5-Day Lesson Plan: Rational vs. Irrational Numbers

Standards:

- **Florida MA.8.NSO.1.1:** Compare and classify rational and irrational numbers.
- **NGSS MS-ETS1-2:** Apply mathematical concepts to analyze real-world problems in design.

Goal/Objective: Students will explore, classify, and apply rational and irrational numbers through interactive activities and STEM applications, demonstrating understanding through discussion, hands-on work, and reflection.

Materials:

- Whiteboard/markers
- Worksheets for each day
- Number line visuals
- Compass or circular objects (for Ferris wheel design)
- Calculator
- Graph paper
- Colored pencils/markers
- **PowerPoint presentation** for each day's topic

Differentiation/Accommodations:

- **ELLs:** Labeled visuals, sentence starters, step-by-step guidance
- **Struggling Students:** Highlighted examples, number lines, guided practice
- **Advanced Learners:** More complex decimals/fractions, STEM problem extensions

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Day 1 – Rational Numbers

Bellwork (5 min – Think-Pair-Share):

- Write a number you see often (price, measurement, etc.) and predict if it is rational or irrational. Share reasoning with a partner.

Teacher-Led Instruction (15 min):

- **Show PowerPoint presentation** to define and illustrate rational numbers: fractions, whole numbers, terminating/repeating decimals
- Show examples on a number line

- Discuss real-life applications: money, measurements

Small-Group Activity (15 min – RoundRobin):

- Classify numbers as rational from a worksheet: 4, 0.75, 7/8, √16, 0.333…, 5, π
- Each student explains reasoning for one number

Paired Activity (10 min):

- Identify terminating vs. repeating decimals, provide real-life examples

Exit Ticket (5 min):

- Write 2 numbers and explain why each is rational

Day 2 – Irrational Numbers & Decimals

Bellwork (5 min – Think-Pair-Share):

- List a number that cannot be written as a fraction

Teacher-Led Instruction (10 min):

- **Show PowerPoint presentation** defining irrational numbers: non-repeating, non-terminating decimals, non-perfect square roots, π
- Place examples on number line, discuss real-life contexts (circle measurements, π)

Small-Group Activity (15 min – Numbered Heads Together):

- Classify numbers as rational or irrational: √2, 1/4, π, 2.718…, √9

Paired Activity (15 min):

- Classify decimals as terminating, repeating, or non-repeating
- Provide real-life examples

Exit Ticket (5 min):

- Write one terminating, one repeating, one non-repeating decimal and label as rational/irrational

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Day 3 – Square Roots & Estimation

Bellwork (5 min – Think-Pair-Share):

- Estimate √50 to one decimal place and decide if rational or irrational

Teacher-Led Instruction (10 min):

- **Show PowerPoint presentation** explaining perfect squares → rational roots, non-perfect squares → irrational roots
- Demonstrate estimation using a number line

Small-Group Activity (20 min – Rally Coach):

- Calculate exact or estimated square roots: 9, 20, 121, 50, 144, 75
- Each student explains solution steps to a partner before recording

Paired Activity (10 min):

- Match square roots with rational or irrational classification

Exit Ticket (5 min):

- Estimate √70. Is it rational or irrational? Explain

Day 4 – Comparing & Ordering Numbers

Bellwork (5 min – Think-Pair-Share):

- Circle the bigger number: √12 or 3.5

Teacher-Led Instruction (10 min):

- **Show PowerPoint presentation** reviewing rational vs. irrational numbers
- Demonstrate ordering decimals and square roots

Small-Group Activity (20 min – RoundRobin/Cooperative Learning):

- Order sets of rational and irrational numbers from smallest to largest:
  - Example sets: √15, 3.6, 5; √28, 5.2, 5.0; √35, 6.0, 5.9

Paired Activity (10 min):

- Solve real-world problems: Which measurement is larger? Which wheel radius fits best?

Exit Ticket (5 min):

- Order √15, 3.6, 5 and label each rational or irrational

Day 5 – STEM Application: Ferris Wheel Project

Bellwork (5 min – Think-Pair-Share):

- Write one circular object in real life that uses π

Teacher-Led Instruction (10 min):

- **Show PowerPoint presentation** introducing the Ferris wheel project
- Show formula: C = 2πr
- Discuss rational vs. irrational numbers in design

Small-Group Activity (20 min – Rally Coach):

- Draw Ferris wheel on graph paper
- Label radius (r), calculate circumference using π and 3.14
- Identify rational/irrational numbers in design

Paired Activity (10 min):

- Exchange sketches with another group; check calculations and classifications

Exit Ticket (5 min):

- Reflection: How do irrational numbers help in real-world design?

Wrap-Up (All Days):

- Rational numbers = fractions, terminating/repeating decimals
- Irrational numbers = non-repeating, non-terminating decimals, non-perfect square roots, π
- STEM Connection: Essential in measurements, engineering, and circular designs

Homework:

- Complete the interactive activity **"Rational and Irrational Numbers"** at: **www.innovatewithmrbarbado.com**