Step by step guide: Classifying Whole Numbers

Grade 10 Mathematics | 40-Minute Lesson

Before Class Begins

Preparation Checklist:

- Arrange learners into groups of 4-5
- Prepare number charts (1-50) for each group
- Have exit tickets ready for distribution
- Set timer for phase transitions
- For struggling learners: Pre-highlight multiples of 2 on their charts

PHASE 1: Problem-Solving and Discovery (12 Minutes)

Opening (2 minutes)

[SAY]:

"Good morning/afternoon, class! Today we're going to explore something you use every day without even thinking about it—the properties of numbers. By the end of this lesson, you'll be able to classify any whole number and explain why it matters in real life."

[SAY]:

"Here's our key question for today: How do we use the properties of real numbers in our day-to-day activities? Keep this question in mind as we work through our activities."

Anchor Activity Introduction (1 minute)

[SAY]:

"I'm going to give each group a chart with numbers from 1 to 100. Your task is to work together to sort these numbers into categories. But first, let me ask you..."

[ASK]:

"Can someone remind us—what makes a number even? What makes a number odd?"

[WAIT for responses, acknowledge answers]

[SAY]:

"Great! Now, in your group, I want you to do the following..."

Group Work Instructions (1 minute)

[SAY - Read slowly and clearly]:

"Step 1: Sort all numbers from 1 to 100 into odd and even.
Step 2: Look for patterns—what do you notice about each group?
Step 3: From your lists, identify which numbers are prime and which are composite.
Step 4: Find any prime numbers that are also even.
Step 5: Think of real-life examples where we use odd, even, prime, or composite numbers.

You have 8 minutes. Begin!"

Circulation and Probing (8 minutes)

[DO]: Walk around the room, observing each group's progress.

[ASK probing questions as you circulate]:

- "What pattern do you see in the last digit of even numbers?"
- "Why do you think 2 is special among prime numbers?"
- "How did you decide if a number is prime or composite?"
- "Can you think of a time when you needed to divide things into equal groups?"

[OBSERVE]: Note which groups have interesting findings to share. Identify any misconceptions (e.g., learners thinking 1 is prime).

[TIME CHECK]: At 6 minutes, announce: "Two more minutes to wrap up your sorting!"

Group Sharing (2 minutes)

[SAY]:

"Time's up! Let's hear from a few groups. [Group name], what patterns did you discover about even numbers?"

[LISTEN to response, then ask another group]:

"[Group name], did you find any prime numbers that are also even? What did you discover?"

[TRANSITION]:

"Excellent observations! Now let's formalize what you've discovered."

PHASE 2: Structured Instruction (8 Minutes)

Connecting to Student Discoveries (3 minutes)

[SAY]:

"Many of you noticed that numbers ending in 0, 2, 4, 6, or 8 were in your 'even' list. This is a great rule of thumb! Let's formalize that."

[WRITE on board or display]:

Even Number: Any integer that is divisible by 2.

Odd Number: Any integer that leaves a remainder of 1 when divided by 2.

[SAY]:

"Your groups also found that 2 is the only even prime number. Why is that? Because every other even number can be divided by 2, so they have more than two factors."

Addressing the "Is 1 Prime?" Misconception (1 minute)

[SAY]:

"I noticed some groups were unsure about the number 1. Is 1 a prime number?"

[PAUSE for responses]

[SAY]:

"Here's the key: A prime number has exactly two distinct factors—1 and itself. The number 1 only has ONE factor (itself). So 1 is neither prime nor composite. It's a special case!"

Properties of Odd and Even Numbers (4 minutes)

[SAY]:

"Now let's look at what happens when we add, subtract, or multiply odd and even numbers. Some of you discovered these patterns already!"

[WRITE on board and explain each]:

Addition and Subtraction:

- Even + Even = Even (Example: 4 + 6 = 10)
- Odd + Odd = Even (Example: 7 + 3 = 10)
- Even + Odd = Odd (Example: 4 + 3 = 7)

[SAY]:

"The same rules apply for subtraction!"

Multiplication:

- Even × Even = Even (Example: 4 × 6 = 24)
- Odd × Odd = Odd (Example: 3 × 5 = 15)
- Even × Odd = Even (Example: 4 × 3 = 12)

[SAY]:

"Notice the pattern with multiplication—if ANY number in the multiplication is even, the result is even. Why? Because you're multiplying by a factor of 2!"

[TRANSITION]:

"Now let's practice applying these properties."

PHASE 3: Practice and Application (12 Minutes)

Direct Classification (4 minutes)

[SAY]:

"Let's start with some quick classification. I'll show you a number, and you tell me if it's even or odd—and explain HOW you know."

[DISPLAY or write each number, call on learners]:

[ASK]: "1107 — even or odd? How do you know?"

[Expected answer]: "Odd, because it ends in 7."

[ASK]: "2028 — even or odd?"

[Expected answer]: "Even, because it ends in 8."

[ASK]: "3333 — even or odd?"

[Expected answer]: "Odd, because it ends in 3."

[ASK]: "5052 — even or odd?"

[Expected answer]: "Even, because it ends in 2."

[SAY]:

"Excellent! You've mastered the quick check—look at the last digit!"

Word Problem Application (6 minutes)

[SAY]:

"Now let's apply this to a real-world situation. Listen carefully to this problem."

[READ the problem slowly]:

"Kirui has 35 cows on his farm and wants to group them into 2 pens. Will each pen have an equal number of cows? Work with your partner to answer this question using what we learned about odd and even numbers."

[GIVE learners 3 minutes to discuss]

[ASK]: "Who can share their answer and reasoning?"

[Expected response]: "No, because 35 is an odd number. Odd numbers cannot be divided into two equal whole number groups. Each pen would have 17 cows with 1 cow left over."

[SAY]:

"Exactly! This is why understanding odd and even numbers matters in real life—whether you're dividing animals, learners, or any objects into equal groups."

Additional Practice (2 minutes)

[SAY]:

"Here's another quick one: If I have 48 learners and want to form pairs for a project, will everyone have a partner?"

[WAIT for responses]

[SAY]:

"Yes! 48 is even, so it divides evenly into pairs of 2. Everyone gets a partner!"

[TRANSITION]:

"Now I want to see what each of you has learned individually."

PHASE 4: Assessment / Checkpoint (8 Minutes)

Independent Work (3 minutes)

[DISPLAY or read the questions]:

"Question 1: Classify the following numbers as even or odd: a) 1008 b) 1521"

"Question 2: A grade 10 class has 52 learners and their class teacher wanted to group them in pairs. Will each group have an equal number of learners? Explain using odd or even properties."

[SAY]:

"You have 5 minutes. Begin."

[DO]: Walk around quietly, ensuring learners are working independently. Do not provide hints.

Collection and Closure (1 minute)

[SAY]:

"Time's up. Please pass your exit tickets forward."

[COLLECT all tickets]

[SAY]:

"Today you learned to classify whole numbers as odd, even, prime, and composite. You also discovered important properties about how these numbers behave when we add, subtract, and multiply them."

[ASK]:

"Let's return to our key question: How do we use the properties of real numbers in our day-to-day activities? Can someone give me one example?"

[ACCEPT 2-3 responses]

[SAY]:

"Great work today! Tomorrow we'll continue exploring number properties. For homework, find three real-life situations where knowing if a number is odd or even would be useful."

Differentiation Notes

For Struggling Learners:

- Provide the 1-50 chart with multiples of 2 pre-highlighted
- Pair with supportive peers during group work
- Offer a definitions handout for reference
- Work directly with this group during the anchor activity

For Advanced Learners:

[GIVE this extension problem]:

"Mutula is organizing a party, and he has 35 party hats. Can Mutula arrange the hats in rows where each row has the same number of hats? What does this tell you about the number 35?"

[Expected thinking]: learners should explore factors of 35 (1, 5, 7, 35) and recognize that 35 is composite because it has factors other than 1 and itself.

Answer Key

Exit Ticket Answers:

Question 1:

- a) 1008 — Even (ends in 8, divisible by 2)
- b) 1521 — Odd (ends in 1, not divisible by 2)

Question 2:

- Yes, each group will have an equal number of learners.

Explanation: 52 is an even number because it ends in 2 and is divisible by 2. When we divide 52 by 2, we get 26. Therefore, there will be 26 pairs, and each pair will have exactly 2 learners.

Post-Lesson Reflection Prompts

After teaching this lesson, consider:

1. What went well? Which activities generated the most engagement?

2. What would I change? Were the time allocations appropriate?

3. Student Understanding: What did the exit tickets reveal? What percentage of learners demonstrated mastery?

4. Next Steps: Which learners need additional support? What concepts need reinforcement in the next lesson?