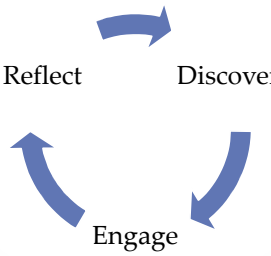
Discovery & Reflection in Developmental Mathematics

NADE – 2016

George Woodbury
College of the Sequoias – Visalia, CA
georgew@cos.edu

Cycles of Learning



Discover

Discover

- Can Developmental Math students really discover this material?
- I'm not looking for my students to discover independently.
- I do want my students to participate in the discovery.

Discover

- As I teach I try to lead the discovery.
- Involve students
- Collaborate, not dictate
- Help students to develop that "little voice"

Self Discovery

The Reversal

- Multiply

$(x+8)(x+5)$

$(x-6)(x-9)$

$(x+2)(x-6)$

$(x+10)(x-4)$

- Multiply

$(x+8)(x+5) = x^2+13x+40$

$(x-6)(x-9) = x^2-15x+54$

$(x+2)(x-6) = x^2-4x-12$

$(x+10)(x-4) = x^2+6x-40$

- What did I multiply to get an answer of

$x^2+15x+54$

- After covering …

$2x^5(3x^4-7x^3+5)$

- Ask …

$3x^2(?) = 6x^4+9x^3-33x^2$

$?(x^2-5x-12) = 8x^5-40x^4-96x^3$

$?(?) = 6x^4+15x^3+27x^2$

- After covering …

Graphing Square Root Functions

- Ask …

Here's a graph. What's the function?

- After covering …

Solving Quadratic Equations By Factoring

- Ask …

Here's a solution set.
What's the equation?

- After covering …

Your Turn

- Ask …

Self Discovery

"Wolfram | Alpha" Style

- Problem: Simplify $\dfrac{x^2+10x+21}{x^2+5x-14}$
- Answer: $\dfrac{x+3}{x-2}$

- Problem: Simplify $\dfrac{x^2+8x+15}{x^2-x-12}\cdot\dfrac{x^2-16}{x^2+12x+35}$
- Answer: $\dfrac{x+4}{x+7}$

- Problem: Simplify $\dfrac{8x^7-28x^5+4x^2}{4x^2}$
- Answer: $2x^5-7x^3+1$

- Problem:

Your Turn

- Answer:

Self Discovery

Properties of Graphs
Desmos.com

Graphing Parabolas

Self Discovery

Properties of Graphs
Desmos.com

Translations (h & k)

Self Discovery

Flipping the Classroom

Simplifying Radical Expressions

Self Discovery

Flipping the Classroom

Graphing Absolute Value Functions

Engage

Reflect

Reflect

- Give students a chance to …
- Summarize what we have done

Reflect

- Give students a chance to …
- Explain concepts in their own words

Reflect

- Give students a chance to …
- Compare (and contrast) current topics to previous topics

Reflect

- Give students a chance to …
- Think about the "big picture"

Reflect - Example

- Compare and contrast the process for solving a linear equation with the process for solving a simple linear inequality.

Reflect - Example

- Which technique would be most efficient for graphing the following lines – graphing by intercepts or graphing by slope? Why?

$$8x + 5y = 80 \qquad y = \frac{3}{4}x - 5$$

Reflect - Example

- Give an example of a system of linear equations that would be better solved by using the substitution method than the elimination method.
- Give an example of a system of linear equations that would be better solved by using the elimination method than the substitution method.

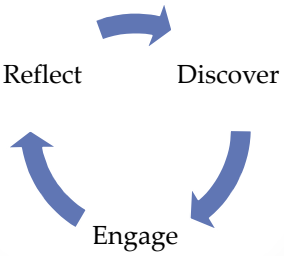
Reflect - Example

- Compare the process of finding the intercepts of a parabola to finding the intercepts of a line.

Reflect – In Class

- Reserve the last 5 minutes of class to …
- Summarize that day's materials
- Ask reflective questions
- Ask students to share their observations

Cycles of Learning



Summary

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True Learning

- I believe that true learning only occurs when students are allowed to participate in the discovery of procedures and problem solving strategies, rather than being handed a recipe of steps to follow.

Active Learning

- Students learn more when they are actively engaged and participating in the process, taking responsibility for their own learning.

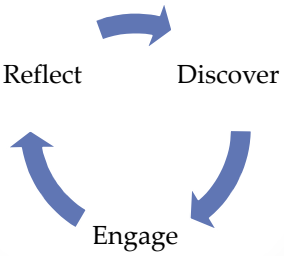
Reflection

- I believe that students must be constantly encouraged to reflect upon what they have learned.

Reflection

- By understanding the differences and commonalities between the current concept and previous concepts helps students develop a true understanding of the material.

Cycles of Learning



Feedback

Questions? Comments?

georgew@cos.edu
@georgewoodbury on Twitter
georgewoodbury.com