I. Lesson Overview

Lesson Title:	Finding Reciprocals of Real Numbers Using Calculators
Strand:	Numbers and Algebra
Sub-Strand:	Real Numbers
Grade Level:	10
Estimated Duration:	40 minutes

Key Inquiry Question

How do we use real numbers in day-to-day activities?

II. Learning Objectives & Standards

Learning Objectives

Upon completion of this lesson, Learners will be able to:

1. **Know (Conceptual Understanding):** Understand how to use a calculator to find reciprocals of real numbers efficiently.
2. **Do (Procedural Skill):** Find reciprocals of various real numbers (whole numbers, decimals, fractions) using a calculator.
3. **Apply (Application/Problem-Solving):** Apply calculator-based reciprocal calculations to solve real-world problems involving rates and proportions.

Curriculum Alignment

Strand:	Numbers and Algebra
Sub-Strand:	Real Numbers
Specific Learning Outcome:	Finding reciprocals of real numbers using calculators.

III. Materials & Resources

Textbooks:	CBC Grade 10 Mathematics Learner's Book CBC Grade 10 Mathematics Teacher's Book

Pre-class Preparation list:

1. Test internet connectivity and access to https://innodems.github.io/CBC-Grade-10-Maths/
2. Ensure all Learner devices can access the digital textbook

3. Pre-load the checkpoint page on the teacher's display device
4. Have backup printed worksheets in case of technical issues
5. Arrange seating for pair work and station rotations

IV. Lesson Procedure

Phase 1: Problem-Solving and Discovery / Engage & Explore (15 minutes)

Objective: To activate prior knowledge about reciprocals and introduce the use of calculators for finding them.

Materials Required: Each Learner/group should have a calculator.

Anchor Activity:

Calculator Introduction:

- Working in groups, use a calculator to work out the reciprocal of 151.6:
  i) Press the keys 1, ÷, 1, 5, 1, ., 6 in that order
  ii) Press the key =

Read the Result:

- Read the displayed result. What is the reciprocal of 151.6 from the calculator?

Practice:

- Work out the reciprocal of each of the following numbers using the calculator:
  a) 0.0038
  b) 0.5498
  c) 1/8
  d) 564

Discussion:

- Discuss with other learners how you determine the reciprocal of a number using a calculator.

Teacher's Role: The teacher circulates among the groups, observing how Learners use the calculators. The teacher asks probing questions (e.g., "What keys did you press?", "What does the result mean?", "How would you verify your answer?"). The teacher identifies common difficulties and uses Learner discoveries as a bridge to formal instruction.

Phase 2: Structured Instruction / Explain (10 minutes)

Objective: To formalize the procedure for finding reciprocals using a calculator.

Key Takeaways & Teacher Connection:

To find the reciprocal of a number using a calculator:

Step 1: Press the key 1

Step 2: Press the key ÷ (division)

Step 3: Enter the number

Step 4: Press the key =

Step 5: Read the displayed result

Example: Finding the reciprocal of 7

i) Press the key 1

ii) Press the key ÷

iii) Press the key 7

iv) Press the key =

Read the displayed result: 0.14285714286

Hence the reciprocal of 7 given to 4 decimal places is 0.1429.

Alternative Method: Some scientific calculators have a reciprocal button labeled 1/x or x^{-1}. Simply enter the number and press this button.

Addressing Misconceptions: "Remember to enter the number correctly, especially for decimals. Always check that your answer makes sense—the reciprocal of a number greater than 1 should be less than 1, and vice versa."

Phase 3: Practice and Application / Elaborate (15 minutes)

Objective: To apply the calculator method to find reciprocals of various numbers and solve real-world problems.

Varied Problems:

1. Direct Calculations: Find the reciprocal of the following using a calculator:

i) 5.6

ii) 0.003

iii) 12.8

Solutions:

i) Reciprocal of 5.6:

Press keys: 1, ÷, 5, ., 6, =

Result: 0.1786 (rounded to 4 decimal places)

ii) Reciprocal of 0.003:

Press keys: 1, ÷, 0, ., 0, 0, 3, =

Result: 333.3333 (rounded to 4 decimal places)

iii) Reciprocal of 12.8:

Press keys: 1, ÷, 1, 2, ., 8, =

Result: 0.078125

Teacher's Role: The teacher monitors Learners as they work, ensuring correct key sequences and helping with decimal entry.

Phase 4: Assessment / Evaluate (Exit Ticket)

Objective: To formatively assess individual Learner understanding.

Exit Ticket Questions:

1. Find the reciprocal of the following numbers using a calculator:

a) 8 b) 125 c) 598 d) 8638

e) 8.861 f) 0.00067 g) 0.01467 h) 0.4875

2. A school cafeteria has 8 large trays of food to serve equally among Learners. Using a calculator, find the reciprocal of 8 and explain what it represents.

3. If a machine completes a task in 6 hours, its work rate per hour is the reciprocal of the time. Use a calculator to determine the reciprocal and explain what it represents.

4. A car travels 12 kilometers on 1 liter of fuel. Use a calculator to find out liters of fuel needed per kilometer.

5. Write down 3 numbers and work out their reciprocals using a calculator.

Answer Key:

1a) Reciprocal of 8 = 0.125

1b) Reciprocal of 125 = 0.008

1c) Reciprocal of 598 ≈ 0.001672

1d) Reciprocal of 8638 ≈ 0.0001158

1e) Reciprocal of 8.861 ≈ 0.1129

1f) Reciprocal of 0.00067 ≈ 1492.54

1g) Reciprocal of 0.01467 ≈ 68.17

1h) Reciprocal of 0.4875 ≈ 2.0513

2. Reciprocal of 8 = 0.125. This means each Learner gets 0.125 (or 1/8) of each tray.

3. Reciprocal of 6 ≈ 0.1667. This represents the fraction of the task completed per hour.

4. Reciprocal of 12 ≈ 0.0833 liters per kilometer.

5. Answers will vary based on Learner-chosen numbers.

V. Differentiation

Learner Group	Strategy & Activity
Struggling Learners (Support)	Scaffolding: Provide a step-by-step visual guide showing which keys to press. Start with simple whole numbers before moving to decimals. Pair with a peer who can assist with calculator operation.
On-Level Learners (Core)	The core lesson activities as described above.
Advanced Learners (Challenge)	Extension Activity: Investigate what happens when you find the reciprocal of a reciprocal. Explore patterns in reciprocals of consecutive numbers. Create word problems that require finding reciprocals.

VI. Assessment

Type	Method	Purpose
Formative (During Lesson)	- Observation during anchor task - Questioning to check calculator usage - Exit Ticket	To monitor progress and adjust instruction.
Summative (After Lesson)	- Homework assignment - Future quiz/test questions	To evaluate mastery of learning objectives.

Checkpoint Integration

Checkpoint protocol for Learners:

1. Click “Show new example question” to load the problem
2. Solve the displayed question
3. Click “submit” to check your answer
4. If incorrect, carefully read the feedback and analyse the error before trying a new question. The immediate feedback from checkpoint submissions allows Learners to identify and correct errors in real-time.
5. Complete at least 5 questions before rotating
6. Pair Learners strategically so stronger learners can explain reasoning to peers.

VII. Teacher Reflection

To be completed after the lesson.

1. What went well?

2. What would I change?

3. Learner Understanding: What did the exit tickets reveal?

4. Next Steps: Based on assessment data, what is the plan for the next lesson?