Good Evening! I am so glad that you are here. Please find a seat, meet your neighbors, then discuss the following questions:

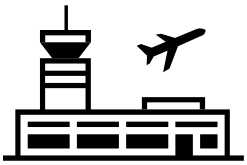
- Think of a time when school was a good fit for you. Why do you think that was so?

- Now think of a time when school was NOT a good fit. What were the reasons?

The success of education depends on adapting teaching to individual differences among learners.

Yuezheng, in fourth century B.C. Chinese treatise, Xue Ji

(Snow, 1982)



Schools are like airport hubs; student passengers arrive from many different backgrounds for widely divergent destinations. Their particular takeoffs into adulthood will demand different flight plans.

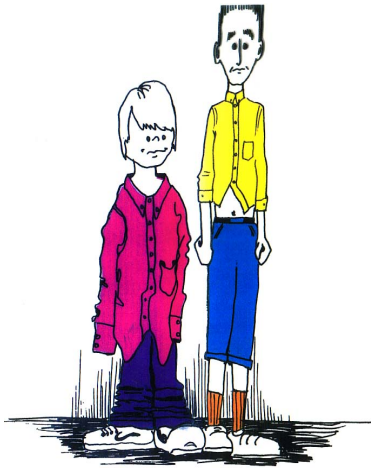
Mel Levine, 2002

Differentiation

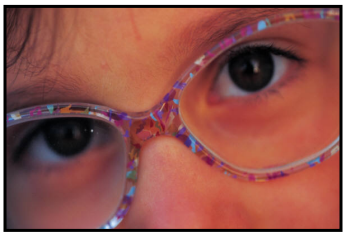
The methods by which teachers manage a range of learners in a heterogeneous classroom. In general, all learners are not at the same learning place at the same time. Therefore, differentiation encourages different things happening for different kids at different times.

Because there are many different things happening in a DI classroom, no one assignment defines "normal," and no one "sticks out." The teacher thinks and plans in terms of "multiple avenues to learning" for varied needs, rather than in terms of "normal" and "different."

-Carol Ann Tomlinson



What is differentiation?



Differentiation is classroom practice that looks eyeball to eyeball with the reality that kids differ, and the most effective teachers do ***whatever it takes*** *to hook the whole range of kids on learning.*

Tomlinson (2001)

What is Differentiated Instruction?

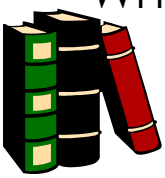
It's a way of thinking about the classroom with the goals of honoring each student's learning needs and maximizing each student's learning capacity while developing a solid community of learners.

What Differentiated Instruction…

IS NOT

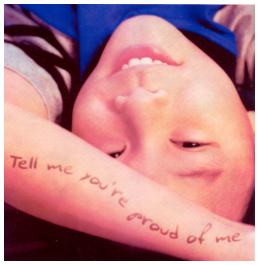
- Individualized instruction
- Acceleration or remediation
- Just another way to provide homogenous instruction
- Just modifying grading systems and reducing work loads
- More work for the "good" students and less and different for the "poor" students

What Differentiated Instruction…



IS

- Differentiated instruction is more QUALITATIVE than quantitative.
- Differentiated instruction provides MULTIPLE approaches to content, process, and product.
- Differentiated instruction is STUDENT CENTERED.
- Differentiated instruction is a BLEND of whole class, small group, and individual instruction.
- Differentiated instruction is for every student's best learning.



Daniel, age 10

If we had to learn exactly alike, we'd quit being unique. People wouldn't develop their special qualities.

How Do You Differentiate?

Readiness

Acknowledges a student's entry point into learning. Factors are prior knowledge, speed of learning new concepts, independence and home factors.

Interest

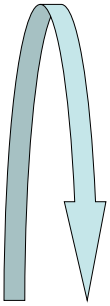
Acknowledges that students have different motivational factors. Interest differentiation can be connecting students' interests with content, but also by giving students voice and choice.

Learning Profile

Activities can be designed to access different ways for making sense. Some structures will be more natural for learning than others for students, and this can change based on topic and circumstances.

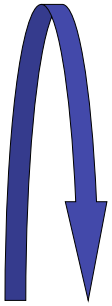
How Do You Differentiate and Why?

Readiness



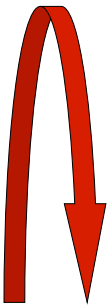
Appropriate Challenge

Interest



Motivation

Learning Profile



Efficiency

How Do You Differentiate?

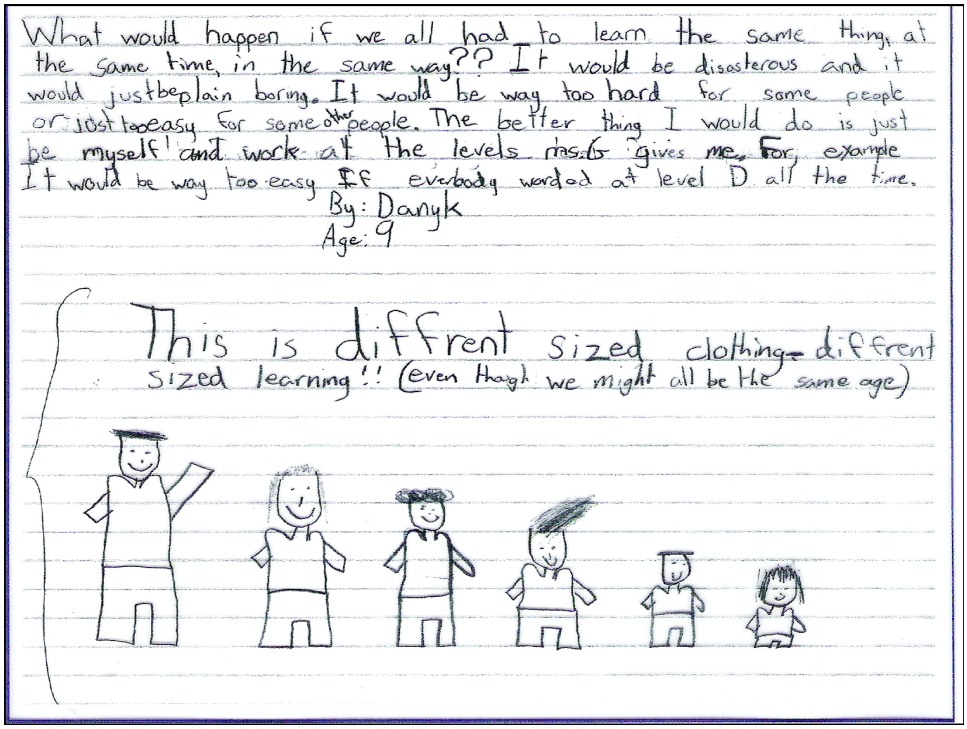
Readiness

Acknowledges a student's entry point into learning. Factors are prior knowledge, speed of learning new concepts, independence and home factors.

MYTH	REALITY
If you are good in math, you should be accelerated early and quickly.	Research indicates that accelerated students often have gaps in learning, and do not continue with higher levels of math in high school and/or college.

Learning Zones

Too Easy	Just Right	Too Hard
•	•	•
•	•	•
•	•	•
•	• 	•
•	•	•



What would happen if we all had to learn the same thing, at the same time, in the same way?? It would be disasterous and it would justbeplain boring. It would be way too hard for some people or jostteeasy for some other people. The better thing I would do is just be myself! and work at the levels that gives me. For example It would be way too easy if everbody wordod at level D all the time.

By: Danyk

Age: 9

This is diffrent sized clothing- diffrent sized learning!! (even thagh we might all be the same age)

WHICH ONE DOES NOT BELONG AND WHY?

8 4 3 2

Kindergarten Counting

Task 1: Find a way to count & show how many people are in our class today. How did you get your answer?

Task 2: Find a way to show how many people are in our class. How many are here today? How many are absent today? How do you know?

Task 3: Find a way to show how many boys are in our class today. How many boys are absent today? How many girls are here today? How many girls are absent today? Prove you are right.

Adding Fractions

Green Group

Use Cuisinaire rods or fraction circles to model simple fraction addition problems. Begin with common denominators and work up to denominators with common factors such as 3 and 6.

Explain the pitfalls and hurrahs of adding fractions by making a picture book.

Adding Fractions

Blue Group

Manipulatives such as Cuisinaire rods and fraction circles will be available as a resource for the group. Students use factor trees and lists of multiples to find common denominators. Using this approach, pairs and triplets of fractions are rewritten using common denominators. End by adding several different problem of increasing challenge and length.

Suzie says that adding fractions is like a game: you just need to know the rules. Write game instructions explaining the rules of adding fractions.

Adding Fractions

Red Group

Use Venn diagrams to model LCMs. Explain how this process can be used to find common denominators. Use the method on more challenging addition problems.

Write a manual on how to add fractions. It must include why a common denominator is needed, and at least three different ways to find it.

How Do You Differentiate?

Interest

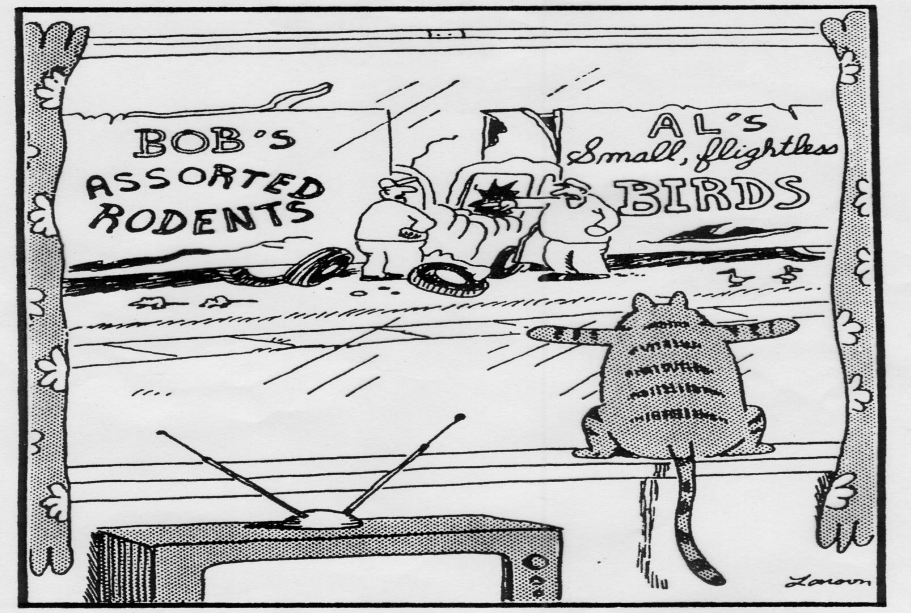
Acknowledges that students have different motivation factors. This differentiation can be connecting students' interests with content, but also by giving students voice and choice.

INTEREST

What does INTEREST mean?

Discovering interest is important; Creating interest is even more important.

Inventing Better Schools, Schlechty



Understanding an Individual's Interest is an Important Aspect of Differentiated Instruction.

BRAIN RESEARCH SHOWS THAT. . .

Eric Jensen, Teaching With the Brain in Mind, 1998

Choices	**vs.**	**Required**
content, process, product		no student voice
groups, resources environment		restricted resources
Relevant	**vs.**	**Irrelevant**
meaningful		impersonal
connected to learner		out of context
deep understanding		only to pass a test
Engaging	**vs.**	**Passive**
emotional, energetic		low interaction
hands on, learner input		lecture seatwork

EQUALS

Increased intrinsic MOTIVATION

Increased APATHY & RESENTMENT

Strategies for Addition

100 Chart:

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

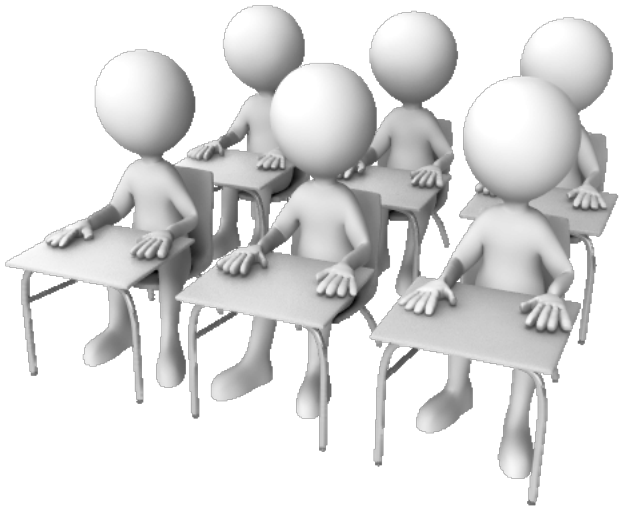
Open Number Line:

Math Problem:

Place Value:

Tally:

How Would You Like To Practice?



7 -8 + 4 2 + 3 6* (3 + 2)	3+4 5 5-1 6+2	16 4 9-7 3+9
30 15 6+ 3 8+ 7	8 9 8-4 1 + 1	12 4 3-2 4 - 1
15 6-2 15 + 7 12	2 22 18 4-7	3 6*3 8-1 9

Worksheet

Operations Worksheet

Directions: Complete each problem. Show your work as needed.

1) 8 – 4 =

2) 6 + 2 =

3) 3 + 9 =

4) 15 – 7 =

5) 6 + 5 =

6) 12 + 11 =

7) 22 – 10 =

8) 32 + 20 =

9) 15 – 4 =

10) 48 – 30 =

How Do You Differentiate?

Learning Profile

Activities can be designed to access different ways for making sense. Some structures will be more natural for learning than others for students, and this can change based on topic and circumstances.

Differentiation Using LEARNING PROFILE

- Learning profile refers to how an individual learns best - most efficiently and effectively.

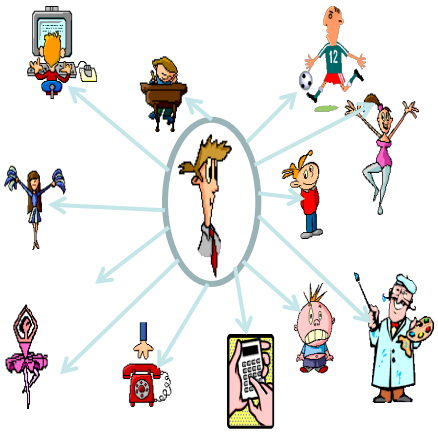
- Teachers and their students may differ in learning profile preferences.

MYTH	REALITY
Differentiation is Multiple Intelligences (or learning styles…)	**Differentiation necessarily addresses readiness, interest, & learning profile.** (Gardner's work addresses 1/4th of 1/3rd of that range.)

What Shapes Learning Profile?

- Gender
- Culture
- Learning Style
- Intelligence Preference

(& the interaction of the four elements)



Differentiation Using LEARNING PROFILE

- Learning profile refers to how an individual learns best - most efficiently and effectively.
- Teachers and their students may differ in learning profile preferences.

Understanding Number

Analytic Task

Make a number chart that shows all ways you can think of to show 5.

Practical Task

Find as many things as you can at school and at home that have something to do with 5. Share what you find with us so we can see and understand what you did.

Creative Task

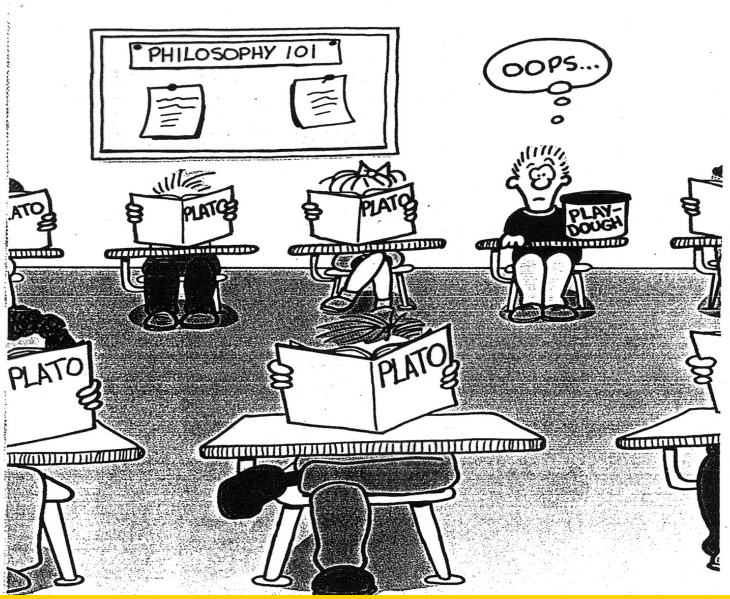
Write and/or recite a riddle poem about 5 that helps us understand the number in many, unusual, and interesting ways.

Multiplying by 3 and 6!

- Play **Multiplication Memory card game** (Kinesthetic, interpersonal).
- Make a **picture book of multiplication facts** for 3 and/or 6 (visual/spatial).
- Make up a **song** about (or of) the multiplication facts for 3 and/or 6 (musical).
- **Write a diary entry** about the 3 and 6 multiplication facts. What are they? How can you remember them? If you forget one, how could you figure it out? (Intrapersonal / verbal linguistic)
- **Write a story** that involves multiplication by 3 and 6 (verbal linguistic).
- Show as many different **models of multiplication** by 3 and 6 of which you can think. How is multiplying by 6 related to multiplying by 3? (Logical / Mathematical)

Multiplication Facts: 4's and 8's

- Visual:
  - Make two posters - one will diagram all of the 4 multiplication facts and the other diagrams the 8 multiplication facts.
- Auditory:
  - Put together a skit or newscast about multiplying by 4 and 8. Have lots of examples!
- Kinesthetic:
  - Play multiplication rummy or memory
  - Use counters to model the 4 and 8 multiplication facts. List all of the resulting equations and answers.



Understanding presumes knowledge,

Knowledge does not presume understanding!

MYTH	REALITY
The way I learned math was good enough for me, it should be good enough for my child.	We need to prepare our students for our ever-changing world. Numerical literacy is essential to succeed .

For What Are We Preparing Our Students?

What Do These Numbers Mean?

2029

65

MYTH	REALITY
Getting the right answer is enough. You don't really understand math.	As the Common Core clearly states, strong mathematicians balance procedural fluency and conceptual understanding.

One seven-year-old student's viewpoint of life at 100

If I were 100 years old

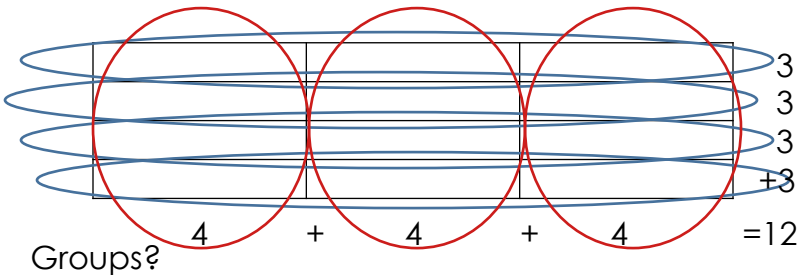
If I were 100 years old, I would go to a nursing home. I would stay there until I was dead. By the time I was 100, I would know Regrouping with Subtraction and then I would die happy.

So What Does It Mean

- To Multiply?
  - Repeated Addition (Skip Counting)
  - Groups with equal numbers of things
  - Creating Area

But… Area is the only meaning that works for all contexts.

Multiplication as Area



Repeated Addition or Skip Counting?

Area?

MYTH	REALITY
There is a right way to do math problems. I can help my students and show them the right algorithm.	Our algorithms are only standard in the US! Other algorithms make connections to future math and reveal understandings.

Algorithms Come Last!!

- Arithmetic vs. Mathematics
- In the CCSS, understandings are built around operations and properties first, including:
  - Contextual Situations
  - Multiple Representations
  - Multiple Strategies
  - "Standard Algorithm"

So, how might I multiply?

Partial Products: 34 X 18

```
      30 + 4
X     10 + 8
-------------
        32
       240
        40
       300
-------------
       612
```

So, how might I multiply?

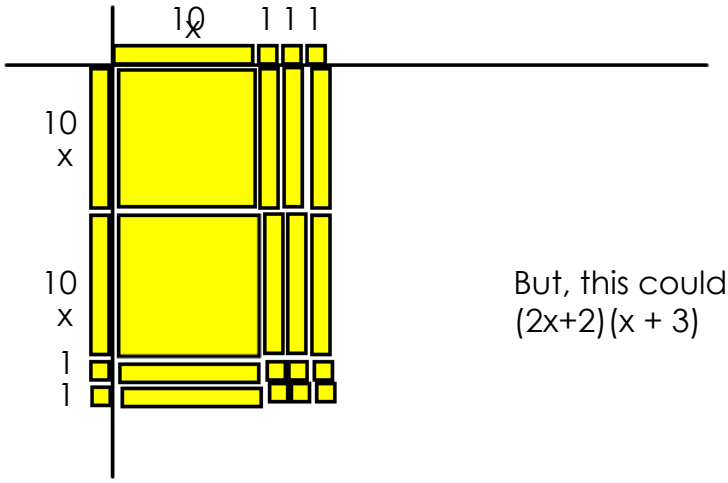
Box or Area Model: 34 X 18

	30	+	4		
10	300		40	=	340
+ 8	240		32	=	272
				+	
	540	+	72	=	612

And We Could Also…

So, how might I multiply?

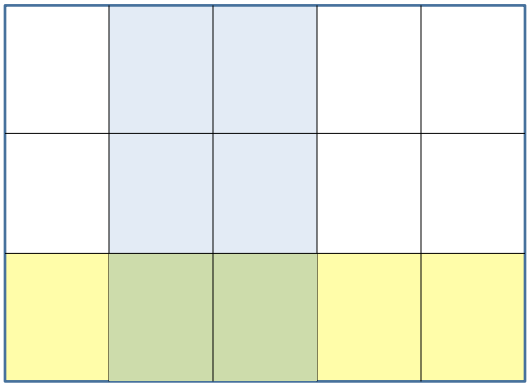
22 X 13



But, this could also be
(2x+2)(x + 3)

Multiplying Fractions with Area

1/3 X 2/5= 2/15



Learning is a journey, not an event.

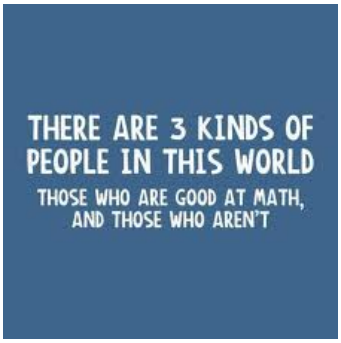
MYTH	REALITY
Our students have to take standardized tests. They will be hampered by differentiation. They need to learn analytically.	Students who learn the content well and make connections in memory perform best on standardized tests.

Students taught in their preferred learning styles demonstrated higher levels of achievement, showed more interest in the subject matter, approved of instructional methods, and wanted other subjects to be taught similarly.

Bell, L. (1986). Learning styles in the middle school classroom: Why and how. *Middle School Journal*, 18(1), 18 – 19.

So How Do I Help My Child?

What determines being "good" at math?



MYTH	REALITY
You are good at math if you get the right answers.	It is important to get the right answers. It is more important to understand, be able to explain, use many representations, and problem solve.

60

MYTH	REALITY
You are either born good at math, or you aren't.	There is no math gene! Effort is the difference maker when it comes to success in math.

The Predictive Power of Mindset – Carol Dweck

Fixed	Growth
• Success comes from being smart • Genetics, environment determine what we can do • Some kids are smart—some aren't • Teachers can't override students' past experiences	•Success comes from effort •With hard work, most students can do most things •Teachers can override students' past experiences •A key role of the teacher is to set high goals, provide high support and ensure student focus—to find the thing that makes school work for a student

So How Do I Help My Child?

- Encourage effort, perseverance and a growth mindset.
- There is no math gene… don't give an excuse to not try.
- Point out the everyday math at home, and have them help (cooking, measuring with tape measures, money, etc.)
- Ask to see classwork
- Please do not show the "standard way" before it is time.

So How Do I Help My Child?