4-12-2024

Standards-Based Grading in Secondary Science Classes

Jesse Wilcox

Sara Karbeling

STANDARDS-BASED GRADING IN SECONDARY SCIENCE CLASSES

How Structuring Secondary Science Courses with Grades Based on Standards can Transform Pedagogy

JESSE WILCOX

University of Northern Iowa

SARA KARBELING

Iowa City Community Schools

April 12, 2024

Outline of Session

- Discussing Grading Practices
- Looking at Four Core Principles of SBG in Science
- Standards-based Grading in Action
- Questions and Discussion

What are some issues with traditional grading practices?

Grade	Letter
0 – 9	F
10 – 19	D
20 – 29	C
30 – 39	B
40 - 100	A

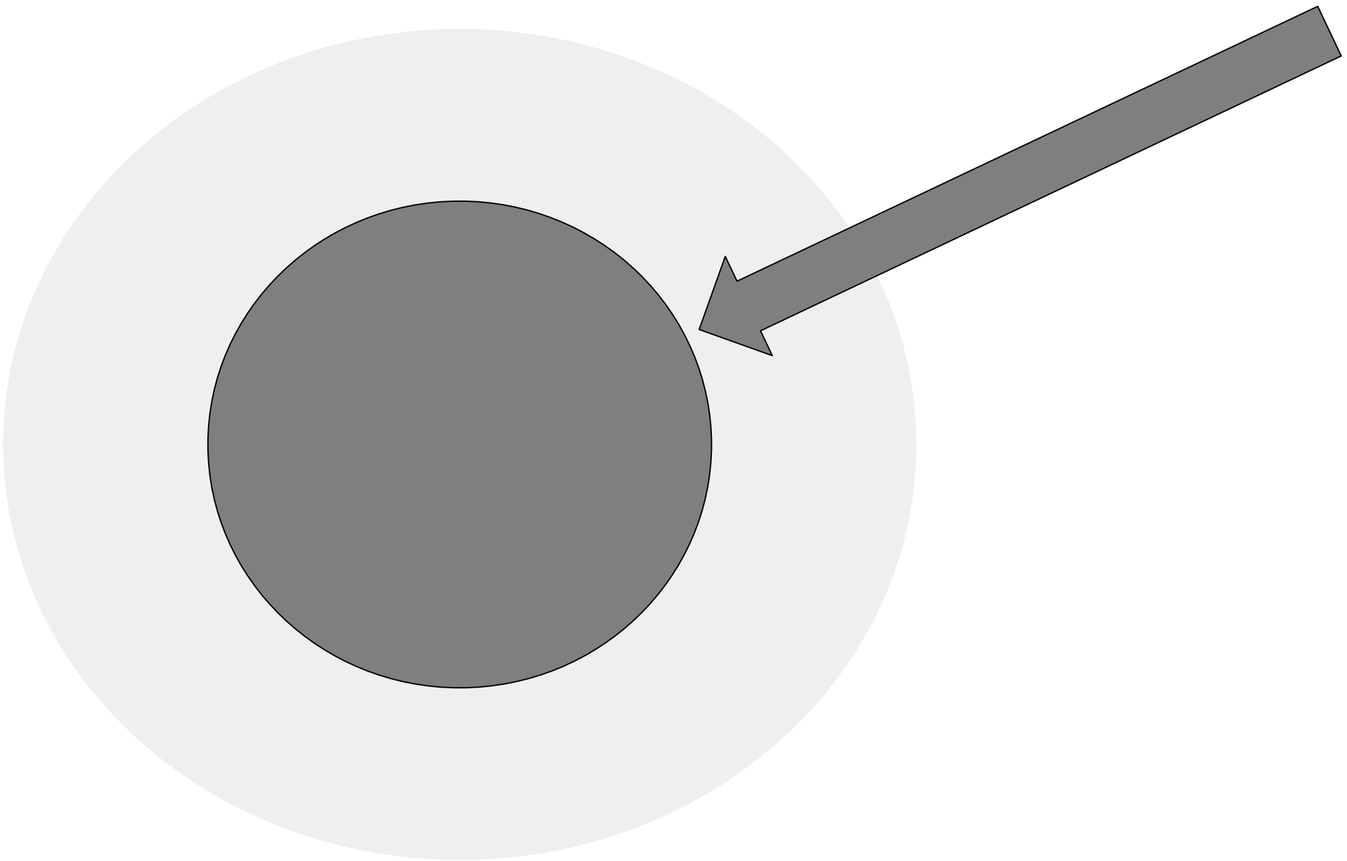
Grade	Letter
0 – 9	F
10 – 19	D
20 – 29	C
30 – 39	B
40 - 100	A

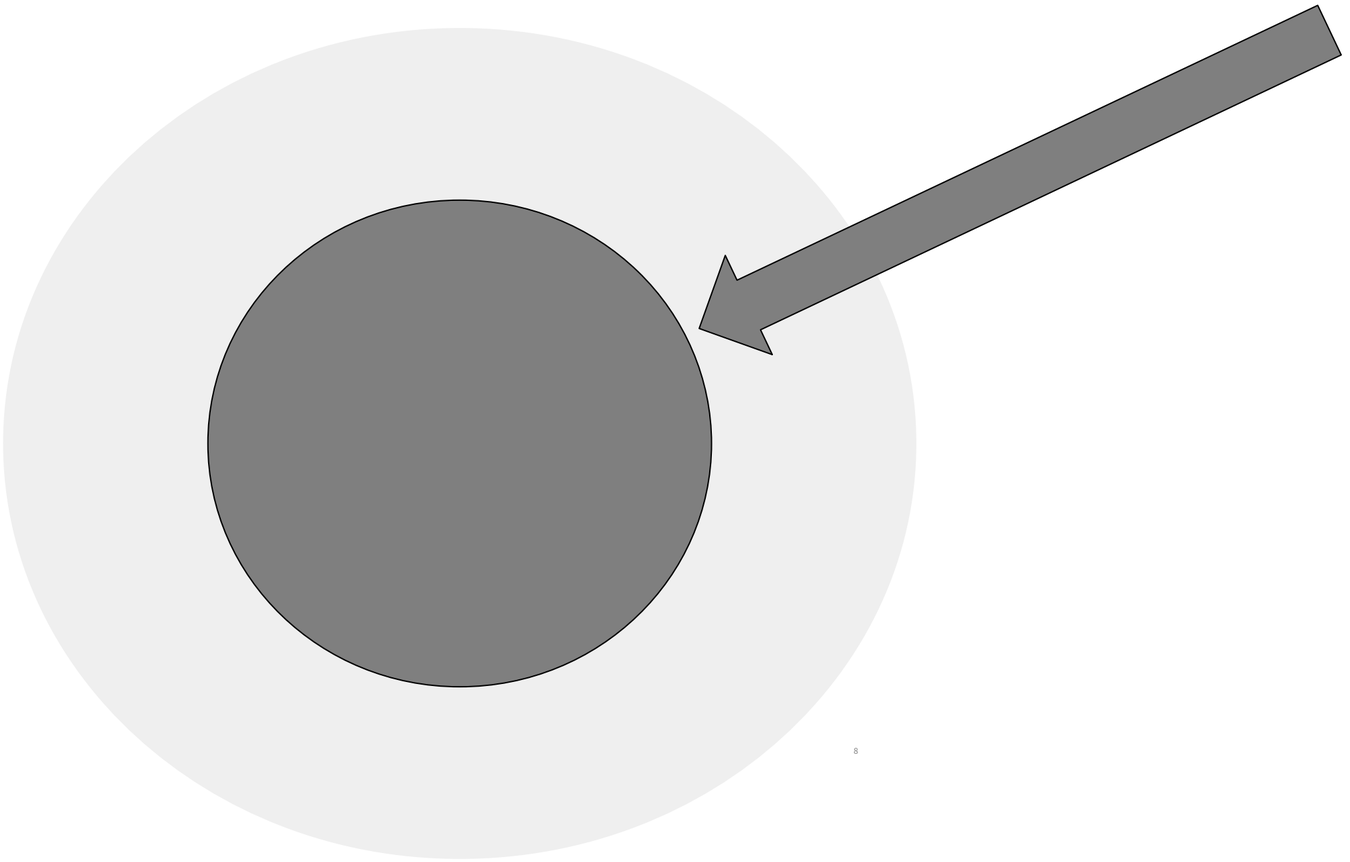
Grade	Letter
90 – 100	A
80 – 89	B
70 – 79	C
60 – 69	D
0 – 59	F

What do you know about Standards-based Grading?

How is it different from traditional grading?

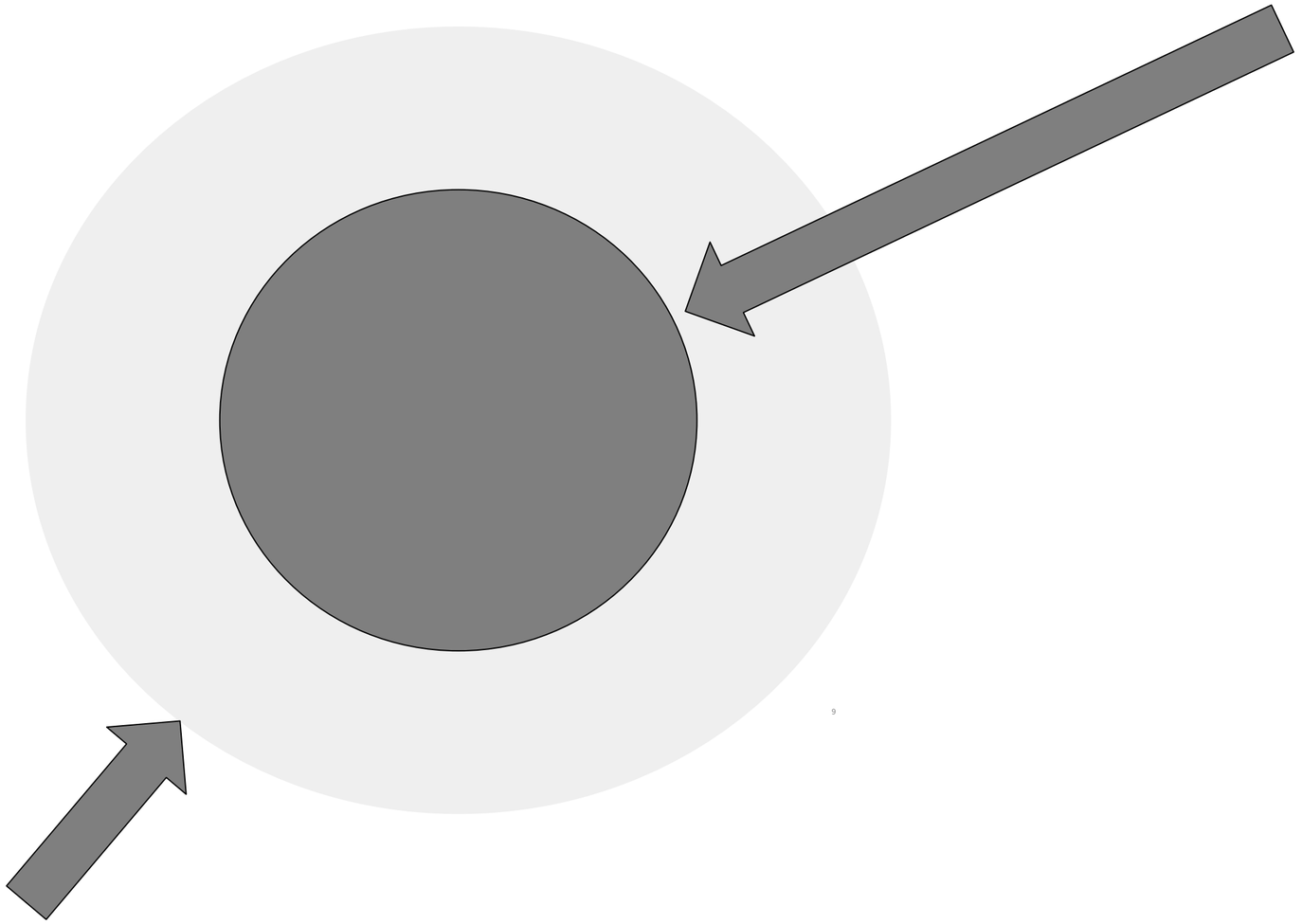
Core Principles of SBG





Core Principles of SBG

- Grading should communicate students' current levels of learning based on the NGSS.
- Teachers should use a finite number of performance categories to assess students' learning.
- Grades should be based on summative assessments rather than formative assessments or student behaviors.
- Students should have multiple opportunities to demonstrate their learning.



Implementation in Science?

Core Principles of SBG

- Grading should communicate students' current levels of learning based on the NGSS.
- Teachers should use a finite number of performance categories to assess students' learning.
- Grades should be based on summative assessments rather than formative assessments or student behaviors.
- Students should have multiple opportunities to demonstrate their learning.

SBG Core Principle #1:

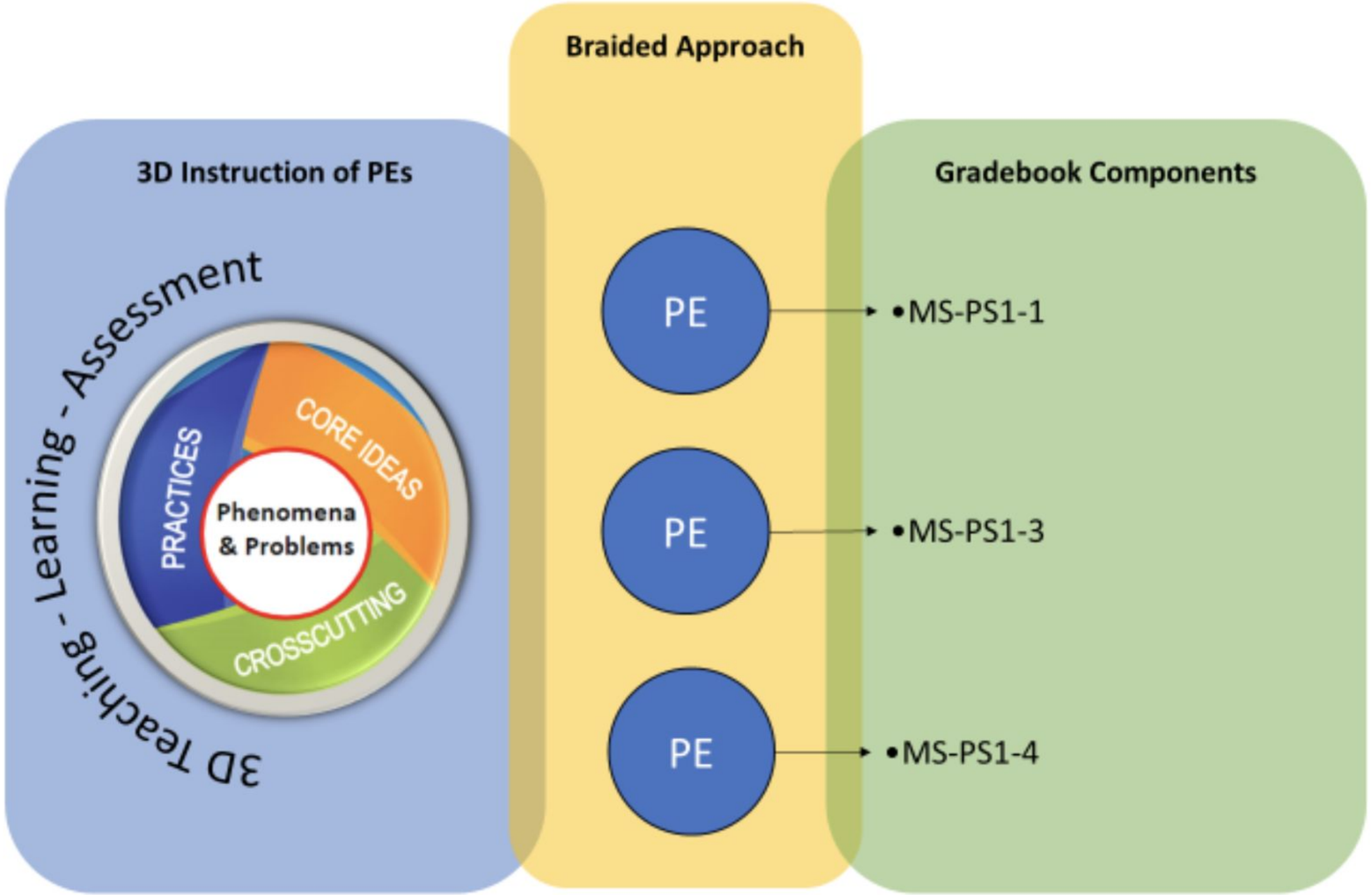
Grading should communicate students' current levels of learning based on the NGSS.

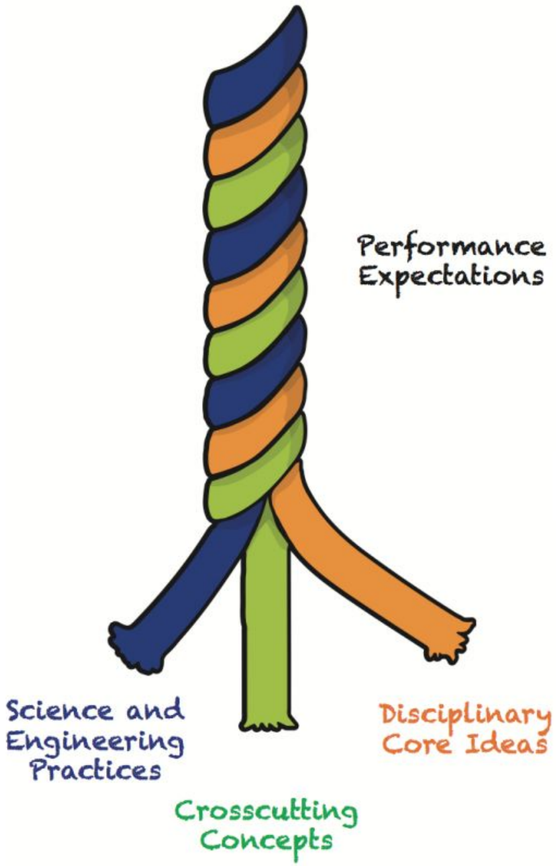
(Thanks to Chris Like!)

Three Common Methods of Communicating Grades in Science: Braided, Unbraided, Learning Targets

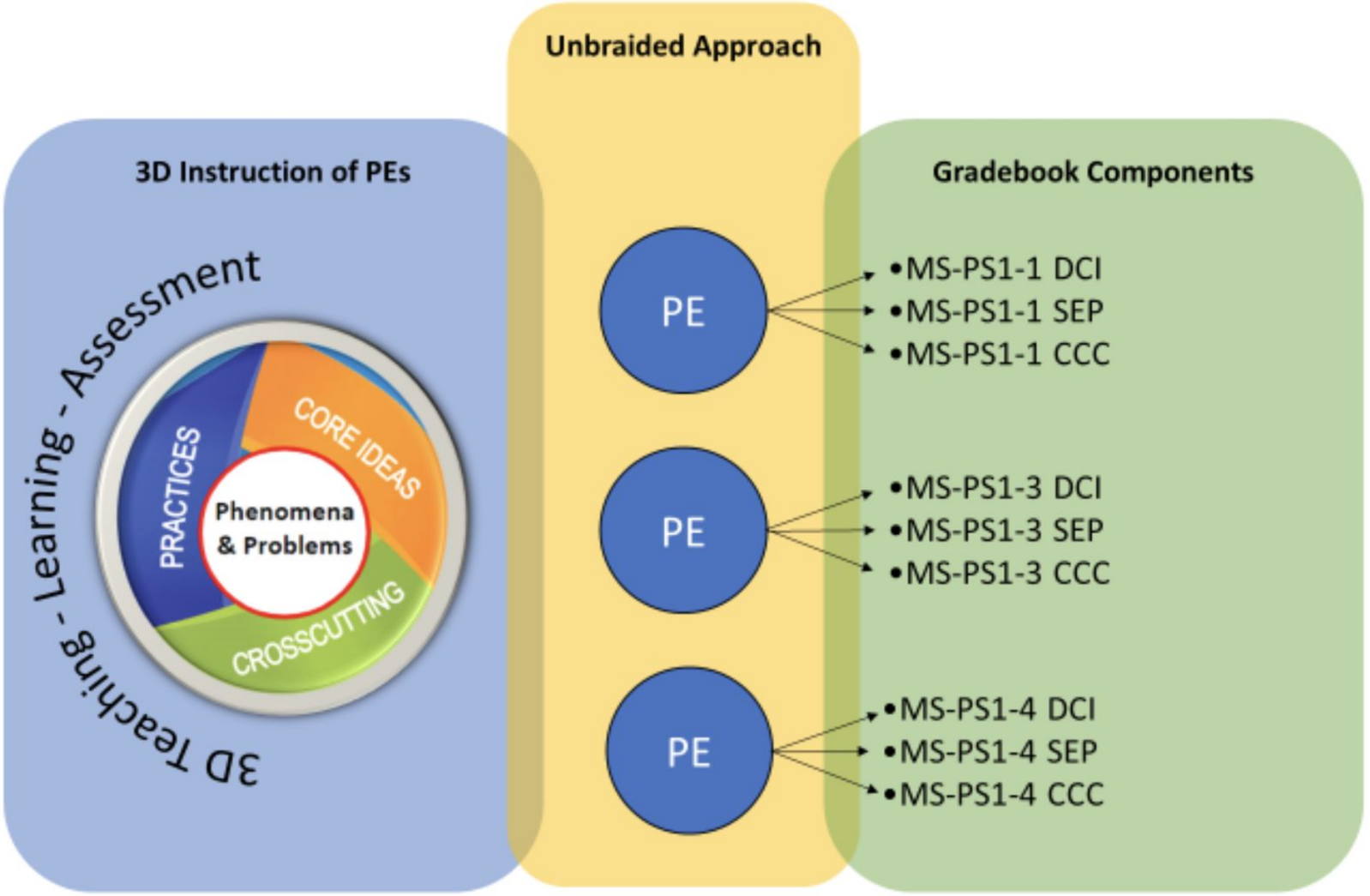
(Wilcox & Townsley, 2024; ACESSE, 2024)

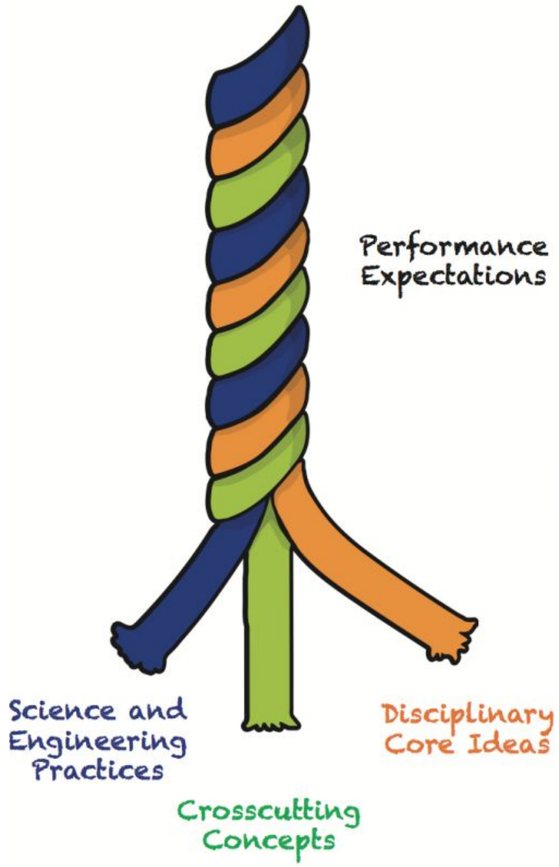
Braided Approach: One Grade for Each Performance Expectation



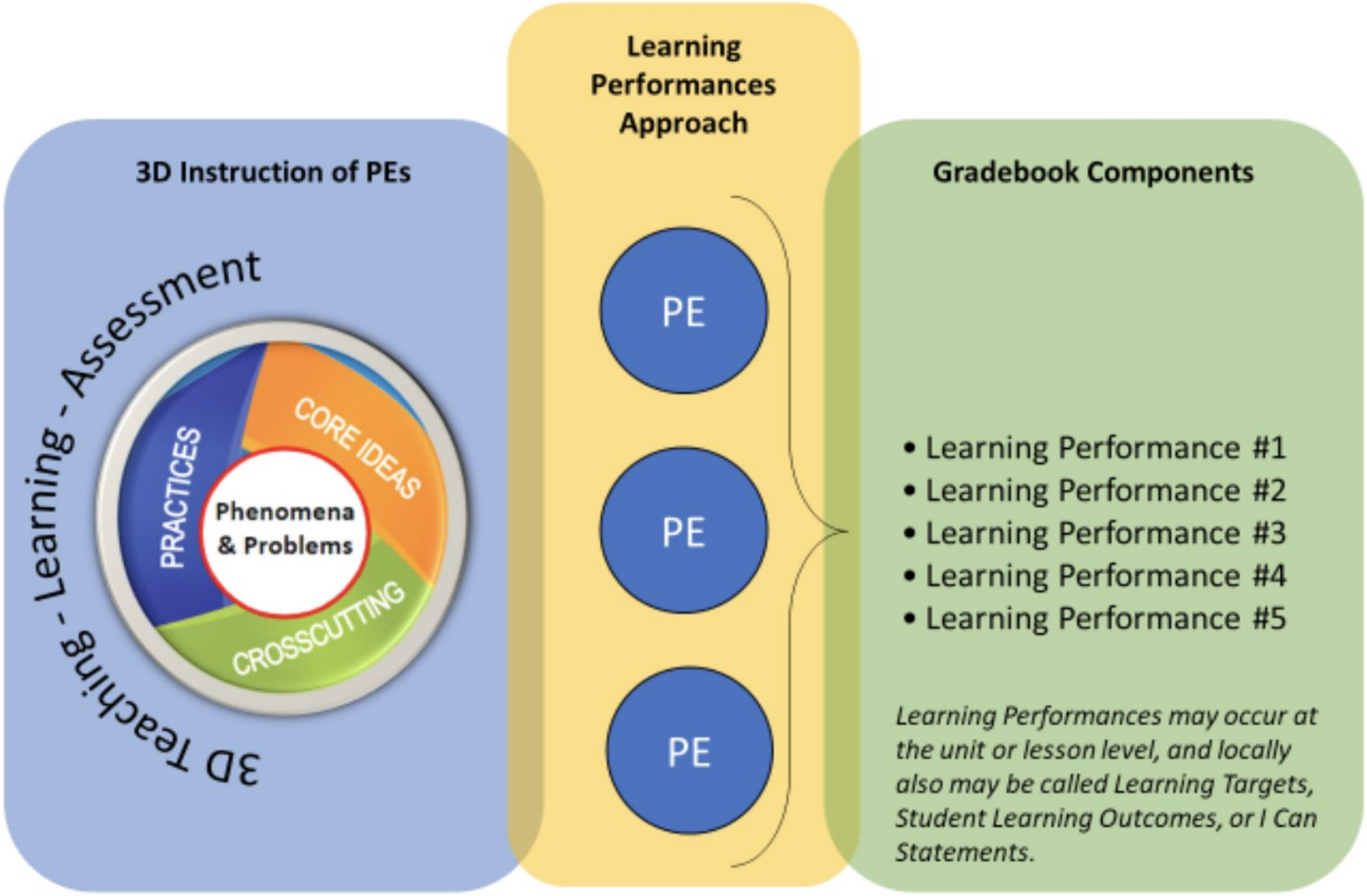


Unbraided Approach: One Grade for Each of the three dimensions (DCI, SEP, CCC)





Learning Target Approach: Breaking Standards into Smaller Pieces



Students who demonstrate understanding can:

MS-PS1-5. **Develop and use a model to describe how the total number of atoms does not change in a chemical reaction and thus mass is conserved.** [Clarification Statement: Emphasis is on law of conservation of matter and on physical models or drawings, including digital forms, that represent atoms.] [*Assessment Boundary: Assessment does not include the use of atomic masses, balancing symbolic equations, or intermolecular forces.*]

The performance expectation above was developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

Science and Engineering Practices

Developing and Using Models

Modeling in 6–8 builds on K–5 and progresses to developing, using and revising models to describe, test, and predict more abstract phenomena and design systems.

- Develop a model to describe unobservable mechanisms.

Connections to Nature of Science

Science Models, Laws, Mechanisms, and Theories Explain Natural Phenomena

- Laws are regularities or mathematical descriptions of natural phenomena.

Disciplinary Core Ideas

PS1.B: Chemical Reactions

- Substances react chemically in characteristic ways. In a chemical process, the atoms that make up the original substances are regrouped into different molecules, and these new substances have different properties from those of the reactants.
- The total number of each type of atom is conserved, and thus the mass does not change.

Crosscutting Concepts

Energy and Matter

- Matter is conserved because atoms are conserved in physical and chemical processes.

Braided	Unbraided	Learning Targets
MS-PS1-5	SEP- Developing and Using Models	How can developing a model help describe unobservable mechanisms such as chemical reactions?
	NOS- Scientific Laws	What are scientific laws and theories, and why can't theories become laws?
	DCI- Chemical Reactions	What happens to the mass of a substance during a chemical reaction?
	CCC- Energy and Matter	What is happening to the atoms during a chemical reaction?
		How do balancing equations connect to the Law of Conservation of Mass?

SBG Core Principle #2:

Teachers should use a finite number of performance categories to assess students' learning.

(Story about student teachers)

Trouble with Traditional Rubrics

FIGURE 1

Example of a traditional grading rubric that emphasizes task completion instead of assessing understanding.

Organelles described in your brochure	**2 points** Only described 1-2 cell parts or processes.	**4 points** Only described 2-4 cell parts or processes	**6 points** Described 4-6 cell parts or processes.	**8 points** Described 6-8 cell parts or processes.	**10 points** Described 8 or more cell parts or processes.
Accurate descriptions of parts/processes using analogies	**2 points** No analogies at all. Simply stated accurate cell part functions in text.	**4 points** 2-4 accurate descriptions using analogies.	**6 points** 4-6 accurate descriptions using analogies.	**8 points** 6-8 accurate descriptions using analogies.	**10 points** 8 or more accurate descriptions using analogies.
Mechanics on all written material	**2 points** More than 7 types of grammatical errors, misspellings, punctuation, mechanics, etc.	**4 points** 5-6 types of grammatical errors, misspellings, punctuation, mechanics, etc.	**6 points** 3-4 types of grammatical errors, misspellings, punctuation, mechanics, etc.	**8 points** 1-2 types of grammatical errors, misspellings, punctuation, mechanics, etc.	**10 points** Grammar, spelling, punctuation, and mechanics are correct. No errors in text.

Standards-based Grading

FIGURE 5

Standards-based grading rubric for learning targets.

Standard Score	Missing or Incomplete	2	2.5	3	3.5	4
Level of Understanding	Cannot Assess	Beginning	Developing	Capable	Strong	Exceptional
Teacher Language	Student did not turn in work or complete the work.	Demonstrates little understanding alone, but partially understands with help.	Demonstrates partial understanding with significant gaps and minimal application.	Demonstrates understanding with minor gaps with little application. No major errors or omissions present.	Demonstrates understanding, but has little application and/or a few minor errors.	Demonstrates a complete understanding through applying their knowledge.
Student Language	I didn't do this standard.	I need LOTS of help!	I need some help.	I have some questions.	I'm almost there.	I understand this very well and can apply it to new situations.

SBG Core Principle #3:

Grades should be based on summative assessments rather than formative assessments or student behaviors.

(Story about late work)

Formative Assessments

Figure 5a- Sample braided grade book that *does not report practice and formative assessment* for MS-PS3-5

Date	Standard	Score
September 8	MS-PS3-5- Construct, use, and present arguments to support the claim that when the kinetic energy of an object changes, energy is transferred to or from the object	4 (Proficient)

Figure 5b- Sample braided grade book that *includes submission marks only for homework and formative assessment* for MS-PS3-5

Date	Assignment or Standard	Score
August 28	Exit Ticket for Newton's First Law	X
August 30	Formative Assessment of Kinetic Energy	✓
September 1	Exit ticket for Mass and Motion	✓
September 6	Student Presentation for Their Own Investigation	✓
September 8	MS-PS3-5- Construct, use, and present arguments to support the claim that when the kinetic energy of an object changes, energy is transferred to or from the object	4 (Proficient)

✓-turned in; X- Not turned in

SBG Core Principle #4:

Students should have multiple opportunities to demonstrate their learning.

(Story about community service project)

Students who demonstrate understanding can:

MS-LS2-2. **Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems.** [Clarification Statement: Emphasis is on predicting consistent patterns of interactions in different ecosystems in terms of the relationships among and between organisms and abiotic components of ecosystems. Examples of types of interactions could include competitive, predatory, and mutually beneficial.]

The performance expectation above was developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

Science and Engineering Practices

Constructing Explanations and Designing Solutions

Constructing explanations and designing solutions in 6–8 builds on K–5 experiences and progresses to include constructing explanations and designing solutions supported by multiple sources of evidence consistent with scientific ideas, principles, and theories.

- Construct an explanation that includes qualitative or quantitative relationships between variables that predict phenomena.

Disciplinary Core Ideas

LS2.A: Interdependent Relationships in Ecosystems

- Similarly, predatory interactions may reduce the number of organisms or eliminate whole populations of organisms. Mutually beneficial interactions, in contrast, may become so interdependent that each organism requires the other for survival. Although the species involved in these competitive, predatory, and mutually beneficial interactions vary across ecosystems, the patterns of interactions of organisms with their environments, both living and nonliving, are shared.

Crosscutting Concepts

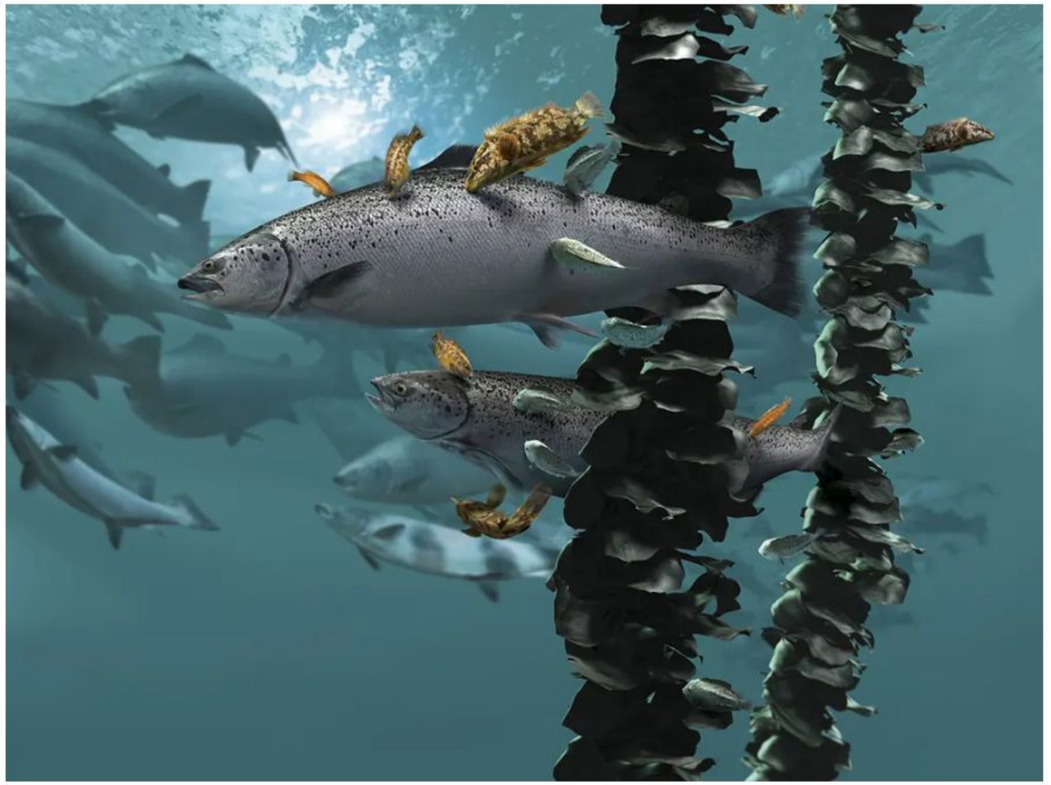
Patterns

- Patterns can be used to identify cause and effect relationships.

Assessment Question for MS-LS2-2

Assessment Question

Sea Lice



Salmon (larger fish) and cleaner fish (smaller fish)

“Sea lice” are small crustaceans that attach to the outside of fish such as the salmon. Cleaner fish eat the sea lice off of the salmon. First, describe the species interactions happening amongst these three organisms. Then, construct an explanation for how those relationships benefit or don’t benefit each organism.

Reassessment Question for MS-LS2-2

Reassessment Question

Aphids (smaller black insects) feed on plants' soft stems, fruits, and other soft tissues. Aphids secret a liquid called honeydew that ants (the larger insect) eat. In return, the ants provide aphids protection from other insects. First, describe the species interactions happening amongst these three organisms. Then, construct an explanation for how those relationships benefit or don't benefit each organism.

Reassessments

FIGURE 7
Reassessment sign-up times on the whiteboard

Name :_____ Block _____

Reassessment Checklist

The following steps must be completed in order. Check them off as you complete them.

☐ 1. Determine which learning target you would like to reassess (only one at a time). Write it below.

Learning Target: _____ ***Original Score:***_____

☐ **2. Complete A or B below depending on your original score and work:**

A. If you got a 3.5 or 3, and you completed and turned in evidence of studying before the test (for example you may have created study cards and answered the "Can I…" statements.) confirm this with your teacher.

Teacher Approval: _____ Date _____

B. If you got less than a 3 or did not complete and turn in evidence of studying before the test, show your teacher you have completed work related to the learning target. A list is posted on the microscope cabinet. This includes related activities in your notebook, practice, etc. If you need help completing these, please do not hesitate to ask.

Teacher Approval: _____ Date _____

☐ 3. Ask teacher for your original assessment (test).

A. Correct the part of the target test related to the learning target you want to reassess using a different color. You may use your notebook, a textbook, the internet, etc. **You may not use another person's test or work with another student.** Doing so may disqualify you.

B. Consider your corrections. Write a reflection that connects original work to corrections. Why did you miss what you missed? What patterns do you notice?

Standards Based Grading in Action

Defining Standards

&

Determining Scales

General Physics: Before

Defining Standards

Content Units	Items to be Graded	Grading Scale
Unit 1: Kinematics Unit 2: Forces & Newton's Laws Unit 3: Pmomentum Unit 4: Energy Unit 5: Waves Unit 6: Light Unit 7: Electricity	Daily Homework Quizzes Tests Corrections (1/2 credit)	A: 90% - 100% B: 80% - 89% C: 70% - 79% D: 60% - 69% F: 59% and below

General Physics: Now

Defining Standards

Content Standards		Items to be Graded	Grading Scale
Kinematics	- 6 standards	Quizzes Tests	Advanced (5) Proficient (4) Developing (3) Emerging (2) Beginning (1)
Forces & Newton's Laws	- 3 standards		
Pmomentum	- 3 standards		
Energy	- 3 standards		
Waves	- 4 standards		
Light	- 5 standards		
Electricity	- 2 standards		

Sample Assessment: Before

"Please discuss...but all of the work should be your own"

"Points awarded for..."

Please discuss/work with classmates but all of the work on your paper should be your own! Round all calculated values to the nearest hundredth. Each problem will be worth 4-5 points. Points are awarded for:

- Complete FBD
- 2 complete F_{net} equations
- Correct physics work
- Correct answers with units

1. Beaker is trying to move a large 6.4 kg box across a horizontal floor. When he applies a force of 22 N downward at an angle that measures 17 degrees from the horizontal, the box does not move. Use F_{NET} equations to determine:
    a. the normal force acting on the box
    b. the force of friction acting on the box

"Each problem is worth 4-5 points"

Success determined by correct numerical answer

Sample Assessment: Now

All graded assessments are individual - following LOTS of practice!

Scores given for each standard

Proficiency scale used for each standard

4.1	I can draw free-body diagrams.	~~Advanced (5)~~ Proficient (4) Developing (3) Emerging (2) Beginning (1)
4.2	I can write net force equations to represent the forces acting on an object and its motion.	~~Advanced (5)~~ Proficient (4) Developing (3) Emerging (2) Beginning (1)
4.3	I can solve quantitative problems involving net force equations for linear motion.	~~Advanced (5)~~ Proficient (4) Developing (3) Emerging (2) Beginning (1)

Beaker is trying to move a large 6.4 kg box across a horizontal floor. When he applies a force of 22 N downward at an angle that measures 17 degrees from the horizontal, the box does not move. Determine the value of both the normal force and the frictional force.

FBD:

$F_{net\ x/\parallel}$:

$F_{net\ y/\perp}$:

Givens:

Unknown(s):

(put a box around your answers & include units)

Success or struggle on one part of problem does not impact opportunity to succeed on other parts.

Defining Standards

Focused on Content

Assessing on Skills

8th Grade Proficiency Guide

Units	Priority Content Standards Addressed (Iowa Core/Disciplinary Core Ideas) (Linked with Priority Standard Scoring Scales)	Common Summative Assessments Skill Standards Assessed (NGSS: SEP's) (Linked with Assessment & the Skill Based Scoring Scales)
Harnessing Human Energy	PS3-1, PS3-2, PS3-5	1. Engaging in Argument from Evidence (SEP: 7) 2. Developing and Using Models (SEP: 2) 3. Analyzing and Interpreting Data (SEP: 4)
Force and Motion	PS2-1, PS2-2, PS2-4	1. Developing and Using Models (SEP: 2) & Constructing Explanations and Designing Solutions(SEP: 6) 2. Planning and Carrying out Investigations (SEP: 3) 3. Analyzing and Interpreting Data (SEP: 4)
Magnetic Fields	PS2-2, PS2-4*, PS2-5, PS3-5	1. Constructing Explanations and Designing Solutions(SEP: 6) 2. Asking Questions and Designing Solutions(SEP: 1) Planning and Carrying Out Investigations(SEP: 3)
Light Waves	PS4-1, PS4-2, PS4-3	1. Engaging in Argument from Evidence (SEP: 7) 2. Developing and Using Models (SEP: 2)
Weather Patterns	ESS2-4, ESS2-5	1. Engaging in Argument from Evidence (SEP: 7) 2. Analyzing and Interpreting Data (SEP: 4)
Ocean, Atmosphere, and Climate	ESS2-4, ESS2-6	1. Develop and Using Models (SEP: 2) 2. Analyzing and Interpreting Data (SEP: 4)
Earth's Changing Climate	ESS3-3, ESS3-4, ESS3-5	1. Obtaining, Evaluating, and Communicating Information (SEP: 8)
Evolutionary History	LS4-1, LS4-2, LS4-3, LS4-5, ESS1-4	1. Obtaining, Evaluating, and Communicating Information (SEP: 8) 2. Constructing Explanations and Designing Solutions (SEP: 6)

Defining Standards

Force and Motion	PS2-1, PS2-2, PS2-4	1. Developing and Using Models (SEP: 2) & Constructing Explanations and Designing Solutions(SEP: 6) 2. Planning and Carrying out Investigations (SEP: 3) 3. Analyzing and Interpreting Data (SEP: 4)
Magnetic Fields	PS2-2, PS2-4*, PS2-5, PS3-5	1. Constructing Explanations and Designing Solutions(SEP: 6) 2. Asking Questions and Designing Solutions(SEP: 1) Planning and Carrying Out Investigations(SEP: 3)

Scoring based on SEP Standards

Student Name:_____

SEP 2: Develop and Using Models

A model is an abstract representation of phenomena that is a tool used to predict or explain the world.

E (Emerging)	D (Developing)	P (Proficient)	A (Advanced)
☐ No accurate model developed. ☐ Develops a model with support.	☐ Develop a model without use of variables. ☐ Develop a model with insufficient explanation ☐ No revisions of original models. ☐ Inaccurate explanation of variables. ☐ Change in variables does not include numerical change. ☐ Uses a given model to demonstrate what happens if one variable or component of a system is changed. ☐ Uses a given model to predict the effect in the situation.	☐ Develop or modify a model based on evidence. ☐ Accurately demonstrates what happens if one variable or component of a system is changed. ☐ Accurately predicts effect in the situation. ☐ Uses given vocabulary. ☐ Accurately labels variables.	☐ Model includes revision/change of multiple variables. ☐ Accurately demonstrates what happens if more than one variable or component of a system is changed ☐ Develop a complex model with different objects. ☐ Written explanation includes defense of all changing variables. ☐ Provides mathematical support for explanation

Sample Assessment

Developing and Using Models [MS-PS3-2][SEP:2]

Name: _____

Potential Energy Model

Create a model that shows a different level of potential energy than the model below.

Mini Fridge:
18 Kilograms

Empire State Building:
443 Meters

Draw Model Here:

Does your model have more or less potential energy than the original? Defend your answer.

Determining Scales

Building-Wide Collaboration
Spring & Summer 2022

April

Outreach to Colleagues throughout Building

Received approval for Teacher Quality Summer Project

May

Collaborate to define SBG

Seeking out resources

June

Develop common language for scales

Discuss various options for grade calculation

July

Create documentation for use in consistent implementation & presentation throughout building

Discuss how to utilize current grade recording to reflect new grading practices

Determining Scales

Developing Common Language

A+ (5)	Beyond course expectations	Exemplary, Advanced, Excessed, Highly, Mastery, Beyond
A (4)	This is the goal	Mastery, Proficient, Meeting, Achieving, Competent
B (3)		Developing, In Progress, Approaching, Progressing, In Process
C (2)		Emerging
D (1)		Limited Progress, Needs Assistance, Below, Basic, Insufficient, Beginning
F (0)		No evidence, Not submitted

Determining Scales

Discussion of Options for Grade Calculation

Menu of options for a department to choose:

- Average of 2 highest -
  - with 3-4 opportunities
- Most recent submission / highest score
- Average of all submissions
- Teacher judgement -
  - with artifacts to support

Liberty Standards Based Grading

Descriptions and Examples for Students and Parents

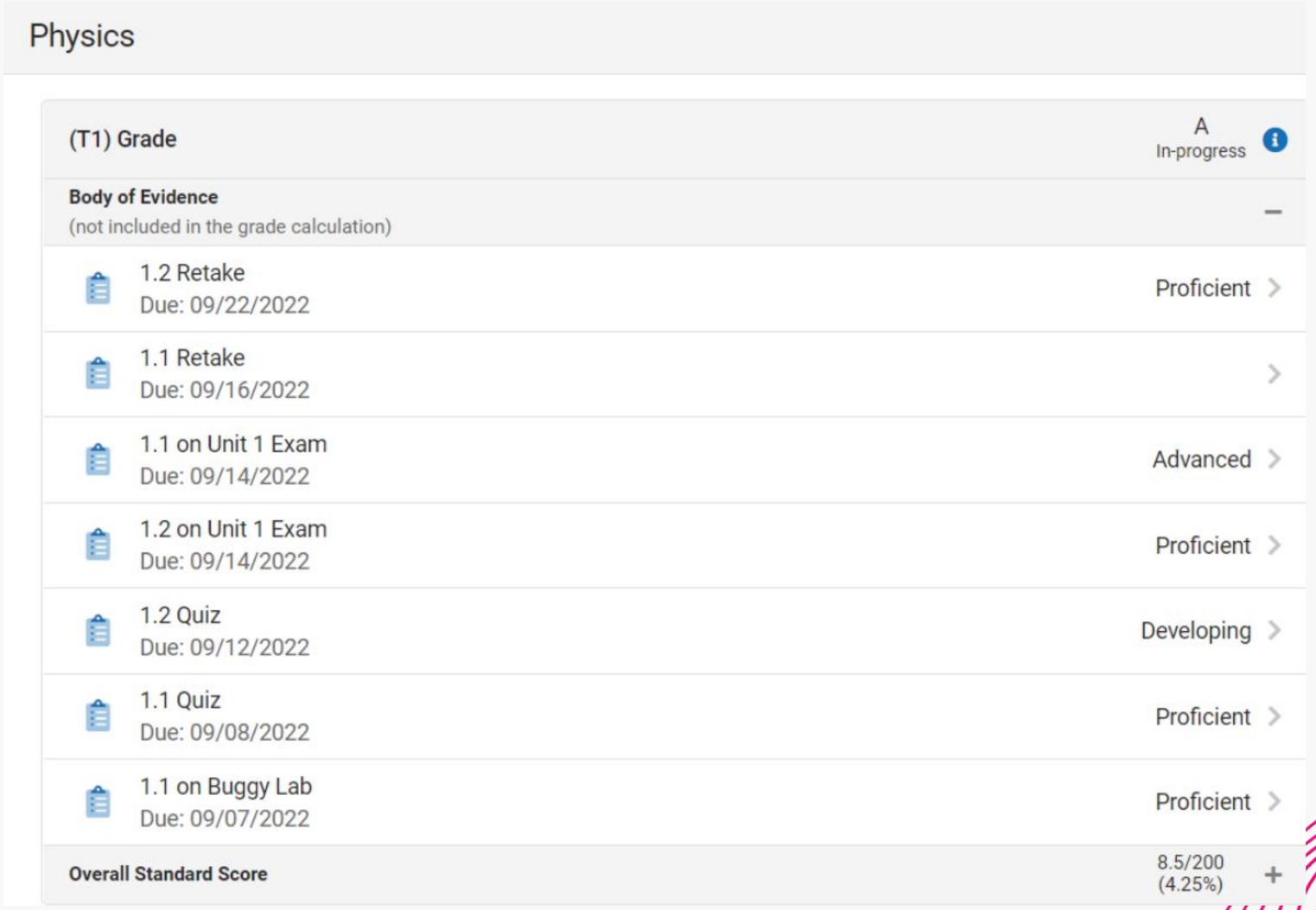
Proficiency Level and "Grade"	0 - No Evidence "F"	1 - Beginning "D"	2 - Emerging "C"	3 - Developing "B"	4 - Proficient "A"	5 - Advanced "A+"
Student Description	• I have not yet submitted evidence to demonstrate progress on the standard.	• The evidence I have submitted so far shows I need assistance to demonstrate the standard.	• I have the foundation of the skills and knowledge for the standard, but there are key concepts I am still working on.	• I have a firm foundation of the skills and knowledge needed to demonstrate the standard, and I am close to Proficient (4).	• **I have independently met the standard, but my work may include errors that don't impact demonstration of the standard.** • ***This is the goal for course-level mastery and should be celebrated!***	• **I have demonstrated deep understanding and/or application that exceeds the standard.**
Student Examples	• I have not completed the assessment/assignment • I wrote down something completely unrelated to the content. For example, your answer to a math problem was "Pokemon" • *A submitted assessment with no evidence does not automatically earn you a retake*	• I can rarely start a problem without relying heavily on outside support • Right now, I can solve problems only with my teacher guiding me through the process • *I need to come in during Liberty Time to work one-on-one with my teacher*	• I can do parts of a problem/process independently without relying on outside support. • *I need to come in during Liberty Time to work with my teacher*	• I can identify my point of confusion but need outside assistance to solve it. • I sometimes need prompting to recognize my own errors.	• **I can almost always independently solve the problems or demonstrate the skills my teacher presents.** • **I can identify my point of confusion and independently solve it.**	• **I can confidently teach someone else without outside resources.** • **I can work independently beyond course-level concepts and skills.**

A closer look at one level of the 5-point scale

Scale Descriptor	Examples for Students	Guidance for Teachers
2 - Emerging "C" • I have the foundation of the skills and knowledge for the standard, but there are key concepts I am still working on.	• I can do parts of a problem/process independently without relying on outside support. • *I need to come in during Liberty Time to work with my teacher*	• Still close to Beginning (1) • Teacher prompting is *often* necessary for skill to be demonstrated • Can do a problem by rote but doesn't seem to fully grasp the concept; cannot transfer to a new situation • Inconsistent generalization across days and novel tasks.

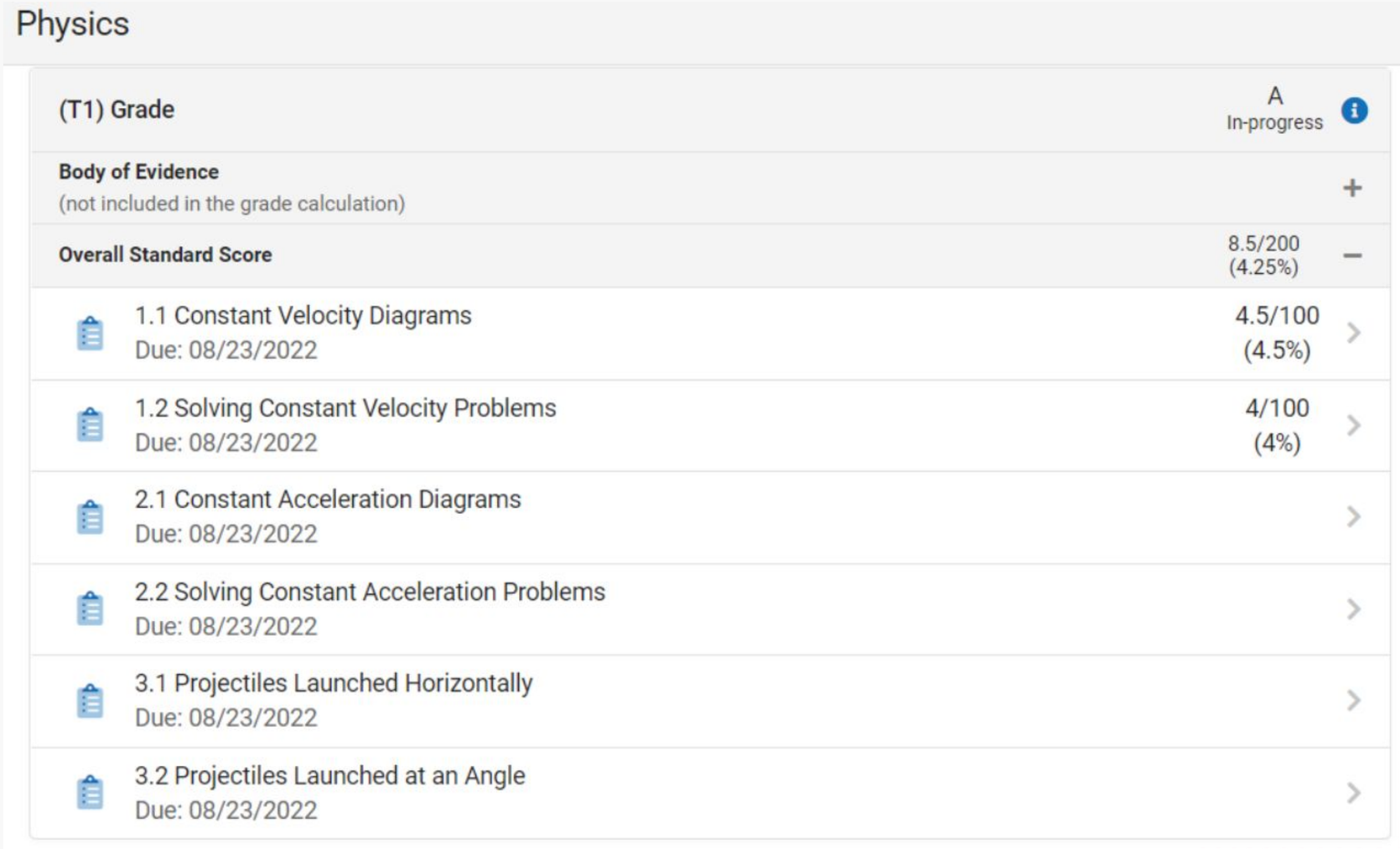
Translating Scores into 'Grades' in Physics

Assessments make up the Body of Evidence



Translating Scores into 'Grades' in Physics

Use Body of Evidence to Determine Standard Score



GRADE	MIN PERCENT
A+	4.5
A	3.5
B	2.5
C	1.5
D	0.5
F	0.0

MINDSET SHIFTS

Some quite unexpected

GRADING PRACTICES & ASSESSMENT STRATEGY

TEACHING PHILOSOPHY & PEDAGODGY

STUDENT REACTION

7.2 I can solve quantitative problems involving the wave equation for all waves.

~~Advanced (5)~~
Proficient (4)
Developing (3)
Emerging (2)
Beginning (1)

Quiz #1 Required

Show your work using the GUESS method!

Middle C is a sound wave with a frequency of 0.256 kHz and moves 345 m/s through room-temperature air.

1. What is the wavelength of Middle C?

2. What is the period of Middle C?

Quiz #2 Optional: following reteaching

7.2 I can solve quantitative problems involving the wave equation for all waves.

~~Advanced (5)~~
Proficient (4)
Developing (3)
Emerging (2)
Beginning (1)

Show your work using the GUESS method!

A wave traveling 4.2×10^{5} m/s has a period of 5×10^{-4} s.

1. What is its frequency?

2. What is its wavelength?

~~Advanced (5)~~
Proficient (4)

7.2 I can solve quantitative problems involving the wave equation for all waves.

~~Advanced (5)~~
Proficient (4)
Developing (3)
Emerging (2)
Beginning (1)

Quiz #1
Required

Quiz #2
Optional: following reteaching

Show your work using the GUESS method!

1. A wave traveling 4.2×10^{5} m/s has a period of 5×10^{-4} s.
   1. What is its frequency?

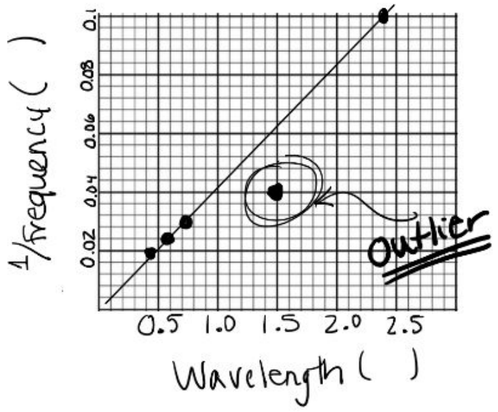
7.2 I can solve quantitative problems involving the wave equation for all waves.

~~Advanced (5)~~
Proficient (4)
Developing (3)
Emerging (2)
Beginning (1)

Show your work & include units on your answers for questions 2 & 3.

A group of physics students collected and graphed the following data utilizing a standing wave lab apparatus similar to the one you used in class this week.

1. Based on the graph axes, identify the units associated with data on both the x and y axes.
2. **Using the identified *outlier point,*** determine the experimental speed based on this data point.
3. **Using the best-fit line,** determine the graphical average speed of the wave in their string.
   *Hint - the answers to questions 2 and 3 will **NOT** be the same!*



1. Units on each axis:

   X axis: _____ Y axis: _____

2. Experimental speed based on *outlier* data point:

3. Graphical average speed based on *best fit line:*

Lab Quiz
Required

7.2 I can solve quantitative problems involving the wave equation for all waves.

Advanced (5)
Proficient (4)
Developing (3)
Emerging (2)
Beginning (1)

Show your work using the GUESS method!
A transverse periodic wave with an amplitude of 2 m, a wavelength of 0.23 m, and
through a rope resting on the floor.

4. What is the frequency of the periodic wave?

5. Explain *how* you would determine the wave's period AND determine th

Unit Test
Required
with optional
Advanced question

Advanced Question (optional): *Complete this question, in addition to the other questions for this standard, to demonstrate that your performance level is beyond course-level concepts and skills*
Spectators at a sporting event do "The Wave" - as shown at right.

a. *Is this a transverse or longitudinal wave? How do you know?*

b. *If the crowd is into it, and it goes around the stadium multiple times, describe how you might measure the frequency, amplitude, and speed of the wave.*

End of Trimester "Phinal"
Optional with Optional Advanced question

Mindset Shift: Grading Practices & Assessment

Assessments are not a chance for more points, they are an opportunity to demonstrate growth in understanding

6.1Q Seq: 6.11 Due: 02/13 Body of Evider Points: 0	6.1Q2 Seq: 6.12 Due: 02/27 Body of Evider Points: 0	6.1P Seq: 6.13 Due: 03/01 Body of Evider Points: 0	6.1SS Seq: 6.19 Due: 03/02 Overall Standa Points: 100	6.2Q Seq: 6.21 Due: 02/21 Body of Evider Points: 0	6.2Q2 Seq: 6.22 Due: 02/27 Body of Evider Points: 0	6.2P Seq: 6.23 Due: 03/01 Body of Evider Points: 0	6.2SS Seq: 6.29 Due: 03/02 Overall Standa Points: 100
Proficient	Proficient	Proficient	4	Developing	Developing	Emerging	3
Emerging	Beginning	Beginning	1.5	Beginning	Beginning	Beginning	1
Beginning	NoEvidence	NoEvidence	.5	Emerging	Proficient	Developing	3.5
Proficient	Proficient	Proficient	4	Proficient	Developing	Proficient	4
Emerging	Proficient	Developing	3.5	Developing	Developing	Developing	3

Mindset Shift: Approach to Practice/Homework

Name: Period:

Unit 6: Energy

6.2: I can define a system and identify the types of energy and relative amounts in the system at various points.

6.2 Quiz is on

Required Activities:

- ☐ Notes: Law of Conservation of Energy (p. 2)
- ☐ Notes: Creating LOL Charts (p. 3)
- ☐ Required Practice: Conservation of Energy (p. 4)
- ☐ Notes: Defining the System (p. 5)
- ☐ Required Practice: Systems & Energy (p. 6-7)

Support and Practice: *Choose at least 2 of the following*

- ☐ Practice: LOL Charts I (p. 8 in packet)
- ☐ Practice: LOL Charts II (p. 9 in packet)
- ☐ Practice: Ranking Tasks (p. 10-11 in packet)
- ☐ Support: Textbook Reading *(pg 162; 169 - 174)*

Answer keys to practice problems can be found on p. 12

MATT TOWNSLEY EdD

EDUCATION AND ASSESSMENT/GRADING ENTHUSIAST

Repurposing homework and checks for understanding as ungraded practice

STOP:

"Each homework assignment is worth 5 points...and homework is 15% of your final grade. Quizzes are worth 25% of the final grade."

START:

"The purpose of homework and quizzes is practice; therefore, I will report them separately and provide you with non-numerical feedback so that you can learn from your mistakes"

Mindset Shift: Student Feedback

At first I didn't like it, but I did like it towards the end because it assesses my learning and not just a composite score of tests and quizzes. It brings down stress levels with grading as well because it's straight forward.

This system actually made me feel like school was about learning and tests were about showing what I knew instead of just doing busy work. I spent more time working on understanding the topics than I did memorizing formulas and other stuff.

At first I thought it was weird and unnecessary, and just confused things. But now that I understand it I realize that it is better, because I could miss half of the problems, learn what I did wrong and fix it and still have an A because by the end I still understood it.

Mindset Shift: Student Feedback

It made me less focused on my grade in the class and more focused on listening and learning the material.

It felt weird at the beginning of the year since it's different, but I've gotten used to it. I don't feel like you could have a good physics class without it anymore.

Thank you!

What questions do you have?

STANDARDS-BASED GRADING IN SECONDARY SCIENCE CLASSES

JESSE WILCOX

jesse.wilcox@uni.edu

University of Northern Iowa

SARA KARBELING

karbeling.sara@iowacityschools.org

Iowa City Community Schools