

General Topic: Integers and Rational Numbers

Lesson Overview:

Students learn about **whole numbers**, **negative numbers**, and **rational numbers**, including how to perform operations with them.

Key Concepts and Subtopics:

- Understanding integers and rational numbers

🌟 Difference between Integers & Rational Numbers	
Integers	Rational Numbers
Whole numbers only	Can be written as fractions
Examples: -3, 0, 5	Examples: $\frac{1}{2}$, -2.5, 0.75, -3
No decimals/fractions	Includes decimals & fractions

- Adding, subtracting, multiplying, and dividing integers

<ul style="list-style-type: none">1. Adding Integers <p>Example: $(-7) + (+4) = -3$</p>	<ul style="list-style-type: none">3. Multiplying Integers <p>Example: $(-6) \times (+3) = -18$</p>
<ul style="list-style-type: none">2. Subtracting Integers <p>Example: $(-5) - (-2) \rightarrow -5 + (+2) = -3$</p>	<ul style="list-style-type: none">4. Dividing Integers <p>Example: $(+20) \div (-5) = -4$</p>

- Applying integers in real-life situations (temperature, money, elevation)

- 1. Temperature 🌡️

- Integers are used to show temperatures above (+) or below (-) zero.

Example:
If the temperature in Baguio is -3°C in the morning and it rises by $+5^{\circ}\text{C}$ at noon:

diff

$$-3 + 5 = +2^{\circ}\text{C}$$

✅ The new temperature is 2°C .

- 2. Money 💰

- Integers represent gains (+) and losses (-).

Example:
You had ₱500, but you spent ₱300:

diff

$$+500 + (-300) = +200$$

✅ You now have ₱200 left.

- 3. Elevation 🏔️

- Integers show height above sea level (+) or depth below sea level (-).

Example:
A mountain is $+1,200$ meters above sea level, and a cave is -400 meters below sea level.

Difference:

yaml

$$1200 - (-400) = 1600$$

✅ The difference in elevation is 1,600 meters.

- Comparing and ordering rational numbers

<p>◆ Step 1: Remember what rational numbers are</p> <ul style="list-style-type: none"> • Numbers that can be written as a fraction p/q ($q \neq 0$). • Examples: $\frac{1}{2}$, $-\frac{3}{4}$, 0.25 (since $0.25 = \frac{1}{4}$), 5 (since $5 = \frac{5}{1}$). 	<p>◆ Step 3: Ordering Rational Numbers</p> <p>Arrange numbers from least to greatest (or vice versa).</p> <p>Example: Order $\frac{1}{2}$, $\frac{2}{3}$, $\frac{3}{4}$</p> <ul style="list-style-type: none"> • Convert to decimals: <ul style="list-style-type: none"> • $\frac{1}{2} = 0.5$ • $\frac{2}{3} \approx 0.67$ • $\frac{3}{4} = 0.75$ • Order: $\frac{1}{2} < \frac{2}{3} < \frac{3}{4}$
<p>◆ Step 2: How to Compare Rational Numbers</p> <p>To compare, we usually:</p> <ol style="list-style-type: none"> 1. Same Denominator Rule <ul style="list-style-type: none"> • If denominators are the same, just compare the numerators. • Example: $\frac{3}{8}$ vs $\frac{5}{8} \rightarrow \frac{5}{8}$ is bigger. 2. Different Denominators <ul style="list-style-type: none"> • Find the Least Common Denominator (LCD), then compare. • Example: $\frac{2}{3}$ vs $\frac{3}{5}$ <ul style="list-style-type: none"> • LCD of 3 and 5 is 15 • $\frac{2}{3} = \frac{10}{15}$, $\frac{3}{5} = \frac{9}{15} \rightarrow \frac{10}{15} > \frac{9}{15} \rightarrow \frac{2}{3}$ is bigger. 3. Convert to Decimals (optional quick method) <ul style="list-style-type: none"> • Example: $\frac{7}{8} = 0.875$, $\frac{4}{5} = 0.8 \rightarrow \frac{7}{8}$ is bigger. 	<p>◆ Quick Real-Life Example</p> <p>Situation: Which is the better deal?</p> <ul style="list-style-type: none"> • A chocolate bar: $\frac{3}{4}$ of ₱100 • A cake slice: $\frac{2}{3}$ of ₱100 <p>Compare $\frac{3}{4}$ and $\frac{2}{3}$:</p> <ul style="list-style-type: none"> • LCD = 12 $\rightarrow \frac{3}{4} = \frac{9}{12}$, $\frac{2}{3} = \frac{8}{12}$ • <input checked="" type="checkbox"/> $\frac{3}{4}$ is bigger \rightarrow the chocolate bar is worth more.

Real-Life Example:

Calculating temperature changes: from -5°C to 3°C is an increase of 8°C .

Remember This!

- Rational numbers include all fractions, decimals, and integers.

General Topic: Fractions, Decimals, Ratio, Proportion, Percent

Lesson Overview:

Students expand on **fractions** and **decimals**, learning **ratios**, **proportions**, and **percentages** in real-life applications.

Key Concepts and Subtopics:

- Simplifying, adding, subtracting, multiplying, and dividing fractions

◆ 1. Simplifying Fractions

👉 Rule: Divide numerator & denominator by the **Greatest Common Factor (GCF)**.

🍕 Think of it like cutting pizza into fewer, bigger slices.

Example:

$$\frac{12}{16} \rightarrow \frac{3}{4}$$

(both divided by 4)

◆ 2. Adding Fractions

👉 Rule: Denominators must be the **same**.

- If same → just add numerators.
- If different → find LCD first.

🍰 Imagine adding slices of cake — they must be the same size of slice.

Example:

$$\frac{1}{4} + \frac{2}{4} = \frac{3}{4}$$

◆ 3. Subtracting Fractions

👉 Same rule as addition: same denominators.

💎 If you eat slices of chocolate, you subtract from the whole.

Example:

$$\frac{5}{6} - \frac{1}{6} = \frac{4}{6} = \frac{2}{3}$$

◆ 4. Multiplying Fractions

👉 Rule: Multiply **numerators together** and **denominators together**.

📦 Think of stacking juice boxes — top with top, bottom with bottom.

Example:

$$\frac{2}{3} \times \frac{4}{5} = \frac{8}{15}$$

◆ 5. Dividing Fractions

👉 Rule: **Keep-Change-Flip (KCF)**

- Keep the first fraction
- Change ÷ to ×
- Flip the second fraction

🍕 Think of sharing pizza — flipping means you change how many groups fit.

Example:

$$\frac{3}{4} \div \frac{2}{5} = \frac{3}{4} \times \frac{5}{2} = \frac{15}{8} = 1\frac{7}{8}$$

🎯 Quick Memory Trick for Grade 6:

- **Simplify** → Cut slices into bigger ones 🍕
- **Add/Subtract** → Same size slices first 🍰
- **Multiply** → Across only 📦
- **Divide** → KCF (Keep, Change, Flip) 🍕

- Converting between fractions, decimals, and percentages

Fractions ↔ Decimals ↔ Percentages

◆ **1. Fractions → Decimals**

👉 Rule: Divide numerator by denominator.

👉 Example:

$$\frac{3}{4} = 3 \div 4 = 0.75$$

◆ **2. Decimals → Percentages**

👉 Rule: Multiply by 100, add % sign.

👉 Example:

$$0.75 \times 100 = 75\%$$

◆ **3. Percentages → Fractions**

👉 Rule: Write it over 100, then simplify.

👉 Example:

$$75\% = \frac{75}{100} = \frac{3}{4}$$

◆ **4. Fractions → Percentages**

👉 Either:

1. Convert to decimal, then $\times 100$
2. Or multiply directly to make denominator 100

👉 Example:

$$\frac{2}{5} = 0.4 = 40\%$$

- Solving ratio and proportion problems

◆ **1. Ratio**

👉 A ratio compares two numbers.
It can be written as:

- 2:3
- 2 to 3
- $\frac{2}{3}$

👉 Example:

If there are 2 boys and 3 girls in a group, the ratio of boys to girls is:

$$2 : 3$$

◆ **2. Proportion**

👉 A proportion says that two ratios are equal.

Example:

$$2 : 3 = 4 : 6$$

(because both simplify to $\frac{2}{3}$)

- Applying percentages in real-life situations (discounts, tax, interest)

Real-Life Example:

A 20% discount on a ₱500 shirt means you pay only ₱400.

Remember This!

- *Fractions, decimals, and percentages are different ways to represent parts of a whole.*

General Topic: Expressions, Equations, and Inequalities

Lesson Overview:

Students use algebraic **expressions** and **equations** to solve problems, learning how to handle **inequalities** as well.

Key Concepts and Subtopics:

- Writing and simplifying expressions

- **Expression** = combination of numbers, variables, and operations
- **Example:**
 - Write: "5 more than a number x " $\rightarrow x + 5$
 - Simplify: $3x + 4x \rightarrow 7x$

- Solving one-step and two-step equations

- Do **one operation** to solve for the variable
- **Example:**
 - $x + 7 = 12 \rightarrow x = 12 - 7 \rightarrow x = 5$
 - $3x = 15 \rightarrow x = 15 \div 3 \rightarrow x = 5$

- Requires **two operations**
- **Example:**
 - $2x + 3 = 11$
 1. Subtract 3 $\rightarrow 2x = 8$
 2. Divide by 2 $\rightarrow x = 4$

- Understanding and solving inequalities

- **Inequality** shows that one value is **greater or smaller than** another
- Symbols: $>$, $<$, \geq , \leq
- **Example:** $x + 5 < 10 \rightarrow x < 5$

Real-Life Example:

Solving for x in $2x + 5 = 15$ gives $x = 5$, representing the number of items bought.

Remember This!

- *Algebra helps us solve problems systematically using symbols and numbers.*

General Topic: Geometry: Plane and Solid Figures

Lesson Overview:

Students explore **2D** and **3D** shapes, their properties, and relationships.

Key Concepts and Subtopics:

- Identifying polygons, circles, and solid figures (cube, cylinder, prism)

◆ **1. Polygons (Flat Shapes with straight sides)**

👉 A polygon is a closed figure with straight sides.

Examples:

- Triangle (3 sides) ▲
- Quadrilateral (4 sides: square, rectangle, trapezoid) ■
- Pentagon (5 sides) ●
- Hexagon (6 sides) ●
- Octagon (8 sides, like stop sign) ●

👉 Remember: A circle ✖ is NOT a polygon (no straight sides).

◆ **2. Circle ●**

👉 A round shape with no sides.

Important parts:

- Radius → from center to edge
- Diameter → line across the circle, through the center ($2 \times$ radius)
- Circumference → distance around the circle

◆ **3. Solid Figures (3D shapes)**

👉 Shapes that have length, width, and height.

Examples:

- Cube (like dice 🎲) → 6 equal square faces
- Rectangular Prism (like a box 📦) → faces are rectangles
- Cylinder (like a can 🥫) → 2 circles + curved surface
- Cone (like an ice cream cone 🍦) → circle base + point
- Sphere (like a ball 🏀) → perfectly round
- Pyramid (like in Egypt 🏛️) → polygon base + triangular sides

- Calculating perimeter, area, and volume

◆ **1. Perimeter (P) → Distance around a shape (2D)**

👉 Add all the sides.

Example (Rectangle):

Length = 8 cm, Width = 5 cm

$$P = 2(L + W) = 2(8 + 5) = 26 \text{ cm}$$

◆ 3. Volume (V) → Space inside a solid (3D)

- Cube:

$$V = s^3$$

👉 Example: side = 4 cm

$$V = 4^3 = 64 \text{ cm}^3$$

- Rectangular Prism (Box):

$$V = L \times W \times H$$

👉 Example: $5 \times 3 \times 2 = 30 \text{ cm}^3$

- Cylinder:

$$V = \pi r^2 h$$

👉 Example: $r = 3 \text{ cm}$, $h = 10 \text{ cm}$

$$V = 3.14 \times 9 \times 10 = 282.6 \text{ cm}^3$$

◆ 2. Area (A) → Space inside a shape (2D)

- Rectangle:

$$A = L \times W$$

👉 Example: $8 \times 5 = 40 \text{ cm}^2$

- Triangle:

$$A = \frac{1}{2}(B \times H)$$

👉 Example: Base = 10 cm, Height = 6 cm

$$A = \frac{1}{2}(10 \times 6) = 30 \text{ cm}^2$$

- Circle:

$$A = \pi r^2$$

👉 Example: $r = 7 \text{ cm}$

$$A = 3.14 \times 7^2 = 153.86 \text{ cm}^2$$

- Understanding angles, symmetry, and congruence

◆ 1. Angles

👉 Angles are formed when **two lines meet at a point (vertex)**.

Types of angles:

- Acute → less than 90° (small, cute) 🐾
- Right → exactly 90° (L-shape) 📐
- Obtuse → more than 90° but less than 180° 🌙
- Straight → exactly 180° (straight line) —

👉 Example:

The corner of a square = **Right Angle (90°)**.

◆ 2. Symmetry

👉 A shape has **symmetry** if you can fold it in half and both sides match.

Examples:

- Square 🟩 → 4 lines of symmetry
- Circle 🔵 → infinite lines of symmetry
- Heart ❤️ → 1 line of symmetry

👉 Fun Test: Draw a line, fold the paper → if both halves match, it's symmetrical.

◆ 3. Congruence






























👉 Two shapes are **congruent** if they are the **same size and shape**, even if flipped or rotated.

Examples:

- Two equal triangles 🔺 🔺 → congruent
- Dice faces 🎲 (all squares) → congruent

👉 Not congruent: A small square vs. a big square (same shape, different size).

- Applying geometry to real-life objects

<ul style="list-style-type: none"> ♦ 1. Polygons in Daily Life <ul style="list-style-type: none"> • Triangle  → road signs , roof of a house  • Rectangle  → doors , books , cellphone  • Pentagon / Hexagon → soccer ball pattern , honeycomb  	<ul style="list-style-type: none"> ♦ 4. Angles in Real Life  <ul style="list-style-type: none"> • Right angles → corners of paper , tiles • Acute angles → slices of pizza  • Obtuse angles → open door 
<ul style="list-style-type: none"> ♦ 2. Circles in Real Life  <ul style="list-style-type: none"> • Wheels , coins , clock face , plates  	
<ul style="list-style-type: none"> ♦ 3. Solid Figures Around Us (3D) <ul style="list-style-type: none"> • Cube  → dice, Rubik's cube • Rectangular Prism  → box, refrigerator • Cylinder  → soda can, water bottle • Cone  → ice cream cone, party hat • Sphere  → basketball, globe  • Pyramid  → Egyptian pyramids, tent 	<ul style="list-style-type: none"> ♦ 5. Symmetry and Congruence Around Us <ul style="list-style-type: none"> • Symmetry → butterfly , leaves , human face  • Congruence → two windows of the same size , tiles on the floor

Real-Life Example:

Calculating the area of a rectangular garden to know how much grass seed to buy.

Remember This!

- *Geometry is all around us—from buildings to everyday objects.*

General Topic: Measurement: Area, Perimeter, Volume, Speed, Time

Lesson Overview:

Students learn to **measure physical quantities** accurately and solve related problems.

Key Concepts and Subtopics:

- Measuring length, area, perimeter, and volume

◆ **1. Length (How long something is)**

- Unit: millimeter (mm), centimeter (cm), meter (m), kilometer (km)
- Tools: ruler, meter stick, measuring tape
- 👉 Example: The height of a notebook = 30 cm

◆ **2. Perimeter (Distance around a shape)**

- Formula: Add all sides (2D shapes)
- 👉 Example: A rectangle 8 m by 5 m

$$P = 2(L + W) = 2(8 + 5) = 26 \text{ m}$$

💡 Real life: Fencing around a garden 🌿

◆ **3. Area (Space inside a shape)**

- Formula depends on the shape:
 - Rectangle → $A = L \times W$
 - Triangle → $A = \frac{1}{2}(B \times H)$
 - Circle → $A = \pi r^2$
- 👉 Example: Floor of a classroom = 60 m²
- 💡 Real life: Buying tiles for the floor 🏠

◆ **4. Volume (Space inside a 3D object)**

- Formula depends on the solid:
 - Cube → $V = s^3$
 - Rectangular Prism → $V = L \times W \times H$
 - Cylinder → $V = \pi r^2 h$
- 👉 Example: Water inside a box = 120 cm³
- 💡 Real life: Filling a water tank 💧

- Calculating speed using distance ÷ time

🏃 **Speed = Distance ÷ Time**

◆ **Formula**

$$\text{Speed} = \frac{\text{Distance}}{\text{Time}}$$

- Distance** → how far (meters, kilometers)
- Time** → how long (seconds, minutes, hours)
- Speed** → how fast (m/s, km/h)

◆ **Example 1**

A car travels 120 km in 2 hours.

$$\text{Speed} = \frac{120}{2} = 60 \text{ km/h}$$

👉 The car's speed is 60 km/h. 🚗

- Converting units (cm↔m, ml↔L, g↔kg)

1. Length (cm ↔ m)

- 100 cm = 1 m
 - 👉 To convert cm → m, divide by 100
 - 👉 To convert m → cm, multiply by 100

Example: 250 cm = 2.5 m

2. Capacity (mL ↔ L)

- 1,000 mL = 1 L
 - 👉 To convert mL → L, divide by 1,000
 - 👉 To convert L → mL, multiply by 1,000

Example: 1,500 mL = 1.5 L

3. Mass (g ↔ kg)

- 1,000 g = 1 kg
 - 👉 To convert g → kg, divide by 1,000
 - 👉 To convert kg → g, multiply by 1,000

Example: 2,500 g = 2.5 kg

Real-Life Example:

Calculating travel time if a car moves 60 km at 30 km/h → time = 2 hours.

Remember This!

- *Accurate measurement is essential in everyday life, from cooking to building.*

General Topic: Data: Tables, Graphs, Probability

Lesson Overview:

Students learn to **collect, organize, and interpret data** to make informed decisions.

Key Concepts and Subtopics:

- Reading and constructing tables

🍎 Favorite Fruits of Grade 6 Students	
Fruit	Number of Students
Mango	12
Banana	9
Apple	15
Watermelon	6

◆ **How to Read a Table**

- Look at the **rows** → (fruits)
- Look at the **columns** → (number of students)
- Example: **15 students** chose **Apple** as their favorite.

◆ **How to Construct a Table**

1. Decide what you want to show (e.g., favorite snacks, pets, subjects).
2. Make **headings** for rows & columns.
3. Fill in the data.

- Interpreting bar graphs, line graphs, and pictographs

■ **1. Bar Graph**

- Uses **bars** (rectangles) to show and compare quantities.
- The **longer the bar**, the greater the value.

Example: Favorite Subjects of Grade 6

- Math: 12 students
- Science: 15 students
- English: 10 students

👉 Question: Which subject is most popular? (Science)

📈 **2. Line Graph**

- Uses **points connected by lines** to show **changes over time**.

Example: Temperature during the day 🌡️

- 6 AM → 20°C
- 12 PM → 30°C
- 6 PM → 25°C

👉 Question: At what time was the temperature highest? (12 PM)

🖼️ **3. Pictograph**

- Uses **pictures or symbols** to represent data.
- Each picture = certain number.

Example: Pets Owned by Students 🐾

🐶 = 2 students

- Dogs: 🐶 🐶 🐶 (6 students)
- Cats: 🐱 🐱 (4 students)
- Birds: 🐦 (2 students)

👉 Question: Which pet is owned by the most students? (Dogs)

- Understanding probability and chance

◆ **What is Probability?**

Probability = the chance that something will happen.
It is usually written as a **fraction, decimal, or percent**.

$$\text{Probability} = \frac{\text{Number of Favorable Outcomes}}{\text{Total Number of Outcomes}}$$

◆ **Examples**

🎲 **1. Rolling a Die**

- A die has **6 sides** (1–6).
- Probability of rolling a 3:

$$\frac{1}{6}$$

🃏 **2. Drawing a Red Card**

- A standard deck has **52 cards** (26 red, 26 black).
- Probability of red card:

$$\frac{26}{52} = \frac{1}{2} = 50\%$$

Real-Life Example:

Rolling a dice and predicting the likelihood of getting a 6.

Remember This!

- *Data helps us understand trends, make predictions, and solve problems.*

General Topic: Patterns and Problem-Solving

Lesson Overview:

Students develop **analytical and logical thinking** by recognizing **patterns** and solving **problems**.

Key Concepts and Subtopics:

- Identifying numeric and geometric patterns

◆ **1. Numeric Patterns**


These are sequences of numbers that follow a rule.


👉 **Example 1 (Addition Pattern):**
2, 4, 6, 8, 10, ...
✦ Rule: Add +2 each time.

👉 **Example 2 (Multiplication Pattern):**
3, 6, 12, 24, 48, ...
✦ Rule: Multiply by 2 each time.

◆ **2. Geometric Patterns**

These are shapes or designs that repeat or grow in a certain way.

👉 **Example 1 (Repeating):**

✦ Rule: Repeat square, triangle.

👉 **Example 2 (Growing):**

✦ Rule: Add 1 square each step.


- Using patterns to predict outcomes


◆ **1. Numeric Pattern Prediction**

Example:
2, 4, 6, 8, __, __, __

👉 Rule: Add +2
👉 Next numbers: 10, 12, 14

◆ **2. Geometric Pattern Prediction**

Example:


👉 Rule: Repeat square, triangle
👉 Next shapes: 

- Solving word problems using logical reasoning
- Applying problem-solving strategies step by step

Real-Life Example:

Noticing the pattern in a sequence: 2, 4, 8, 16... → next number is 32.

Remember This!

- Mathematics is about recognizing patterns and thinking logically to find solutions.*