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Fact or Concept? Quelling the Math Wars

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LET'S LEARN TO COUNT

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Alphabitia Numbers

	A	B	C	D	E	F
XA	AA	BA	CA	DA	EA	FA
XB	AB	BB	CB	DB	EB	FB
XC	AC	BC	CC	DC	EC	FC
XD	AD	BD	CD	DD	ED	FD
XE	AE	BE	CE	DE	EE	FE
XF	AF	BF	CF	DF	EF	FF
?						

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XD	AD	BD	CD	DD	ED	FD
XE	AE	BE	CE	DE	EE	FE
XF	AF	BF	CF	DF	EF	FF
XXA	AXA	BXA	CXA	DXA	EXA	FXA

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OK, LET'S COUNT!

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Let's Try Adding

Add these	Answers
• A + B =	• C
• C + D =	• XA
• A + E =	• F
• AA + C =	• DA

QUESTION

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- Which is more important in the previous adding activity:
 - Knowing the alphabitalia “numbers”?
 - Knowing the amount that the alphabitalia number stands for?

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The “MATH WARS”

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- <http://www.mathematicallycorrect.com/>
- <http://www.mathematicallysane.com/home.asp>
- <http://www.vormath.info/WordPress1/>
- <http://www.learnnc.org/lp/editions/pcmath/1>
- <http://ios.org/showcontent.aspx?ct=245&h=53>

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The Problem

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- Much of the current debate, however, has centered on the way in which mathematics is being taught in many classrooms in this country. On one side of the conflict are the traditionalist who claim that students should learn math by memorizing and practicing basic facts and skills. On the other side are proponents of what is often called “whole math,” who deride the old “kill and drill” methods of education, claiming that children learn best when they discover, understand, and integrate knowledge through independent exploration.

Starr, L. (2002). Math Wars! *Education World*. http://www.education-world.com/a_curr/curr071.shtml

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A Mathematician

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- By all means liven up the textbooks, make the subject engaging, include interesting problems, but don’t give up on basic skills! Conceptual understanding can and must coexist with computational facility – we do not *need* to choose between them!

<http://www.math.harvard.edu/~schmid/articles/wars.html>

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Underlying questions

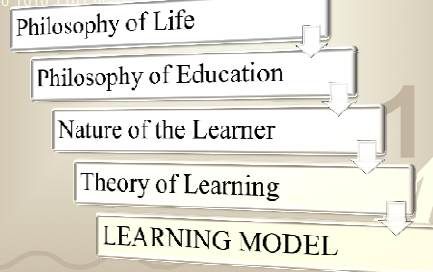
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- What is mathematics? Or at least, what do we believe it is?
- How do children best learn mathematics?
- Do we teach facts or do we teach concepts?

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A flow to help answer

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My Answers

- There is something to be known and we have the ability to know.
- We are created in God's image – therefore we can create too.
- All are capable of learning – even mathematics.
- How I learn is reflective of how God created me.
- The WHOLE person must learn.

Problems...

1. We don't know the content or mathematical concepts well enough.
2. Parents have never learned mathematics in this way – therefore they cannot help their children.
3. It looks different!
4. Other problems you can think of?

Solutions

1. Start with the concept.
2. Develop the skill from the concept
3. PRACTICE the skill
4. "Closure"

Example: Basic Facts

SKILL – "Automaticity" of fact

CONCEPT – What does it mean when we

ADD: Joining, combining, "in all"

SUBTRACT: "take away", remove, compare

MULTIPLY: total amount when I'm given number of groups, amount in a group. Array, area

DIVIDE: total amount broken into groups of same size, how many groups? OR total amount broken into a set number of groups, how many in each group?

Necessary pre-requisite understanding is place value!


Example: Fractions

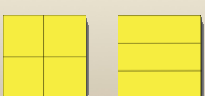
- CONCEPT: What does a fraction represent? How does it represent it?
 - Equivalent Fractions
 - Which fraction is bigger?
- SKILL: Comparing fractions, operating on fractions

Example: FRACTIONS

- WORKSHEET #1
 - 10 pairs of fractions
 - Each pair has the same numerator
 - DRAW each fraction and compare – which is the bigger fraction
 - Make a generalization that starts "when fractions have the same numerator, the one with.... Is the larger fraction BECAUSE..."

Which is bigger?

$\frac{1}{2}$ or $\frac{1}{4}$ 

$\frac{2}{4}$ or $\frac{2}{3}$ 

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Example: FRACTIONS

- WORKSHEET #2
 - 10 pairs of fractions
 - Each pair has the same denominator
 - DRAW each fraction and compare – which is the bigger fraction
 - Make a generalization that starts “when fractions have the same denominator, the one with.... Is the larger fraction BECAUSE...”

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Example: FRACTIONS

- WORKSHEET #3
 - 10 pairs of fractions
 - Each pair has a different numerator/denominator
 - DRAW each fraction and compare – which is the bigger fraction
 - Make a generalization that starts “when fractions have different numerators and denominators, the larger fraction will be BECAUSE...”

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Example: Geometry

- CONCEPT: What *is* area? When I find the area, what is it I’m finding?
- SKILL – actually find the area of a figure.

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Example: Geometry

- Cardboard pieces that are rectangular – all same size. Put students into groups.
- Give each group ONE rectangle. They must figure out how many of their rectangles it will take to cover a desk top.
- Record their numbers. Have groups share how they found the area. Why did we multiply? Is the corner piece counted twice?

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Example: Geometry

- Use an L-shaped figure. Have students find as MANY different ways to find the area of this shape.
- Record the different ways. Categorize the different ways.

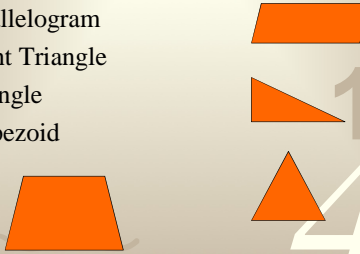


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Example: Geometry

- Parallelogram
- Right Triangle
- Triangle
- Trapezoid



The slide displays four orange geometric shapes: a parallelogram, a right-angled triangle, a general triangle, and a trapezoid. The background features a faint binary sequence and large, semi-transparent numbers 1, 2, 4, and 5.

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QUESTIONS/ COMMENTS



The slide features the text 'QUESTIONS/ COMMENTS' in a bold, black font. The background includes a wavy line and large, semi-transparent numbers 1, 2, 4, and 5, matching the design of the first slide.