-Olsen (composer) have kindly granted me permission to print the song.

Frances Schatz

Solutions

Erica's solution: (10 toothpicks in total)



▲ Teacher Notes: Visual Fractions

by Dr. Joan A. Cotter

Introduction and Preparation

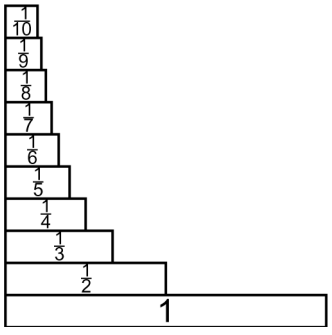
A linear model of fractions, in contrast to pies or circles, makes it easier for students to compare and compute with fractions. No one should be asked to compare two pies according to a quote from www.statcan.ca, Specialists also suggest refraining from using more than one pie chart for comparison.: A similar quote from www.askoxford.com says. “Experts in visual literacy say that comparing quantities in pie charts is difficult because most people think linearly. It is easier to compare along a straight line than compare pie slices.”

1. Copy the fraction chart on the next page, enough for every one or two students. Cut them apart on the lines. (IF using commercial products, be sure the sevenths and ninths are included. All fractions should be the same colour to make comparing easier.)
2. Prepare strips of paper the length of the 1 on the fraction chart and 2 or 3 cm wide.

Activities

1. Ask the students to divide a paper strip into two parts. Ask, What do you have? (Two halves)

   Explain that we can write 1 divided by 2 as $\frac{1}{2}$.
   The line in the middle means *divided by*.
   Ask them to write the fraction on each half.
2. Repeat for thirds, asking students to write 1 divided by 3 on each third. Continue with fourths and eighths.
3. Show students the whole fraction chart. Give them a set of the fraction pieces and ask them to put it together like a puzzle.
4. Explain that we name fractions, except for one-half, using ordinal numbers, for example, one-third and one-tenth. Occasionally, you might hear a young child say one tooth.
5. Ask, How many fourths do you need to make a whole? (4) How many ninths equal 1? (9)
6. Ask the students to build the fraction stairs Discuss how they are different form stairs they climb. Then ask for comparisons such as, Which is greater, $\frac{1}{3}$ or $\frac{1}{4}$? Ask why that is true.

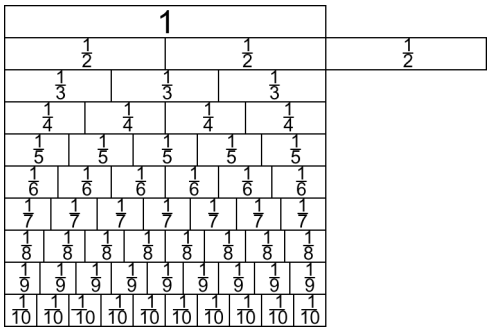


7. Tell the students to look at the completed fraction chart. Ask, How many fourths are equal to one-half?(2); How many sixths, (3); eighths (4); sevenths (3 and one-half).

   Tell them we write two-fourths as $\frac{2}{4}$.
8. Ask, Which is greater, $\frac{2}{3}$ or $\frac{3}{4}$?

   Which is greater, $\frac{4}{5}$ or $\frac{5}{6}$? Which is greater, $\frac{8}{9}$ or $\frac{9}{10}$?
9. Tell the students to place an extra half (from a partner’s set) in the second row. Ask, How many halves do you think we have now? (3) Ask for another name (one and one-half).

   Show them how we write it, $1\frac{1}{2}$.



   This seems to be a difficult concept, so give them plenty of practice in building, naming and writing fractions such as $1\frac{2}{3}, 1\frac{7}{9}$, and $2\frac{3}{4}$.
20. You can even proceed with a bit of multiplication and division.

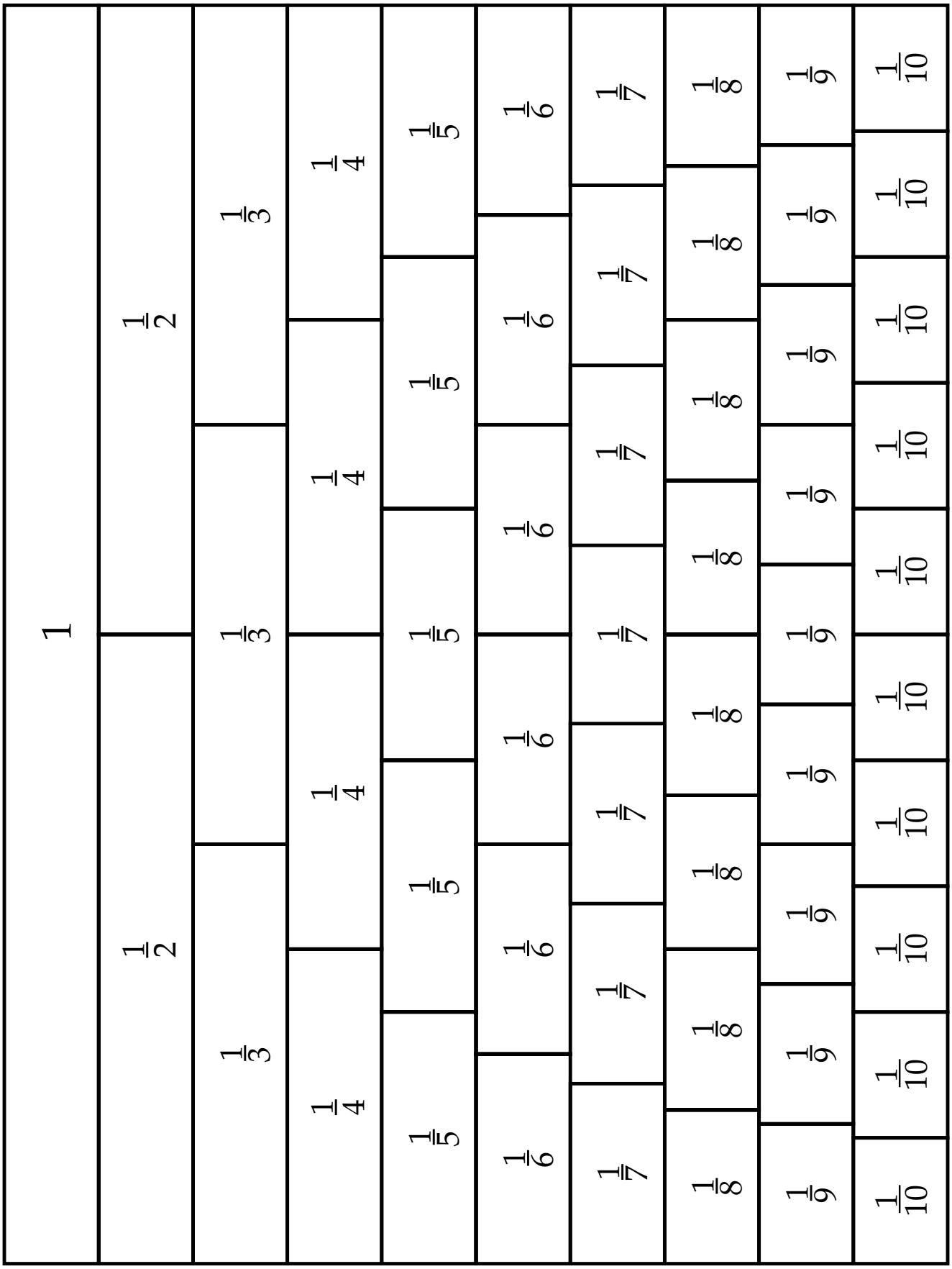
   Ask, What is $\frac{1}{2}$ of $\frac{1}{3}$? $\left(\frac{1}{6}\right)$ What is $\frac{1}{3}$ of $\frac{1}{2}$? $\left(\frac{1}{6}\right)$

   What is $\frac{1}{2}$ divided by $\frac{1}{8}$?

   That means how many $\frac{1}{8}$s in $\frac{1}{2}$? (4)

With this model internalized, students can learn other aspects of fractions with confidence..

▲ Fraction Chart



▲ Teacher Notes: CD Spinners

© Math Wizards, 2003

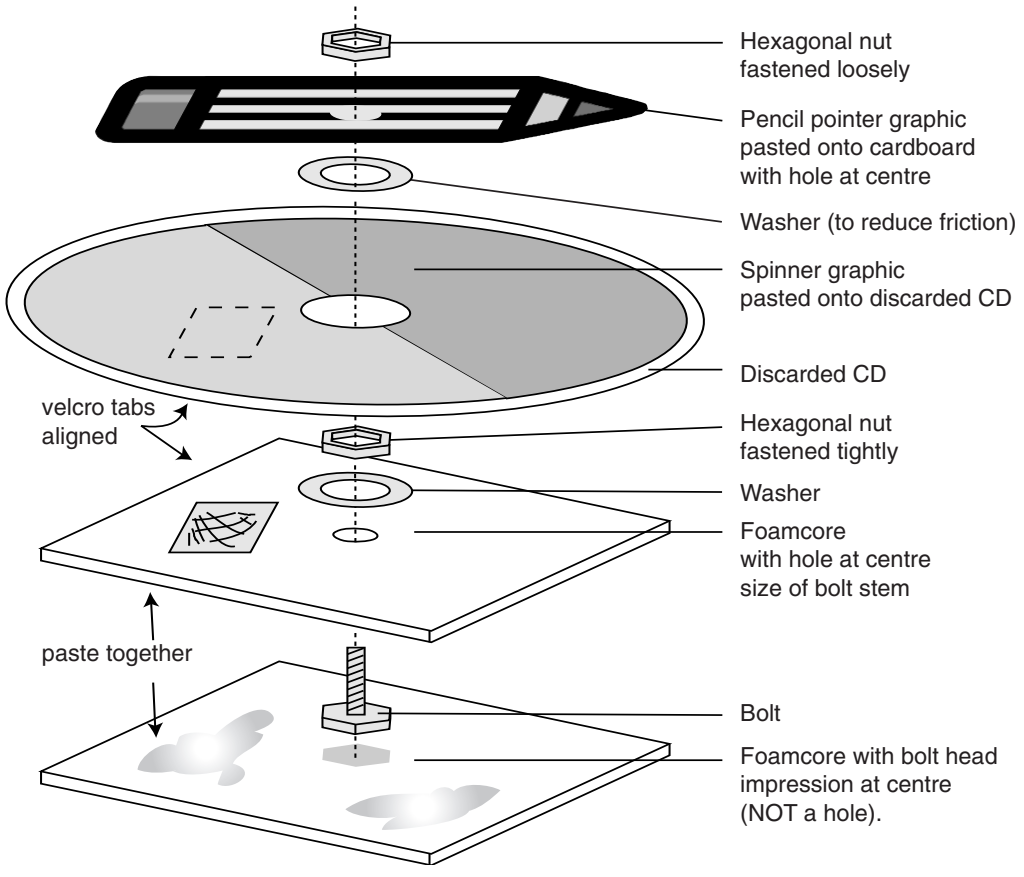
Spinners are a wonderful way for children to explore probability. These spinners use old, unwanted CD's and are easy and inexpensive to make. The directions and templates are also available to download in PDF format along with grade 2 and grade 3 data management & probability activities for an entire year at www.bonfieldpublicschool.com. This is a non-profit web site that is dedicated to providing free resources for the Ontario curriculum.

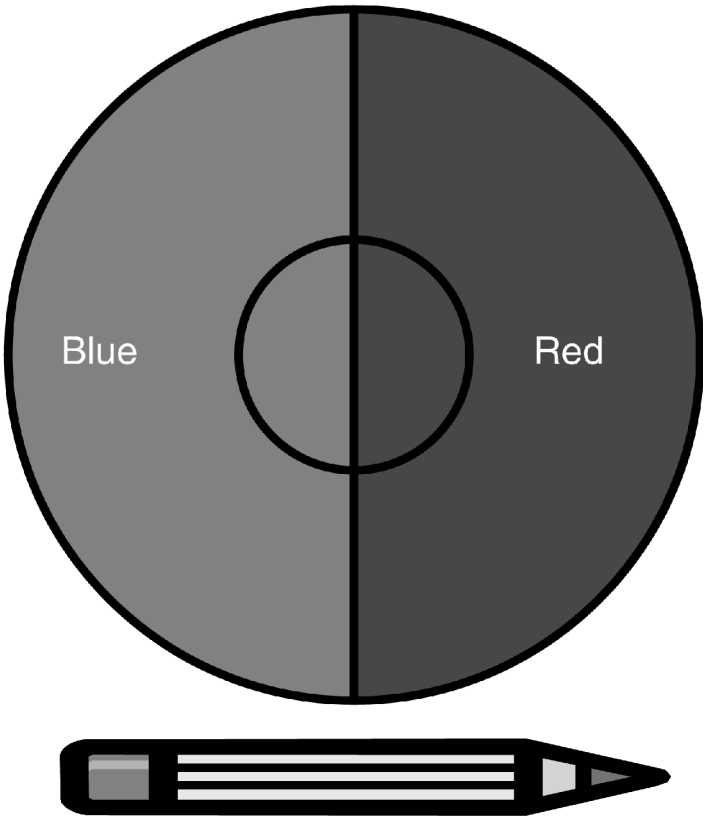
Materials:

1. foam core board (available at stationary stores)
2. ruler
3. exacto knife
4. pencil
5. hammer
6. #8-32 x 3/4 bolt
7. glue
8. back up plate (washer)
9. #8-32 x 3/4 nut
10. an unwanted CD
11. velcro
12. full white sheet labels (example: Avery 08165 for inkjet printers)
13. Clear CD / DVD labels
14. cardboard
15. scissors
16. 4mm-.7 nut

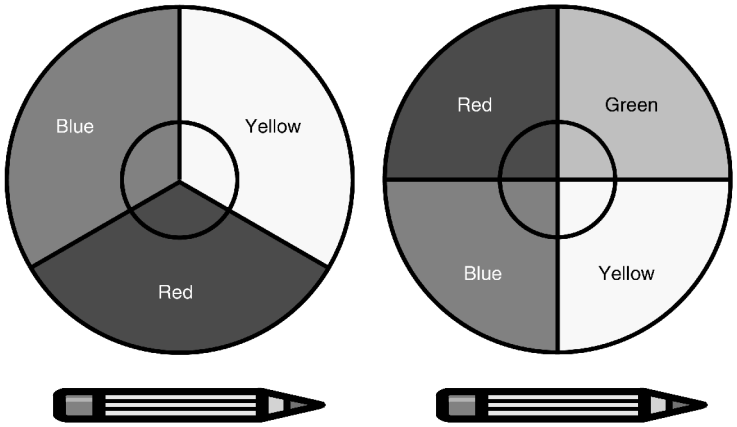
Directions

1. Cut two 7.5cm x 7.5cm squares of foam core with an exacto knife.
2. Mark the centre of one square on both sides, and on one side of the second square.
3. Hammer the bottom of the bolt into the centre of ONE foam core square to form a hole in which the bolt may be inserted.
4. Lightly hammer the head of the bolt into the SECOND foam core square so that it makes a small dimple.
5. Insert the bolt through the FIRST foam core square (through the hole).
6. Glue the dimple foam core square and place the dimple over the head of the bolt. This piece will help to keep the spinner flat.
7. Place one metal washer over the bolt and then screw on the medium hexagonal nut tightly.
8. Photocopy spinner templates and paste onto CD OR decorate your own CD labels. You may choose to use the clear CD labels to place over top the decorated label for protection.
9. Attach one side of the velcro to the foamcore base and the other side to your CD. Remember while placing the velcro to keep things centred and that the velcro pieces match up. The bolt should come up through the hole in the CD.
10. Place the second metal washer over the bolt. This will reduce the friction between the CD and the pointer.
11. Photocopy pencil pointer templates to paste onto cardboard (cereal box guage is appropriate) and cut out the pointers. Punch a hole through the centre of the pointer.
    OR trace pointer onto cardboard and cut out. You may choose to decorate it in your own way.
12. Place the pointer over the bolt and then screw on the small hexagonal nut just enough to prevent the pointer from flying off.

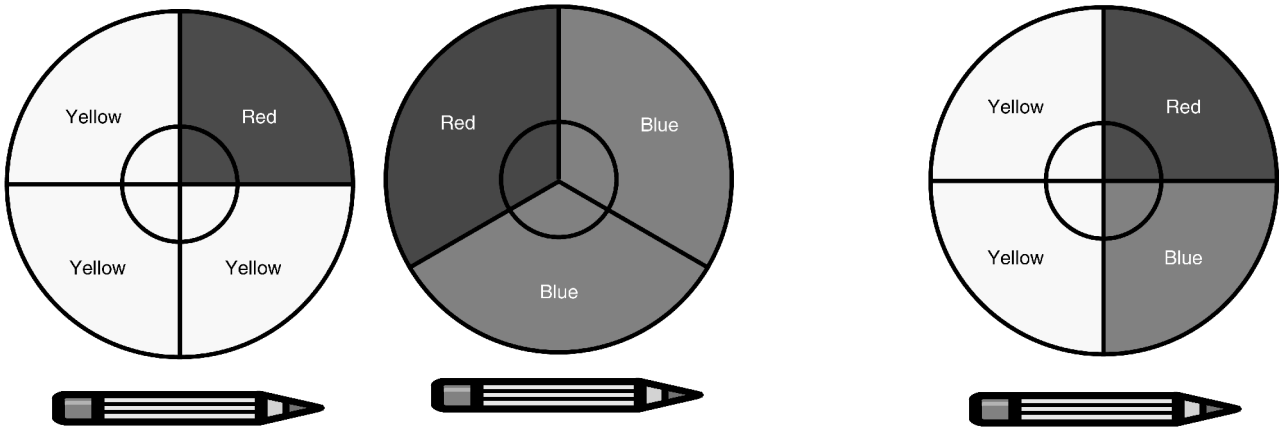




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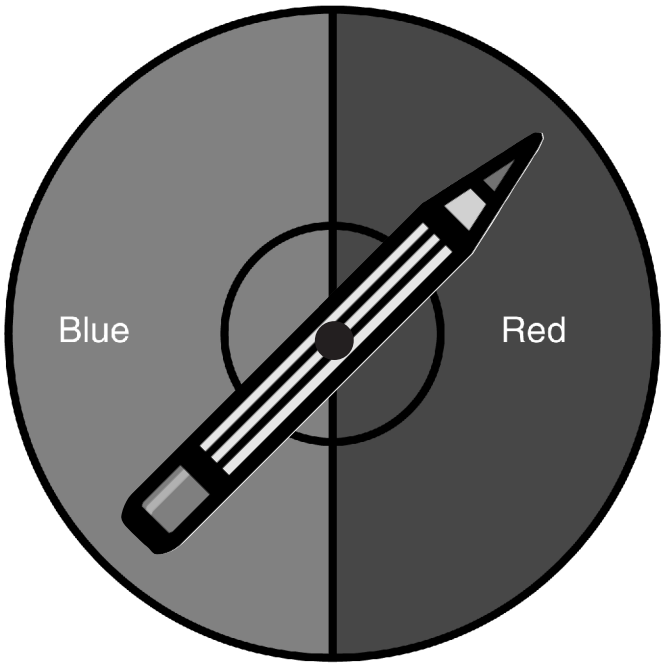
photocopy @200% to enlarge



▲ Activity: Data Management and Probability

© Math Wizards with permission

Merlin wants us to do a probability experiment with a spinner.



Spin the spinner 30 times and record your results in the tally chart below.

My Prediction:

I think the spinner will land more often on the colour:

_____

Chart:

Colour	Tally
RED	
BLUE	

Complete the following questions:

1. What colour did the spinner land on the most?

   _____

2. Did you predict correctly?

   _____

2. Repeat the above using another spinner. (3 colour or 4 colour.)

   _____

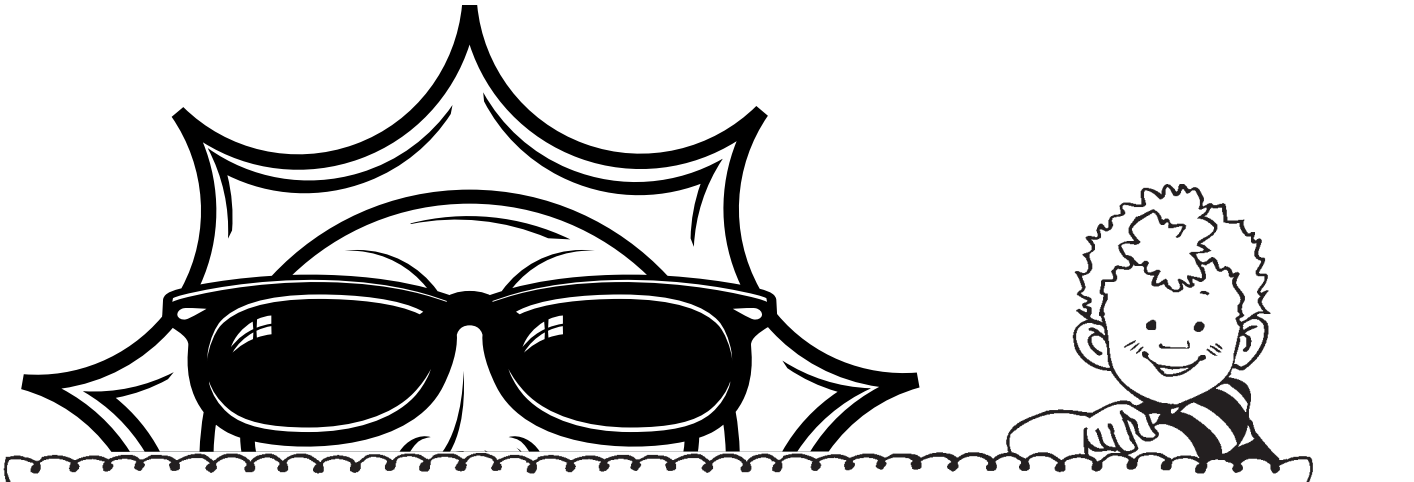
▲ Activity: Erica's Toothpick Puzzle

Use ten toothpicks to form the equation below.

VI = VI – I

Move one toothpick to get a true equation.

▲ Yellow is the Sun



Lyrics by Joan A. Cotter

Composed by Rosine Hermodson-Olsen
Arranged by Barbara Ask

C G C G

Yellow_ is the sun. Six is five and one. Why is the sky so blue?

C F G C

4

Seven is five and two. Salty is the sea. Eight is five and three.

Dm G C

7

Hear the thunder_ roar. Nine is five and four.

C Gmaj7 C

9

Ducks will swim and dive. Ten is five and five.

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