Aaron				
LO	Em	D	P	Ex
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

Blake				
LO	Em	D	P	Ex
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

Denise				
LO	Em	D	P	Ex
1				
2				
3				
4				
5				
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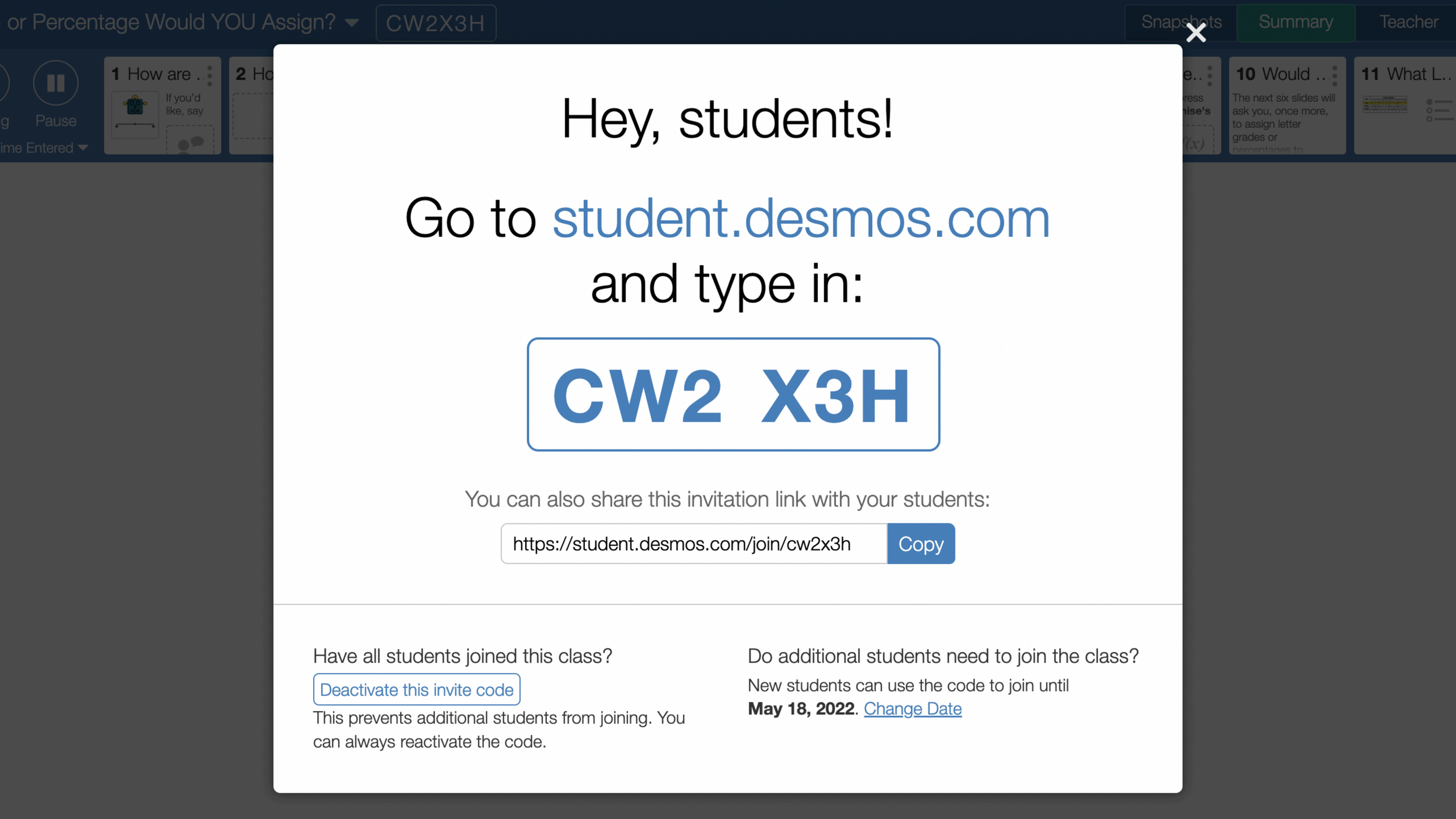
7				
8				
9				
10				

“Yeah, But How Do I Translate That to a Percentage?” & Other Standards-Based Assessment FAQs

STA Convention • May 6, 2022


or Percentage Would YOU Assign?
CW2X3H
Snapshots
Summary
Teacher
Pause
1 How are ..
If you'd like, say
2 Ho
10 Would ..
The next six slides will ask you, once more, to assign letter grades or
11 What L..
Hey, students!
Go to student.desmos.com
and type in:
CW2 X3H
You can also share this invitation link with your students:
https://student.desmos.com/join/cw2x3h
Copy
Have all students joined this class?
Deactivate this invite code
This prevents additional students from joining. You can always reactivate the code.
Do additional students need to join the class?
New students can use the code to join until
May 18, 2022. Change Date

Chris Hunter

K-12 Numeracy Helping Teacher

Surrey Schools

email: hunter_c@surreyschools.ca

Twitter: @ChrisHunter36

blog: chrishunter.ca

chrishunter.ca/tag/standards-based/

Traditional

Students accumulate **points** tied to **events**

e.g., “Quiz 2.3”

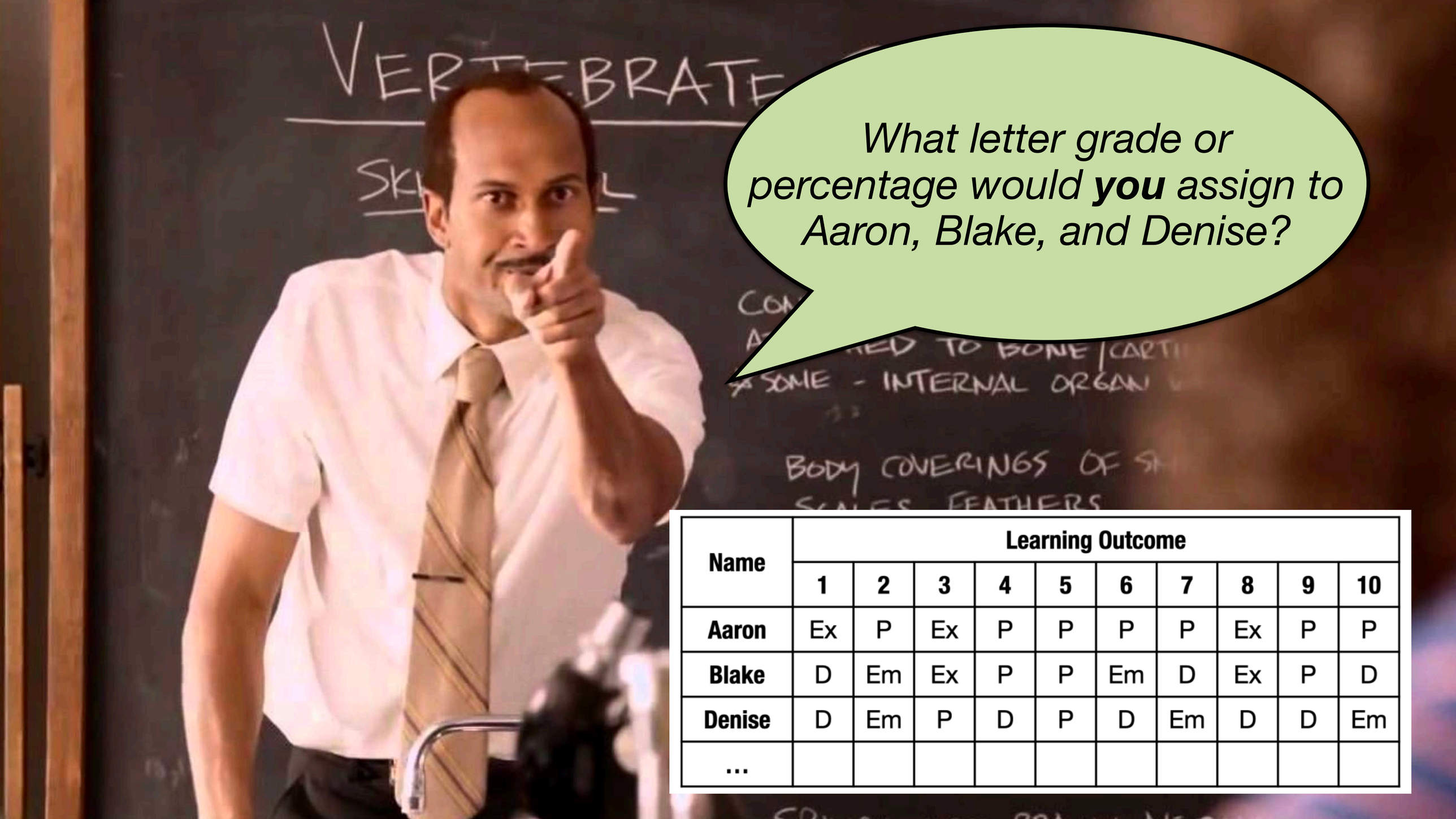
Compares students to **each other**

Standards-Based

Students demonstrate **evidence** in relation to **learning standards**

e.g., “use ratios and rates to make comparisons between quantities”

Compares student learning against **proficiency levels**



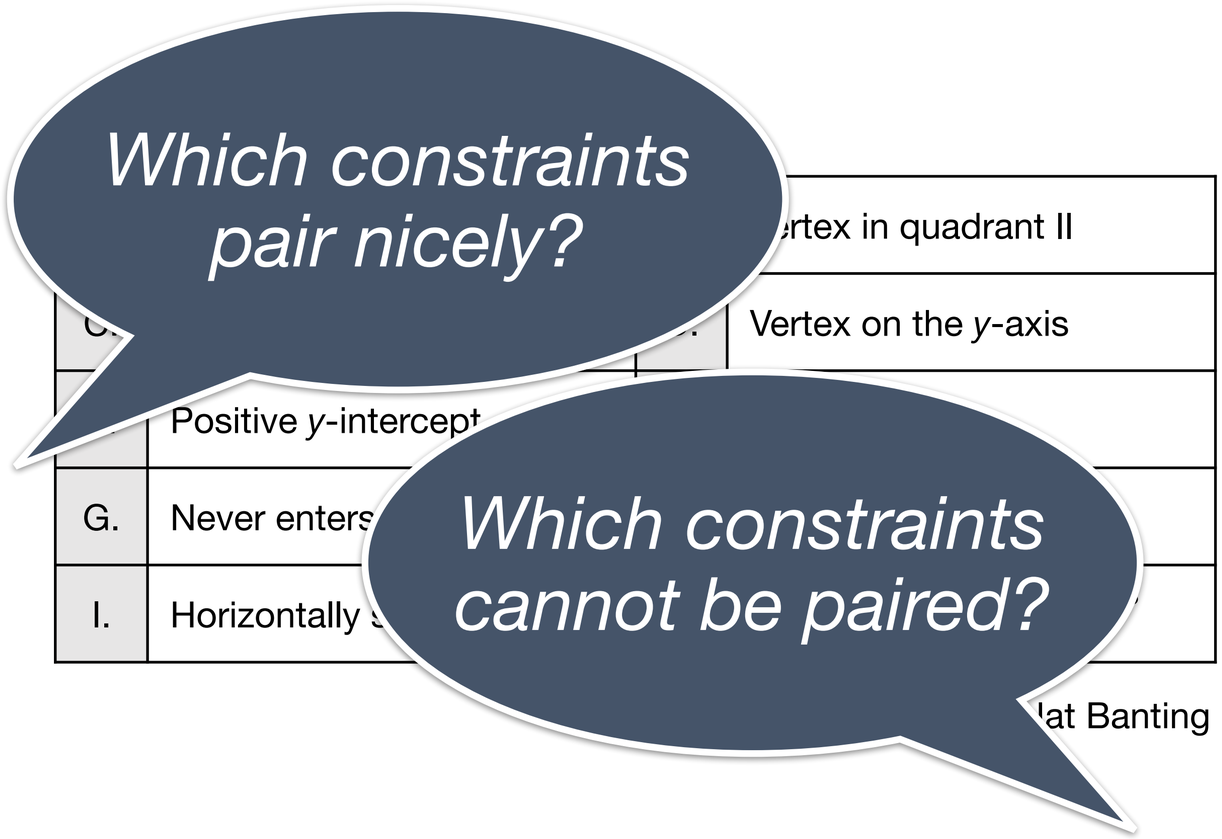
Name	Learning Outcome									
	1	2	3	4	5	6	7	8	9	10
Aaron	Ex	P	Ex	P	P	P	P	Ex	P	P
Blake	D	Em	Ex	P	P	Em	D	Ex	P	D
Denise	D	Em	P	D	P	D	Em	D	D	Em
…										

FAQs

- *Why change?*
- *Why reinvent the wheel?*
- *Assess what?*
- *How many learning standards?*
- *What do* **Emerging** *and* **Extending** *mean?*
- *What does each proficiency level look like?*
- *How do I elicit evidence of learning?*
- *How do I keep track of data?*
- *Yeah, but how do I translate that to a percentage?*

Menu Math

- Think about the following “design specifications” of quadratic functions
- You *could* build ten different quadratic functions to satisfy these ten different constraints
- Instead, build a set of as few quadratic functions as possible to satisfy each constraint at least once
- Write your functions in the form $y = a(x - p)^2 + q$
- Describe how and why you built each function
- Be sure to identify which functions satisfy which constraints

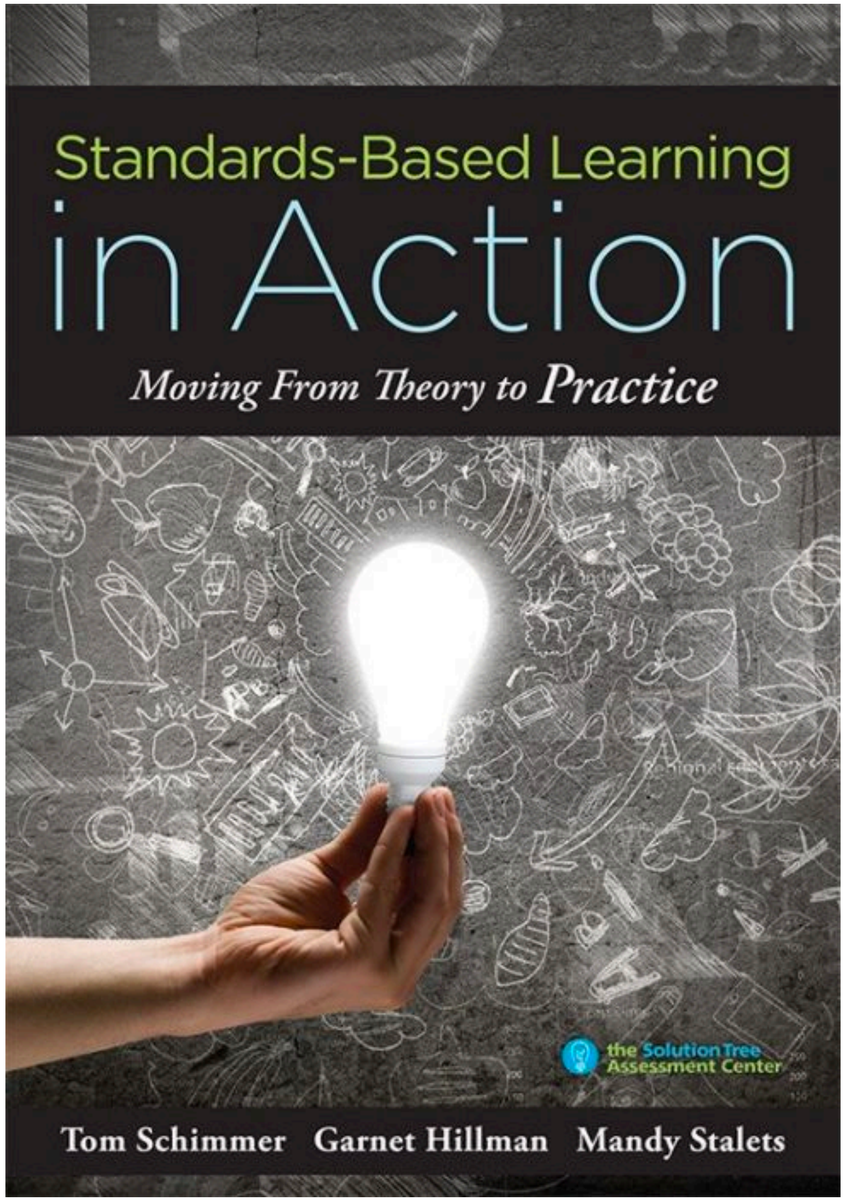


Menu Math

A.	Two negative x-intercepts	B.	Vertex in quadrant II
C.	Never enters quadrant III	D.	Vertex on the y-axis
E.	Positive y-intercept	F.	No x-intercepts
G.	Never enters quadrant I	H.	Has a minimum value
I.	Horizontally stretched	J.	Line of symmetry enters quadrant IV

–Nat Banting


Why change?


Standards-Based Learning
in Action
Moving From Theory to Practice
the Solution Tree Assessment Center
Tom Schimmer Garnet Hillman Mandy Stalets

“In this **traditional system**, experience has trained students to play the game of school. Schools dangle the carrot (the academic grade) in front of their faces and encourage students to chase it. With these practices, schools have created a **culture of compliance**.

Tom Schimmer

Becoming **standards based** is about changing to a **culture of learning**. ‘Complete this assignment to get these points’ changes to ‘Complete this assignment to improve your learning.’ […] Educators have trained learners to focus on the academic grade; they can coach them out of this assumption.”

Tom Schimmer

BUILDING THINKING CLASSROOMS in MATHEMATICS

GRADES K–12

14 TEACHING PRACTICES FOR ENHANCING LEARNING

PETER LILJEDAHL

FOREWORD BY TRACY JOHNSTON ZAGER

ILLUSTRATIONS BY LAURA WHEELER

CORWIN Mathematics

“If you want to start valuing day-to-day learning evidence or how students work in groups, you’ll have to make a **paradigm shift**.”

Peter Liljedahl

Point-Gathering → **Data**-Gathering

more accurate

more fair

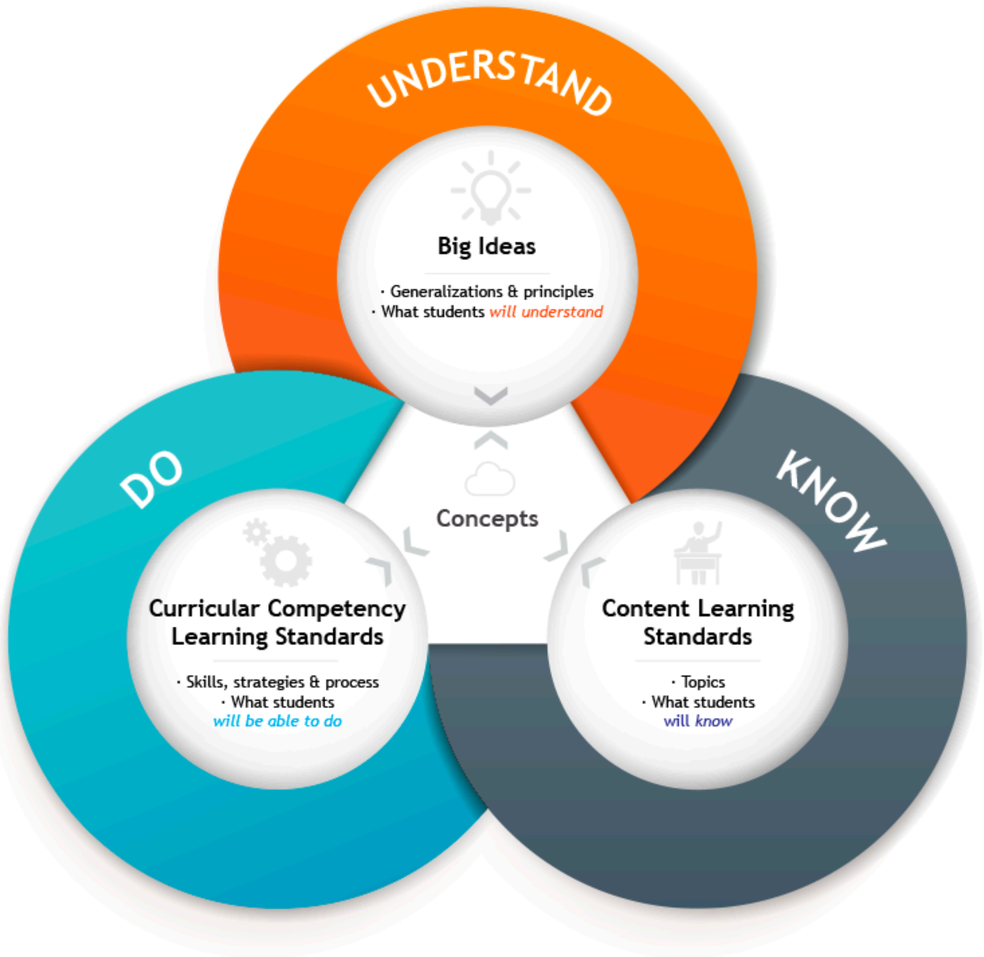
more relevant

no less objective

“Students start thinking about their learning rather than their grades and, as they do so, grading becomes a byproduct of learning rather than the objective of learning.”

Peter Liljedahl

Why  *?*


UNDERSTAND
Big Ideas
· Generalizations & principles
· What students will understand
DO
Curricular Competency Learning Standards
· Skills, strategies & process
· What students will be able to do
Concepts
KNOW
Content Learning Standards
· Topics
· What students will know

Point-Gathering → **Data**-Gathering

more accurate

more fair

more relevant

no less objective


Assess what?

Menu Math

- Think about the following "design specifications" of quadratic functions
- You *could* build ten different functions to satisfy these t constraints
- Instead, build a set of as functions as possible to sat constraint at least once
- Write your functions in the form $y = a(x - p)^2 + q$
- Describe how and why you built each function
- Be sure to identify which functions satisfy which constraints

*Which **learning standards** did you "bump into" as you solved the problem?*

	enters quadrant I	H.	Has a minimum value
I.	Horizontally stretched	J.	Line of symmetry enters quadrant IV

B.	Vertex in quadrant II
D.	Vertex on the *y*-axis
F.	No *x*-intercepts

–Nat Banting

Pre-calculus 11

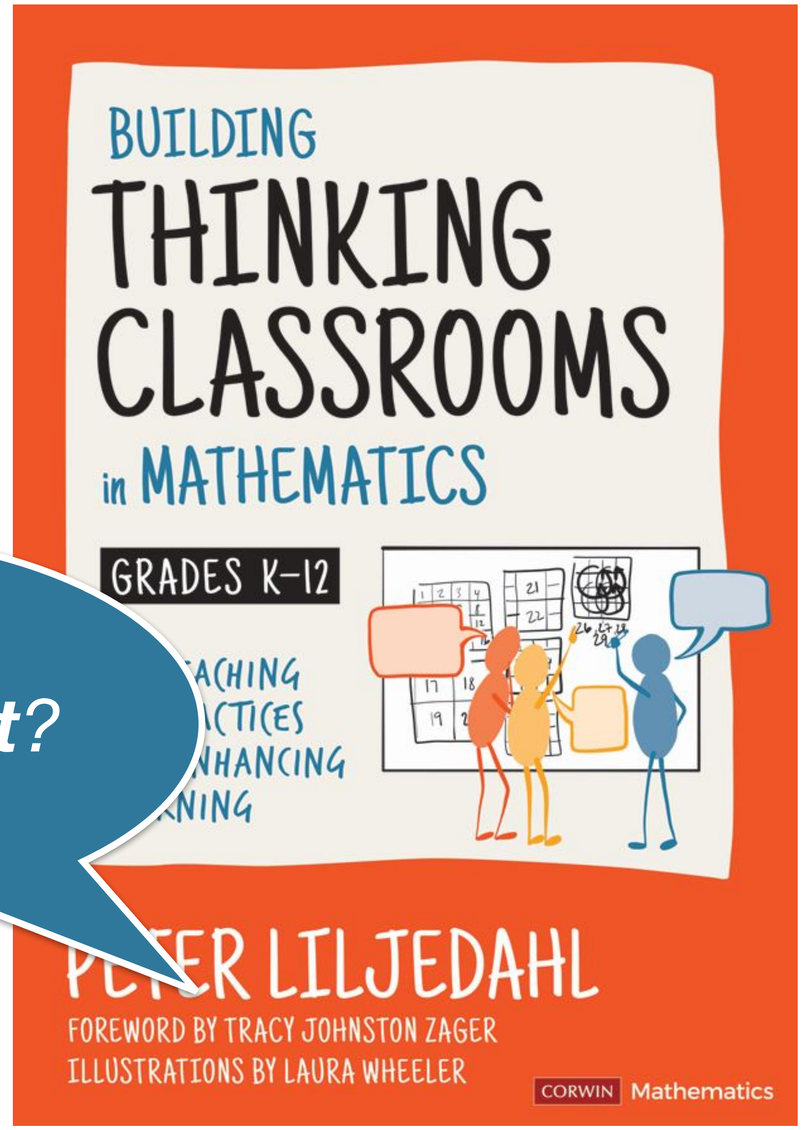
Learning Standards	
Curricular Competencies	**Content**
• **analyze** and **apply** mathematical ideas using reason	• quadratic functions
• **explain** and **justify** mathematical ideas and decisions	


How many learning standards?

FRACTIONS	BASIC	INTERMEDIATE	ADVANCED
Definitions			
Add and subtract proper fractions			
Add and subtract mixed fractions			
Multiply and divide proper fractions			
Multiply and divide mixed fractions			
Solve order of operation tasks with proper and mixed fractions			
Solve contextual problems involving fractions			
Estimate solutions for problems involving fractions			

*What feels **correct**?*

*What **doesn't**?*



FRACTIONS	BASIC	INTERMEDIATE	ADVANCED
Definitions			
Add and subtract proper fractions			
Add and subtract mixed fractions			
Multiply and divide proper fractions			
Multiply and divide mixed fractions			
Solve order of operation tasks with proper and mixed fractions			
Solve contextual problems involving fractions			
Estimate solutions for problems involving fractions			

Operations with Fractions
add and subtract fractions
multiply and divide fractions
evaluate expressions with two or more operations on fractions
solve contextual problems involving fractions

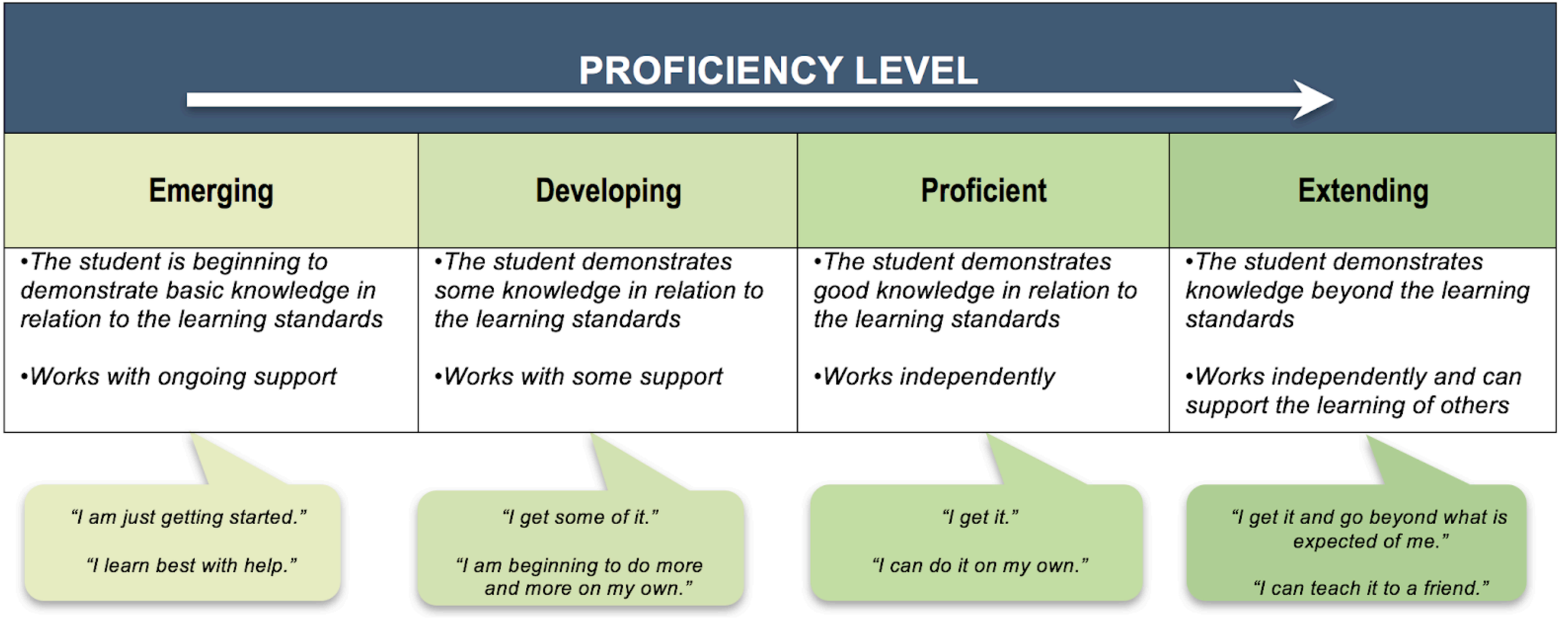
Foundations of Mathematics and Pre-calculus 10

Learning Standard	Delineated Learning Standards
systems of linear equations	*Deconstruct this standard into 2-4 subtopics, or outcomes.*

Foundations of Mathematics and Pre-calculus 10

Learning Standard	Delineated Learning Standards
systems of linear equations	solve systems of linear equations graphically
	solve systems of linear equations algebraically
	model and solve contextual problems involving systems of linear equations

What do **Emerging**
& **Extending** *mean?*



Source: Surrey Schools?

Proficiency Scale	Emerging	Developing	Proficient	Extending
	The student demonstrates an initial understanding of the concepts and competencies relevant to the expected learning.	The student demonstrates a partial understanding of the concepts and competencies relevant to the expected learning.	The student demonstrates a complete understanding of the concepts and competencies relevant to the expected learning.	The student demonstrates a sophisticated understanding of the concepts and competencies relevant to the expected learning.

Source: BC Ministry of Education (as of the 2018/19 school year)

PROFICIENCY LEVEL			
Emerging	**Developing**	**Proficient**	**Extending**
•The student is beginning to demonstrate basic knowledge in relation to the learning standards *•Works with ongoing support*	*•The student demonstrates some knowledge in relation to the learning standards* *•Works with some support*	*•The student demonstrates good knowledge in relation to the learning standards* *•Works independently*	*•The student demonstrates knowledge beyond the learning standards* *•Works independently and can support the learning of others*
"I am just getting started." *"I learn best with help."*	*"I get some of it."* *"I am beginning to do more and more on my own."*	*"I get it."* *"I can do it on my own."*	*"I get it and go beyond what is expected of me."* *"I can teach it to a friend."*

Proficiency Scale	Emerging	Developing	Proficient	Extending
	The student demonstrates an initial understanding of the concepts and competencies relevant to the expected learning.	The student demonstrates a partial understanding of the concepts and competencies relevant to the expected learning.	The student demonstrates a complete understanding of the concepts and competencies relevant to the expected learning.	The student demonstrates a sophisticated understanding of the concepts and competencies relevant to the expected learning.

basic some good beyond

initial partial complete sophisticated

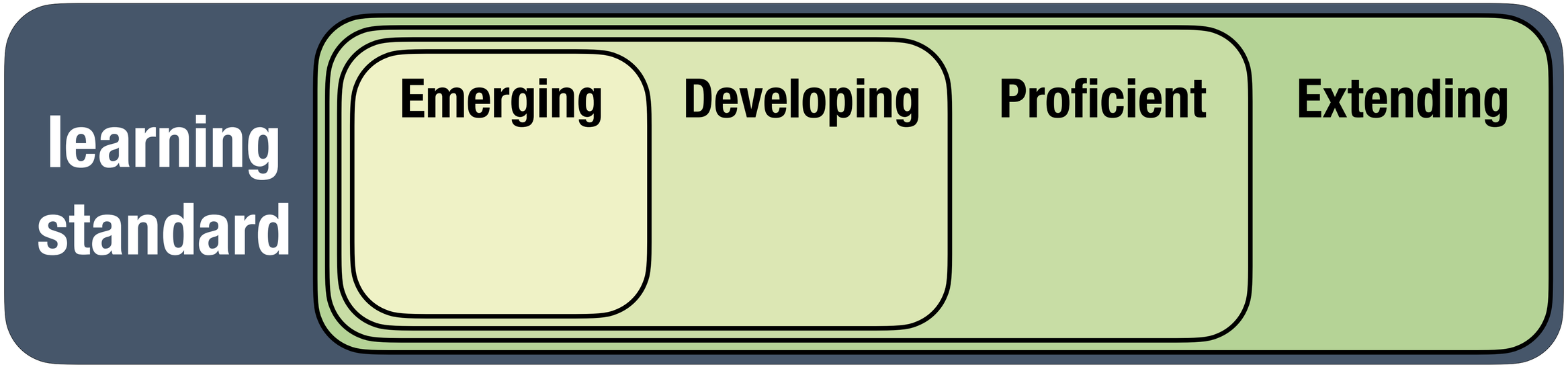
with support independence

depth

teach

What are some implications?

What does each proficiency level look like?



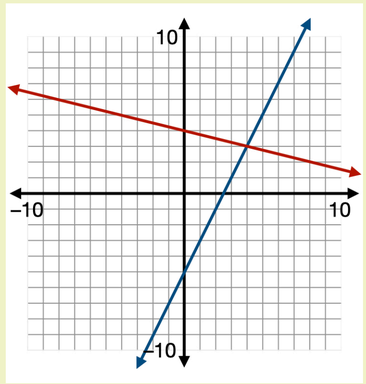
Descriptive · Positive · Progressive & Additive

solve systems of linear equations graphically

Emerging

identify the solution from a graph or table

What is the solution to the system represented by the graph?



Developing

determine the solution given equations in slope-intercept form

Solve graphically:

$$y = 2x - 5$$
$$y = -\frac{1}{4}x + 4$$

Proficient

determine the solution given equations in general form

Solve graphically:

$$2x + 5y + 25 = 0$$
$$4x - 2y + 14 = 0$$

determine the number of solutions

Analyze the system to determine whether it has one solution, no

Extending

create a system given constraints

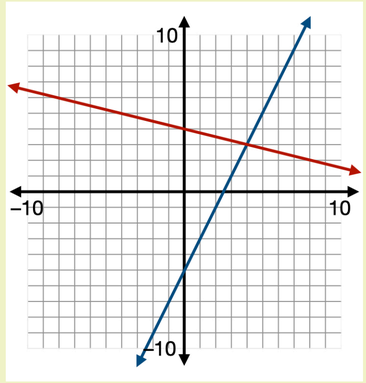
Create a system so that:

- the solution is (-3, -1)
- one line has a negative slope
- one line enters the first quadrant

Place the numbers from 1 to 9 in the boxes below so that the system has infinitely many solutions:

solve systems of linear equations graphically

What is the solution to the system represented by the graph?



form

Solve graphically:

$$y = 2x - 5$$
$$y = -\frac{1}{4}x + 4$$

Solve graphically:

$$2x + 5y + 25 = 0$$
$$4x - 2y + 14 = 0$$

determine the number of solutions

Analyze the system to determine whether it has one solution, no solution, or infinitely many solutions:

$$y = \frac{1}{2}x - 4$$
$$3x - 6y - 12 = 0$$

Create a system so that:

- the solution is (-3, -1)
- one line has a negative slope
- one line enters the first quadrant

Place the numbers from 1 to 9 in the boxes below so that the system has infinitely many solutions:

$$\square x + \square y = \square$$
$$\square x + \square y = \square$$

(Each number can be used only once.)

solve systems of linear equations algebraically

Emerging

verify the solution by substitution

Is (2, 5) a solution to the system:

$y = 3x - 1$
$x - 2y = 8$?

solve by elimination where multiplication is *not* necessary

Solve:

Developing

solve by substitution where *one* variable is isolated in an equation

Solve:

$x = 6 - 4y$
$2x - 3y = 1$

solve by elimination where multiplication of *one* equation is necessary

Proficient

solve by substitution where *neither* variable is isolated in an equation

Solve:

$2x + 5y + 7 = 0$
$3x - y = -2$

solve by elimination where multiplication of *both* equations is necessary

Extending

select, apply, and defend an algebraic approach

Would you rather solve the following system by elimination or substitution?

$4x - y - 3 = 0$
$6x - 2y - 5 = 0$

Why?

solve systems of linear equations algebraically

Is (2, 5) a solution to the system:

$y = 3x - 1$
$x - 2y = 8$?

solve by elimination where multiplication is *not* necessary

Solve:

$3x - 4y = 23$
$7x + 4y = 27$

variable is isolated in an equation

Solve:

$x = 6 - 4y$
$2x - 3y = 1$

solve by elimination where multiplication of *one* equation is necessary

Solve:

$7x + 2y = -1$
$3x - 4y = 19$

variable is isolated in an equation

Solve:

$2x + 5y + 7 = 0$
$3x - y = -2$

solve by elimination where multiplication of *both* equations is necessary

Solve:

$5x + 4y = 13$
$8x + 3y + 3 = 0$

approach

Would you rather solve the following system by elimination or substitution?

$4x - y - 3 = 0$
$6x - 2y - 5 = 0$

Why?

model and solve contextual problems involving systems of linear

Emerging

interpret the solution in context given a model

The heights of two candles over time can be modelled by:

$h = 20 - 2t$
$h = 16 - 1.5t$

What is the meaning, in context, of the solution (8, 4)?

Developing

model and solve combination problems

Two t-shirts and four hoodies sell for $254. Four t-shirts and five hoodies sell for $361. What is the price of each item?

Proficient

model and solve parts-whole and catch-up problems

Tickets to a charity hockey game cost $12 for adults and $8 for children. A total of 150 tickets were sold for $1640. How many of each type of ticket were sold?

A gas vehicle has an initial cost of

Extending

model and solve mixture problems

A scientist needs to make 200 ml of a 42% alcohol solution. They mix 30% alcohol and 50% alcohol solutions. How much of each solution do they need?

solve contextual problems involving systems of linear equations

$h = 20 - 2t$
$h = 16 - 1.5t$

What is the meaning, in context, of the solution (8, 4)?

sell for $361. What is the price of each item?

$12 for adults and $8 for children. A total of 150 tickets were sold for $1640. How many of each type of ticket were sold?

A gas vehicle has an initial cost of $31 000 and an operating cost of $1500 per year. An electric vehicle has an initial cost of $43 000 and an operating cost of $500 per year. How many years will it take for the total cost of both vehicles to be same?

50% alcohol solutions. How much of each solution do they need?

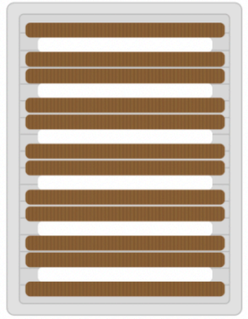
Let's get precise.

Show Correctness

Single Crème

Nutrition Facts

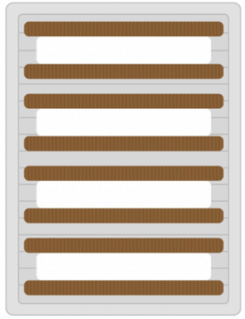
Calories 320



Double Crème

Nutrition Facts

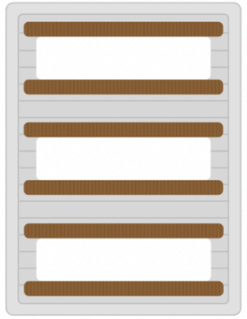
Calories 280



Triple Crème

Nutrition Facts

Calories



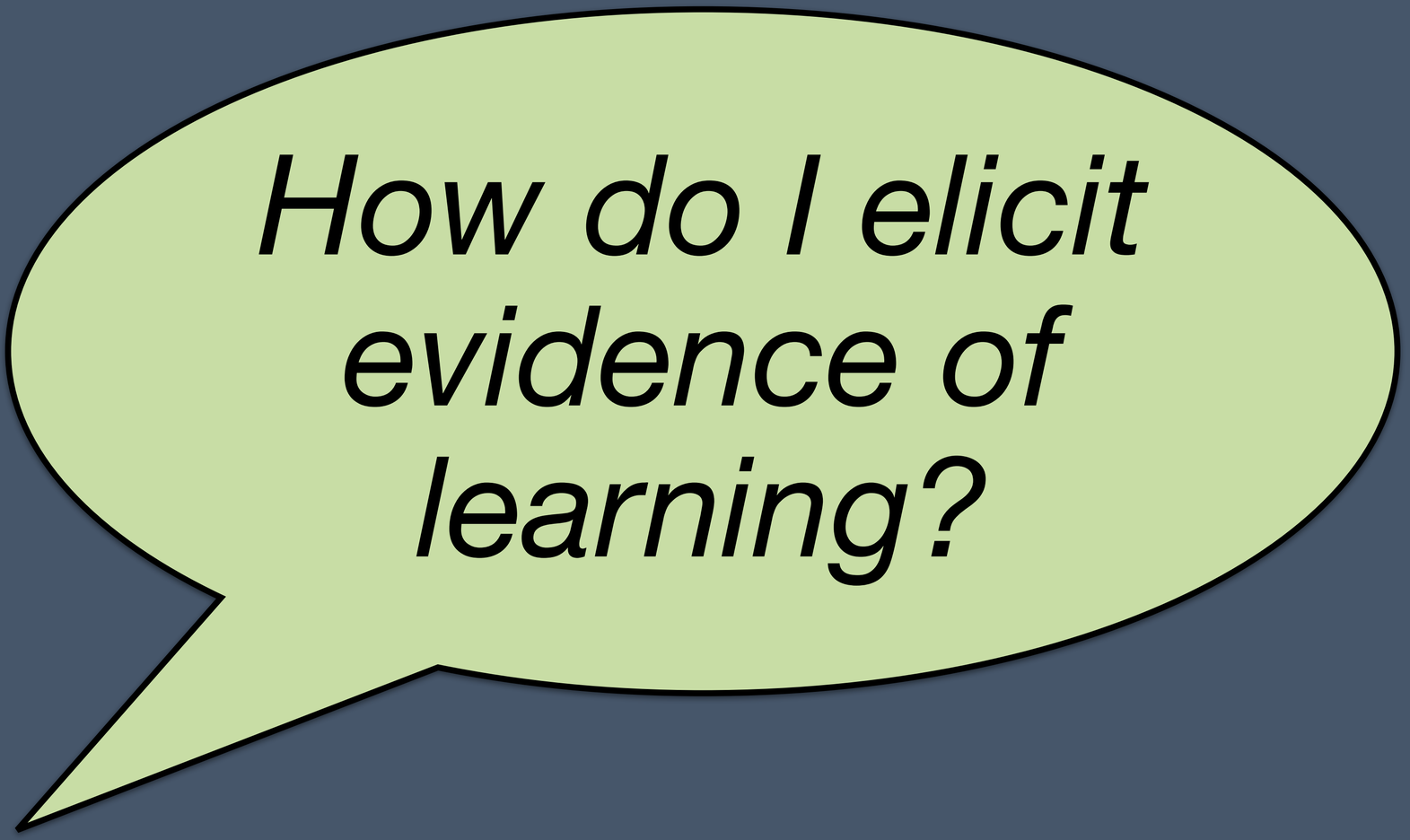
Use the information here—with whatever tools you want—to calculate the exact number of calories in the Triple Crème pack.

Enter your answer here.

Responses | Summary

No responses yet...

Teacher Moves | Sample Responses


How do I elicit evidence of learning?

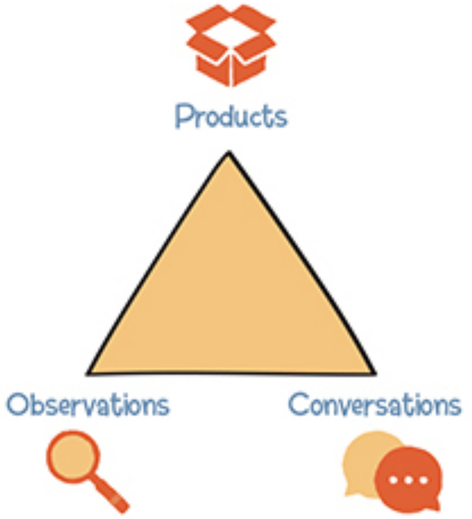

Conversations
EVIDENCE OF STUDENT LEARNING
Observations
Products

SEEKING TRUTH VIA TRIANGULATION

Ideas by Peter Liljedahl & Sketchnote by @DanielLaGamba

DATA SOURCES

Student learning can be documented through multiple sources of data



MISCONCEPTION

Triangulation is NOT about averaging the data from multiple sources

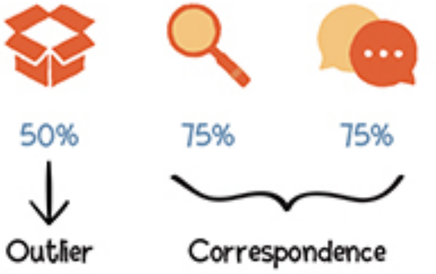
$$\bar{x} = \frac{\text{📦} + \text{🔍} + \text{💬}}{n}$$

TYRANNY OF OBJECTIVITY

Averaging in this manner is a form of grade deflation.

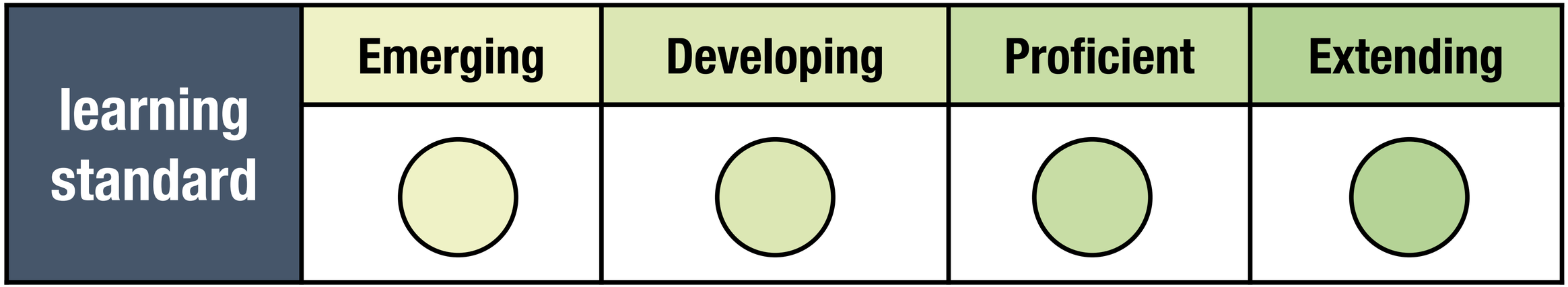
CORRESPONDENCE

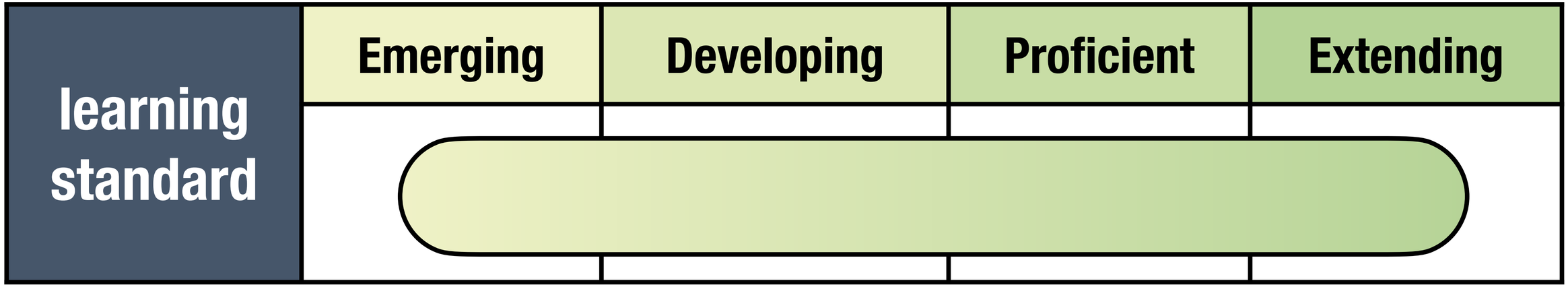
Triangulation seeks correspondence between multiple sources of data



RULE OF TWO

If there is correspondence between two data forms, then it is unnecessary or redundant to reference a third data form.


learning standard
Emerging
Developing
Proficient
Extending


learning standard
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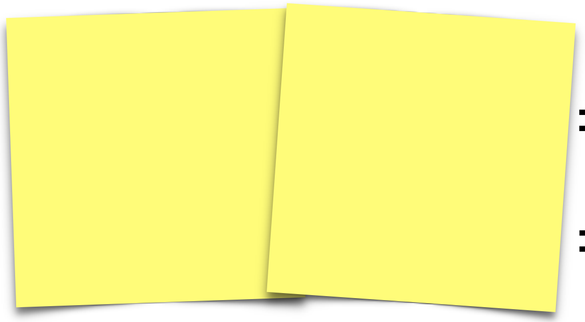


$= 0$ ①

$= 0$ ②

$$10p + 6q + 38 = 0$$

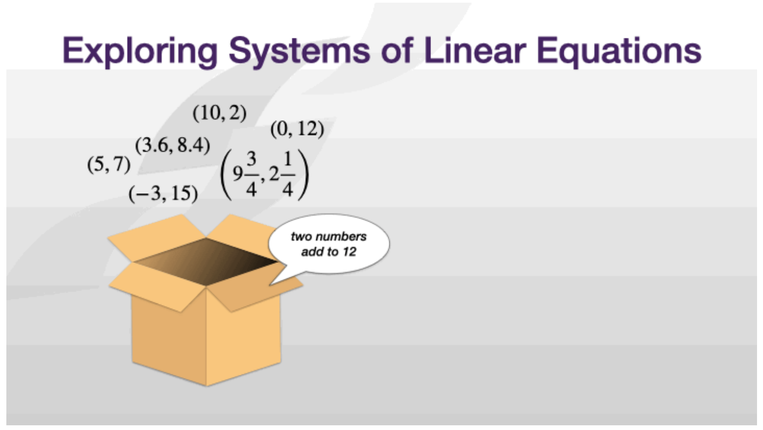
$$-10p + 25q + 55 = 0$$

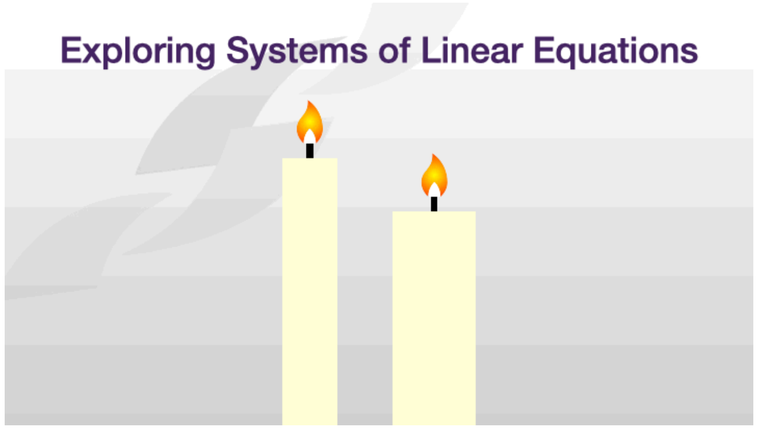
$$31q + 93 = 0$$

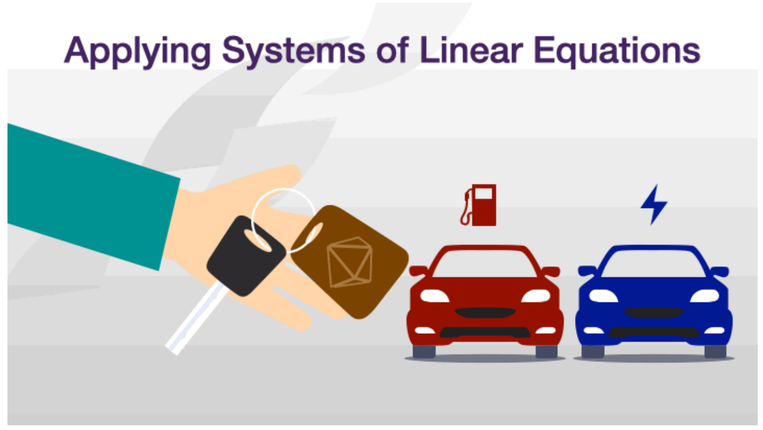
$$31q = -93$$

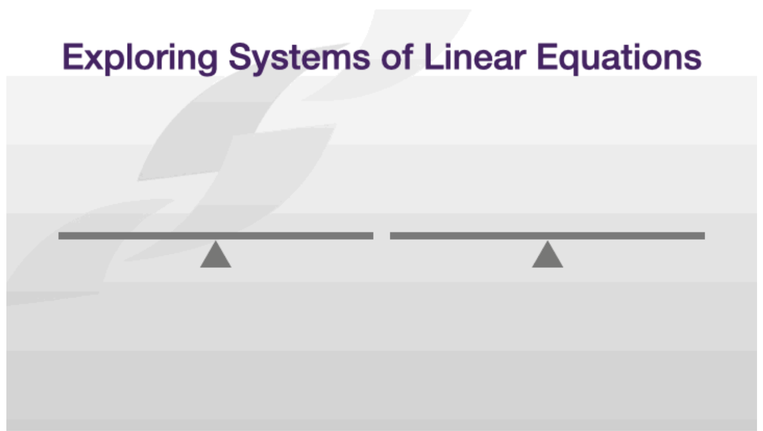
$$q = -3$$

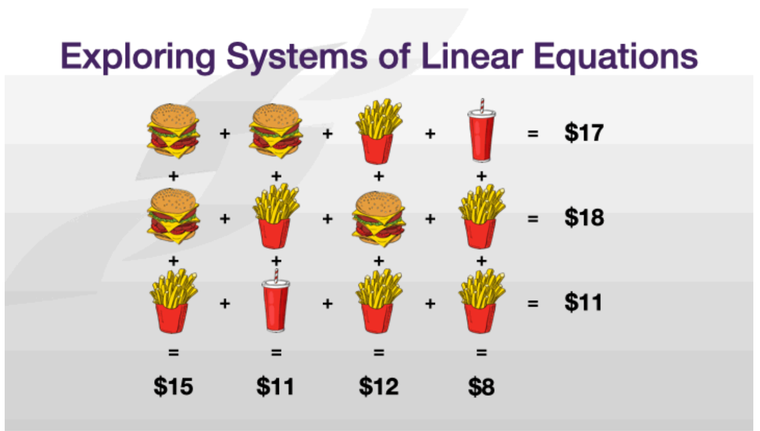
chrishunter.ca/2020/11/23/principles-of-math-videos/

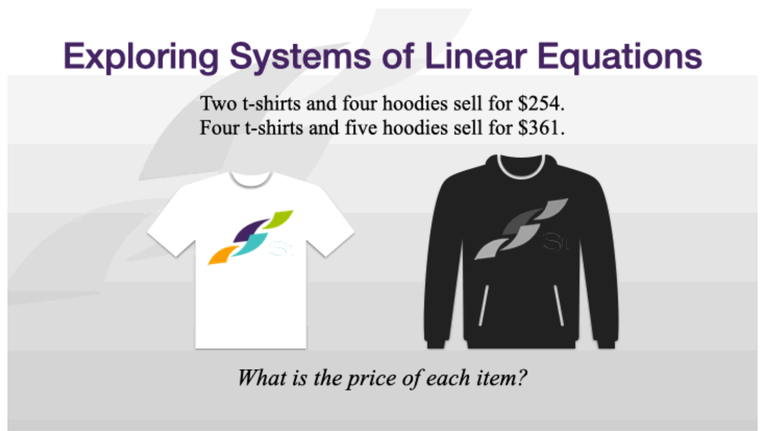












Emerging

Solve Graphically

Solve Algebraically

Model Contextual Problems

vs.

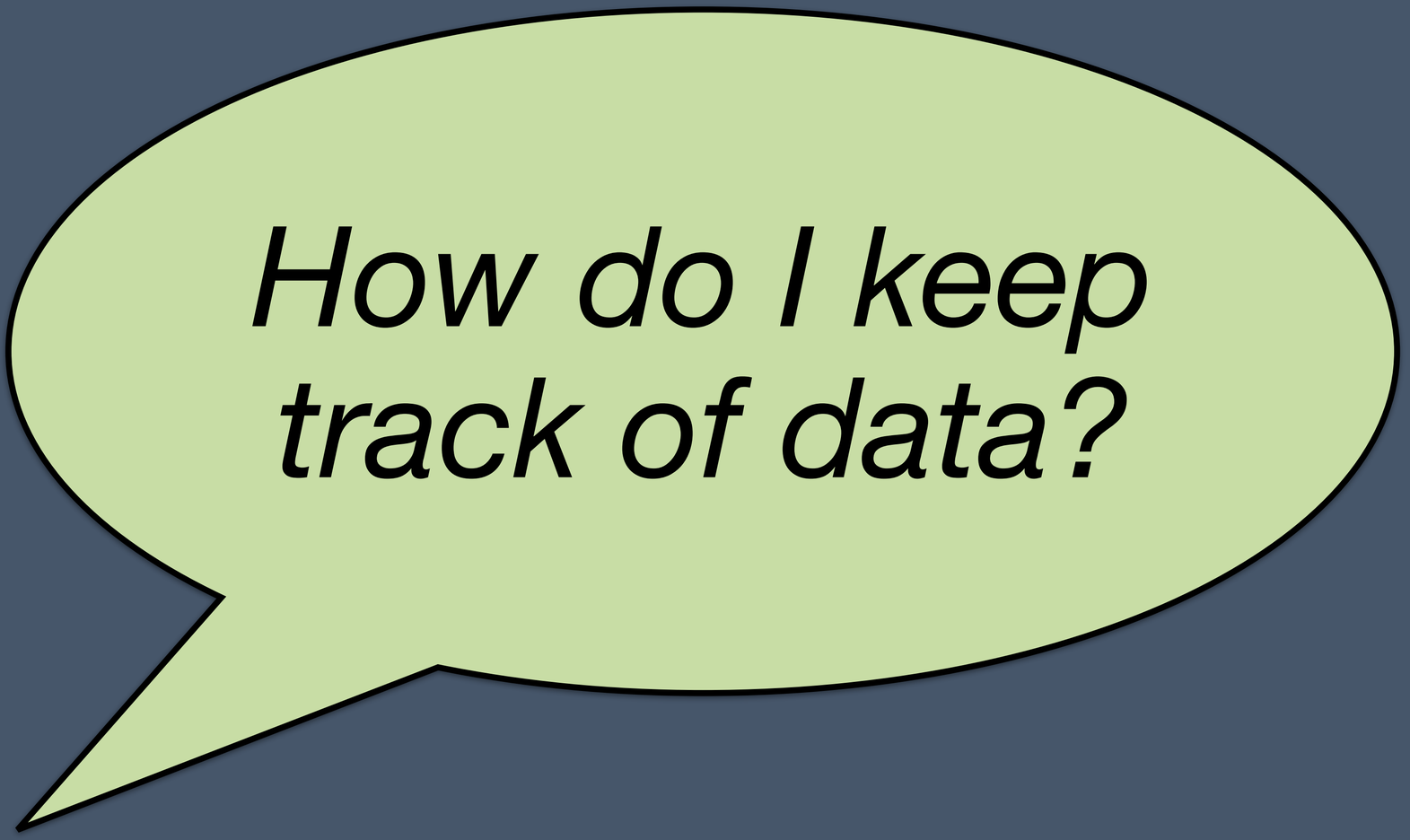
Solve Graphically

Emerging

Developing

Proficient

Extending


How do I keep
track of data?

Name	Learning Outcome									
	1	2	3	4	5	6	7	8	9	10
Aaron	Ex	P	Ex	P	P	P	P	Ex	P	P
Blake	D	Em	Ex	P	P	Em	D	Ex	P	D
Denise	D	Em	P	D	P	D	Em	D	D	Em
...										

Name	Learning Outcome									
	1	2	3	4	5	6	7	8	9	10
Aaron	Ex	P	Ex	P	P	P	P	Ex	P	P
Blake	D	Em	Ex	P	P	Em	D	Ex	P	D
Denise	D	Em	P	D	P	D	Em	D	D	Em
…										

D P P Ex Ex → Ex

BUILDING THINKING CLASSROOMS in MATHEMATICS

GRADES K–12

14 TEACHING PRACTICES FOR ENHANCING LEARNING

PETER LILJEDAHL

FOREWORD BY TRACY JOHNSTON ZAGER

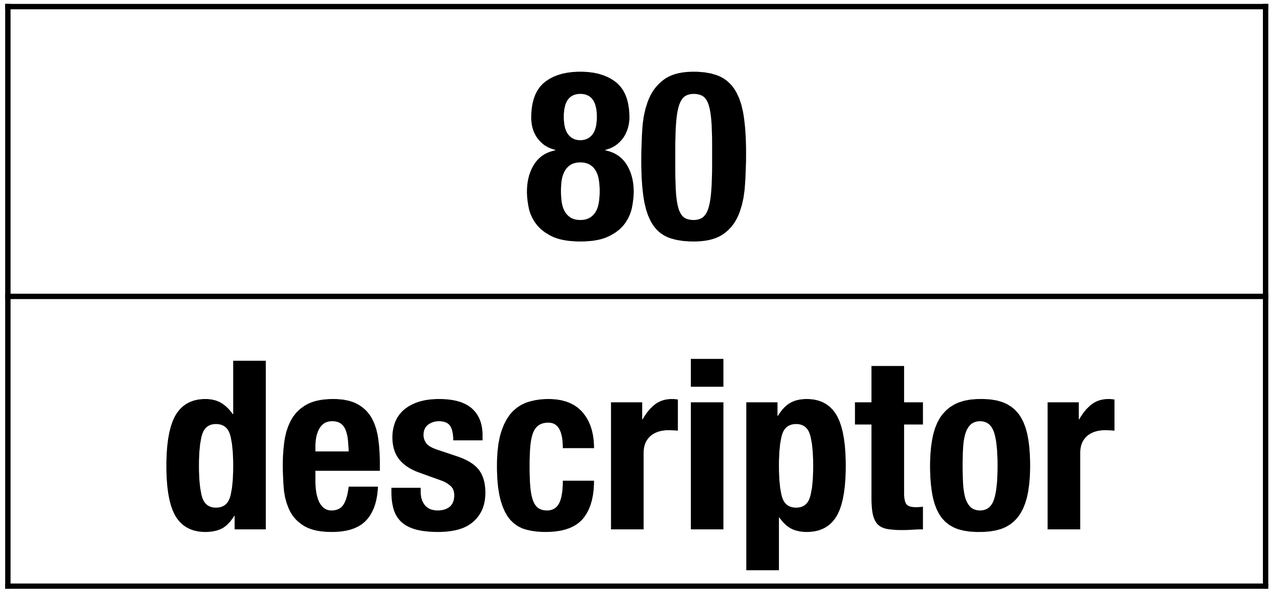
ILLUSTRATIONS BY LAURA WHEELER

CORWIN Mathematics

“The fact that she didn’t know how to do something in the beginning is expected–she is learn***ing***, not learn***ed***, and she shouldn’t be punished for her early-not-knowing.”

Peter Liljedahl

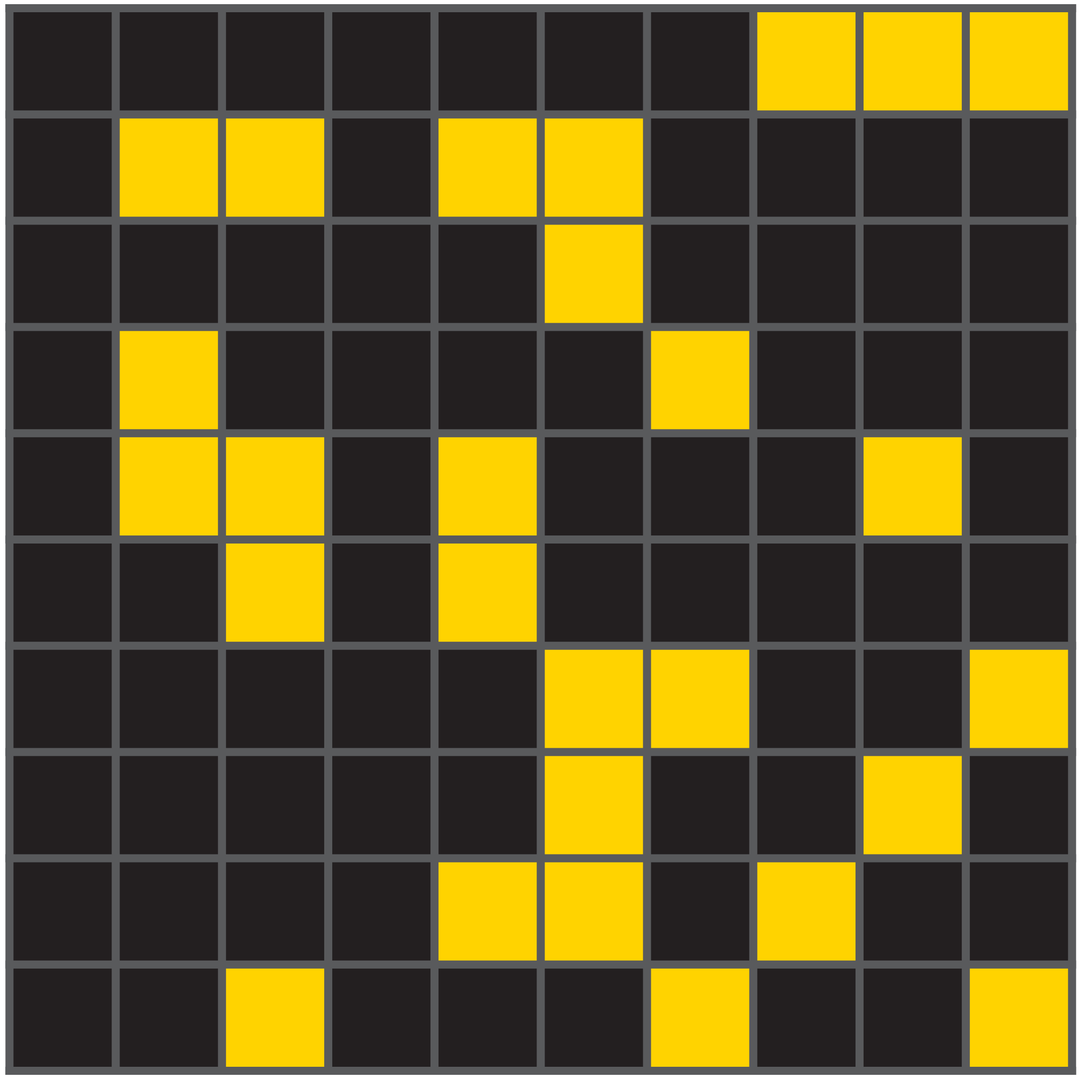
How do I translate that to a percentage?

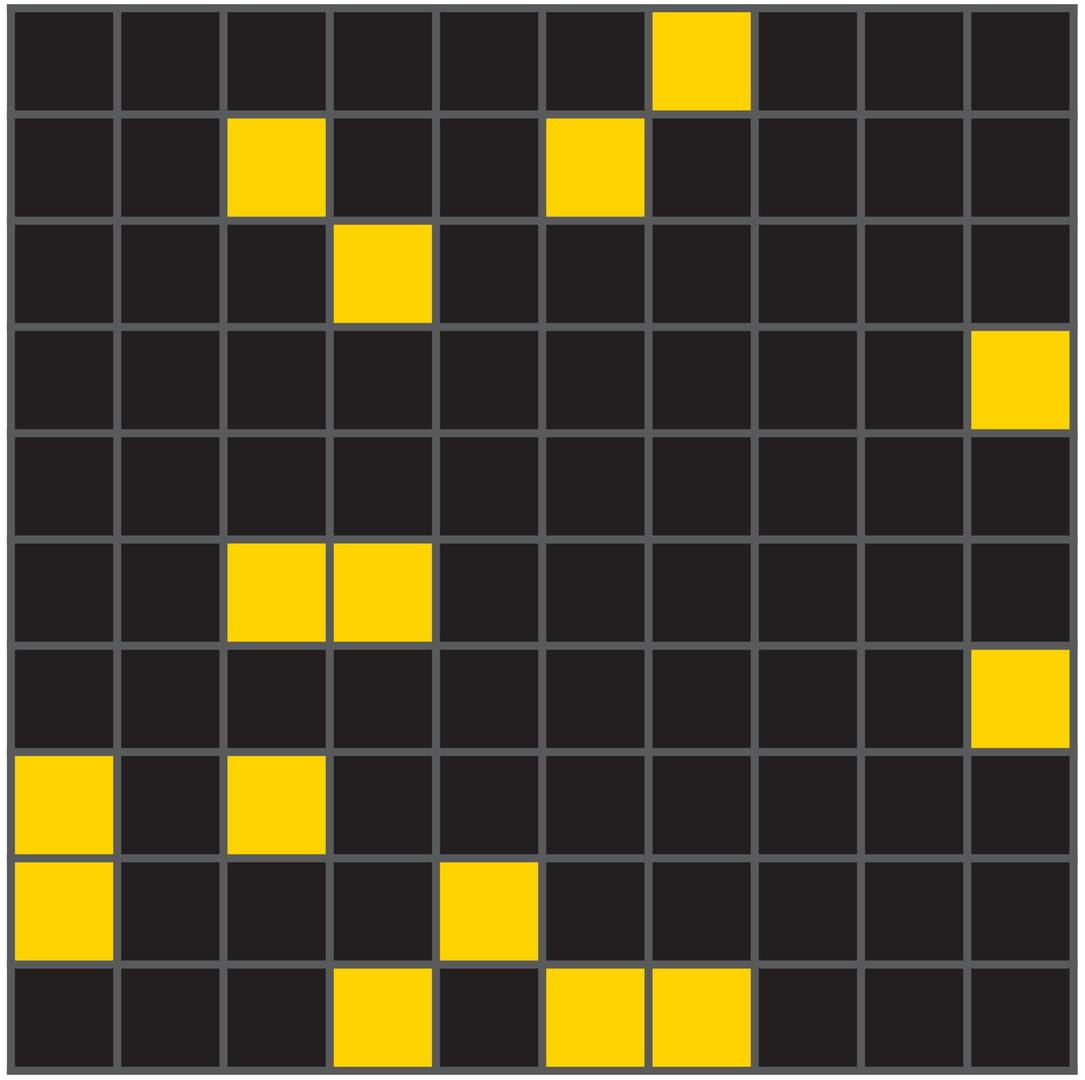

80
descriptor

79	80	81
descriptor	descriptor	descriptor

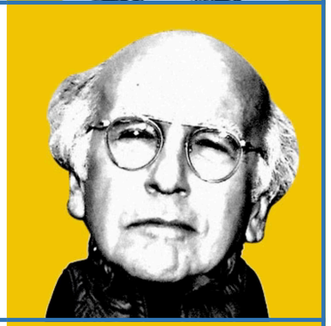
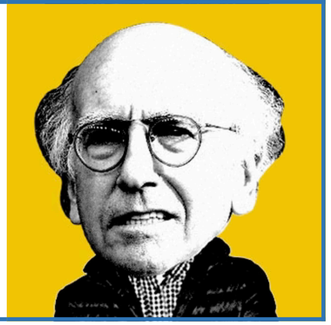
B

73	74	75	76	77	78	79	80	81	82	83	84	85
descriptor	descriptor	descriptor	descriptor	descriptor	descriptor	descriptor	descriptor	descriptor	descriptor	descriptor	descriptor	descriptor





Letter Grade	Percentage Range	Definition
A	86 - 100	The student demonstrates excellent or outstanding performance in relation to the learning outcomes for the course or subject and grade.
B	73 – 85	The student demonstrates very good performance in relation to the learning outcomes for the course or subject and grade
C+	67 – 72	The student demonstrates good performance in relation to the learning outcomes for the course or subject and grade.
C	60 – 66	The student demonstrates satisfactory performance in relation to the expected learning outcomes for the course or subject and grade.
C-	50 – 59	The student demonstrates minimally acceptable performance in relation to the learning outcomes for the course or subject and grade.
F	0 – 49	The student has not demonstrated, or is not demonstrating, minimally acceptable performance in relation to the learning outcomes for the course or subject and grade.

Letter Grade	Percentage Range	Definition	
Hi-B	82 – 85	The student demonstrates **pretty, pretty, pretty, pretty good** performance in relation to the learning outcomes for the course or subject and grade.	
Mid-B	77 – 81	The student demonstrates **pretty, pretty, pretty good** performance in relation to the learning outcomes for the course or subject and grade.	
Lo-B	73 – 76	The student demonstrates **pretty, pretty good** performance in relation to the learning outcomes for the course or subject and grade.	

F												
37	38	39	40	41	42	43	44	45	46	47	48	49
descriptor	descriptor	descriptor	descriptor	descriptor	descriptor	descriptor	descriptor	descriptor	descriptor	descriptor	descriptor	descriptor

C-									
50	51	52	53	54	55	56	57	58	59
descriptor	descriptor	descriptor	descriptor	descriptor	descriptor	descriptor	descriptor	descriptor	descriptor

C						
60	61	62	63	64	65	66
descriptor	descriptor	descriptor	descriptor	descriptor	descriptor	descriptor

C+					
67	68	69	70	71	72
descriptor	descriptor	descriptor	descriptor	descriptor	descriptor

B												
73	74	75	76	77	78	79	80	81	82	83	84	85
descriptor	descriptor	descriptor	descriptor	descriptor	descriptor	descriptor	descriptor	descriptor	descriptor	descriptor	descriptor	descriptor

A														
86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
descriptor	descriptor	descriptor	descriptor	descriptor	descriptor	descriptor	descriptor	descriptor	descriptor	descriptor	descriptor	descriptor	descriptor	descriptor

1-2-3-4

Aaron				
LO	Em	D	P	Ex
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

$$\frac{(7 \times 3) + (3 \times 4)}{10 \times 4} = \frac{33}{40} = 83\,\%$$

Blake				
LO	Em	D	P	Ex
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

$$\frac{(2 \times 1) + (3 \times 2) + (3 \times 3) + (2 \times 4)}{10 \times 4} = \frac{25}{40} = 63\,\%$$

Denise				
LO	Em	D	P	Ex
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

$$\frac{(3 \times 1) + (5 \times 2) + (2 \times 3)}{10 \times 4} = \frac{19}{40} = 48\,\%$$

2-3-4-5

Aaron				
LO	Em	D	P	Ex
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

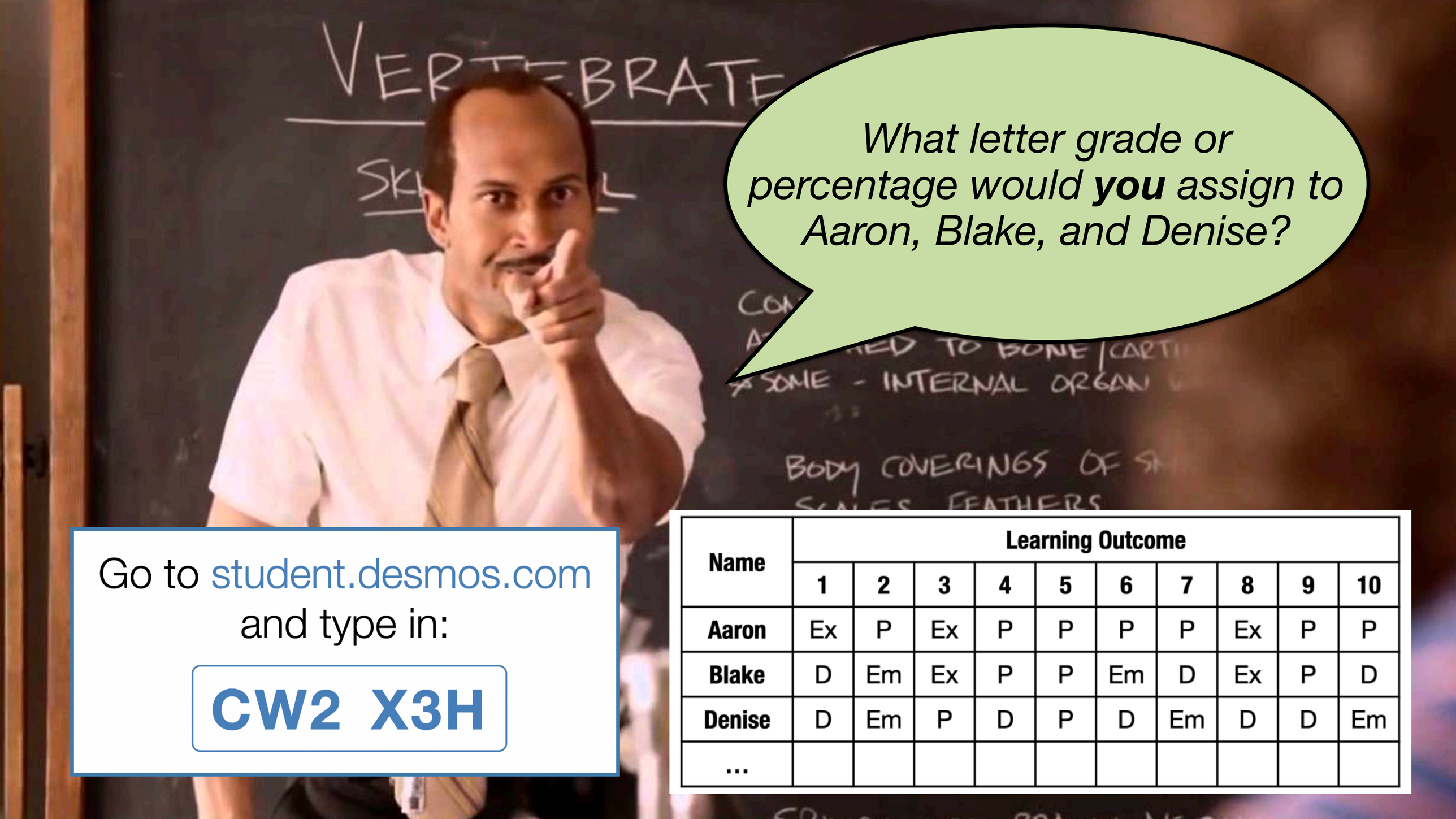
$$\frac{(7\times 4)+(3\times 5)}{10\times 5}=\frac{43}{50}=86\,\%$$

Blake				
LO	Em	D	P	Ex
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

$$\frac{(2\times 2)+(3\times 3)+(3\times 4)+(2\times 5)}{10\times 5}=\frac{35}{50}=70\,\%$$

Denise				
LO	Em	D	P	Ex
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

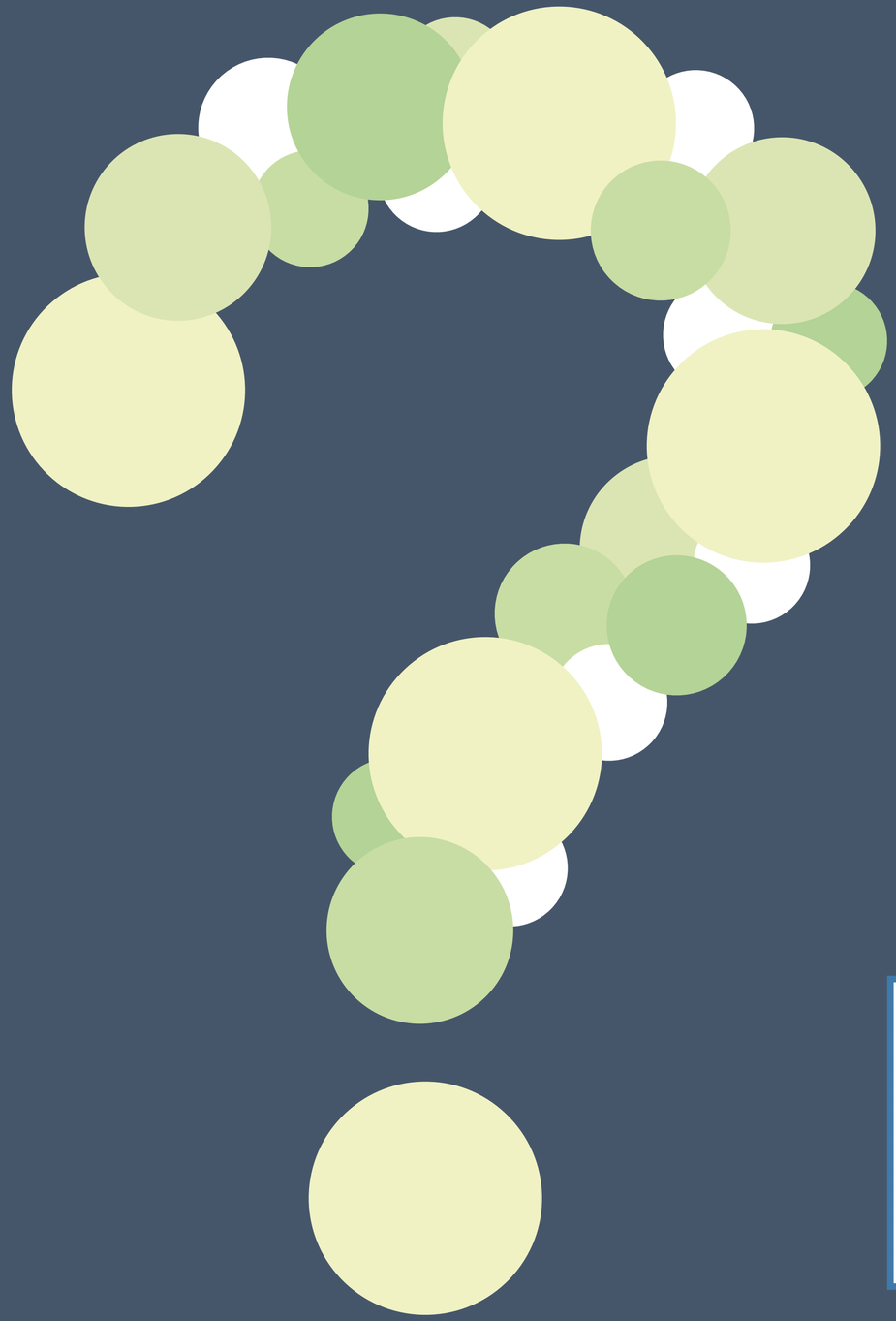
$$\frac{(3\times 2)+(5\times 3)+(2\times 4)}{10\times 5}=\frac{29}{50}=58\,\%$$



Go to student.desmos.com and type in:

CW2 X3H

Name	Learning Outcome									
	1	2	3	4	5	6	7	8	9	10
Aaron	Ex	P	Ex	P	P	P	P	Ex	P	P
Blake	D	Em	Ex	P	P	Em	D	Ex	P	D
Denise	D	Em	P	D	P	D	Em	D	D	Em
…										



Go to student.desmos.com
and type in:

CW2 X3H