

SOLVING EQUATIONS

LESSON FOR ADULT EDUCATION LEARNERS

THIS LESSON IS DESIGNED TO BE USED IN AN ADULT EDUCATION CLASSROOM AS AN OVERVIEW OF EQUATION SOLVING. HOWEVER, IT MAY BE ADAPTED TO MEET THE NEEDS OF ANY AGE GROUP OR CLASS.

This lesson is aligned with the following South Carolina Adult Education Curriculum Framework Standards for Math:

- ❖ 6.EE1.4/6.EE4- Identify when two expressions are equivalent.
- ❖ 6.EE1.5/ 6.EE.5 - Understand solving an equation as a process of answering a question: which values make the equation true? Use substitution to determine whether a given number makes an equation true.
- ❖ 6.EE1.6/ 6.EE.6 - Use variables to represent numbers when solving a real-world or mathematical problem; understand that a variable can represent an unknown number.
- ❖ 8.EE1.7/ 8.EE.7 - Solve linear equations in one variable.

Objective:

Students will be able solve equations by isolating a variable. Students will be able to determine if a given value is a solution to an equation.

Plan of Instruction:

- Students will be provided paper to make [origami](#). Students will watch [video](#) on how to create a simple origami object. Students may watch the video independently on a smartphone or tablet, or video may be viewed together as a class. Instructor may choose to have students “build” something else such as a paper airplane or an object with building blocks, provided instructions are given. Instructions can be written, in video format, etc. It may be necessary to set a time limit.
- Upon completing the task, students will be asked to share with the larger group what they built and how the process worked for them. (Did they follow the instructions in the video or try to complete the task quicker? Did they skip steps? Did they get frustrated with the process? Do the instructions matter?)
- Next, have students discuss how this task relates to solving math problems. Do they think the processes have similarities? Write down or [display student answers](#) on the whiteboard, SmartBoard, poster paper, etc.
- Each student will be given a [sticky note](#). Each student should write down a math topic or skill they can recall (or a topic that has recently be taught) that involves a process (like order of

operations, integer operations, adding/subtracting/multiplying/dividing fractions, etc.). Students will place responses on the board.

- The teacher will choose a few responses. The teacher can use this time to discuss how the topics or skills chosen by the students do in fact represent a given process as it relates to solving a particular problem. This discussion will allow the teacher to explain that we are going to look at another “process” - solving algebraic equations.
- Vocabulary will be introduced for the lesson. Terms to be discussed before starting lesson are attached: [Vocabulary Terms - Algebraic Equations](#). Students can do a word sort with the vocabulary words and sort them into words they know and words they do not know. Then, vocabulary can be discussed and reviewed as necessary.
- [Solving Equations Video](#) - Intro to Algebra/Algebraic Equations - Students will watch video, which provides an overview of algebraic equations as a group. Link to video: [Solving Equations](#)
Note: Other videos can be added as needed by the instructor to demonstrate strategies for solving equations. .
- Teacher will model and discuss the process of solving equations with students. Teacher will model “**think-aloud**” strategy as problems are discussed in class.
 - Problems to use for examples can include:
 - $x+10 = 15$
 - $y - 3 = -1$
 - $3x+5 = 14$
 - $4m + 1 = -7$
- Students and teacher work together to fill-in [graphic organizer](#) for equation solving. [Graphic organizer and key attached \(PDF format\)](#).
- At this point, students can be divided into groups and work on equation solving. Teacher can circulate and work with groups and individuals as needed. Students are encouraged to talk through the process of the steps for solving an equation.
- Equations with multi-steps can be introduced to each group as they are able to progress. Combining like terms and the distributive property will need to be taught and discussed, but could be introduced in small groups or even with the use of small white boards, if available.
- Include a “**Test Taking Strategy**” along with the lesson, too. Students should brainstorm (individually or as a group) about other strategies for solving an equation (like if they get “stuck” in the process), especially if they have a multiple choice question. After discussion, encourage students that they can always “**work backward**” with a multiple choice question (i.e., plug in answer choices and see which one makes a true statement).

Assessment/Check for Understanding:

- Students can work through a set of equations and discuss/get feedback.
- Sets of problems can be assigned to individual students in Khan Academy to check progress.
- Students can be given 2-3 problems to solve AND write down in detail the step-by-step process used to solve.

Videos referenced in the Lesson:

1. [Origami Crown](#) :
Origami Very Easy Collection <https://bit.ly/2ldTALU>
License
[Creative Commons Attribution license \(reuse allowed\)](#)
2. [Solving Equations - 9th-12th Grade Common Core Mathematics](#) :
NEA Portal
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