Gold Seal Lesson:

Copernicus Education Gateway

Author(s):Doris Quick			*Lesson Title: Bike Shop*			
Grade Span			*ICLE Application Model*			
K-4	*5-8*	*9-12*	*A*	*B*	*C*	*D*
X					*X*	

Instructional Focus:

Statistics and Probability
Students use statistics and probability to analyze given situations and the results of experiments. Students communicate the reasoning used in arriving at a conclusion.

Problem-Solving and Mathematical Reasoning
Students apply a variety of problem-solving strategies to investigate and solve problems from across the curriculum as well as from practical applications.

Performance Task

Ben is the owner of a store that makes bicycles and tricycles. Ben has 21 wheels. Using manipulative materials and / or pictures, find all the different combinations of bicycles and tricycles that Ben could make using all of his 21 wheels.
Answer the following, justifying your response:
1. Is it possible to make all bicycles?
2. Is it possible to make all tricycles?
3. What is the least number of additional wheels Ben would need so he could make the same number of bicycles as tricycles?

ICLE Essential Skills

Know how to determine ***combinations*** (i.e., the various grouping a set may be arranged in without regard to order). M43

Use ***direct proof and indirect proof*** sequencing techniques to reach a conclusion. Direct proof uses the Laws of Reasoning to create an orderly arrangement of steps leading to a conclusion. Indirect proof uses an initial assumption that the conclusion is false, and through a series of logically sound reasoning steps the statement may be proved otherwise. M32

Scoring Guide:

4 The student independently responds to all parts of the task. He / she lists all combinations of bicycles and tricycles that can be made with the given number of wheels. The student answers each question asked and justifies each of his/her answers.

3 The student needs some assistance in responding to all parts of the task. He / she understands how to model the problem using manipulative materials and/ or pictures but does not give a complete listing of all possible combinations. The student answers each question asked but is unable to justify his / her answers.

2 The student needs considerable assistance in responding to the task. He / she does not understand the process of modeling the problem situation and only comes up with one combination as an answer to the problem. He / she does not answer all the questions asked and is unable to justify any of his / her responses.

1 The student shows no understanding of using modeling as a problem-solving strategy. He/she is unable to do the task and is not able to answer any of the questions asked.

Keywords

English Language Arts	Mathematics	Science
Reading	**Algebra**	**Earth Science**
Writing	**Geometry**	**Life Science**
Communications	**Statistics** ***Manipulatives*** ***Problem Solving*** ***Combinations***	**Chemistry**
Literature	**Calculus**	**Physics**
Other	**Trigonometry**	**Other**
	Other	