Increasing and Decreasing Patterns

Question: What is the pattern rule for each of these patterns?

Pattern 1
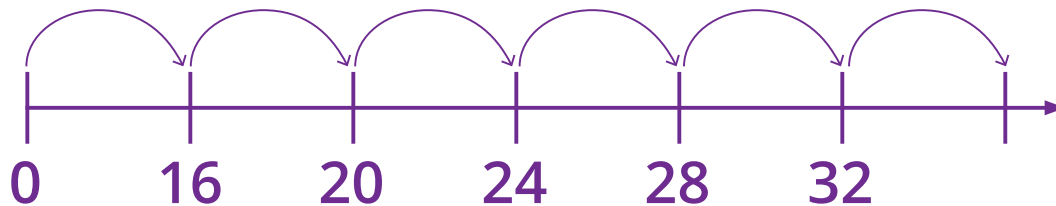

Pattern 2

Pattern 3

Pattern 4

80, 70, 60, 50, …

Pattern 5

0   16   20   24   28   32

NELSON
nelson.com

Math Background

Children see, hear, and experience patterns everywhere. They can hear and experience patterns in songs, chants, stories, dances, sports, and physical routines. They can see patterns in art, in architecture, and in familiar items such as clothing. Children need lots of experiences describing, identifying, and creating patterns. As a result of these experiences, they come to recognize the repetitive nature of patterns.

In earlier grades, children learn that a *repeating pattern* involves repetition of the elements that make up the pattern. They learn to identify the shortest string of elements that repeats in a repeating pattern. This part of a repeating pattern that stays the same and repeats itself over and over is called the pattern's *core*. For example, in the pattern made up of two different shapes shown here, the shortest part of the pattern that repeats itself is circle, square, square. This part is therefore the core of the pattern.
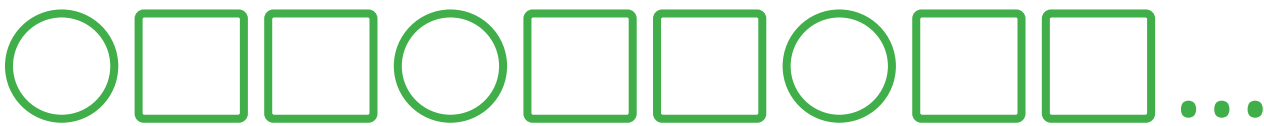
Children will eventually learn how to state the pattern rule. The pattern rule tells how the pattern starts and how it continues. The pattern rule for the pattern shown here is one green circle and then two green squares.

Once children have had many experiences identifying and creating repeating patterns, they can begin to work with *increasing* and *decreasing patterns*. These kinds of patterns are sometimes called growing and shrinking patterns. These patterns involve an increase or a decrease in the elements of the pattern as the pattern continues.

For example, 2, 4 ,6, 8, 10, … is an increasing pattern. The pattern starts at 2 and increases by two each time. In contrast, 100, 90, 80, 70, … is a decreasing pattern. The pattern starts at 100 and decreases by 10 each time.

Purpose

In this activity, children will examine a variety of increasing and decreasing patterns featuring different materials and numerical models. Children will identify and describe increasing and decreasing patterns. They will state the pattern rule. They will also identify what comes next in a pattern and create their own increasing and decreasing patterns using concrete materials and numbers. When stating the pattern rule, children need to state where the pattern starts and how it continues.

Materials
- A 100-chart. (A 100-chart has been included for you or you can create your own.)
- A number line (A blank number line has been included for you or you can create your own.)
- Materials for creating patterns, such as small building blocks, coins, bingo dabbers, small cut-out squares or circles, toothpicks, pipe cleaners, straws, paper clips, and so on
- Paper, pencil, coloured crayons, and pencil crayons

100-Chart

My name is _____ .

Number Lines

My name is _____.
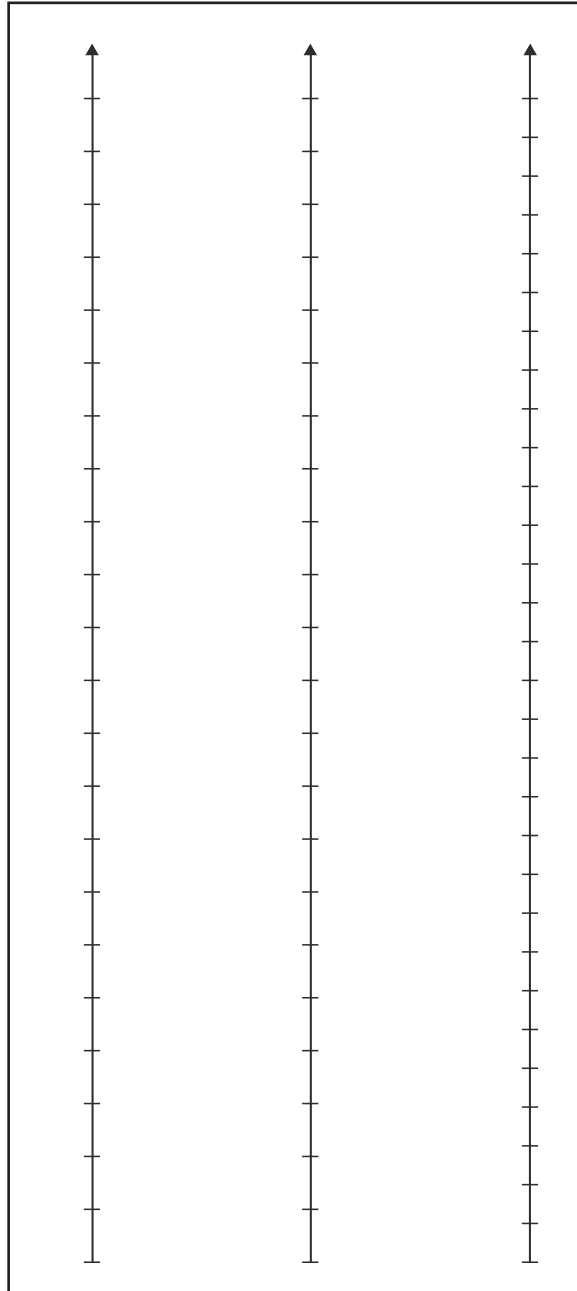
Identify Patterns and State Pattern Rules

Note: Children may wish to use the 100-chart to help them identify and create increasing and decreasing number patterns.

1. Model an increasing pattern for children by using an action pattern. Say, **Listen to the pattern I am making.** Stomp once, then stomp twice, and then stomp three times. Say, **Describe my pattern.** (You are stomping one more time each time. You are adding one more stomp each time.) **Ask, What will come next in my pattern?** (four stomps) **How do you know?** (because you are adding one more stomp each time)

2. Tell children that your actions demonstrate an *increasing pattern or a growing pattern.* Ask, **Why do you think the pattern I made is called an increasing pattern?** (because it gets bigger each time)

3. Have children look at Pattern 1 on the Activity Card shown above. Ask, **How is this pattern like my stomping pattern?** (It is like your stomping pattern because it gets bigger by one each time.) **What is the pattern rule for this pattern?** (This pattern starts with one square and then one more square is added each time.) Remind children that a pattern rule describes how a pattern starts and how it continues.

4. Have children look at Pattern 2 on the Activity Card. Ask, **How many circles are in each group?** (12, 10, 8, 6) **What do you notice about the number of circles?** (The number of circles is getting smaller.) Tell children that this pattern is called a decreasing, or shrinking, pattern. Ask, **What is the pattern rule for this pattern?** (Start at 12 and subtract two each time. Start at 12 and decrease by two each time.)

5. Have children examine the next three patterns on the Activity Card. For each pattern, ask, **What kind of pattern is this? What is the pattern rule?**

   • Pattern 3: This is an increasing pattern. The pattern rule is start at 3 and increase by two each time.

   • Pattern 4: This is a decreasing pattern. The pattern rule is start at 80 and decrease by 10 each time.

   • Pattern 5: This is an increasing pattern. The pattern rule is start at 16 and increase by four each time.

6. Ask children to look back at each of the five patterns and identify what would come next in the pattern.

Create Increasing and Decreasing Patterns

1. Ask children to use blocks or another concrete material to create a pattern that follows this pattern rule: **Start at 2 and add four each time.**

2. Have children use a number line to show this pattern: **Start at 50 and get smaller by two each time.**

3. Ask children to draw their own increasing pattern. Then have them write the pattern rule underneath their pattern.

4. Ask children to create their own decreasing pattern using numbers. Have them write the pattern rule underneath the numbers.

NELSON
nelson.com

5. Show children these two pattern beginnings. Have them show two different ways to continue each increasing pattern:

2, 4, __ , __ , __ , __, ...

2, 4, __,__ ,__ ,__ , ...

They may choose answers such as: increase by two each time (2, 4 ,6, 8, 10, 12, ...) or increase by doubling each time (2, 4, 8, 16, 32, 64, ...).