**Hot Hooks**

**What is a Hook?**

A hook, or more commonly known as an anticipatory set, is an activity that focuses the students' attention, provides a brief practice and/or develops a readiness for the instruction that follows. It is the attention getter of the lesson. The hook also connects the students’ past learning to the new material.

**Why should we use Hooks?**

Are you tired of the same old, same old, day after day? Well, how do you think your students feel in your classroom? They do the same old drill and kill day after day. Also, how many times has a student ever said to you, “When will I ever use this?” A hook is how we can put an end to this unsettling question that has plagued math teachers for ages. If you use a hook, you will be either connecting it to their lives through an entertaining word problem or activity, and/or making it fun through a hands-on activity. Sometimes the students will be so engaged they forget that they are actually getting educated at the time being. If you do are able to use hooks, then you just might be able to take down your beloved “Real World Applications of Math” poster that is so proudly hanging on the wall of your classroom.

**How to make a successful Hook?**

 To make a successful hook, is much like making a cake; we need to throw in all the necessary ingredients so that it turns out right. To make a hook, we should involve most or all of the following ingredients:

* **Make it a hands-on activity**

We all know that learning is much more fun when it’s hands-on. When we say hands-on, we don’t mean racing to copy the notes either. The activity should involve getting the students moving, or getting the students using various manipulatives to demonstrate an idea.

* **Involve the students/connect the material to their lives.**

If the students are not involved, they tend to lose interest and stop paying attention. How can we fix this? The most obvious solution would probably be to actually involve them! Students can’t get enough of hearing about their interests, or even seeing themselves or fellow classmates in a word problem. If you’re creating a word problem, try to either connect it to their lives by including what they enjoy or throw a few of their names in to get their attention.

* **Use interesting examples/current trends**

We don’t want to use the same old painting a fence word problem that we’ve done every year since middle school. How many times do you need to paint a fence? As we said before, the hook is meant to be an attention getter. If we use more current examples, we can better grip the attention of the students. Incorporating current celebrities/stars is a great way to do this.

***The following hooks are some of our favorites that could easily be brought into a Middle or High School mathematics classroom.***

**The Rise and Fall of Hannah Montana**

**Introduction:**

Are your students having trouble solving quadratic equations due to lack of motivation? Here is a real world application of quadratic equations with a comical story involving what’s popular among today’s students. You can have your students figure out the problem any way that you want, but we used the two methods of solving graphically and by factoring.

**Standards:**

* A.CN.1 Understand and make connections among multiple representations of the same mathematical idea.
* A.R.7 Use mathematics to show and understand social phenomena (e.g., determine profit from student and adult ticket sales).
* A.A.20 Factor algebraic expressions completely, including trinomials with a lead coefficient of one (after factoring a GCF).
* A.G.8 Find the roots of a parabolic function graphically (Note*: Only quadratic* *equations with integral solutions.).*
* A2.PS.2 Recognize and understand equivalent representations of a problem situation or a mathematical concept.

**Hook:**

For years now Disney has been exploiting young and untalented actors and actresses. We have seen many untalented stars come out of the Disney breeding labs such as: The Jonas Brothers, Hannah Montana, and Miley Cyrus. Out of those 3 very young and untalented stars one got exploited particularly well with our nation’s younger audience. This is the story of Hannah Montana. After the first season of Hannah Montana ratings rocketed for her show. It hit its max at season 4 and has been on a steady decrease in popularity ever since. The shows trend in popularity can be shown with the equation y =-x2 +8x-7, where **x** is the season the show is in, and **y** is viewers (in millions). Find what season it will be when all of Hannah’s fans are gone, and her reign of terror is finally put to an end.

**Solutions:** **Graphical Representation**



Viewers (In Millions)

Answer: We see that the show will finally end in its 7th and final season (We know that 1 is not an acceptable answer because it already had at least 4 seasons).

X=1

X=7

Season

$$\frac{PLAY}{DOUGH}+\frac{KITCHEN}{SCALE}= ?$$

**Introduction:**

 Want a cool new way to add and visualize fractions? Thanks to play dough and a simple kitchen scale, it becomes a lot easier. You can give the students a hands on opportunity to make fractions and then they can visually see them being added together.

**Standards:**

* 8.CM.4 Share organized mathematical ideas through the manipulation of objects, numerical tables, drawings, pictures, charts, graphs, tables, diagrams, models and symbols in written and verbal form.
* 8.R.2 Explain, describe, and defend mathematical ideas using representations
* 8.A.5 Use physical models to perform operations with polynomials

**Materials:**

* 20+ Cans of play dough
* A few kitchen scale with new labels (see instructions)
* Plastic knives

**Directions:**

1. Split up your students into teams of two
2. Give each group two plastic knives and two canisters of play dough that are different colors.
3. Write two fractions, being added together, on the board.
4. Have them represent each fraction using the two colors of play dough and then add them together.
5. Have them take turns using the scales to see who gets the closest to the correct answer.
6. Repeat steps 3-5 until you feel the students have a better understanding. You can even add in mixed numbers if you provide enough play dough.

**How to make the new labels for the scale**

 First get a kitchen scale that is not digital. Take one canister worth of play dough and put it on the scale. Instead of the scale having labels at the lbs marks, you are going to put a new label over top of the default ones to show where one canister’s weight is and put a 1. Do this for all of the numbers and add in the fractional parts for 1/3, 2/3, 1/4, 1/2, 3/4 and whatever fractions you will be using with your examples. You now have a play dough scale.

**Homemade play dough recipe**

4 cups flour
1/4 cup powdered tempera
1/4 cup salt
1 1/2 cups water
1 tablespoon oil

Mix together flour, powdered paint and salt. Mix water and oil, and food coloring if desired. Gradually stir the water and oil mix into the flour mix. Knead the play dough as you add the liquid. Add more water if too stiff, more flour if sticky. Add food coloring as desired.

Food coloring

**You too, can be a Mathemagician**

**Introduction:**

The idea behind this “interactive hook” is to help make students believe they are not doing math but simply a magic trick. The real trick though, is getting the students hooked to the idea of how to perform the trick themselves. This is a great trick that will help introduce students to multivariable equations in integrated algebra, but is easy enough to be introduced to students at the middle school grade level.

**Standards:**

* A.A.4 Translate verbal sentences into mathematical equations or inequalities
* A.A.5 Write algebraic equations or inequalities that represent a situation
* A.A.7 Analyze and solve verbal problems whose solution requires solving systems of linear equations in two variables

**Materials:**

* A deck of cards with 10’s, Jack’s, Queen’s, and King’s removed; this trick will only work with a card equaling a single digit number (Note that Aces are ones)
* Calculator if necessary

**Directions:**

As class starts and the students are all settled in, sell the idea that you, the teacher, have magical powers and that you have the ability to read your students minds. Pull out a deck of cards, select a student at random, and demonstrate on an overhead/Elmo.

**Steps:**

1. Choose a student at random and have him/her pick one card from anywhere in the deck and place it face up on the overhead for the entire class to see. (Except for the teacher)
2. Once all the students have seen the card, ask the chosen student to multiply that number by 2.
3. Now have the student add their new number by 5.
4. Finally have the student multiply the newest number by 5 and tell them to make sure that they remember their number or write it down after all the calculations.
5. Now have the student pick another card at random from the deck, and once again have them show the entire class, without letting the teacher see.
6. Now have the student take their new card and add it to the old number they were supposed to remember.
7. With this total number, the teacher will subtract 25 from the value in their head and then they will be able to see that the number in the tens place is represented by their first card and the number in the ones place is represented by the second card.

**Was it Magic?**

What students don’t realize is that everything that was done to find what cards they had was all done through math. The mathematical process is represented below.

The first card will be represented by the variable $ x$.

$$x$$

$$2x$$

$$2x+5$$

$$5\left(2x+5\right)$$

$$10x+25$$

The second card will be represented by$ y$**.**

$$10x+25+y$$

$$10x+25+y-25$$

$$10x+y$$

Since we know that the deck only contains single digit numbers we see that in our 10’s place we will have our x and in our 1’s place we will have our y.

**Example:**

Our first card is a 6.

$$6$$

$$2\left(6\right)=12$$

$$12+5=17$$

$$17\left(5\right)= 85$$

Our second card is a 4.

$$85+4=89$$

$$89-25=64$$

The first card was a 6 and the second card was a 4!

**Fun Sites to help make your classes more fun!**

<http://nlvm.usu.edu/>

<http://illuminations.nctm.org/>

<http://www2.scholastic.com/browse/learn.jsp>

<http://www.cut-the-knot.org/Curriculum/index.shtml>

<http://www.shodor.org/interactivate/lessons/>