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Using This Book

This all-in-one set of lessons enables both the student and teacher/parent to cooperatively learn together through fun, yet challenging, activities. **To ensure a smooth start it is most important that the student and teacher review together the initial five pages in this book.** Similarly, as new topics are introduced, jointly reading over the pages (while using the fraction circles - see below) will boost student understanding and motivation to apply themselves during the follow-up practice. Spot-checking those completed worksheets by asking students to explain (justify) their reasoning on a few problems is mathematically valuable as it deepens their understanding and enhances their ability to mentally manipulate fractions.

Fraction Circles Cut-Outs

There are fraction circles cut-outs on pages 59 and 61 to be used as support and free exploration for students to “see” how fractions work. A free PDF (www.CriticalThinking.com/fractioncircles) of these fraction circles is also available to download and print. These can provide a helpful aid both when topics are introduced (to follow along with the examples in the lesson) and during the practice exercises. A few suggestions follow:

- Coloring each circle a different color (but keeping the fraction label visible) will aid students when looking for similar fractions (such as all the one-fifths, e.g.).
- To increase durability, glue or paste the page to a heavier stock (such as a file folder or thin cardboard) prior to cutting out the circle parts.
- Fastening an envelope to the inside back cover will allow storage of the complete set, ready for the next lesson.

Extra for Experts

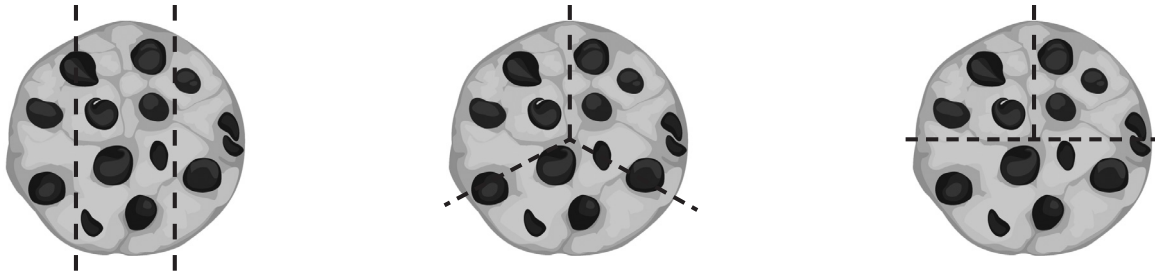
Most activities in this book end with a starred problem (★) which provides a higher-level learning option for those up to a challenge! These additional problems are not required to solve the riddles in the “check yourself” portion.

About the Author

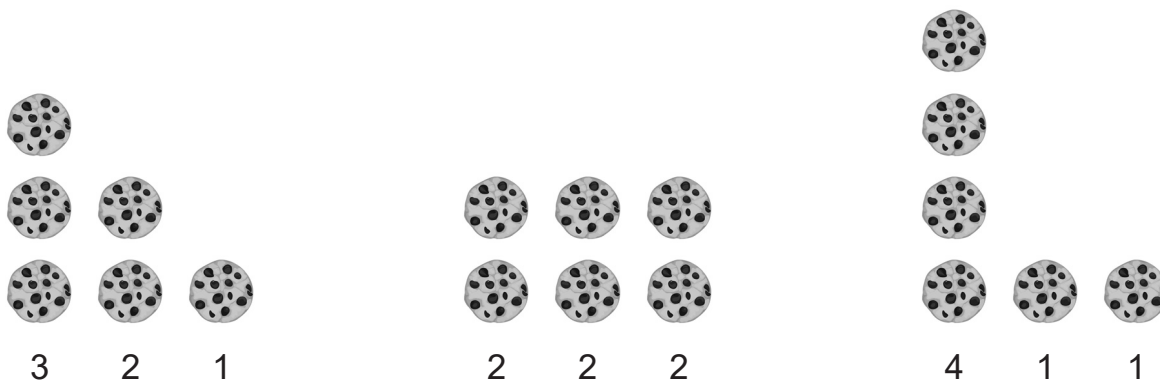
Robert Femiano won the highest honor in education, the Presidential Award for Excellence in Mathematics and Science Teaching in 2002. For more than 30 years he was an elementary teacher in Seattle public schools, and adjunct faculty at Seattle Pacific University, conducting math methods courses. Publications include *Algebraic Problem Solving in the Primary Grades* article in National Council of Teachers of Math journal and the award-winning *Balance Math™ & More* series by The Critical Thinking Co.™ His interest in using logic puzzles for teaching math resulted in the best-selling series/apps, *Balance Benders™* by The Critical Thinking Co.™

In math, the whole amount is always divided into equal-sized parts, as if “fair-sharing.” Everyone receives the “same-size” fraction, so whether it was a half cookie or half of six candies, both kids should have their fair share of one-half.

What if there were 3 friends and only 1 cookie? Which picture shows a fair way to share so each friend ends up with “same-size” pieces?



Similarly, how about 6 cookies and 3 friends? Which picture shows a fair way for each friend to end up with one-third of the cookies?



– Think About It –

In both cases, the middle choice correctly shows the whole divided into 3 equal parts, or one-third for each friend.

If there were 4 friends, the cookies would be divided into 4 equal parts, called fourths. For 5 friends, it would be broken into fifths, and so on.

What Fraction?



penny

1 ¢



nickel

5 ¢



dime

10 ¢



quarter

25 ¢



half-dollar

50 ¢

silver
dollar

100 ¢



\$1 bill

100 ¢



\$2 bill


200 ¢

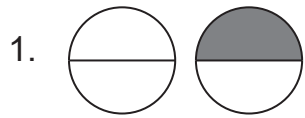
Use the pictures above to answer the questions.

1. What fraction of these are made of metal? —
2. What fraction of these are non-metallic? —
3. What fraction of these is worth more than 5 dimes? —
4. What fraction of these are less than \$1 but more than a quarter? —
5. A penny is $\frac{1}{100}$ of a dollar. What fraction of a dollar is a nickel? —
6. What fraction of the coins has a value that is an even number? —
7. What fraction of the coins is larger (in size) than a penny? —
8. What fraction of the coins is worth less than 12 nickels? —
9. A bust is a drawing or sculpture of a head and neck. What fraction have a bust? —
10. What fraction of these have a penny value that is an odd number? —
11. What fraction of \$2, do all the coins make? —
12. ★ What fraction of these, if they were doubled, would equal another coin or bill? —

What fraction is shaded? Circle the best answer.

Remember that a fraction is written: $\frac{\text{part}}{\text{total}}$

 2 parts shaded out of 4 total parts is $\frac{2}{4}$



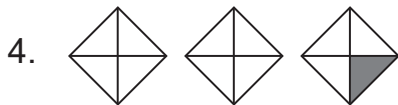
$\frac{4}{1}$ $\frac{3}{4}$ $\frac{1}{4}$



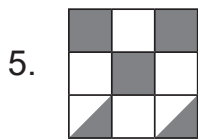
$\frac{1}{2}$ $\frac{2}{1}$ $\frac{1}{4}$



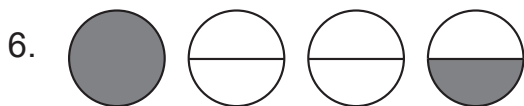
$\frac{1}{4}$ $\frac{4}{8}$ $\frac{4}{4}$



$\frac{11}{12}$ $\frac{1}{4}$ $\frac{1}{12}$



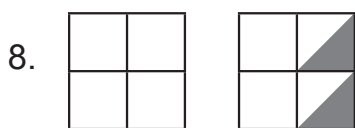
$\frac{5}{9}$ $\frac{4}{9}$ $\frac{9}{4}$



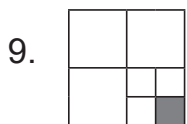
$\frac{1}{4}$ $\frac{2}{4}$ $\frac{3}{8}$



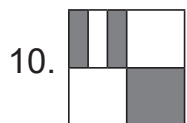
$\frac{2}{6}$ $\frac{2}{12}$ $\frac{2}{7}$



$\frac{1}{8}$ $\frac{1}{4}$ $\frac{2}{8}$



$\frac{1}{4}$ $\frac{1}{7}$ $\frac{1}{16}$



$\frac{3}{4}$ $\frac{5}{12}$ $\frac{2}{4}$



$\frac{2}{3}$ $\frac{3}{8}$ $\frac{5}{9}$ $\frac{5}{18}$

What's the New Word?

Follow the directions and write the answer in the blank.

1. Add the first half of the word "made" with the last half of the word "path". The new word is _____.
2. Take the second half of "camper" and then add the last half of "lesson". The new word is _____.
3. Put the first $\frac{2}{5}$ of the word "third" with the last $\frac{3}{4}$ of the word "wink". The new word is _____.
4. Take the first $\frac{1}{3}$ of the word, "kindergarten" and add to it, the last half of "weakness". The new word is _____.
5. To the first $\frac{2}{3}$ of the word "police," add the middle $\frac{1}{3}$ of the word "intend". The new word is _____.
6. Take the first $\frac{1}{4}$ of the word "freedoms" and add on $\frac{7}{7}$ of the word "actions". The new word is _____.
7. Take the first $\frac{1}{4}$ of the word "construction", add on the final $\frac{2}{3}$ of "inside", followed by the middle $\frac{4}{6}$ of "crater". The new word is _____.
8. ★Use these letters from left to right to find the word. The letter M position is $\frac{1}{12}$.
MLSFOPRLUEHB

$\frac{11}{12}$ $\frac{5}{6}$ $\frac{1}{6}$ $\frac{1}{2}$ $\frac{1}{3}$ $\frac{3}{4}$ $\frac{2}{3}$

Review – Final

In the blank next to the problem, write the letter for the correct answer. Then complete the “check yourself” exercise below. An answer may be used more than once. It may help to draw or use your fraction circles.

___ 1. $\frac{1}{4}$ of 10



___ 2. $\frac{1}{3}$ of $\frac{1}{3}$

___ 3. $\frac{1}{3}$ of 2

___ 4. $\frac{1}{3} =$

___ 5. $\frac{2}{3}$ of 4

___ 6. $\frac{18}{9} =$

___ 7.  = $\frac{1}{2}$ so  =

___ 8.  = $\frac{1}{2}$ so  =

___ 9. $\frac{11}{4}$

___ 10. $\frac{1}{2} + \frac{1}{3} =$

___ 11. Reduce $\frac{16}{32}$

___ 12. $\frac{3}{4} - \frac{1}{3}$

___ 13. $\frac{1}{3} + \frac{1}{4} + \frac{1}{6} + \frac{1}{12} = ?$ (Common denominator of 12.)

___ 14. $\frac{3}{4}$ of $1\frac{1}{2}$

___ 15. $\frac{1}{2}$ of $\frac{1}{3}$ of $\frac{1}{4}$ of 24

u $\frac{1}{2}$
 t $\frac{2}{3}$
 e $\frac{4}{12}$
 r $\frac{5}{12}$
 e $2\frac{2}{3}$
 l $2\frac{1}{2}$
 t $\frac{1}{9}$
 h $\frac{1}{8}$
 a $1\frac{1}{8}$
 f $\frac{1}{6}$
 y $\frac{5}{6}$
 u $\frac{1}{4}$
 z $\frac{3}{3}$
 b $2\frac{3}{4}$
 t $\frac{2}{1}$

Free resource from www.criticalthinking.com. Commercial redistribution prohibited

Check yourself: Write the letter for each problem in the numbered spaces below to answer the riddle.

How do butterflies move?

6 7 4 10 8 1 11 2 3 5 12 9 13