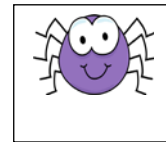# Spiders and Ants

Adapted by:
Susan Call
George Mason University, COMPLETE Math
Fall 2015

The Task

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?

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	Standards of Learning for Grades 6-7-8
3.2 recognize/use inverse relationships between add/sub and mult/div to complete fact sentences/solve problems	6.18 solve one-step linear equations in one variable
3.4 estimate/solve single-step and multistep problems involving sum/diff of two whole numbers 9,999 or less	7.12 represent relationships with tables, graphs, rules, and words
4.16 a) recognize/demonstrate meaning of equality in equation	7.13 a) write verbal expressions as algebraic expressions and sentences as equations and vice versa; b) evaluate algebraic expressions
4.4 d) solve single-step and multistep add/sub/mult problems with whole numbers	8.14 make connections between any two representations (tables, graphs, words, rules)
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	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 – Bicycles and Tricycles

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?
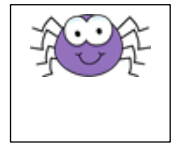
Related Task – Touchdowns and Field Goals

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.

Spiders and Ants
Lesson Plan

Adapted by:
Susan Call
George Mason University, COMPLETE Math
Fall 2015

The Task

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 as spiders. How many of each type of bug are there?

| Materials	Facilitating Task
- The task - Pictures of a spiders and ants - Large Presentation Paper per group	- Begin by sharing pictures of a spiders and ants. - 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	Suggested Prompts or Questions
• Students may confused by the constraints. Students may add spiders and ants before multiplying, added just the legs, or multiplied spiders times ants. • Students may solve the problem and not consider all constraints. • Students might reverse the relationship of spiders and ants (4a=s or 4s=a).	• 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?

Spiders and Ants
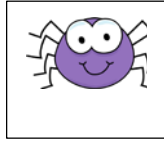
Name_____

Date_____

Task

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?

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