Teaching Mathematics for Ab-so-lute Engagement!

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“Yes, they check their cellphones during class, but think about how long you can stand in line without looking at your phone. Now imagine being used to that technology your whole life and having to sit through Algebra.”

~Scott Hess, Senior V.P. of Human Intelligence for SparksSMG

Motivation & Interest Are Important!

- Motivation is learned
- Motivation is adaptive
- Motivation is “in the moment”
- Motivation is social
- Creates long-term attitudes
- Success matters

Allow Students to Choose Their Own Challenge

• Add, Multiply, Subtract or Divide to get to 24

• May use any operation any number of times

• May use each number or expression only once

While still allowing them to experience success
Show Your Work!

1.
2.
3.
4.

Yellow Level

1.
2.
3.
4.

Red Level

1.
2.
3.
4.

Treat errors as a learning opportunity
Solving Equations Using Hands-On® Equations

- $4x + 5 = 2x + 13$
  
  $-2x$ $-2x$

- $2x + 5 = 13$
  
  $-5$ $-5$

- $2x = 8$

- $x = 4$
Solving Equations for Success

• Groups of two to three students

• Each step of each equation is written out and solved on paper

• Teacher cuts out steps of equations and puts strips (steps) in an envelope; teacher gives each group an envelope that contains one equation to solve

• Pairs solve the equation by putting each step in order and write out steps on paper in 5 minutes or less

• Groups rotate problems at the end of five minutes and turn in written solutions when finished
Make it Engaging!
The Radian Walk
Teaching the Unit Circle using a game and Inside/Outside Circle
Developing Interest and Motivation through pictures

Teaching Fractions

The concepts of partitioning and iteration can be seen and developed.
Teaching about Parabolas
Rotation and Symmetry
Use your “place-based” curriculum
Problem Context

- Can be generated by student or teacher
- Teachers can give CHOICES of context
- Increases understanding and interest
How can you motivate students to do homework?

What is valued is taught and graded/assessed

Less is more - 10 problems MAX!

Spiral it

Make students responsible for doing it:
  - Use Think-Pair-Share
  - Students put problems on the board
  - Give homework quizzes, worth 20 points each
Homework Example

- P. 263-4: 36, 42
- P. 270; 51, 56
- P. 309; 19, 20, 21
- P. 369; 12, 18, 19

P. 264, #42

P. 309, #20

p. 270, #57

p. 369, #18
Beliefs influence action. The action taken includes the direction to specific goals.

Self-efficacy beliefs were found to impact the type of goal, whether mastery or performance, achievement and causal attribution

Hard work leads to success- Ability is not fixed!

Students with performance goals are concerned with proving their ability, while students with mastery goals are concerned with improving their ability (Dweck and Legget, 1988).
What Is Self-Efficacy? Why is It important?

Judgments people make about their ability to do specific things

Self-concept addresses the question: Am I able?
Self-efficacy addresses the question: Can I do it?

People are not born with low self-efficacy, they are created!
Goals
(adapted from Ames and Archer [1988])

<table>
<thead>
<tr>
<th>Climate dimension</th>
<th>Mastery Goal</th>
<th>Performance Goal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Success defined as...</td>
<td>Improvement, progress</td>
<td>High grades, high normative</td>
</tr>
<tr>
<td>Achievement Goal Analysis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Value placed on...</td>
<td>Effort/learning</td>
<td>Normatively high ability</td>
</tr>
<tr>
<td>Reasons for satisfaction...</td>
<td>Working hard, challenge</td>
<td>Doing better than others</td>
</tr>
<tr>
<td>Teacher oriented toward...</td>
<td>How students are learning</td>
<td>How students are performing</td>
</tr>
<tr>
<td>View of errors/ mistakes...</td>
<td>Part of learning</td>
<td>Anxiety eliciting</td>
</tr>
<tr>
<td>Focus of attention...</td>
<td>Process of learning</td>
<td>Performance to others</td>
</tr>
<tr>
<td>Reasons for effort...</td>
<td>Learning something new</td>
<td>High grades, performing better than others</td>
</tr>
<tr>
<td>Evaluation criteria...</td>
<td>Absolute, progress</td>
<td>Normative</td>
</tr>
</tbody>
</table>
What Is Our job?

- Focus on effort and help them set goals
- Their difficulty is not necessarily related to their ability
- Avoid deliberately making students fail
- Arrange for students to experience success
- Tell them that they are expected to make mistakes and that’s why they have a pencil with an eraser.
- Failure is a learning experience and back that up with more opportunities to experience success
References


Hands-On® Equations. www.borenson.com

References


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