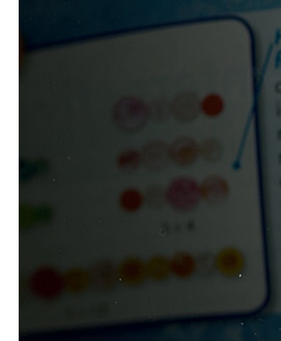
ELL STRATEGY Visual Learning

Visual



How can arrays help find factors? [An array shows a rectangular arrangement in rows and columns. The number of objects in each row and the number of objects in each column are factors.] *When would making arrays not help very much?* [When there are very large numbers]

Arrays can help you find all the factors of a number. However, an easier way is to use divisibility rules.

A whole number is divisible by another when the quotient is a whole number and the remainder is 0.

What is a whole number?
[A number that does not name any fraction or decimal parts; the numbers 0, 1, 2, 3, and so on]

Divisibility Rules

A number is divisible by

- **2** → If the number is even.
- **3** → If the sum of the digits of the number is divisible by 3.
- **4** → If the last two digits are divisible by 4.
- **5** → If the last digit is 0 or 5.
- **6** → If the number is divisible by BOTH 2 and 3.
- **9** → If the sum of the digits is divisible by 9.
- **10** → If the last digit is 0.

Visual Learning Animation
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Prevent Misconceptions

Some students may just check the rules and not other prime numbers to see if they are factors. Have the students notice there are no divisibility rules for 7 and 8. *If a number is divisible by 8, what else is it divisible by?* [2 and 4] *These are the most used divisibility rules. Even if the rules don't work on a number, you will need to still check if it is divisible by other prime numbers like 7, 11, 13 and 17. Using the rules is a great place to start checking for factors.*

Lesson 4-7

Understanding Factors

How can you find all the factors of a number?

Three possible arrays of 12 buttons are shown. The arrays can help find all the factors of 12. The factors of 12 are 1, 2, 3, 4, 6, and 12.

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Guided Practice*

Do you know HOW?

In **1** through **4**, list all the factors of each number.

1. 25 — 1, 5, 25
2. 42 — 1, 2, 3, 6, 7, 14, 21, 42
3. 36 — 1, 2, 3, 4, 6, 9, 12, 18, 36
4. 18 — 1, 2, 3, 6, 9, 18

Do you UNDERSTAND?

5. What factor pair does every number have?
   1 and itself
6. List the possible arrays you can arrange 18 buttons in.
   1 by 18; 2 by 9; 3 by 6

Independent Practice

In **7** through **12**, name two different factor pairs of the given number.

7. 30 — 3, 10; 6, 5; 15, 2; 1, 30
8. 32 — 8, 4; 16, 2; 1, 32
9. 36 — 6, 6; 1, 36; 4, 9; 2, 18; 3, 12
10. 40 — 8, 5; 4, 10; 1, 40; 2, 20
11. 42 — 7, 6; 14, 3; 1, 42; 2, 21
12. 39 — 1, 39; 3, 13

In **13** through **24**, list all the factors of each number.

13. 45 — 1, 3, 5, 9, 15, 45
14. 48 — 1, 2, 3, 4, 6, 8, 12, 16, 24, 48
15. 50 — 1, 2, 5, 10, 25, 50
16. 54 — 1, 2, 3, 6, 9, 18, 27, 54
17. 60 — 1, 2, 3, 4, 5, 6, 10, 12, 15, 20, 30, 60
18. 70 — 1, 2, 5, 7, 10, 14, 35, 70
19. 84 — 1, 2, 3, 4, 6, 7, 12, 14, 21, 28, 42, 84
20. 98 — 1, 2, 7, 14, 49, 98
21. 108 — 1, 2, 3, 4, 6, 9, 12, 18, 27, 36, 54, 108
22. 114 — 1, 2, 3, 6, 19, 38, 57, 114
23. 8 — 1, 2, 4, 8
24. 55 — 1, 5, 11, 55

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*For another example, see Set G on page 118.

2 Guided Practice

Formative Assessment

Remind students that factors are whole numbers that do not have a remainder when they are divided into a given number.

Exercise 4

Error Intervention

If students cannot find all the factors of 18,

then have them proceed systematically: $1 \times \underline{18}$, $2 \times \underline{9}$, $3 \times \underline{6}$, $4 \times \underline{?}$, and so on. Once factor pairs start to repeat, all the factors have been found.

Reteaching For another example and more practice, assign **Reteaching** Set G on p. 118.

3 Independent Practice

Remind students to use the divisibility rules to find the factor pairs of a given number. *For Exercise 12, how can you check to see if 39 is divisible by 3?* [Add the digits: 3 + 9 = 12. Since 12 is divisible by 3, 39 is divisible by 3.]