Lesson Plans

FRACTIONS AND PROBLEM SOLVING

UNIT 1: FRACTIONS AND PROBLEM SOLVING

LESSON 1: DIFFERENT WAYS TO EXPRESS RATIONAL NUMBERS

<table>
<tr><td>Topic</td><td colspan="3">Fractions and decimals</td></tr>
<tr><td>Subject</td><td colspan="3">Optional subject</td></tr>
<tr><td>Level</td><td colspan="3">ESO 3</td></tr>
<tr><td>Timing</td><td colspan="3">6 h</td></tr>
<tr><td>Aims</td><td colspan="3">To identify, solve and create problems involving the concept of rational numbers
To understand the instructions of a simple question or a problem –real or abstract-
To realise there are non-rational numbers</td></tr>
<tr><td colspan="2">Teaching Objectives</td><td colspan="2">Learning Outcomes</td></tr>
<tr><td>Content</td><td>To understand:
• Every rational number can be represented as a fraction or as a decimal number
• The conversion from fraction to decimal and vice-versa
• There are irrational numbers</td><td>Content</td><td>Students will be able to:
• Identify fractions and decimals in a problem data and convert to the same representation
• Give examples of rational and irrational numbers</td></tr>
<tr><td>Cognition</td><td>• To distinguish relevant information from a problem or text
• To follow the steps to solve a problem
• To stimulate recognising similar problems or situations in everyday life.</td><td>Cognition</td><td>• To organise problems data or information from a text in a diagram
• To identify data and objective in a problem
• To create and formulate problems</td></tr>
<tr><td colspan="4">Communication</td></tr>
<tr><td colspan="2">Language of learning
• Fractions and decimal numbers key vocabulary: Elements, concepts and actions
• Language associated with solving problems: Data giving and question asking.</td><td>Language for learning
• To rephrase a problem in own words
• To express the strategy to solve a problem
• To check understanding with teacher or peers.
• To justify answers in a true/false or multiple choice exercise.</td><td>Language through learning
• Imagine and setting out new problems.
• Food and recipes language from the problems
• Online research about Pythagoras</td></tr>
<tr><td colspan="4">Culture</td></tr>
<tr><td colspan="4">• Realise differences: notation, recipes, use of mixed numbers
• Have some perspective of mathematics evolution, especially numbers.</td></tr>
<tr><td colspan="4">Assessment criteria</td></tr>
<tr><td colspan="4">Students should be able to:
• Ask and answer questions involving language of fractions and decimal numbers
• Summarising and rephrasing the instructions of a question or problem
• Convert a fraction to a decimal number and vice-versa
• Represent proportions on a diagram and analyse them
• Give examples of irrational numbers
• Explain the disappointment or frustration of Pythagorean school members about the discovery of irrational numbers</td></tr>
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UNIT 1: FRACTIONS AND PROBLEM SOLVING

LESSON 2: OPERATIONS WITH FRACTIONS

<table>
<tr><td>Topic</td><td colspan="3">Operations with rational numbers – fractions, mixed numbers or decimals-</td></tr>
<tr><td>Subject</td><td colspan="3">Optional subject</td></tr>
<tr><td>Level</td><td colspan="3">ESO 3</td></tr>
<tr><td>Timing</td><td colspan="3">7h</td></tr>
<tr><td>Aims</td><td colspan="3">To know how to add, subtract, multiply, divide and solve powers with fractions and mixed numbers and in what situations can be applied.
To apply operations to solve problems
To realise that different strategies are possible to solve a problem
To analyse historic contributions to maths involving fractions</td></tr>
<tr><td colspan="2">Teaching Objectives</td><td colspan="2">Learning Outcomes</td></tr>
<tr><td>Content</td><td>To understand:
The procedures to add, subtract, multiply, divide and up to the nth power fractions
The concept of proportionality in numbers and geometry.
Strategies to solve problems involving fractions or ratios
Formulas
Fractions in history</td><td>Content</td><td>Students will be able to:
Operate with fractions
Identify when a fraction means a number, an operator or a ratio.
Solve problems of proportionality and distributions
Identify formulas and used them to calculate the subject value</td></tr>
<tr><td>Cognition</td><td>To distinguish relevant information from a problem/text
To identify the right operation to solve a question
To evaluate different strategies to solve problems
To stimulate recognising similar problems or situations in everyday life.
To apply algebraic language to express relations</td><td>Cognition</td><td>To identify data and objective in a problem
To recognize similar problems as a first step to solve them.
To apply different strategies to solve problems
Find advantages/disadvantages
To create new problems freely or according to the solution
To deduce relationships and express them with a formula</td></tr>
<tr><td colspan="4">Communication</td></tr>
<tr><td colspan="2">Language of learning
Ratios, proportions and distributions vocabulary.
Operations and resolution processes vocabulary
Language involved in problems: Data giving and question asking.</td><td>Language for learning
To rephrase a problem in own words
To explain a procedure or a strategy to solve a problem
To check understanding
To justify in a true/false or multiple choice exercise</td><td>Language through learning
Imagine and setting out new problems.
Analyse the use of fractions in ancient civilisations
Research the history of fractions</td></tr>
<tr><td colspan="4">Culture</td></tr>
<tr><td colspan="4">Realise differences in: currencies and unit systems
Have some notions of the history of mathematics, especially fractions.</td></tr>
<tr><td colspan="4">Assessment criteria</td></tr>
<tr><td colspan="4">Students should be able to:
Explain the procedure to solve the five operations using an example
Summarising and rephrasing the instructions of a question or problem
Solve problems and simple questions involving operations, proportions and distributions and justify the strategy
Deduce relations between sets of fractions and express them using formulas
Locate the first evidence of fractions in history</td></tr>
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