

## **STRAND 2: LINEAR FUNCTIONS**

### **TOPIC 2.9: SOLVING EQUATIONS USING CONCRETE MODELS**

#### **Topic 2.9 Notes**

##### **Mathematical focus**

Students will investigate and connect methods for solving linear equations.

##### **Topic overview**

Students will solve linear equations with algebra tiles and relate the solutions to patterns, graphs, and tables. Students will explain the connections among the various representations. This topic contains 6 tasks:

Task 2.9.1: Algebra Tiles

Task 2.9.2: Algebra Tiles with Negative Units

Task 2.9.3: Graphing Intersections

Task 2.9.4: Algebra Tiles and Rational Equations

Task 2.9.5: Alicia's Homework

Task 2.9.6: Tile Patterns

##### **TE<sub>x</sub>ES Standards focus**

**TE<sub>x</sub>ES Standard II.006 Patterns and algebra.** The teacher understands linear and quadratic functions, analyzes their algebraic and graphical properties, and uses them to model and solve problems. The beginning teacher:

(G) Models and solves problems involving linear and quadratic equations and inequalities using a variety of methods, including technology.

##### **TEKS/TAKS focus**

**TEKS A.4 Foundations for functions.** The student understands the importance of the skills required to manipulate symbols in order to solve problems and uses the necessary algebraic skills required to simplify algebraic expressions and solve equations and inequalities in problem situations. The student is expected to:

(A) find specific function values, simplify polynomial expressions, transform and solve equations, and factor as necessary in problem situations.; and

(B) use the commutative, associative, and distributive properties to simplify algebraic expressions.

High School TAKS Objective 2: The student will demonstrate an understanding of the properties and attributes of functions.

**TEKS A.7 Linear functions.** The student formulates equations and inequalities based on linear functions, uses a variety of methods to solve them, and analyzes the solutions in terms of the situation. The student is expected to:

(B) investigate methods for solving linear equations and inequalities using concrete models, graphs, and the properties of equality, select a method, and solve the equations and inequalities.

High School TAKS Objective 4: The student will formulate and use linear equations and inequalities.
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### Materials

Task	#1	#2	#3	#4	#5	#6
Algebra tiles	x	x	x		x	
copies of the task “Solving Linear Equations Using Concrete Models”	x	x	x	x	x	x
Graphing calculator	x	x	x	x	x	x

### Procedure

After giving each participant a copy of the task, break the class into partners. Work through the first exercise with the participants, demonstrating the tiles, multiple solution strategies, and the graphing calculator connections. Have participants record the tile manipulations by sketching on their paper. Stress the importance of sketching tiles as a bridge from the concrete to the symbolic.

### Summary

After completing this topic, participants will have an understanding of how symbolic manipulations of algebraic equations “look”. Participants will be able to represent pictorially the solutions to algebraic equations and relate them to the graphs and tables.

### Extensions

*TEXTEAMS Algebra I: 2000 and Beyond* Chapter 3 *Solving Linear Equations* can be used as extension activities.

### Assessment/Transition to the Classroom

Participants should complete the Teacher’s Journal, recording their responses and making any modifications necessary to make the tasks completely classroom ready.