Investigation 1

ACE Assignment Choices

Differentiated Instruction

Problem 1.1

Core 1
Other *Applications* 18, *Connections* 20–24

Problem 1.2

Core 2
Other *Connections* 25, 26; unassigned choices from previous problems

Problem 1.3

Core 3–12
Other *Connections* 27; unassigned choices from previous problems

Problem 1.4

Core 13–17, 19
Other *Connections* 28–30, *Extensions* 31–37; unassigned choices from previous problems

Adapted For suggestions about adapting Exercise 31 and other ACE exercises, see the CMP *Special Needs Handbook*.
Connecting to Prior Units 20–26: *Prime Time*

Applications

1. **a.** Possible answers: The sixth-graders have raised \$150. The sixth-graders have reached $\frac{1}{2}$ of their goal. The sixth-graders need to raise \$150.
   b. Possible answers: The sixth-graders have raised \$200. The sixth-graders are $\frac{2}{3}$ of the way to their goal.
   c. Check students' work to see if thermometer is shaded to show $\frac{2}{3}$ of the goal.
2. **a.** Possible answers: eighths, twelfths and sixteenths (multiples of 4).
   b. fourths, twelfths
3. $\frac{1}{4}$ **4.** $\frac{3}{8}$ **5.** $\frac{4}{5}$ **6.** $\frac{11}{12}$
7. **a.** about two thirds $(\frac{2}{3})$
   b. about 80 cups
   c. about one third $(\frac{1}{3})$
   d. about 40 cups
8. Check students' sketches for parts a–c.
   a. almost full
   b. exactly halfway between empty and half full (also accept almost empty or about half full)
   c. about half full
9. A **10.** J
11. $\frac{37}{120} \approx \frac{1}{3}, \frac{10}{120} = \frac{1}{12}$
12. If the progress fell between $\frac{3}{5}$ and $\frac{4}{5}$ you could fold the fifths in half to make tenths. Since tenths are smaller than fifths they are more accurate. The fraction between $\frac{3}{5}$ and $\frac{4}{5}$ would be $\frac{7}{10}$.
13. $\frac{1}{4}$ **14.** $\frac{3}{4}$ **15.** $\frac{2}{3}$
16. Possible answer: The snack bars are not the same size.
17. Check students' work to see if the thermometers are drawn to be the same length as the sixth- and seventh-grade thermometers. The thermometers should be partitioned and shaded to show that $\frac{3}{4}$ of the goal has been met.
18. $\frac{155}{775}$ or $\frac{31}{151}$
19. $\frac{24}{32}$ or $\frac{3}{4}$

Connections

20. Yes, because 450 can be divided evenly into groups of 5, 9, and 10 with no remainders.

21. a. Yes, because $12 \times 4 = 48$.

b. No. $150 \div 4 = 37.5$

c. Yes, because $3 \times 17 = 51$.

22. C **23.** J

24. a. Miguel is right. If a number is divisible by 2 it can be separated into two equal halves.

b. Manny is also correct. If a number is divisible by 3 it can be separated into 3 groups of equal size, or into thirds.

c. Lupe is correct. If a number is divisible by *n*, it can be separated into *n* groups of equal size or into *nths*.

25. a. Possible answer: All fractions with denominators that are factors of twelve (halves, thirds, fourths, sixths, and twelfths) can be measured with a twelfths strip. Some fractions that have denominators that are multiples of twelve can also be measured with a twelfths strip. For example, $\frac{12}{24}$, which is equivalent to $\frac{6}{12}$, can be measured with a twelfths strip while $\frac{13}{24}$ cannot. (Note to teacher: Actually you can measure any fraction with a twelfths strip but you will not get a whole-number numerator. This answer should not be excluded, but it is not expected.)

b. Possible answer: If you start with a fraction strip folded into 2, 3, 4, or 6 parts of equal size, you can repartition the strip to make a twelfths strip. Strips that are factors of 12 can be repartitioned to make a twelfths strip.

26. a. Possible answer: All fractions with denominators that are factors of ten (halves, fifths, and tenths) can be measured with a tenths strip. Some fractions that have denominators that are multiples of ten can also be measured with a tenths strip. For example, $\frac{12}{20}$, which is equivalent to $\frac{6}{10}$, can be measured with a tenths strip while $\frac{11}{24}$ cannot. (Note to teacher: Actually you can measure any fraction with a tenths strip but you will not get a whole number numerator. This answer should not be excluded, but it is not expected.)

b. Possible answer: If you start with a fraction strip folded into 2 or 5 (factors of 10) parts, you can repartition the strip to make a tenths strip.

27. a. 4 beetles

b. 12 beetles

c. $3\frac{1}{4}$ fraction strips long

28. Mr. Chan: one third or $\frac{1}{3}$.
Mr. Will: one fourth or $\frac{1}{4}$.
Ms. Luke: one fourth or $\frac{1}{4}$.

29. Orange juice was the most popular in Mr. Chan's class because $\frac{1}{3}$ is greater than $\frac{1}{4}$.

30. a. Mr. Will: about 7 students
Ms. Luke: about 8 students

b. Mr. Chan: 30 cans of juice
Mr. Will: about 28 cans of juice
Ms. Luke: about 32 cans of juice

Extensions

31. a. Yes, two people can have half if "half" means half of the three complete pizzas or $1\frac{1}{2}$ pizzas each.

b. Yes, six people can have half if "half" means half of one pizza, making 6 halves.

c. Yes, twelve people can have half if "half" means half of one half of a pizza or one fourth of a pizza.

32. $1\frac{1}{2}$ **33.** $1\frac{2}{3}$ **34.** $2\frac{1}{4}$ **35.** $3\frac{1}{2}$

36. a. Possible answers:
close to $\frac{1}{2}$: $\frac{10}{22}$ or $\frac{12}{22}$
close to but greater than 1: $\frac{23}{22}$

b. Possible answers:
close to $\frac{1}{2}$: $\frac{21}{43}$ or $\frac{22}{43}$
close to but greater than 1: $\frac{44}{43}$

c. Possible answers:
close to $\frac{1}{2}$: $\frac{8}{17}$ or $\frac{9}{17}$
close to but greater than 1: $\frac{18}{17}$

37. a. Possible answers:
close to $\frac{1}{2}$: $\frac{22}{43}$ or $\frac{22}{45}$
close to but greater than 1: $\frac{22}{21}$

b. Possible answers:
close to $\frac{1}{2}$: $\frac{43}{85}$ or $\frac{43}{87}$
close to but greater than 1: $\frac{43}{42}$

c. Possible answers:
close to $\frac{1}{2}$: $\frac{17}{33}$ or $\frac{17}{35}$
close to but greater than 1: $\frac{17}{16}$

Possible Answers to Mathematical Reflections

1. Two classes that are the same fraction of the way toward their goal can raise the same amount of money only if their dollar goals were the same. If their goals differed, the two classes did not collect the same amount of money. For example, suppose that one class set a goal of \$200 and another class set a goal of \$300, then the first class raised $\frac{3}{5}$ of \$200, or \$120, and the other class raised $\frac{3}{5}$ of \$300, or \$180.

2. The denominator tells you how many equal parts are in the whole. For example, in the fraction $\frac{2}{3}$, the 3 tells you that the whole has been divided into three equal parts. The numerator tells you how many of those equal parts are being referred to. The 2 in $\frac{2}{3}$ refers to two of the three equal parts.

3. If a class goes over its goal then the fraction of the goal it met is a fraction greater than 1. For example, if a class has \$400 as its goal and it raises \$400, then it met its whole goal. But if the class raised \$500, then it was \$100 over its goal. Since \$100 is $\frac{1}{4}$ of \$400, the class met its goal and exceeded it by a fourth. This could be represented using $1\frac{1}{4}$ or $\frac{5}{4}$.