All Tied Up

Class: Math 46

Course context:
This activity covers solving systems of linear equations. It can be done after going over substitution/elimination.

Overview:
Students tie knots in ropes of different lengths and thicknesses. They find how the relationship of rope length and number of knots for each kind of rope. They then solve a system of equations graphically and algebraically in order to figure out how many knots to tie in each rope in order to make them of equal length. The catch is that they need to tie the same number of knots in each rope.

Objectives:
They should know: finding slope and writing the equation of a line in slope-intercept form; physical interpretation of slope as a rate of change and what the y-intercept means; solving a system of linear equations graphically and algebraically.

Timing:
60-90 minutes

Groups:
3 students per group is ideal.

Materials:
Two ropes of different thicknesses and lengths, the thick rope should be longer than the thin rope
Graph paper
Rulers
Meter sticks

Activity:
Part 1: Students will collect data by tying the same number of knots in each rope and measuring them.

> *You or the students may decide whether to measure in only inches or only centimeters. Encourage them to tie the knots consistently. (I suggest that each group has a specific knot person.) For Best Fit lines, remind students not to connect the dots, but to draw a straight line that goes close to all of the points.*

Part 2: Students solve the system of equations graphically and algebraically. The two results should be close.

Part 3: To test their models, students use a new pair of ropes to come up with two new equations and verify that they will work.

Deliverables: (What will students produce?) A project write up as described in the handout.