Grading Practices for Physics (Standards-Based Grading) updated as of August 18, 2022
(also, on my website at https://www.pickphysics.com)

After a discussion with my physics class, we're moving forward with Standards Based Grading (SBG). I used this the last few years in some of my physics classes, and it was well received by students. I hope to continue to improve how I use SBG in my physics classes. This year my goal is to have a set about forty standards that we will try to master throughout the year. These will be a mix of both process standards (such as Lab Skills or Habits of Mind) and content standards (such as those relating to Forces or DC Circuits).

My goal is that each standard will count for 10 points. You will have multiple attempts to attain each standard, and you will be allowed a retake a content standard at any point during the year if you fill out a form requesting this and complete certain reasonable requirements prior to the retake date. You may earn points for content standards from labs, activities, or tests/quizzes, but the final score will often be from a test or quiz.

Your grade at any point in time for a certain standard will depend on two methods of scoring. For content standards and Habits of Mind standards, your grade for each standard will be determined as an average between your **highest score** and your **most recent (latest)** score for that standard, with at least two unique assignments making up your average. In other words, the two averaged scores must be unique. For example, if your most recent score was also the highest score, then I would not count that twice. However, if you have a most recent score and an earlier score on another assignment which are both the highest score, I would average those. For Habits of Mind, we will have you fill out a performance rubric toward the end of the quarter which allows you to reflect on how you've done in each area, and a place where I can give you individualized feedback. Things in the Habits of Mind area include aspects of homework, effort, participation in class discussions, timeliness of getting work done, willingness to improve your work, etc.

Lab Skills and Scientific Reasoning standards reflect the lab work we do all year, and for these standards your grade will be determined by **averaging your best score and the average of all your scores for each standard**. This is called a decaying average, by the way. You can also ask to reassess the lab standards, although most likely this will be a lab activity and in general just doing well in future labs will help you just as much.

As discussed in class early on, *this year I want to use cumulative grading, where your grade as the year goes on reflects your mastery of the standards up to that point. Therefore, your final grade for the year would be forced to be the same as your 4th quarter grade since it reflects your mastery of the content and process skills all year long.* To allow you to improve all year, I'll have opportunities throughout the year for improving your scores in any standard we've covered up to that point. At times, this might mean having parts of a test or lab require you to demonstrate understanding from much earlier in the year, but it also means you're likely to really learn it, not just memorize and forget that content or skill. I'll also allow for retakes all year. My intention is to allow students to retake up to one standard every week if they want, as long as I have enough notice for you to do so. We'll discuss the details of this in class. As I stated in class, my goal is to be as fair as possible, and help you really learn as much as possible without wasting your time. It also involves trust. I trust my students to give a good faith effort in class, and I hope you trust me to have a grading system that's fair and clear. I'll get feedback from you all year long, and we don't think things are going well, we can adjust how this goes. If you retake a standard and still don't show a solid understanding, but you still want to improve, we will come up with an additional opportunity to allow you to try and do so.

A NOTE TO PARENTS AND STUDENTS: Don't fret! Often times the first attempt at a standard isn't going to be the best. That's expected and normal. What it means is you need to NOT PANIC and understand that there will be multiple attempts at every content standard, and that normally this means your score in a standard will go up over time. Sometimes it may take a while, but you will have these extra attempts. If for some reason we won't have multiple attempts at a standard, I won't end up having that count toward your grade.

My intention is to provide you with a list of the standards to be assessed, although early in the year this is subject to change. Obviously if we don't get to cover a certain topic in class, I wouldn't assess you on standards related to that content. I'll update grades once a week in something called SBGBook online (https://www.sbgbook.xyz/gbook/login/) after I get that set up the weekend of Labor Day, if not before. The grading average is what will be reported to Infinite Campus, not any other details.

My hope is this will be clearer and fairer way to score students' ability to perform in class. Some of the best physics teachers nationally use this system, and one of the best English teachers I've known (Mr. Baptist, who's now the assistant principal at Lakeview Junior High) used a similar system at Pickerington North! Now, I want to take class time to answer specific questions you may have.

ADVANCED/MASTERY - Indicators representing the score for the standard include:

10 =	I nailed it!
	I can thoroughly explain/teach the standard/skills to another student.
	I have high confidence on how to demonstrate the standard/skills.
	I can have a conversation about the standard/skills showing complete understanding.
	I can independently demonstrate extensions of my knowledge.
	I can create analogies and/or find connections between different areas within the sciences or between science and other areas of study.
	My responses demonstrate in-depth understanding of main ideas and of related details.
	I could be a peer teacher.
	I understand the content/skills completely and can explain them in detail.
	I have shown all of the relevant aspects of the standard/skill successfully.
	The errors I had (if any) are merely cosmetic. Principles applied perfectly with attention to details with solutions that are mathematically accurate, including correct units on all numbers, and reporting answers to appropriate precision.
	I do a great job of having my phone/ear buds/head phones away. The only time I get my phone out is if I am instructed to get it out to use for class.

PROFICIENT - Indicators representing the score for the standard include:

8 =	The basic concept is good.
	I understand the important things about the content/skills.
	I have confidence on how to do the standard/skills on my own most of the time, but I need to continue practicing some parts that still give me problems.
	I need my handouts, notes, or other references once in a while.
	I am proficient at describing terms and independently connecting them with correct concepts.
	I understand not just the "what," but can correctly explain the "how" and "why" of scientific processes.
	My responses demonstrate in-depth understanding of main ideas.
	I am developing understanding of the content/skills.
	I have shown several of the sub-skills/standard, but not all aspects of it.
	I have some errors and/or omissions in the execution of the work, but overall correct understanding is clearly demonstrated.
	I can demonstrate the standard well now, but my understanding may not be deep enough to demonstrate it in a few weeks time
	I feel confident explaining the main concept to others, but would not be able to explain all the details
	I am pretty good about putting my phone/ear buds/head phones away at start of class and rarely need a reminder to put my phone/ear buds/head phones away.

DEVELOPING - Indicators representing the score for the standard include:

6 =	I have a general understanding of the content/skills, but I'm also confused about some important parts.
	I need some help from my teacher or peers (one-on-one or small group) to do the skills correctly.
	I do not feel confident enough to do the standard/skills on my own much of the time.
	I need my handouts, notebook, or other references most of the time.
	I can correctly identify concepts and/or define vocabulary; however I cannot not make connections among ideas and/or independently extend my own learning.
	My responses demonstrate basic understanding of some main ideas, but significant information is missing.
	I have a beginning understanding of the concept / skill.
	I am able to show some of the sub-skills.
	My understanding of the concept/skill is still developing as there are significant conceptual errors.
	I would not feel confident if asked to correctly explain the standard/skill to others in class.
	Attempts at problems show an understanding of the basic concept, but little correct follow through toward a correct solution.
	I have to be asked / reminded at least once a week to put my phone/ear buds/head phones away. I have not made it a habit of making sure it is away to start class and I need reminders to put the phone/ear buds/head phones away.

BEGINNING - Indicators representing the score for the standard include:

5 =	I need lots of help from my teacher, classmates, or peers (one-on-one).
	I have low confidence on how to do the skills and need more instruction.
	I need my handouts, science notebook, or other references at all times.
	I do not understand the concepts/skills at the core of the standard.
	I cannot correctly identify concepts and/or define vocabulary related to the standard.
	I cannot make connections among ideas or extend the information provided.
	My responses lack detail necessary to demonstrate fundamental understanding.
	Attempts at problems are limited; little to no progress is shown toward a correct solution beyond the given information.
	I have to be asked / reminded to put my phone/ear buds/head phones away repeatedly. I have not made it a habit of making sure it is away to start class and I need reminders during class to put the phone/ear buds/head phones away.

NO BASIS/ NO DATA - Indicators representing the score for the standard include:

0 =	I misunderstood a question that the content/skill I'm trying to show is not observable in my response.
	I have a completely correct solution without showing a work/particular content/skill that I was asked to demonstrate.
	I have not asked the teacher for help to understand the standard/skill
	I did not provide any responses for which a judgment can be made about my understanding.
	I did not attempt or work shows no understanding of this standard/skill.
	I did not provide data.
	I refuse to put my phone/ear buds/head phones away when asked.
	I repeatedly have to be asked over multiple days to put phone/ear buds/head phones away.
	I take phone/ear buds/head phones out after being instructed to put the phone/ear buds/head phones away.

Physics standards for Standards Based Grading

Habits of Mind: Unit 0-A

Standard	Description	Score
HM1	I actively participate in labs, small group discussions, and whole class discussions to increase my own understanding as well as that of my peers.	
HM2	I focus on physics during physics class and am ready to learn through the entire class period; I limit my use of electronics to situations that help me learn physics. My attitude and actions helps learning in class and I am willing to ask and offer help from my teacher and peers.	
HM3	I perform deliberate practice to improve my understanding of physics, as shown by: class involvement, coming in for extra help, and completing homework, labs, practice problems and classwork to the best of my ability, and review and reflect on my work. I can implement a plan for improvement based on feedback from my teacher and peers. I work hard in and out of class. Compared to my best effort, I'm performing well. I am well prepared and put full effort into formative assignments such as homework and reading quizzes.	
HM4	Classroom atmosphere and respect - I help foster an atmosphere conducive to learning in class by being respectful and treating others as I would wish to be treated. I treat my classmates and instructor with respect, dignity, and honesty.	
HM5	Persistence. If my understanding of a topic or performance on a project isn't at a high level, I make the effort to improve by attempting to get extra help, complete extra work to show mastery, retake an assessment if necessary, and revise and improve upon a project that performs poorly.	

Laboratory Skills and Scientific Reasoning: Unit 0-B

Standard	Description	Score
LSSR1	I can design and carry out experiments based on the task at hand using a working hypothesis and selecting appropriate lab equipment that is used correctly while maximizing the amount and range of data collected within the time allowed. I can also communicate and represent the details of an experimental procedure clearly and completely using words, graphs, equations, and/or diagrams.	
LSSR2	I can explain the difference between accuracy & precision, error & uncertainty, and identify experimental variables as independent, dependent or controlled and analyze these within a given experiment.	
LSSR3	I can identify patterns in data and represent the data mathematically and graphically, along with providing physical meaning to the slope, y-intercept, and area where appropriate. When making a graph, I can place variables correctly, label axes, and follow other graphing norms to show a possible relationship between two variables. If slope is changing, I can explain the physical significance of this.	
LSSR4	I can analyze data or lab results appropriately and analyze the information clearly and completely. I can make a reasonable judgement about the results of a given experiment supported by evidence and reasoning and use this to revise a hypothesis when necessary. I can make a claim about the data or results and support the claim with data, evidence and reasoning support the correct physical model in the situation.	
LSSR5	Student performance and participation in online feedback for assignments, such as the Interactive Online Assignment about creativity in science	

Math Skills and Vectors: Unit 0-C

Standard	Description	Score
	I can solve various algebraic equations for any variable. I can solve problems with right angle trigonometry (sine, cosine, tangent, Pythagorean theorem). I can interpret how the shape of a graph relates to a mathematical relationship. I can use conversion factors to express quantities in other units (metric-metric, English-metric). NOTE: This will not be a separate standard, but is the math that will be embedded within problem-solving for a number of the content standards.	
MV1	I can show clear understanding of the similarities and differences between scalar and vector quantities, including representing vector quantities with diagrams	
MV2	I can add, subtract, and find the vector product of multiple vectors both graphically and using mathematics such as the Pythagorean Theorem and trigonometry and I can break down a resultant vector into components using the same techniques.	

Forces: Unit 1

Standard	Description	Score
F1	I can solve both static and dynamic force problems using multiple models to check for consistency (e.g. Balanced Force Particle Model vs. Unbalanced Forces Particle Model) and relate gravitational force with the mass of an object to explain the concept of '*g*', gravitational acceleration.	
F2	I can correctly draw, label, and interpret Free Body Diagrams (FBD's) based on a situation, use FBD's to help describe the motion of an object, and identify different types of forces (applied, friction, drag, normal).	
F3	I can relate and apply Newton's Laws (1st [Law of Inertia], 2nd [Law of Acceleration] and 3rd [Law of Interaction]) to 1-D and 2-D motion using mathematics, graphs, diagrams, and verbal or written descriptions in various situations including those that involve static, kinetic or rolling friction and stretched or compressed springs.	

1-Dimensional Motion: Unit 2

Standard	Description	Score
1D1	I can use mathematical models to solve physics problems involving 1-D motion and I can distinguish between vector and scalar quantities in 1-D motion to solve problems appropriately (e.g., the difference distance and displacement, average speed and average velocity)	
1D2	I can draw and interpret motion graphs (position, velocity, acceleration), motion maps, mathematical models, and verbal or written descriptions to represent the motions of constant velocity or accelerating objects, and to determine the correct model of motion (constant velocity, constant acceleration, uniform circular motion, etc.)	
1D3	I can explain the meaning of slope (changing or constant), area and y-intercept as needed for kinematics graphs representing constant speed or accelerated motion, as well as other types of graphs that come up during the course.	

Momentum and Impulse: Unit 3

Standard	Description	Score
MI1	I can demonstrate that momentum is conserved in an isolated system before and after a collision or explosion, and that the change in momentum in a non-isolated system is equal to the impulse applied to the system by an outside force. I can also explain how force and collision time are inversely retlated and understand this can be used to protect an object in a collision (such as with an arbag) with the idea that for the same impulse a smaller force can be applied over a larger time	
MI2	I can mathematically apply the law of momentum conservation to various types of collisions using correct vector resolution to determine the motion of center of mass of a system (which is conserved before and after a collision) and the speed and direction of individual objects that collide.	

2-Dimensional Motion and Universal Gravitation: Unit 4

Standard	Description	Score
2D1	I can model the horizontal and vertical motion of a projectile using constant velocity and constant acceleration models and solve mathematical problems involving projectile motion using 1-D motion concepts in numerous ways learned earlier in the course, including mathematically, graphically, with motion maps, and through descriptions. I can demonstrate the independence of	
2D2	I can identify what factors affectthe amount of torque on an object, and use proportional reasoning to solve problems involving torque and forces. (T = F x d)	
2D3	I can correctly use and apply Newton's Law of Universal Gravitation mathematically, and conceptually to predict how gravitational forces change as positions and masses of objects change	

Energy conservation and transfer: Unit 5

Standard	Description	Score
E1	I can demonstrate a deep understanding of the Law of Conservation of Energy by showing an understanding of a system, including that energy can't be created or destroyed, only transferred in or out of a system (in the form of work) or transformed to a different form of energy (such as kinetic energy being converted into thermal [heat] energy).	
E2	I can use Work-Energy bar charts to demonstrate an understanding of energy conservation, and as a way to demonstrate energy flow (in the form or work) in or out of a system. I can also define a system and use that to explain energy conservation and interaction with the outside environment.	
E3	I can perform calculations for objects involving one or more types of energy, including elastic potential energy, gravitational potential energy, and kinetic energy. I can calculate the work done by a system or on a system, and demonstrate that power is the rate at which work is done. I can also explain the fundamental difference between potential energy and kinetic energy.	

Charge and electrostatics: Unit 6

Standard	Description	Score
EL1	I can predict whether charges will be attracted, repelled or have no interaction with other charges based on my understanding of electrostatics.	
EL2	I can mathematically apply Coulomb's Law and my understanding of vectors to determine the net force (magnitude and direction) on a charged object.	

DC circuits: Unit 7

Standard	Description	Score
DC1	I can identify the conditions needed to form a complete circuit, and what factors will affect the brightness of a bulb (which represents the power) of a circuit. I can predict how the brightness of a bulb will change if another element in the circuit is added or removed.	
DC2	I can determine and explain the relationships of current, voltage, resistance and power in simple series, parallel, and combined circuits using Ohm's Law and power calculations.	
DC3	I can demonstrate an understanding of resistance (and what factors affect resistance) and resistivity. and whether a material is Ohmic or not. I can make predictions about the resistance of various materials and wires of different thicknesses and lengths.	

Unit 8 (Project Perfromance and other topics - TBD)

Standard	Description	Score
P1	I am actively involved in any building and design projects, including work needed outside of class. I show effort, thought, creativity and a willingness to complete the project at a high level.	
P2	Projects will show a full understanding of the physics learned up to that point in the year, as demonstrated by the performance of the project and/or analysis of the performance verbally or in writing.	
P3	I demonstrate progress toward a finished project at checkpoints along the way	
P4	The quality of your design/project/lab compared to others in class or the course or to a set standard as described in the project handout	