

IISME Summer 2005  
Algebra On-Line Help  
Education Transfer Plan

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Table of Contents

Introduction	
Premise .....	2
Connection to IISME Fellowship .....	2
Materials / Resources Needed .....	2

Connection to California State Standards .....	3
Project Timeline	
Project Summary .....	4
Phase I – Teaching MS Word for Project .....	4
Phase II – First Entry to the Table of Contents .....	5
Next Steps .....	5
Desired Outcomes .....	6
Project Rubric .....	7
Project Example .....	8

## **Algebra on-line help**

Introduction

### **Premise**

The math department at my school has been trying to encourage our students to write accurate and clear notes. Along with writing, we enforce not just the right answer, but a detailed explanation. Many of the math teachers at our school encourage our students to keep a math notebook. In this they keep track of all the notes in the class, practice problems, explanations, etc. For the most part this has been successful. But I have always wanted to do more.

### **Connection to IISME fellowship**

This past summer I spent some time in my fellowship writing on-line help for new software the company had been developing. This was an interesting process for me. I first had to learn a new software program and then write instructions on how to use it, detailing every feature. I felt much of the things I imagine students feel when they learn algebra for the first time; confusion, frustration, etc. But by the end I knew the software very well and was able not just to use the software, but explain to others in writing how to use it.

The software instructions I wrote were in the form of on-line help using MS Help Workshop. There is a Table of Contents page which unfolds into several categories. I am still investigating the possibility of using this software for the students to create on-line help. If I am unable to use this software I will just simply have the students use MS Word to create a Table of contents with hyperlinks to the specific topic.

### **Materials / Resources Needed**

The teacher will need access to a computer lab equipped with MS Word (or word processing equivalent). If a lab is not available the teacher will need a location where the students will be able to type and edit MS Word documents.

The best scenario would be a networked computer lab where students have their own login and folder to save work. The teacher would have access to each drive from a central location. If the teacher is able to access each folder from a central location, it makes it much easier to grade. This allows for easier grading of student work.

### **Connection to California State Standard**

Throughout the course of the year the students will have the opportunity to strengthen their writing and explaining skills. This project will be used throughout the year as the students study all Algebra 1 standards. The writing skills the students will be strengthened relate to California English Standards.

**English state standard 2.6:**

Write technical documents (e.g., a manual on rules of behavior for conflict resolution, procedures for conducting a meeting, minutes of a meeting):

- a. Report information and convey ideas logically and correctly.
- b. Offer detailed and accurate specifications.
- c. Include scenarios, definitions, and examples to aid comprehension (e.g., troubleshooting guide).
- d. Anticipate readers' problems, mistakes, and misunderstandings.

## Project Timeline

### **Project Summary**

Through the course of the year the students will write an on line help system for Algebra

1. They will create a table of contents which will list each topic that has been studied.

From the Table of contents page the user will be able to hyperlink to the specific

explanation, practice problems, etc. Throughout the course of the year the students will continue to add to the table of contents and the content of the on line help.

### **Phase 1 - Learning how to use MS Word for project**

The first part of this project is for students to learn how to create MS Word documents containing hyperlinks and equations. Spend a few days in the lab going over these topics. Decrease / Expand time as needed.

- Day 1 - Teaching hyper linking

A week or two into the school year the teacher should introduce this year-long project. A big part of this project is creating the Table of Contents. Introduce this to the students. A day is spent in the classroom explaining the project, showing examples of what a table of contents should look like, etc.

- Day 2 – Student practice in lab

In the next couple of days the class is brought into the lab and they are taught how to create a word document and hyperlink to other places in the same document. The finished result will be one word document. Each section of the document will begin at top of new page. The students will be taught how to insert a bookmark into MS Word and then hyperlink to that book mark. They will be given a chance to practice in the lab with bookmarks and hyperlinks.

- Day 3 – Teach equation editor, students practice

Along with knowing how to create hyperlinks, the students will also need to know how to create equations. There on line help will contain many equations in their explanations and sample problems. After learning hyperlinks, spend a day explaining the MS equation editor. To use MS Equation editor go to the **Insert** pull down menu and select **Object**. Under the **Create New** tab select *Microsoft Equation 3.0*. This will bring up the Equation Editor Toolbar and a picture box in your document to create the equation. The toolbar is pretty self explanatory and after a few minutes of playing with the options you should understand it well enough to create simple equations. Give the students an opportunity to practice creating equations in MS equation editor and inserting them into MS word documents

### **Phase II - First Entry into the Table of Contents**

- Day 1 – Writing rough draft of 1<sup>st</sup> topic

Once the first topic has been covered in Algebra the students will create the first entry in their on-line help. Before anything is entered into the computer they will write a draft in their math notebooks. They should have:

- Teacher’s description of the type of problem

- Their own explanation of the problem (in their own words)

Sample problems with explanations

Practice problems (no explanation needed for these).

Teacher will collect their notebooks and check what they have written before students go into the lab. Give feedback on their writing and give them an opportunity to edit their notes.

- Day 2 – Entering 1<sup>st</sup> topic into computer

Once the students have final versions they will create their table of contents with the first entry. In a new MS Word, they will type at the top Table of Contents, chapter and topics. At the beginning of the next page they will type their explanation, sample problems, practice problems. When they are finished the teacher will check all their work and give them a chance to edit. This is easiest if the computers are networked and you can access every computer from one place.

- Day 3 – Completing table of contents

When all their work has been checked they will then put in the hyperlinks from the Table of contents to the bookmarks for each topic.

### **Next Steps**

The above is an example of how each topic will be created in the on-line help. There will be a day of writing a rough draft and reviewed, a day in the lab to type and a last day in the lab to add hyperlinks and clean up any items in the document. Eventually, the teacher will not have to check the rough drafts before entering, you will only have to check the work once it has been typed in (not in their notebooks) and give them feedback on this work with an opportunity to edit. However, at the beginning it is important to check the work in as many places as possible. Once they have the system down this will not be necessary. They will keep everything in their notebooks. We will go into the lab at the end of each chapter for the students to update their on line help.

At the end of the year I will take their finished document and burn it onto a CD for them to keep.

### **Desired Outcomes:**

Algebra I has the highest number of failures than any other math class. We need to think of new and innovative ways for students to learn. When students are able to write and express a topic more clearly, they have a much better chance of success in that topic. With the computer generation today, no matter what you do, if it is done on a computer you have a much better chance of success with the student. By having students keep their notes electronically we are trying to take advantage of this. The goal of the project is to

have students express themselves in a more thoughtful way. When students practice writing clearly and accurately they will begin to speak clearly and accurately. The students will do a much better job when they come to the board to explain problems or answer questions. When students are able to think and express themselves clearly this will translate into higher tests scores and a more successful math student.

### Scoring Rubric

This rubric will be applied after every entry the student makes into their on-line help guide

	<b>Beginning</b> 1	<b>Developing</b> 2	<b>Accomplished</b> 3	<b>Exemplary</b> 4	<b>Score</b>
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<b>Teachers Explanation</b>	Has entered a few inaccurate comments.	Has entered some of the teacher's explanation, but has gaps.	Has entered all of the teacher's explanation, with a few errors.	Has entered all of the teachers explanation, with no errors.	
<b>Students Explanation</b>	Has entered a few inaccurate comments.	Has entered some explanation, but many gaps exist	Has entered a complete description, but more detail could be used	Has entered a complete description, with great detail	
<b>Sample Problems</b>	Has entered a few sample problems, missing explanations	Has entered a few sample problems, with limited explanations.	Has entered several sample problems, a little more detailed explanation could be used	Has entered several sample problems with detailed explanations	
<b>Practice Problems</b>	Has entered a few sample problems, missing answers	Has entered a few sample problems, with limited answers.	Has entered several sample problems, with answers containing a few errors.	Has entered several sample problems, with all accurate answers	

(Example of Table of Contents main page)

## Algebra on Line Help

### Ch 3 – Solving Equations and Problems

- 3.1 [Transforming Equations: Addition and Subtraction](#)
- 3.2 [Transforming Equations: Multiplication and Division](#)
- 3.3 [Using Several Transformations](#)

- 3.4 [Using Equations to Solve Problems](#)
- 3.5 [Equations with the Variable on Both Sides](#)
- 3.6 [Problem Solving: Using Charts](#)
- 3.7 [Cost, Income, and Value Problems](#)

## Ch 4 – Polynomials

- 4.1 [Exponents](#)
- 4.2 [Adding and Subtracting Polynomials](#)

(If you were to click on: **4.2 Adding a Subtracting Polynomial** in would bring you to this page of the document)

### 4.2 Adding and Subtracting Polynomials

[Teachers Explanation](#)

[Students Explanation \(in your own words\)](#)

[Sample Problems](#)

[Practice Problems](#)

## Teacher Explanation

Each of the following expressions is a monomial:  $14$ ,  $x$ ,  $\frac{2}{3}r$ ,  $-6x^2y$ . A sum of monomials

is called a polynomial. A polynomial such as  $x^2 + (-4x) + (-5)$  is usually written as  $x^2 - 4x - 5$ . Some polynomials have special names like Binomials and Trinomials. A polynomial is simplified, or in simplest form, when not two of its terms are similar. You may use the distributive property to add similar terms. You may find it helpful at first to copy the polynomial and underline similar terms.

When we solve systems by graphing....

## Students Explanation

I look for "like terms" If a polynomial has any of these then I can add them together to make the polynomial smaller. Once I have added all the like terms then I have simplified the polynomial.

## Sample problems

Simplify:  $-6x^3 + 3x^2 + x^2 + 7x^3 - 5$

Solution:  $\underline{-6x^3} + \underline{3x^2} + \underline{x^2} + \underline{7x^3} - 5$

*The like terms have the same number of lines underneath.*

*They can be added*

$$(-6 + 7)x^3 + (3 + 1)x^2 - 5$$

*The coefficient for each like term is added.*

$$1x^3 + 4x^2 - 5 = x^3 + 4x^2 - 5 \quad \text{answer}$$

## Practice Problems

Simplify each polynomial

a.  $6x^2 - 15x + 22 - 14x^2 + 8$

b.  $8x + 19x - 8x^2 + 20x$

c.  $6y + 20x + 10y - 8$

**ans:**  $-8x^2 - 15x + 30$

**ans:**  $47x - 8x^2$