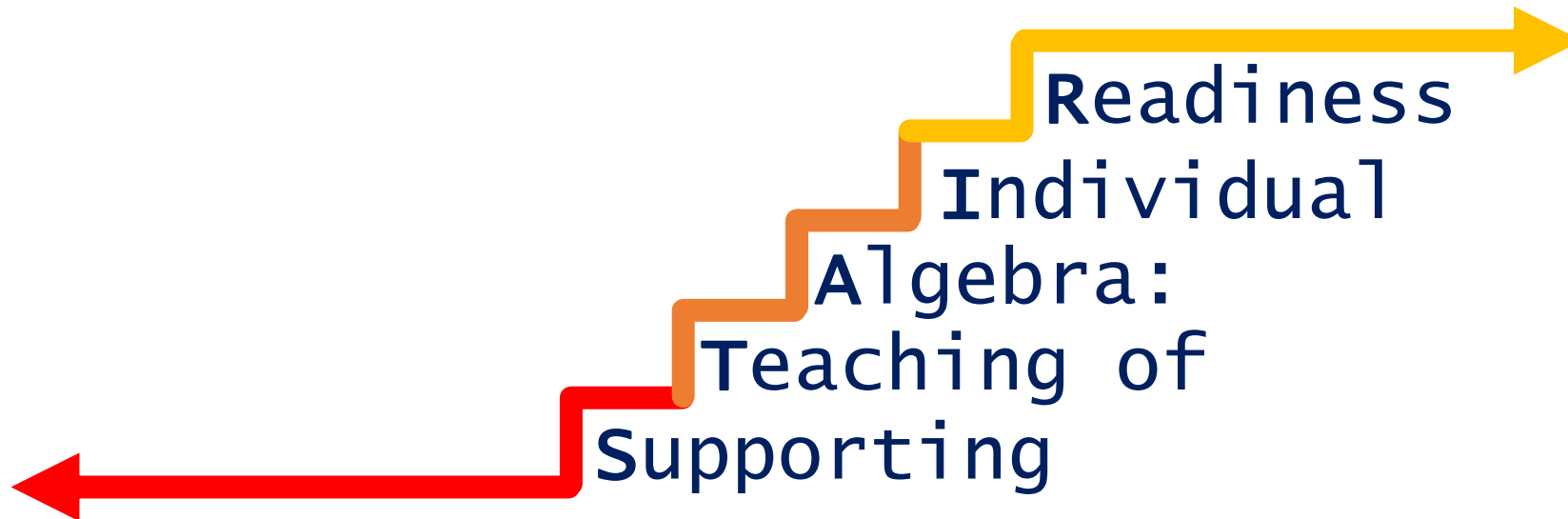


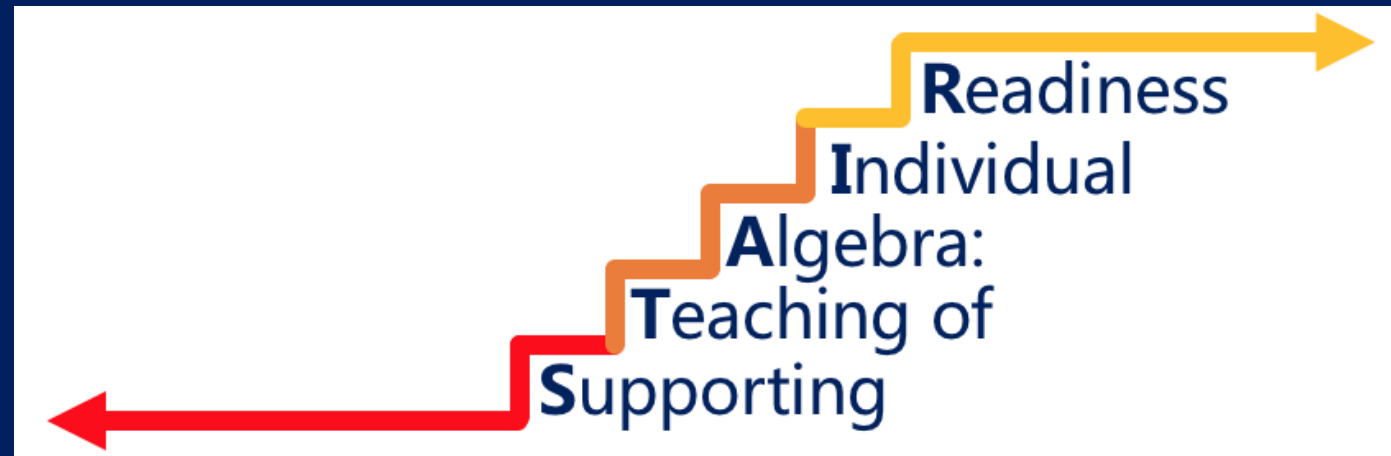
# Project STAIR

Introduction to Data-Based Individualization  
and Assessment

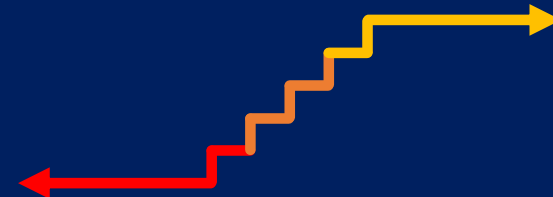
Erica Lembke and Jiyung Hwang,  
University of Missouri



# Project STAIR

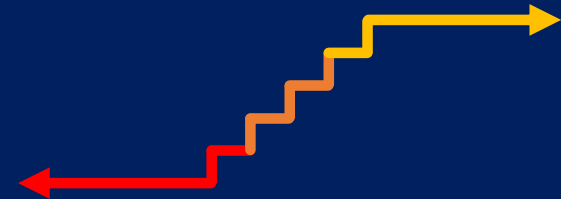


- Funded by the Office of Special Education Programs of the U.S. Department of Education
- Researchers from:
  - University of Missouri
  - Southern Methodist University
  - University of Texas at Austin
- Funding period: 2018-2022

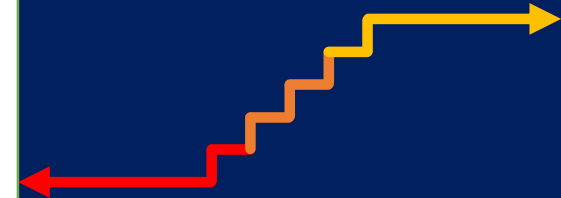
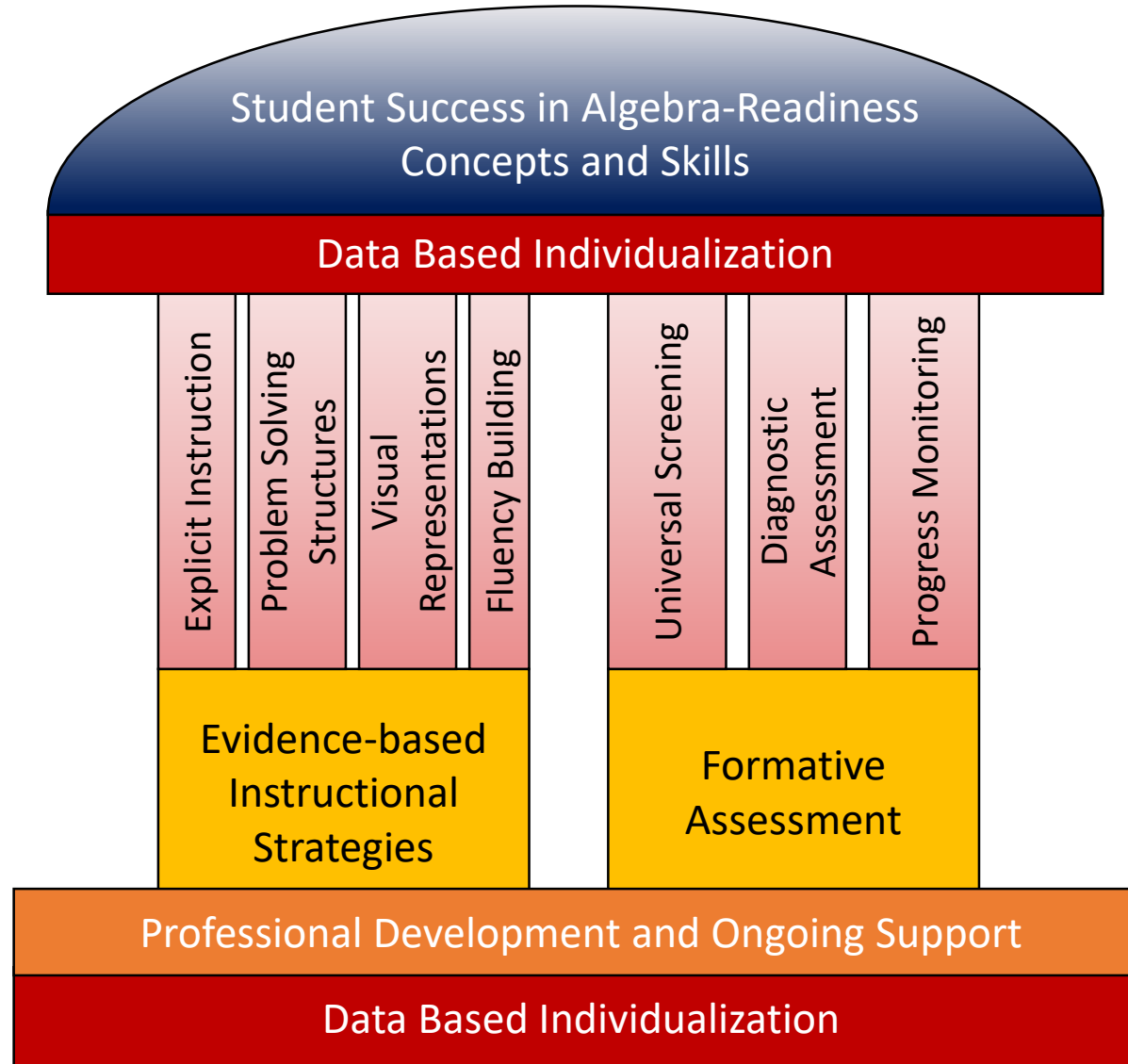


# Project STAIR

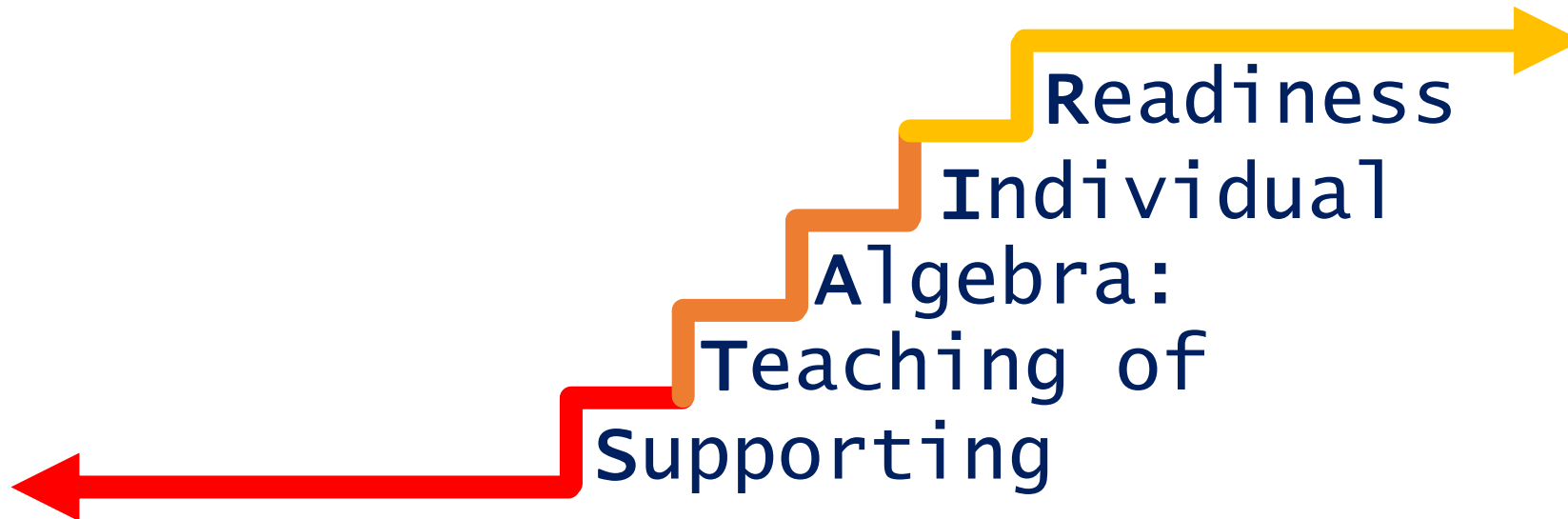
- Project STAIR targets early intervention in middle schools
- Goal → preparation for Algebra 1 in high school
- To reach this goal, we designed Project STAIR, a four-year model demonstration project



# Description of the Model



# Defining DBI



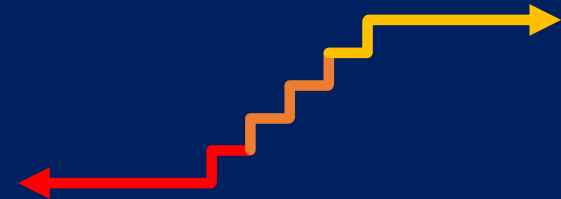
# Define DBI

## Data-Based Individualization (DBI)

systematic

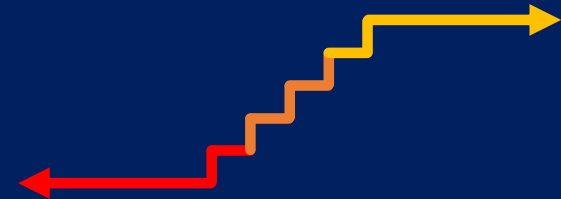
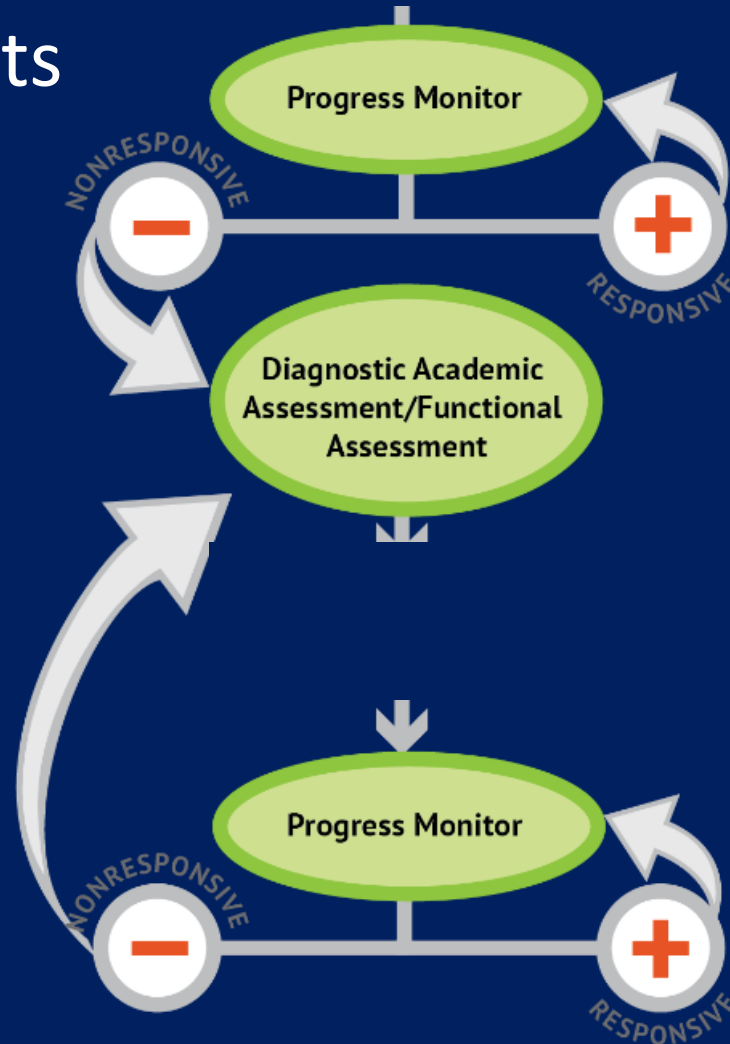
relies on data

helps  
individualize  
instruction



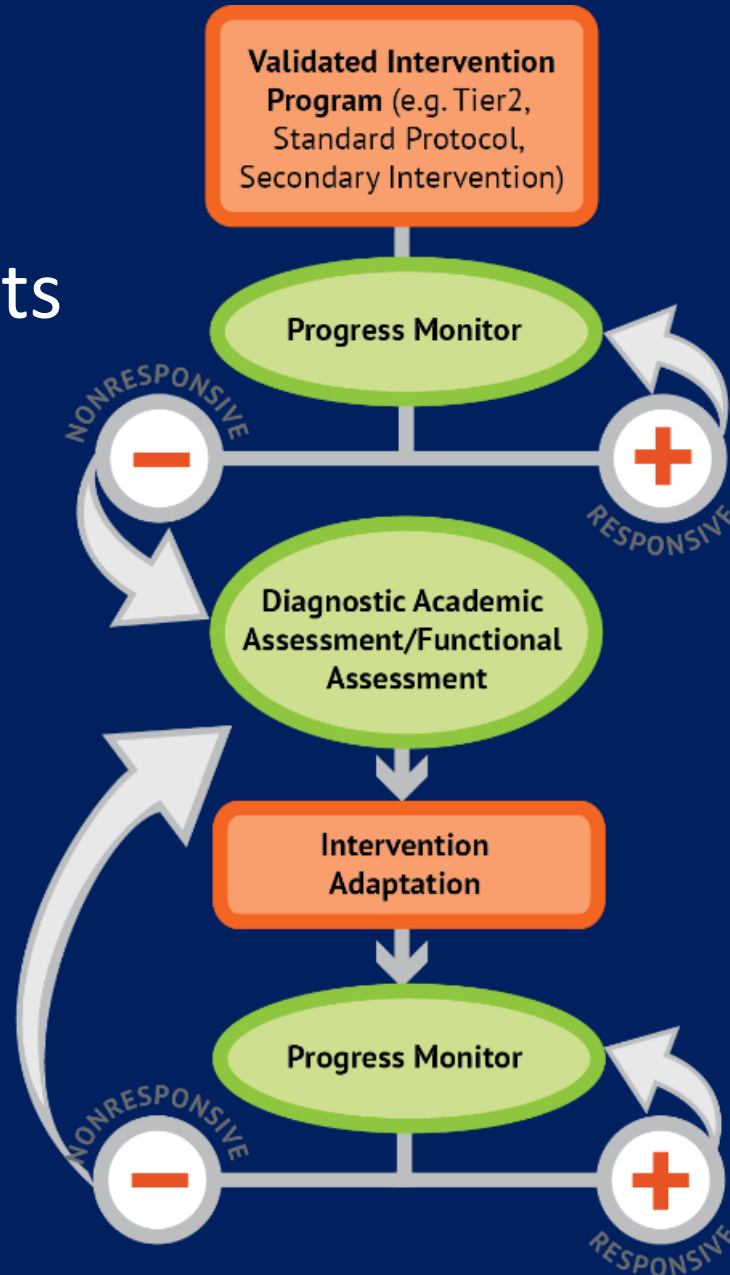
# Define DBI

- Two primary components
  - **Assessment**
  - **Instruction**

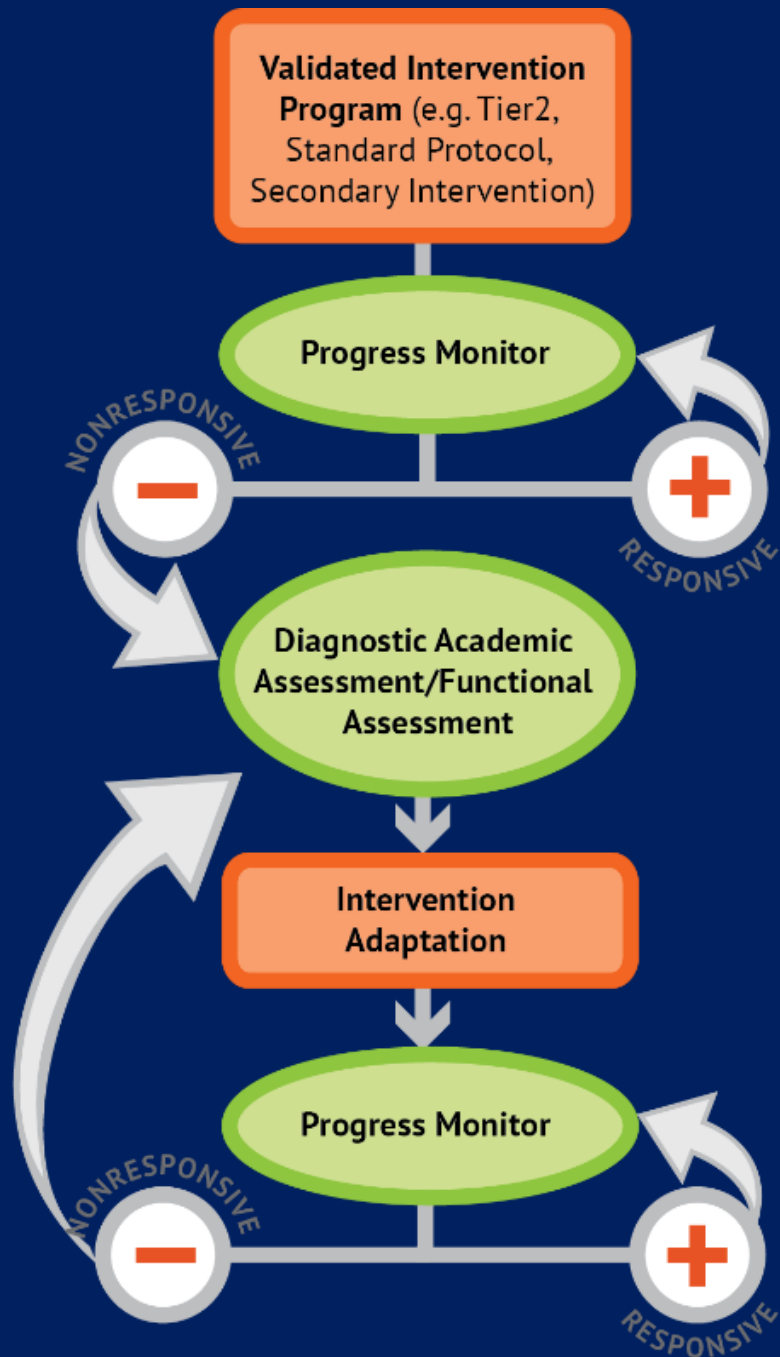


# Define DBI

- Two primary components
  - **Assessment**
  - **Instruction**

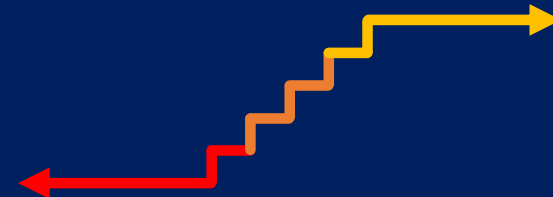
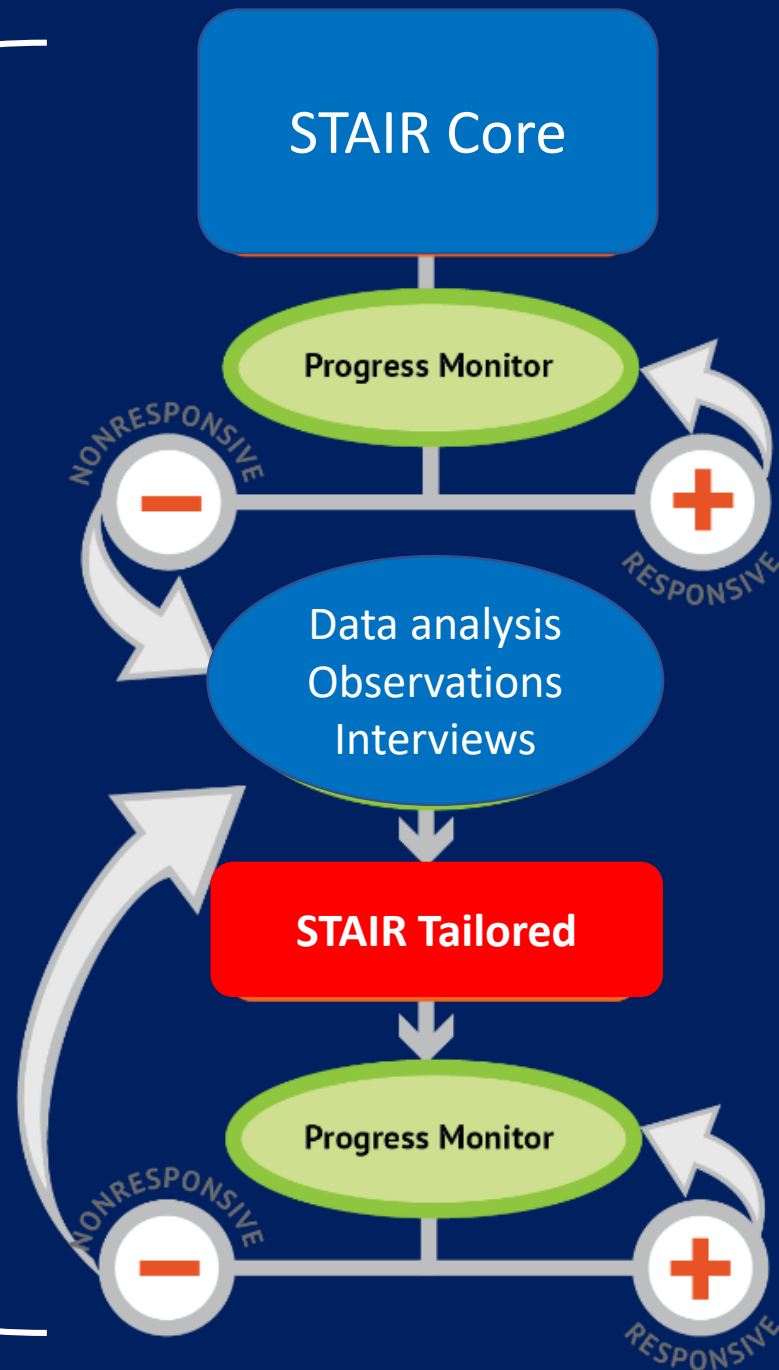




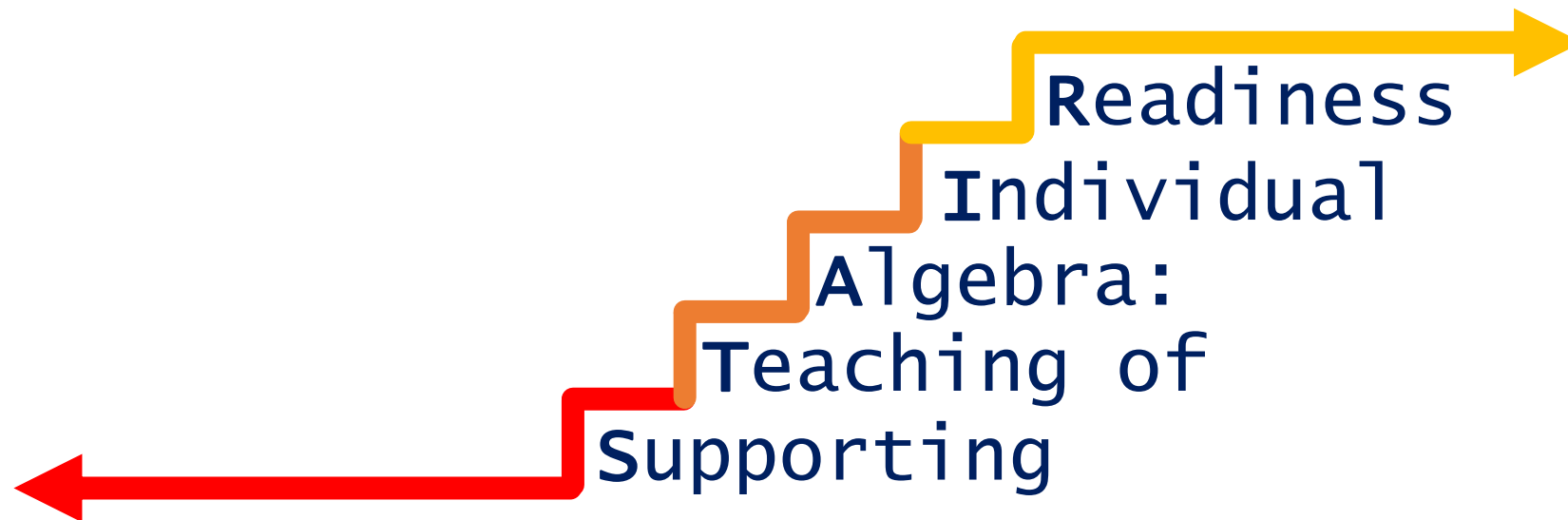


After STAIR Core, teachers implement DBI with their students

And we used STAIR Tailored to improve teaching practices for students



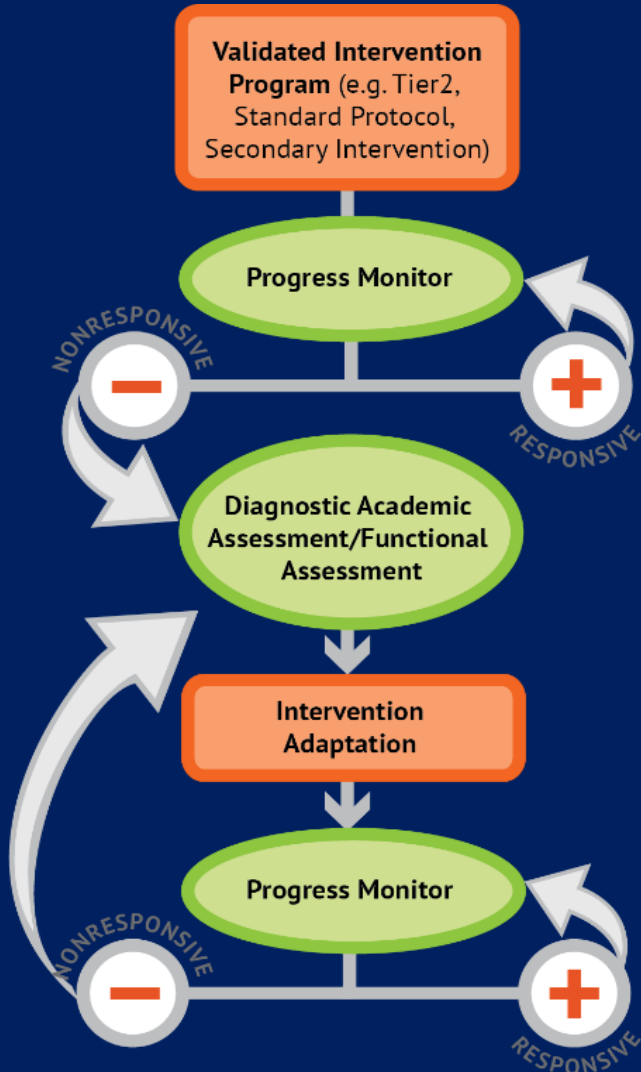
# Key Components of DBI



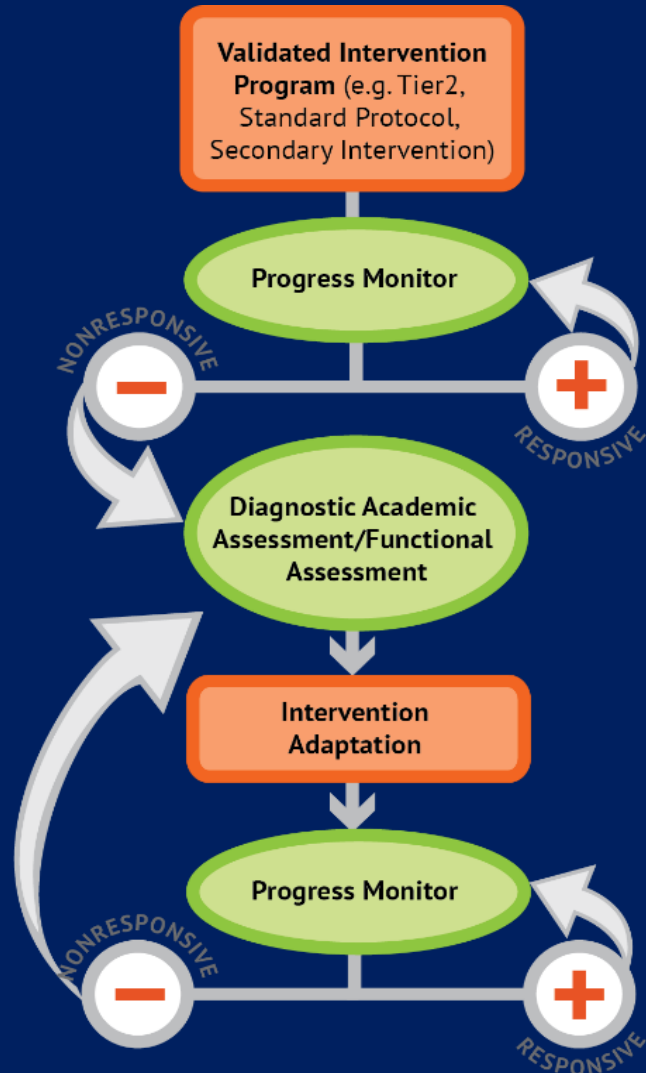
## 2. Key Components of DBI

1

- Establish that there is a Tier 2 validated intervention program in place



## 2. Key Components of DBI



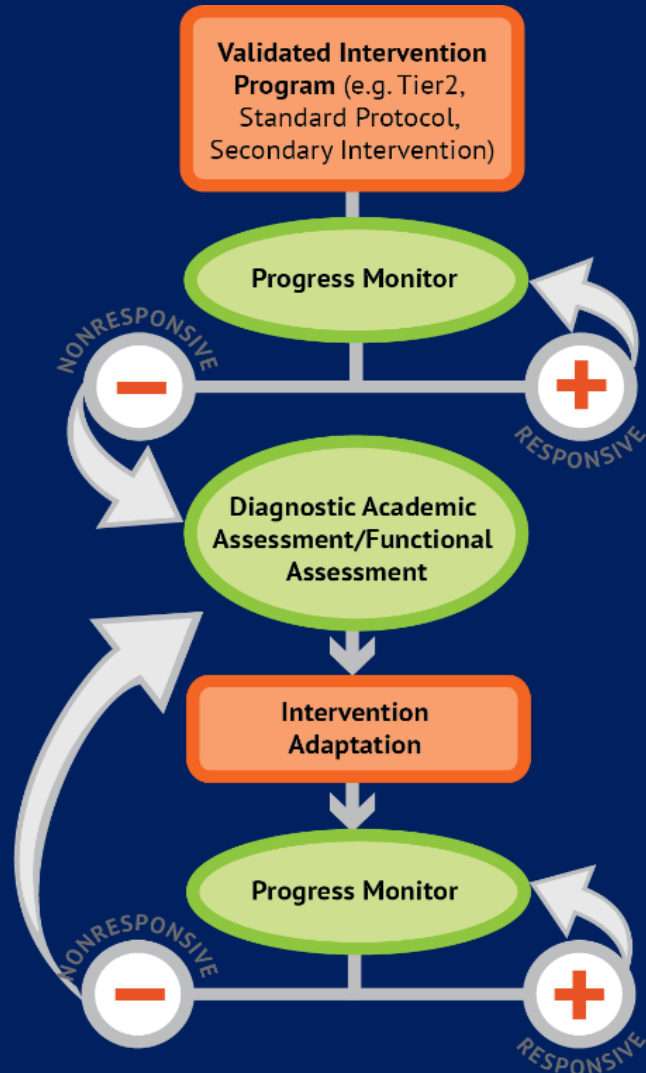
1

- Establish that there is a Tier 2 validated intervention program in place

2

- Progress monitor
  - Establish a present level
  - Set an ambitious long term goal
  - Collect frequent assessment data
  - Use decision rules

## 2. Key Components of DBI



1

- Establish that there is a Tier 2 validated intervention program in place

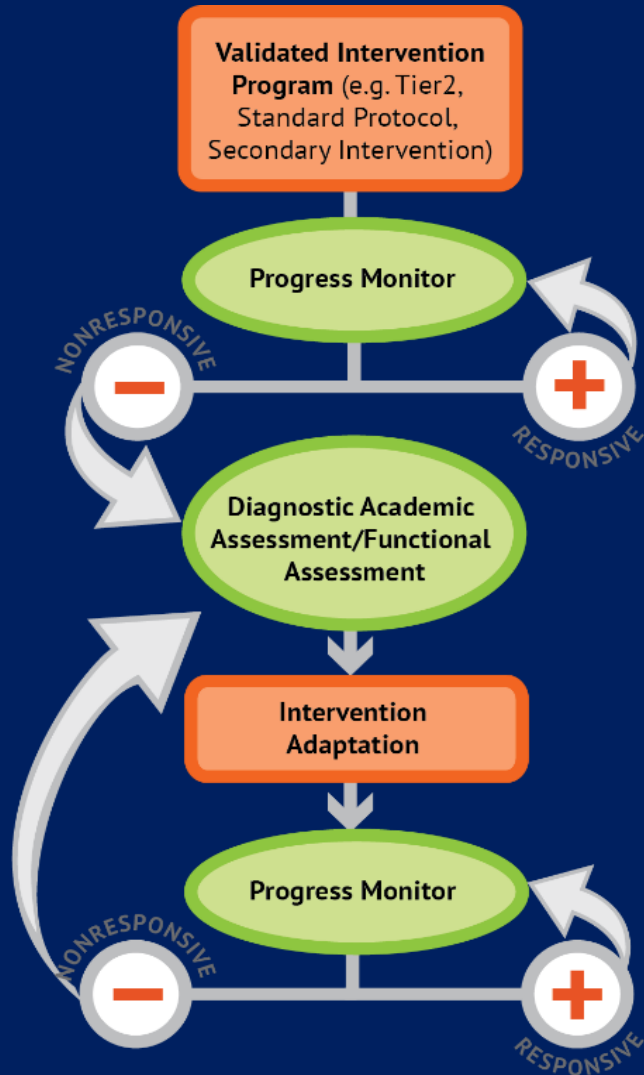
2

- Progress monitor
  - Establish a present level
  - Set an ambitious long term goal
  - Collect frequent assessment data
  - Use decision rules

3

- Based on student responsiveness:
  - Continue the Tier 2 program with progress monitoring
  - Collect Diagnostic data

## 2. Key Components of DBI



1

- Establish that there is a Tier 2 validated intervention program in place

2

- Progress monitor
  - Establish a present level
  - Set an ambitious long term goal
  - Collect frequent assessment data
  - Use decision rules

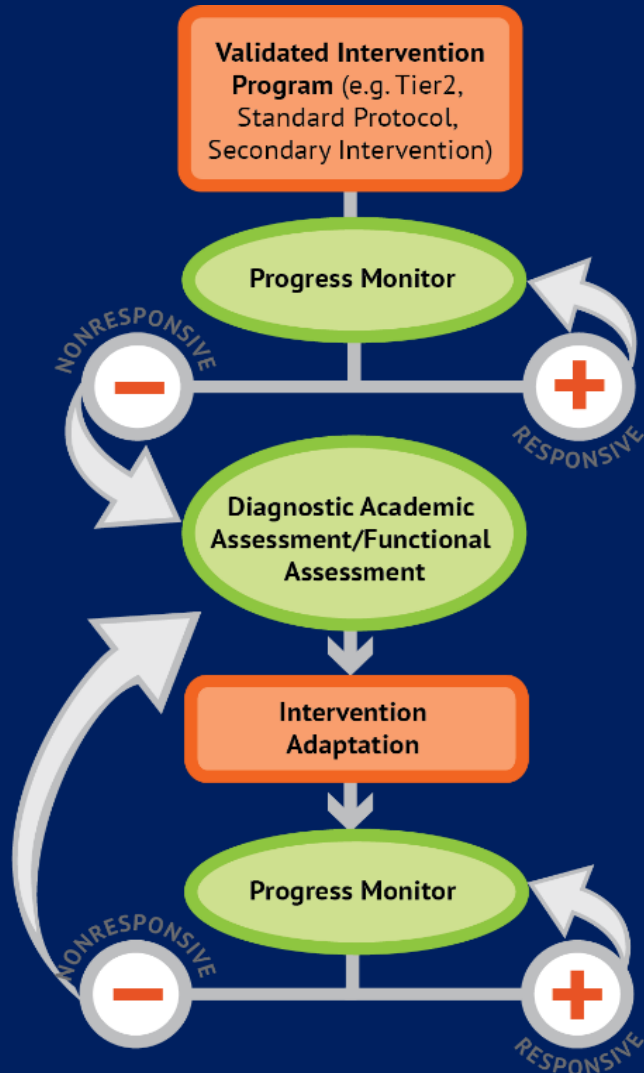
3

- Based on student responsiveness:
  - Continue the Tier 2 program with progress monitoring
  - Collect Diagnostic data

4

- Make an instructional change based on hypothesis

## 2. Key Components of DBI



1

- Establish that there is a Tier 2 validated intervention program in place

2

- Progress monitor
  - Establish a present level
  - Set an ambitious long term goal
  - Collect frequent assessment data
  - Use decision rules

3

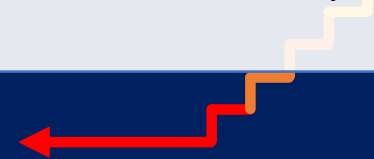
- Based on student responsiveness:
  - Continue the Tier 2 program with progress monitoring
  - Collect Diagnostic data

4

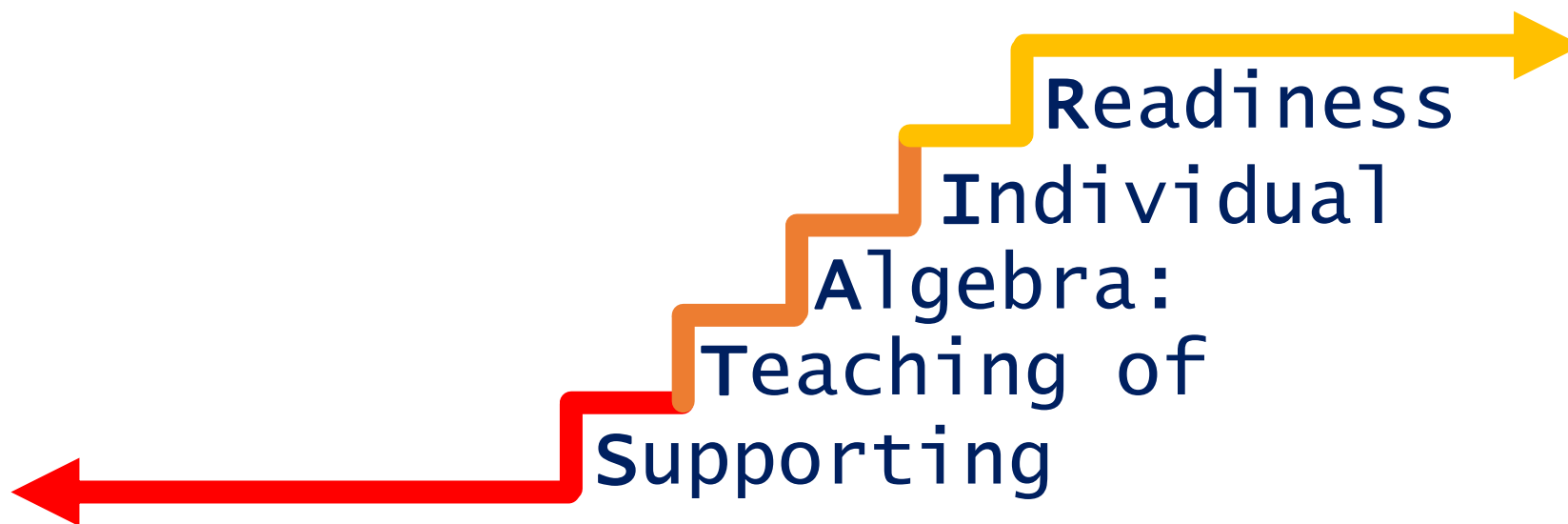
- Make an instructional change based on hypothesis

5

- Continue to monitor progress to determine if student is/is not responsive to instruction



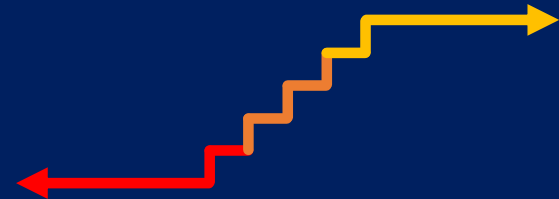
# DBI: why do we use it?





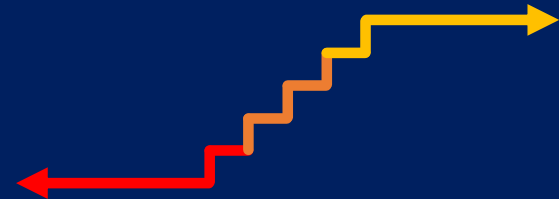
# why Implement DBI?

- Some students do not respond to research-based interventions.
- DBI provides a framework to individualize instruction.
- When teachers use DBI correctly, student achievement can improve.



# Who Should Receive DBI?

- DBI is intended for *students who require intensive, individualized instruction*
  - Students for whom core instruction and/or supplemental intervention is not sufficient
  - Students identified as in need of Tier 3 instruction in an RTI model
  - Students in special education

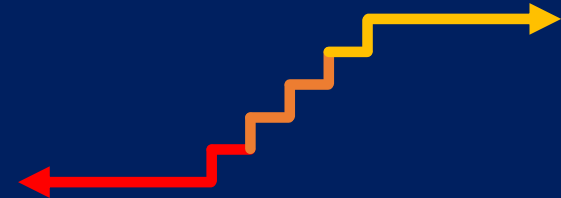
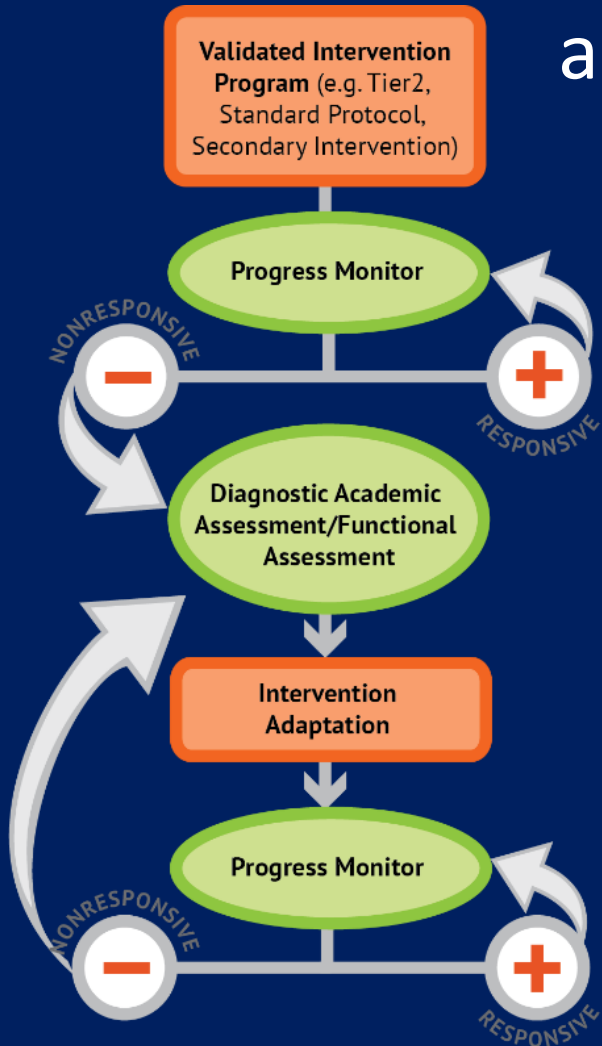


# Assessments for DBI

Establish present level of mathematics performance  
and use this information to set ambitious goals

Universal Screener

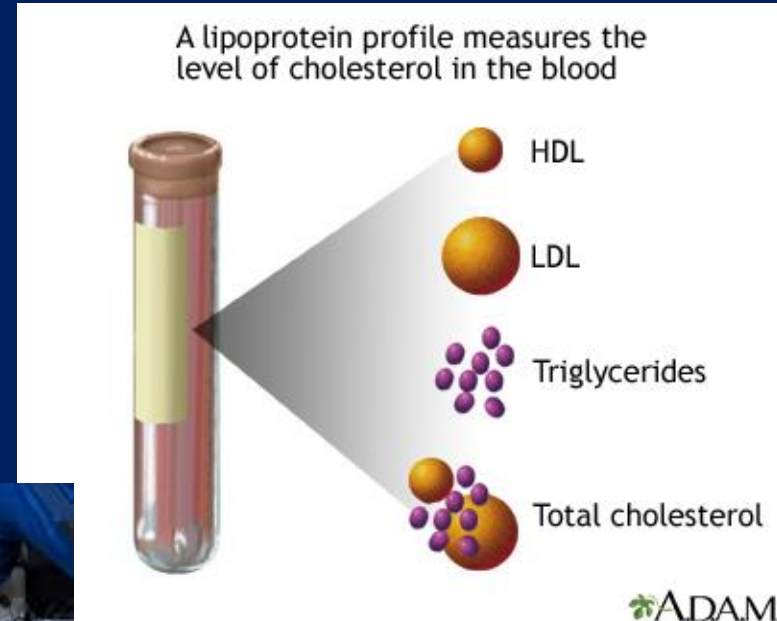
Progress Monitoring Measure



# Universal Screening



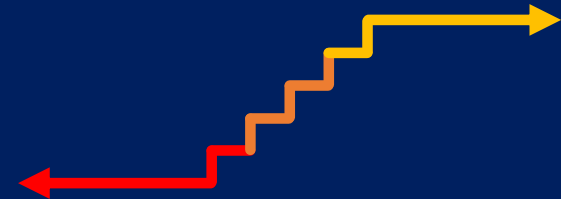
Well-baby check-up



Cholesterol tests

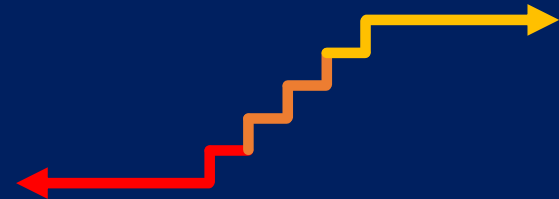


Tune-up for your car



# Decisions from Universal Screening Data

- Are students at-risk or underperforming?
- Which students need interventions?
- What degree of intensity of intervention is needed?
- Not intended to provide diagnostic information



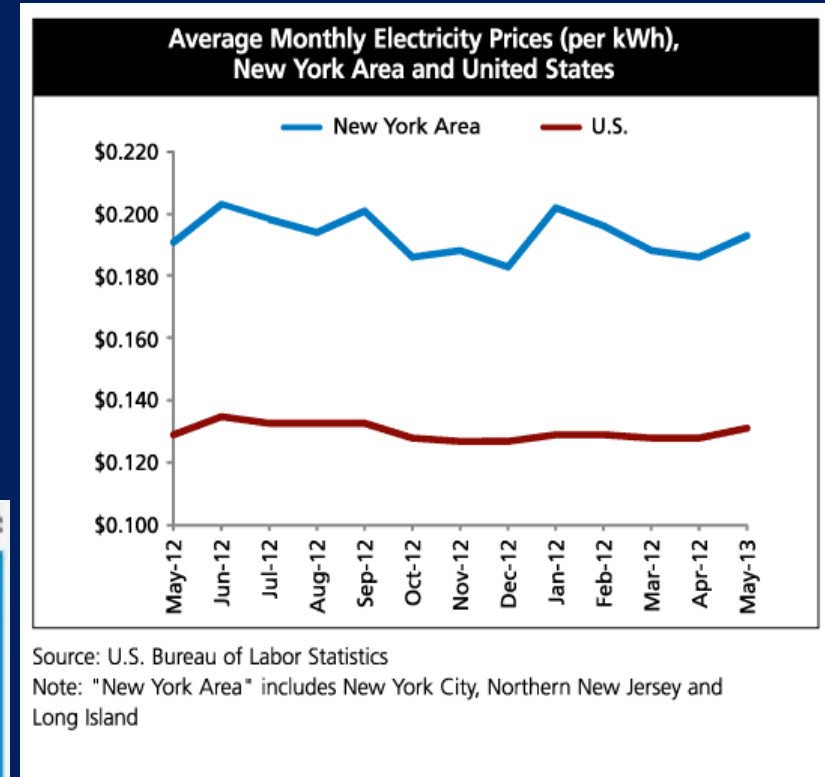
# Progress Monitoring



Exercise Tracker



Baby Growth Chart



Average Monthly Electricity Prices in NY & US

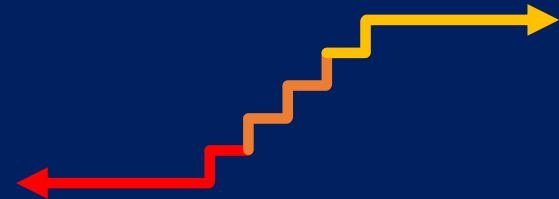


# Characteristics of Progress Monitoring Measures

- Quick and easy to administer
- Multiple parallel forms (same difficulty, format, content)
- Standardized administration and scoring (same timing, setting, scoring rules)

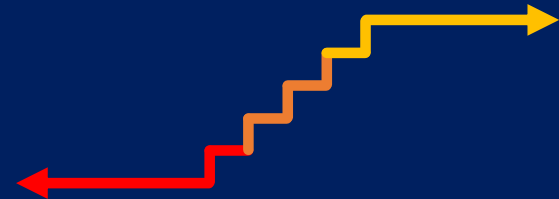


Why are these features important?



# Algebra Readiness Progress Measures (ARPM) from iStation

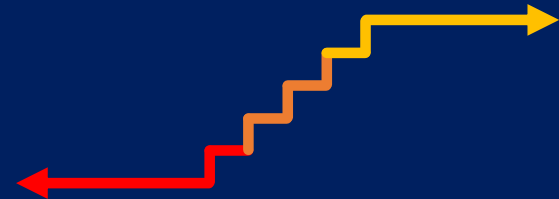
- Three types of measures:
  - Number properties
  - Proportional Reasoning
  - Quantity Discrimination





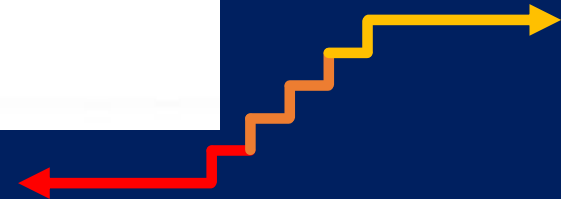
# Number properties

$\frac{1}{2}(10 \times 60)$	<input type="checkbox"/>	$5 \times 10$	16	$58 + 1.7$	<input type="checkbox"/>	$1.7 + 5.8$
$\frac{2}{3} \times \frac{3}{2}$	<input type="checkbox"/>	0	17	$\frac{3}{12} \times \frac{5}{8}$	<input type="checkbox"/>	$\frac{5}{8} \times \frac{1}{4}$
$8.8 \times 1.2$	<input type="checkbox"/>	$1.3 \times 8.8$	18	$1\frac{1}{4}(7 \times 8)$	<input type="checkbox"/>	$8\frac{3}{4} \times 1\frac{1}{2}$
$-9(-2 + -6)$	<input type="checkbox"/>	$90 + 54$	19	$-90 \times -32$	<input type="checkbox"/>	$-90 \times -32$
$-198 \times -78$	<input type="checkbox"/>	$-78 \times -199$	20	$\frac{3}{9} + \left(\frac{5}{16} + \frac{1}{8}\right)$	<input type="checkbox"/>	$\left(\frac{7}{9} + \frac{5}{16}\right) + \frac{1}{8}$
$-\frac{1}{2} + \frac{1}{2}$	<input type="checkbox"/>	1	21	$3\frac{1}{4} \times \left(5\frac{5}{6} \times 2\frac{7}{8}\right)$	<input type="checkbox"/>	$\left(3\frac{3}{4} \times 5\frac{5}{6}\right) \times 2\frac{7}{8}$
			22			



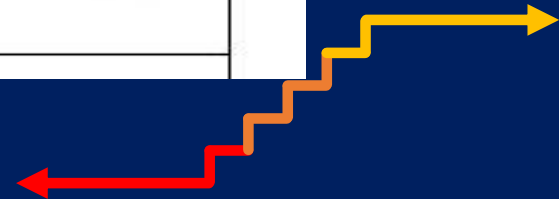
# Proportional Reasoning

37% of 100 <input type="text"/> 12% of 100	47% of 34 <input type="text"/> 89% of 34
45 out of 90 <input type="text"/> 30 out of 90	3 to 7 <input type="text"/> 8 to 9
$\frac{3}{5}$ of 80 <input type="text"/> $\frac{9}{15}$ of 80	2 to 5 <input type="text"/> 2 to 7
5:8 <input type="text"/> 3:10	6:7 <input type="text"/> 18:21
12% of 65 <input type="text"/> 12% of 97	8 out of 48 <input type="text"/> 18 out of 20
$\frac{1}{5}$ of 10 <input type="text"/> $\frac{1}{5}$ of 50	1:4 <input type="text"/> 1:2

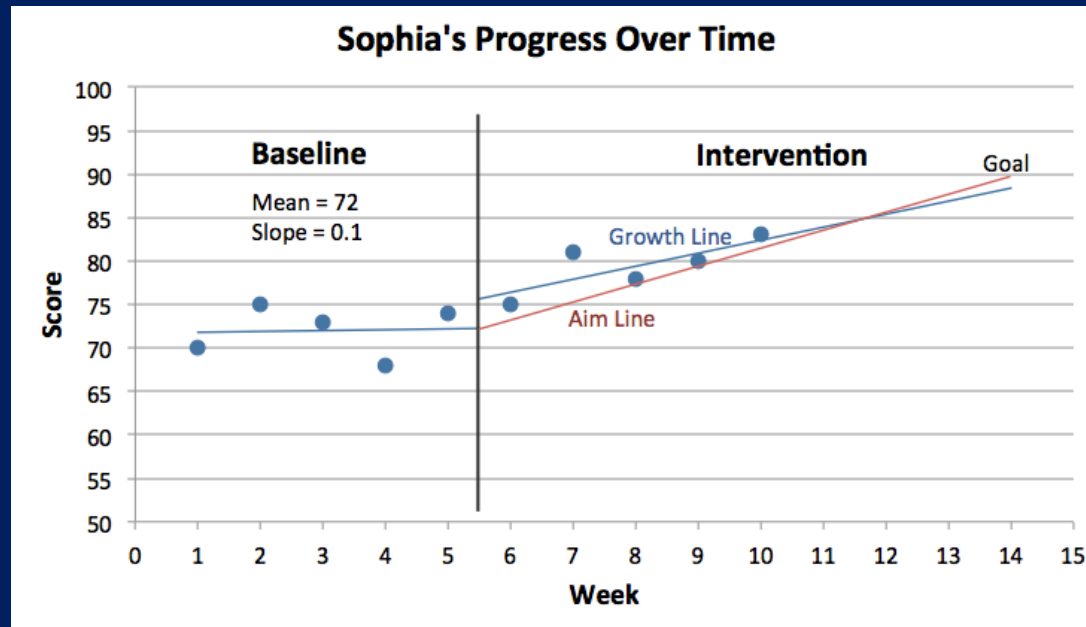


# Quantity Discrimination

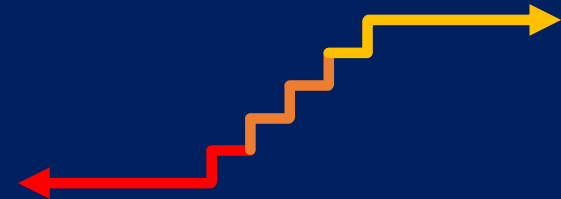
7	$\frac{43}{6}$	2	$\frac{1}{2}$	0.33	3	-15	-13
1.25	137%	5	$5\frac{3}{10}$	5.7	6	25%	$\frac{1}{5}$
$6\frac{15}{16}$	$\frac{26}{4}$	8	$3\frac{1}{2}$	32%	9	151%	$15\frac{1}{10}$
16.95	$19\frac{17}{20}$	11	2.2	-24	12	62%	0.062
$\frac{9}{10}$	88%	14	0.15%	1.5%	15	$\frac{5}{2}$	$2\frac{1}{4}$
0.23	$\frac{1}{4}$	17	$\frac{7}{8}$	$\frac{3}{4}$	18	0.07%	0.5%
		20			21		



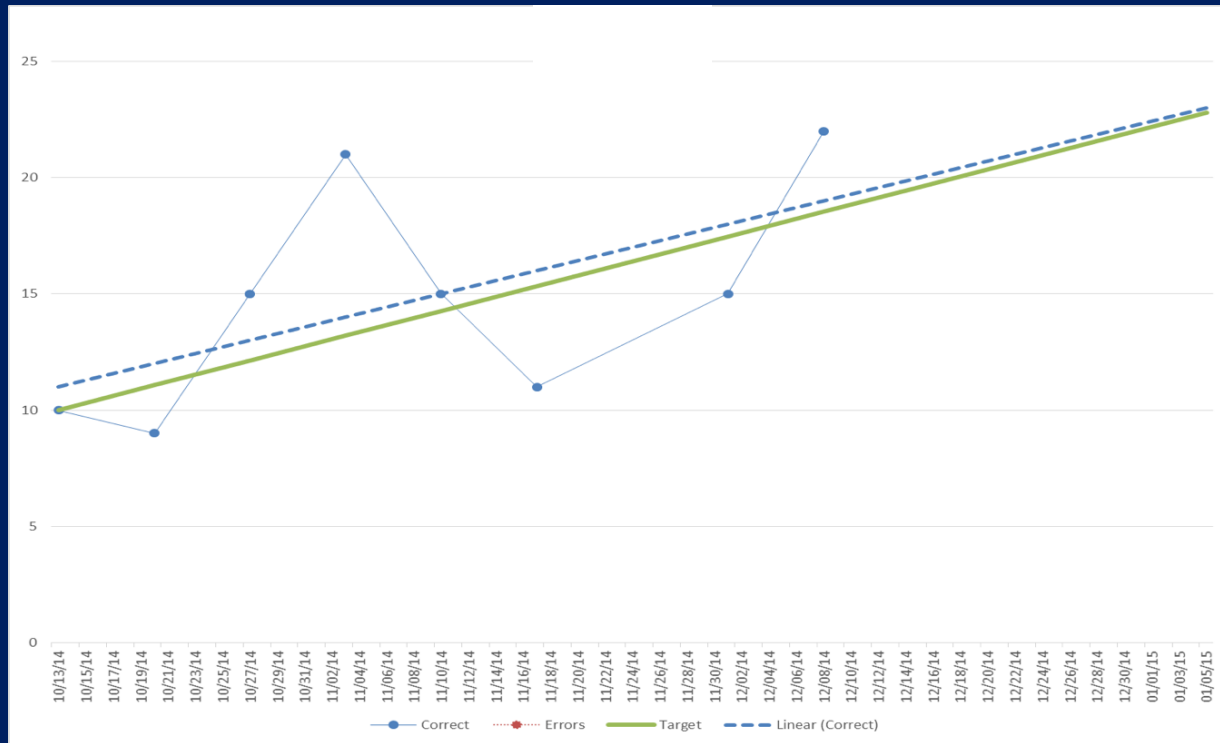
# Interpreting Results from Progress Monitoring Measures



1. Gather baseline data
2. Set performance goals
3. Implement the intervention
4. Administer progress monitoring measures at regular intervals
5. Evaluate the student's progress



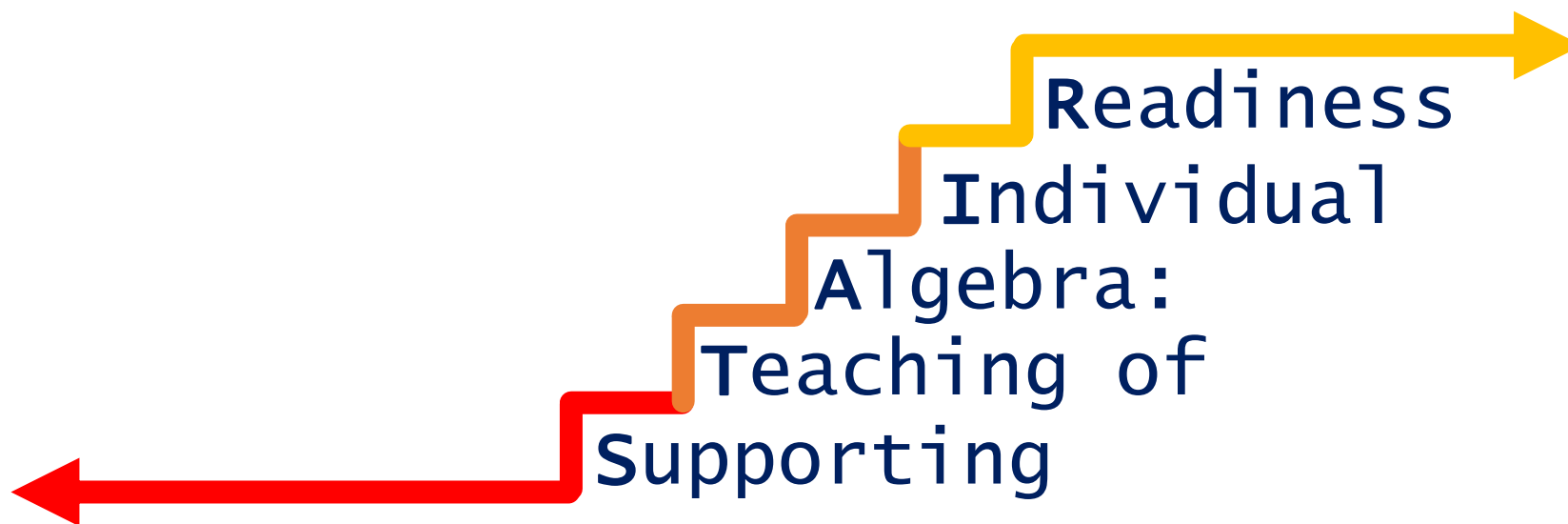
# Make Decisions from Progress Monitoring Results

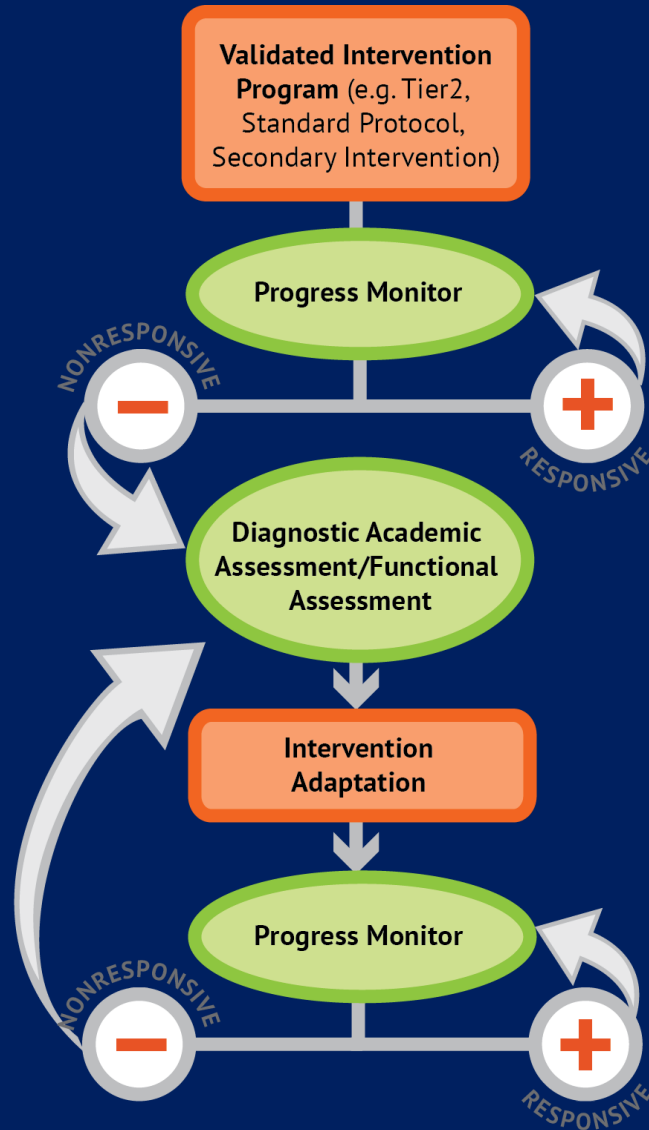


- Is the student making adequate progress toward his or her goals?
  - How do you know?
  - How could you confirm?
- Is the intervention effectively meeting the student's needs?
  - How do you know?
  - How could you confirm?



# Instructional Platform





# Instructional Platform

## INSTRUCTIONAL DELIVERY

Explicit instruction

Multiple representations

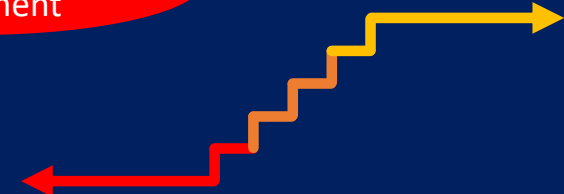
Precise language

## INSTRUCTIONAL STRATEGIES

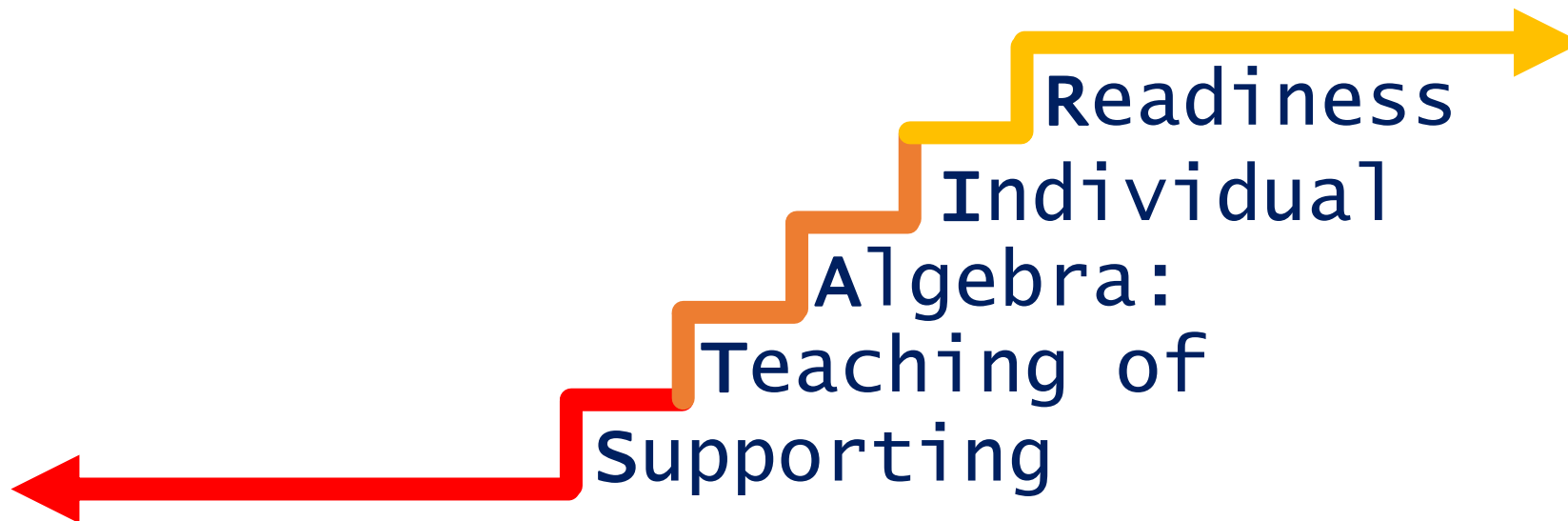
Fluency building

Problem solving instruction

Motivation component



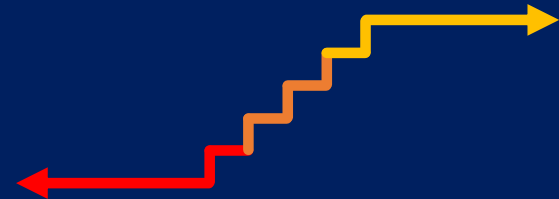
# Professional Development





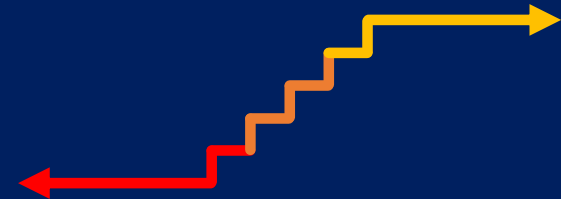
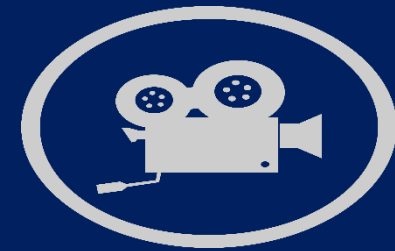
# Core Professional Development (PD)

- Whole-group
- Similar to Tier 1 or Universal supports
- Introduction
- Content and skill focused
- Interactive

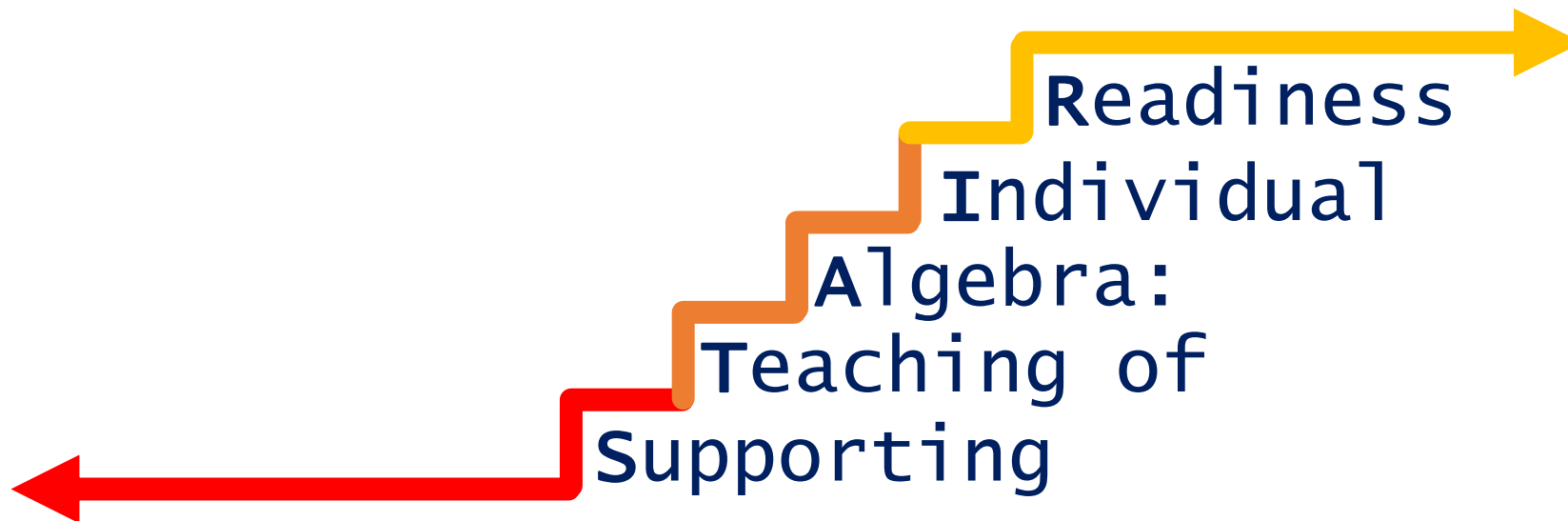


# Tailored Professional Development (PD)

- Individualized
- Tailored to content and skills of need
- Provided through lightboard videos and coaching sessions

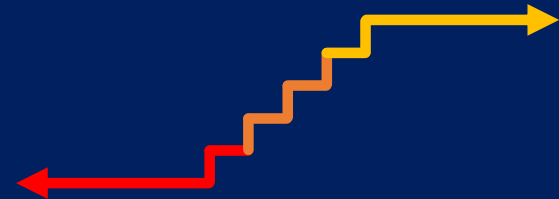


# Coaching

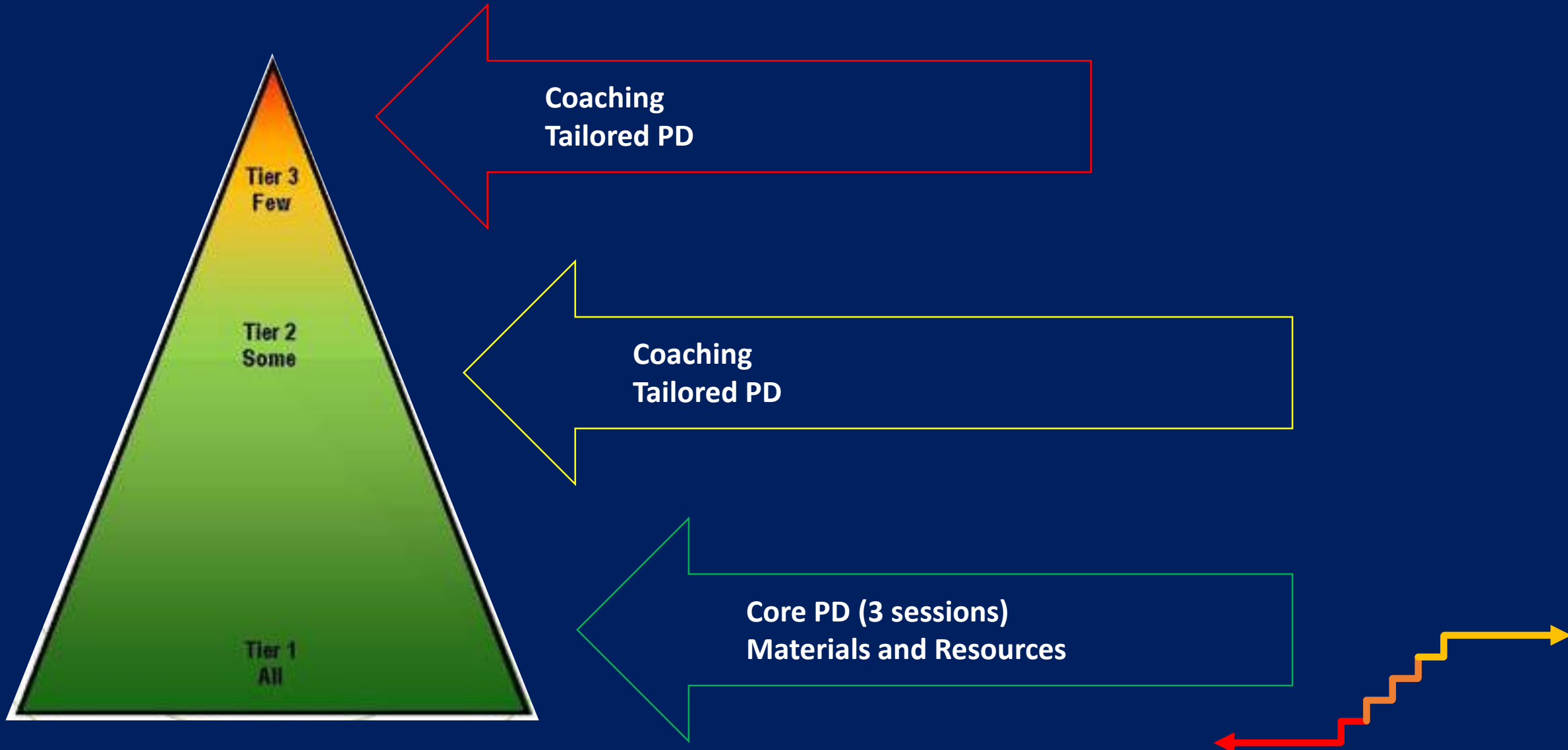


# What Does Coaching Look Like?

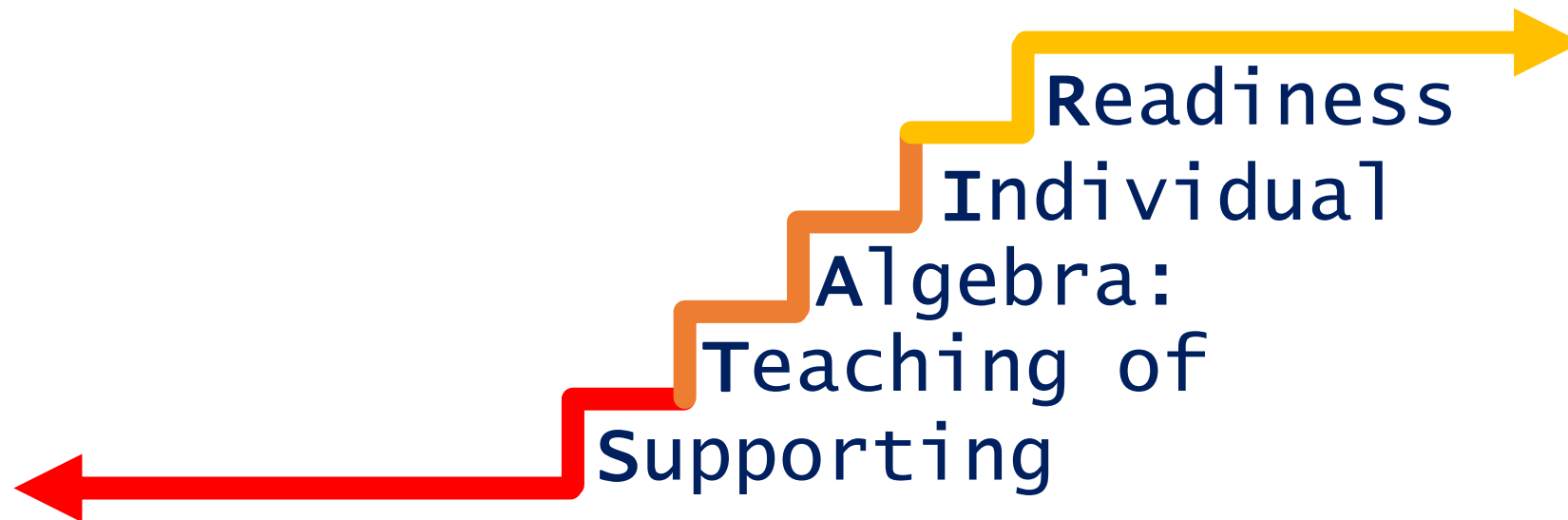
- Contact every other week
  - Virtual (e.g., Zoom, Google Hangouts)
  - Face-to-face
- Structured Conversation
- Purposeful



# Tiered Supports for Adults

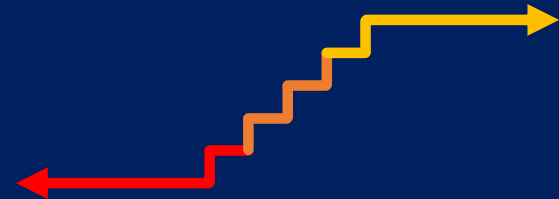


# Project STAIR Basic Steps



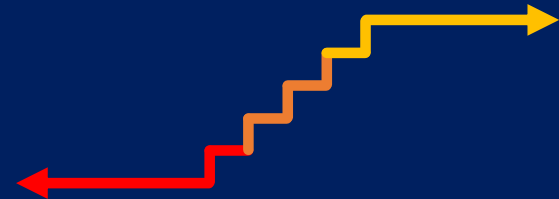
# Project STAIR Pilot Study, 18–19

- Coached 22 teacher participants across 4 sites in 2 states
- 82 student participants identified at-risk or with an IEP in mathematics



# Measures

- Student
  - Iowa Algebra Test (standardized test)
  - Diagnostic Online Math Assessment
  - Algebra Progress Monitoring Measures from iStation
- Teacher
  - Teacher instructional practices
  - Demographics
  - Teacher efficacy
  - Teacher content knowledge





# Teacher Instructional Practices Survey

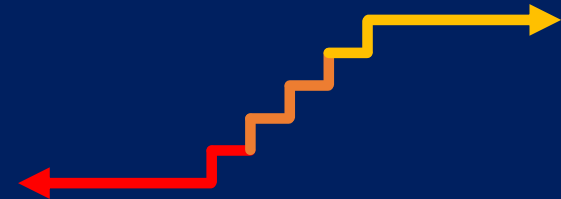
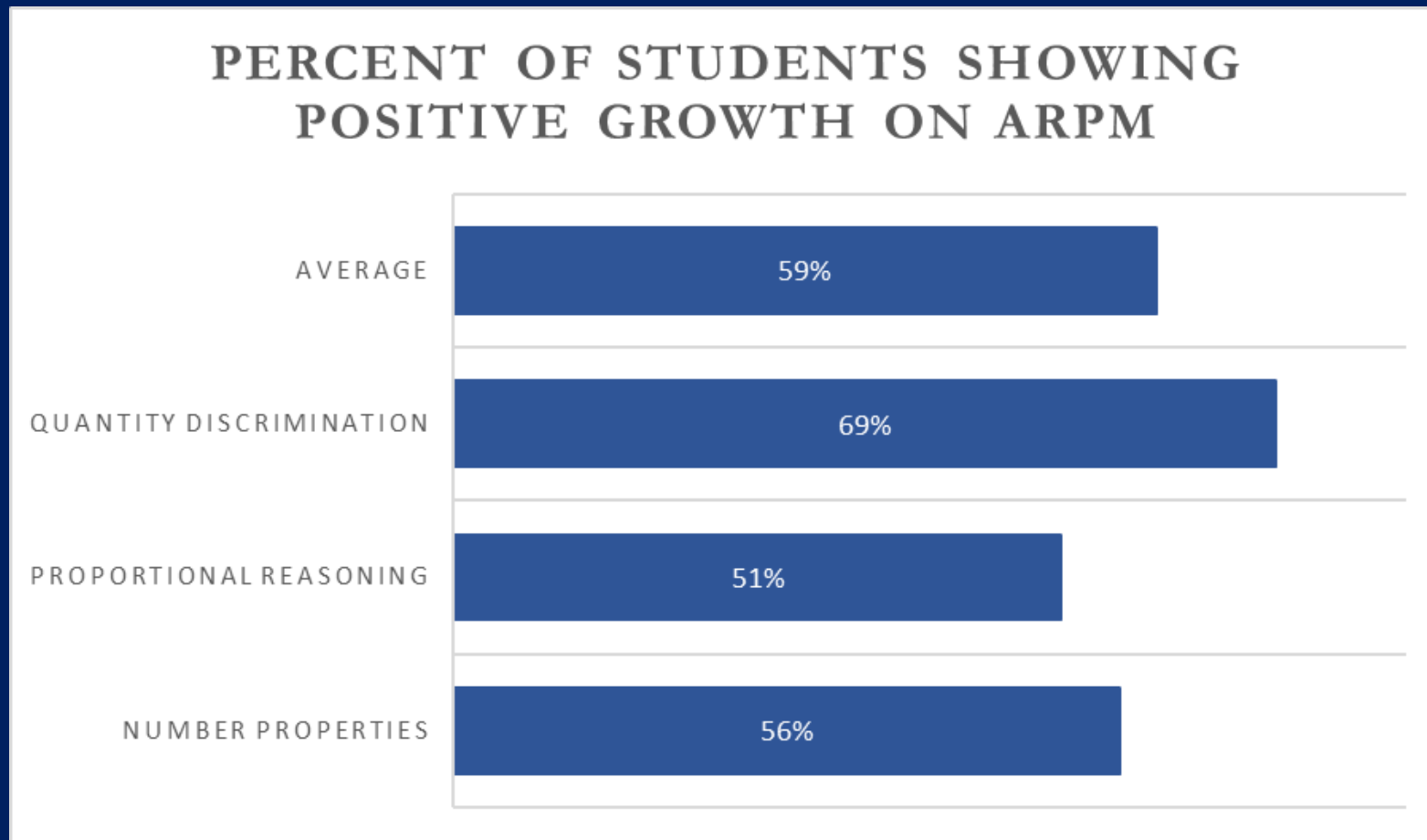
N=22							
Teachers' Instructional practices		Pre (N= 22)		Post (N = 22)		t	p
		M	SD	M	SD		
Data Based Individualization	Importance of practice	2.44	0.69	2.35	0.54	.65	.525
	Understanding of the practice	2.05	0.78	2.48	0.50	2.31	.031*
	Confidence in implementing the practice	1.95	0.78	2.29	0.66	.80	.088
	Frequency of implementing the practice	2.42	1.03	2.83	1.13	1.30	.210
Instructional Practices	Importance of practice	2.77	0.21	2.74	0.31	.51	.617
	Understanding of the practice	2.66	0.30	2.83	0.24	2.25	.036*
	Confidence in implementing the practice	2.56	0.38	2.74	0.31	1.66	.112
	Frequency of implementing the practice	4.30	0.39	4.49	0.48	2.03	.055
Assessment Practices	Importance of practice	2.40	0.48	2.66	0.51	2.86	.009*
	Understanding of the practice	2.28	0.51	2.82	0.31	4.58	.000***
	Confidence in implementing the practice	2.24	0.57	2.75	0.38	3.92	.001**
	Frequency of implementing the practice	2.39	1.01	1.94	1.15	1.93	.068
Culture/Climate		3.20	0.61	3.45	0.51	2.26	.034*
Note. p***<.000, p**<.001, p*<0.05							
0: Less often than 1 time per month, 1: 1 time per month, 2: 2-3times per month, 3: 1 time per week, 4: 2-3 times per week, 5: Everyday – Provide independent practice opportunities							



# Teacher self-efficacy

Teacher Self-Efficacy				N = 20
Question	Pre	Post	t	p
	M (SD)	M (SD)		
I am confident in my ability to teach math to the students in the grade I currently teach	2.50 (.76)	2.95 (.22)	-2.65	.016*
I like to teach math	2.55 (.76)	2.95 (.22)	-2.18	.042*
I can effectively teach math	2.50 (.76)	2.85 (.37)	-1.79	.090
I am confident that I can answer questions about math that my students ask	2.60 (.75)	2.85 (.37)	-1.56	.135
I would be confident if my supervisor wanted to observe me teaching a math lesson	2.45 (.76)	2.75 (.72)	-1.30	.21
I know how to do the math, but I am not comfortable explaining how I got the answer	0.65 (.81)	0.65 (.93)	.00	1.00
I understand the concepts in math, but may not be able to do the steps to solve the problem	.55 (.95)	.50 (.83)	-.18	.86
3- Strongly agree, 2- Agree, 1- Disagree, 0 - Strongly disagree				$P < .001$ ***, $p < .01$ **, $p < .05$ *

# Student measure–Algebra Readiness Progress Measures



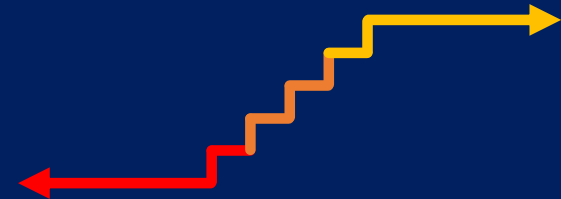
# Brief outcomes--sustainability

- Created over 100 Tailored Videos in the Lightboard Room

**STAIR Tailored:**  
**Word-Problem Instruction:**  
**Multiple Representations**

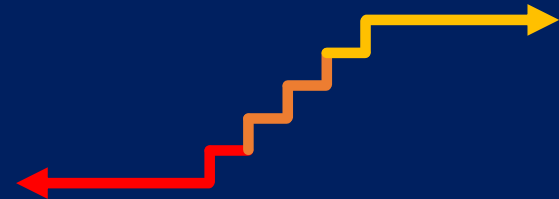


**STAIR Tailored:**  
**Factoring Quadratic Expressions –**  
**Part 2: Using Manipulatives to Factor**  
**Quadratic Expressions**



# Next steps...

- This year...
  - Randomized control trial with assignment at the teacher level
  - Special education and general education teachers
  - Implementing with coaching support for 20 weeks
  - Teacher measures given pre/post
  - Three PD sessions provided
  - Student measures given pre/post and as ongoing progress monitoring



# Thank You!

Please contact Erica Lembke, [lembkee@Missouri.edu](mailto:lembkee@Missouri.edu), for more information.

Follow us on Twitter! @ProjectSTAIR

