**Solving Equations with Variables on Both Sides**

1. TITLE OF LESSON: This lesson will teach the kids how to solve equations with variables on both sides of the equation as well as showing the kids how to solve equations where they need to use the distributive property and combining like terms.
2. CONTEXT OF LESSON: The students should be comfortable with solving 2 step and 1 step equations. They should also be comfortable in combining like terms and using the distributive property.
3. LEARNING OBJECTIVES and ASSESSMENT:

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| --- | --- | --- |
| Learning Objective  The student should be able to: | Bloom | Assessment (Formative/Summative) |
| Solve equations with variables on both sides of the equal sign. | A | The students will be working out problems and turning them in to be evaluated. I will also be paying attention to discussions that the students are having in groups. |
| Use the distributive property to solve equations. | A |
| Justify steps in solving equations. | E | The student will create a flip book where they will be justifying each step of solving a multistep equation on a separate page. |
| Create a product that will help them in solving multistep equations. | C |

1. RELATED 2009 VIRGINIA STANDARDS OF LEARNING:

A.4: The student will solve multi-step linear and quadratic equations in two variables, including:

* 1. Solving literal equation for a given variable
  2. Justifying steps used in simplifying expressions and solving equations, using field properties and axioms of equality that are valid for the set of real numbers and its subsets
  3. Solving quadratic equations algebraically and graphically
  4. solving multistep linear equations algebraically and graphically
  5. solving systems of two linear equations in two variables algebraically and graphically and
  6. Solving real world problems involving equation and systems of equation.

Graphing calculators will be used both as a primary tool in solving problems and to verify algebraic solutions.

1. MATERIALS NEEDED:

I supply: Like terms warm-up, guided notes, PowerPoint, tarsia activity already cut out.

They supply: Pencil and Paper

1. PROCEDURE:

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| --- | --- | --- |
| Time | Mathematical Tasks to be Used,  Teacher Thoughts/Actions/Questions | Anticipated Student Comments, Questions, Actions, and Strategies |
| 15 min | Distribute like terms warm up and describe what is expected in RESPECT-DEFEND-CONCENSUS.  Collect warm up answers.  Give answers to warm up and answer any questions. | Students should create coversheet, the complete warm up in respect mode. They should be putting their answers on two sheets of paper, one that will be turned in at the end of respect mode. Then the students should get into pairs and compare answers to a partner and change any answers as needed. Then they should all get together as a group and come up with a group answer. They will then switch the papers with another group and have them checked. The group with the most answers correct will get a special treat. |
| 10 min | Say : “Now that you have mastered two step equations, see if you can solve this problem:  Explain your reasoning. | Students will work in pairs to see if they can come to a solution. |
| 5min | Say: “This is called a multi step equation. Why do you think it is called that? How is it similar to other problems that you have done? How is it different?”  Go over problem using directions from class. | Discuss how they solved the problem, discuss with their groups and then with the whole class how to solve a multi step equation. |
| 15 min | Go over solving multistep equations power point and hand out guided notes. | The students should fill out guided notes and work out problems as they are presented. They may use their seat partners for independent problems. |
| 20 min | Have students get into pairs and work through multistep equations dominoes with a partner. | The students will be given a set of math dominoes. They should work together to solve problems on the dominoes and piece them together in their pattern with question to answer. The students will turn in all work that is done on a separate sheet of paper. |
| 15 min | Distribute the flip book project and take the students to the computer lab to work out problems. | The students will create a multistep equation that has five steps or more.  They will create a flip book that shows one step on each page and add graphics as necessary.  When they are finished they should print it out and make sure that it is organized a prepared to turn in. |
| 10 min | Share books that the kids have created. | Talk about books that they have created and have kids check for errors in books. If any were found the author should correct them. |

1. MEETING THE NEEDS OF ALL STUDENTS: I could shorten assignments done in class and allow more time for completion of flip book. I could also have the kids do a flip book for a two step equation instead of a multi-step equation.
2. WHAT COULD GO WRONG WITH THIS LESSON AND WHAT WILL YOU DO ABOUT IT? Students may misbehave in the computer lab in which case the project could be done with paper and pencil in the classroom. Students may need more time to finish and review project which could be done at home.
3. LINK TO CTA: I am again using Strebe group strategies and also a project to get the kids interested. I am also using technology and student generated products to aide in learning of the topic. The project is also very open ended, since they may come up with other ways of solving equations.









