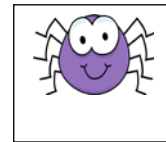


# Spiders and Ants



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

- 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 – 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?

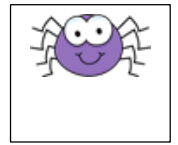
### **Related Task – Touchdowns and Field Goals**

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



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### 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

- The task
- Pictures of a spiders and ants
- Large Presentation Paper per group

#### Facilitating Task

- 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.

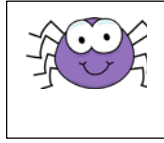
### **Misconceptions**

- Students may be confused by the constraints. Students may add spiders and ants before multiplying, add just the legs, or multiply 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  $4s=a$ ).

### **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?

## 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.