

## Grade 4 Mathematics

### Patterns, Relations, and Functions: Lesson 2

Read aloud to the students the material that is printed in **boldface type** inside the boxes. Information in regular type inside the boxes and all information outside the boxes should **not** be read to students. Possible student responses are included in parentheses after the questions.

NOTE: The directions read to students may depend on the available materials. Read only those parts of the lesson that apply to the materials you are using.

Any directions that ask you to do something, such as to turn to a page or to hand out materials to students will have an arrow symbol ( $\Rightarrow$ ) by them.

#### *Purpose of Lesson 2:*

- In this lesson, the tutor and the students will
  - ✓ understand the concept of even and odd numbers,
  - ✓ identify missing numbers in a number pattern, and
  - ✓ continue a given pattern or sequence of numbers.

#### *Equipment/Materials Needed:*

- Copies of Student Sheet 66
- Crayons – 1 per student
- Paper and pencils
- 16 counters (for yourself, not per student)

#### *Preparations before beginning Lesson 2:*

- Run off 1 copy of Student Sheet 66 for each student. Cut it into 2 parts.
- Get paper and pencils, crayons, and counters.

## *Lesson 2: Patterns, Functions, and Relations*

⇒ Give students the number chart on the top half of Student Sheet 66.

Say:

**I want you to count by 2's silently. As you count, color in, on the chart, every number that you say to yourself. The numbers that are colored on your chart are called the 2's facts or multiples of 2. Does anyone know a different name for the colored numbers? (even numbers) What do you notice about the ones digit in all of the even numbers? (It is always 0, 2, 4, 6, or 8.) What do you notice about the tens digit? (The students may say it is either 0, 1, 2, 3, 4 or 5. What you want to get them to understand is that any tens digit will work as long as the ones digit is 0, 2, 4, 6, or 8.) Is 72 an even number? (Yes) Why? (The ones digit is a 2.) Is 35,356 an even number? (Yes.) Why? (The ones digit is a 6.) Is 445 an even number? (No) Why? (The ones digit is a 5.)**

**The numbers that are not colored on your chart also have a special name. Does anyone know the name of these numbers? (odd numbers) What do you notice about the ones digit in all of the odd numbers? (It is always 1, 3, 5, 7, or 9.) What do you notice about the tens digit? (They may say it is either 0, 1, 2, 3, 4 or 5. What you want to get them to understand is that any tens digit will work as long as the ones digit is 1, 3, 5, 7, or 9.) Is 57 an odd number? (Yes.) Why? (The ones digit is a 7.) Is 62,451 an odd number? (Yes.) Why? (The ones digit is a 1.) Is 534 an odd number? (No.) Why? (The ones digit is a 4.)**

⇒ Place 9 counters in front of you.

Say:

**There is another way to tell whether a number is even. If you can divide the number into two equal groups with no leftovers, the number is even. If you have 1 leftover, the number is odd. Would one of you take the counters and separate them into 2 equal groups? How many counters do you have? (9) When you divide them into 2 groups, do you have any leftovers? (Yes.) Is the number even or odd? (odd) Why? (because you have a leftover)**

⇒ Place 16 counters in front of you.

Say to one of the students:

**Would you take the counters and separate them into 2 equal groups. How many counters do you have in all? (16) When you divide them into 2 groups, do you have any leftovers? (No.) Is the number even or odd? (Even) Why? (because you have no leftovers)**

⇒ Write the following numbers on the board or on a sheet of paper:  
18, 28, 51, 49, 205, 206.

Say:

**Is 18 even or odd? (even); 28? (even); 51? (odd); 49? (odd); 205? (odd); 206? (even)**

⇒ Write these numbers on a piece of paper or on the board: 3, 5, 7, 9.

Say:

**Remember in our last lesson, we looked at repeating patterns with figures and pictures. The pattern repeated itself over and over. In this lesson, we will look at another kind of pattern. This pattern is called a *growing pattern*. Look at the numbers I have written on the board. Each number is 2 more than the one before it. What would the next number be? (11) Why? (because it is 2 more than 9) What number would come after 11? (13) Why? (because it is 2 more than 11)**

⇒ Write these numbers on a piece of paper or on the board: 10, 8, 6, 4.

Say:

**Look at the numbers I have written on the board. This pattern is still a growing pattern, but the numbers are growing smaller. Each number is 2 fewer than the one before it. What would the next number be? (2) Why? (because it is 2 less than 4) What number would come after 2? (0) Why? (because it is 2 less than 2)**

⇒ Write these numbers on a piece of paper or on the board:  
10, \_\_\_\_, 14, 16, 18.

Say:

**Look at the numbers I have written on the board. One number is missing? How can we find the missing number?** (Look at the other numbers. Each number is 2 more than the one before it. So 2 more than 10 would be 12.)

⇒ Write these numbers on a piece of paper or on the board:  
\_\_\_, 15, 20, 25, 30.

Say:

**Look at the numbers I have written on the board. One number is missing? How can we find the missing number?** (Look at the other numbers. Each number is 5 more than the one before it. So 15 would be 5 more than 10. So the answer is 10.)

⇒ Write these numbers on a piece of paper or on the board: 25, 29, 33, \_\_\_.

Say:

**Look at the numbers I have written on the board. What is the next number in the pattern?** (Look at the other numbers. Each number is 4 more than the one before it. 4 more than 33 is 37.)

⇒ Write these numbers on a piece of paper or on the board:  
156, 153, 150, 147, \_\_\_.

Say:

**Look at the numbers I have written on the board. What is the next number in the pattern?** (Look at the other numbers. Each number is 3 less than the one before it. So  $147 - 3 = 144$ .)

⇒ Give students the bottom half of Student Sheet 66. Discuss each one with the students.

Answers:

- |       |       |        |        |
|-------|-------|--------|--------|
| 1. 41 | 2. 19 | 3. 80  | 4. 104 |
| 5. 70 | 6. 80 | 7. 406 | 8. 100 |

⇒ Have one student summarize today's lesson.

**Student Sheet 66 (Patterns: Lesson 2)**

|           |           |           |           |           |           |           |           |           |           |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| <b>1</b>  | <b>2</b>  | <b>3</b>  | <b>4</b>  | <b>5</b>  | <b>6</b>  | <b>7</b>  | <b>8</b>  | <b>9</b>  | <b>10</b> |
| <b>11</b> | <b>12</b> | <b>13</b> | <b>14</b> | <b>15</b> | <b>16</b> | <b>17</b> | <b>18</b> | <b>19</b> | <b>20</b> |
| <b>21</b> | <b>22</b> | <b>23</b> | <b>24</b> | <b>25</b> | <b>26</b> | <b>27</b> | <b>28</b> | <b>29</b> | <b>30</b> |
| <b>31</b> | <b>32</b> | <b>33</b> | <b>34</b> | <b>35</b> | <b>36</b> | <b>37</b> | <b>38</b> | <b>39</b> | <b>40</b> |
| <b>41</b> | <b>42</b> | <b>43</b> | <b>44</b> | <b>45</b> | <b>46</b> | <b>47</b> | <b>48</b> | <b>49</b> | <b>50</b> |

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**Write the missing odd number.**

1. 33, 35, 37, 39, \_\_\_\_\_

2. \_\_\_\_\_, 21, 23, 25, 27

**Write the missing even numbers.**

3. 78, \_\_\_\_\_, 82, 84, 86

4. \_\_\_\_\_, 106, 108, 110, 112

**Write the missing number.**

5. 54, 58, 62, 66, \_\_\_\_\_

6. \_\_\_\_\_, 89, 98, 107, 116

7. 397, 400, 403, \_\_\_\_\_, 409

8. \_\_\_\_\_, 120, 140, 160, 200