

Bicycles and Tricycles

Adapted by:
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The Task

Jenny's Bicycle Shop sells only bicycles and tricycles. They have a total of 24 seats and 61 wheels in the shop. How many bicycles and how many tricycles are in the shop?

Big Ideas

- Relationships can be described and generalizations made for mathematical situations that have numbers or objects that repeat in predictable ways.
- Mathematical situations and structures can be translated and represented abstractly using variables, expressions, and equations.
- Rules of arithmetic and algebra can be used together with notions of equivalence to transform equations and inequalities so solutions can be found.

Standards of Learning for Grades 3-4-5

- 3.2 recognize/use inverse relationships between add/sub and mult/div to complete fact sentences/solve problems
- 3.4 estimate/solve single-step and multistep problems involving sum/diff of two whole numbers 9,999 or less
- 4.16 a) recognize/demonstrate meaning of equality in equation
- 4.4 d) solve single-step and multistep add/sub/mult problems with whole numbers
- 5.18 a) investigate/describe concept of variable; b) write open sentence using variable; c) model one-step linear equations using add/sub; d) create problems based on open sentence

Standards of Learning for Grades 6-7-8

- 6.18 solve one-step linear equations in one variable
- 7.12 represent relationships with tables, graphs, rules, and words
- 7.13 a) write verbal expressions as algebraic expressions and sentences as equations and vice versa; b) evaluate algebraic expressions
- 8.14 make connections between any two representations (tables, graphs, words, rules)
- 8.16 graph linear equation in two variables

Process Goals

- Problem Solving and Reasoning – Students will apply their knowledge of numbers, operations, and equations to make sense and determine solutions to the problem.
- Connections and Representations – Students will represent their solutions with pictures, tables, or equations. They recognize and use mathematical connections to extend or generalize patterns in their solutions.
- Communication – Students will justify their findings and present their results to the class with precise mathematical language

Related Task – Spiders and Ants

A spider's web contains a certain number of spiders, which have eight legs, and their six-legged meal: ants. There are 64 legs in all, and four times as many ants than spiders. How many of each bug is there?

Related Task – Touchdowns and Field Goals

Emma plays in a flag football league where the only two ways to score are via touchdowns, which are worth 7 points, and field goals, which are worth 3 points. In yesterday's game, her team scored eight times. How many points did her team score?

Find all possible solutions.

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Lesson Plan

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Materials

- The task
- Pictures of a bicycle and tricycle
- Large presentation paper per group

Facilitating Task

- Begin by sharing pictures of a bicycle and tricycle.
- Read the problem together. Have students retell the problem in their own words.
- Provide individual work time for students to begin finding possible solutions.
- Form small groups (4 students maximum) to compare strategies and solutions. After reaching consensus as a group, record solution and justification on Presentation Paper.
- Each group shares and justifies their solution to the class.
- As groups share, the teacher asks questions to support students in connecting the strategies shared and the mathematical ideas highlighted.

Misconceptions

- Students may be confused by the constraints. Students may add bikes and trikes before multiplying, added just the wheels, or multiplied bikes times trikes.
- Students may solve the problem and not consider all constraints.

Suggested Prompts or Questions

- How does your solution make sense to you?
- How is your strategy similar to another strategy that someone used?
- What do you know about the problem?

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Name _____

Date _____

Jenny's Bicycle Shop sells only bicycles and tricycles. They have a total of 24 seats and 61 wheels in the shop. How many bicycles and how many tricycles are in the shop?

Answer the question using pictures, words, tables, graphs, and/or symbols.