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EQUIP Rubric for Lessons & Units: Science (Version 3.0)

Lesson/Unit Title: Amplify - Balancing Forces
~~Lesson~~ Lesson 3.1

Grade: 3

Reviewer Name or ID:

Category I: NGSS 3D Design (lessons and units): The lesson/unit is designed so students make sense of phenomena and/or design solutions to problems by engaging in student performances that integrate the three dimensions of the NGSS.

Lesson and Unit Criteria	Specific evidence from materials and reviewer's reasoning	Evidence of Quality?	Suggestions for improvement
<p>Lesson and Unit Criteria Lessons and units designed for the NGSS include clear and compelling evidence of the following:</p> <p>A. Explaining Phenomena/Designing Solutions: Making sense of phenomena and/or designing solutions to a problem drive student learning.</p> <ol style="list-style-type: none"> Student questions and prior experiences related to the phenomenon or problem motivate sense-making and/or problem solving. The focus of the lesson is to support students in making sense of phenomena and/or designing solutions to problems. When engineering is a learning focus, it is integrated with developing disciplinary core ideas from physical, life, and/or earth and space sciences. <p>B. Three Dimensions: Builds understanding of multiple grade-appropriate elements of the science and engineering practices (SEPs), disciplinary core ideas (DCIs), and crosscutting concepts (CCCs) that are deliberately selected to aid student sense-making of phenomena and/or designing of solutions.</p>	<p>Phenomena defined: Adding new train service; floating train; students must explain model</p> <p>Investigate/make sense of phenomena: rise (chpt.1) fall (chpt.2) and float (chpt.3) of trains - balanced/unbalanced forces builders + explaining model physical science</p>	<p><input type="checkbox"/> None <input type="checkbox"/> Inadequate <input checked="" type="checkbox"/> Adequate <input type="checkbox"/> Extensive</p>	<p>At this point students are not defining solution</p> <p>Question relating to students in a given location</p> <p>SEP</p> <ul style="list-style-type: none"> Analyze + Interpret data Needs more math + computational thinking Designing solutions Planning investigations
<p>Document evidence and reasoning, and evaluate whether or not there is sufficient evidence of quality for each dimension separately</p> <ol style="list-style-type: none"> Students are given a question possible questioning developing using models carry out investigation construct explanation potential for engaging in a rigorous + communicating + obtaining, evaluating + communicating Physical Science cause + effect stability + change possibly structure + function 	<p><input type="checkbox"/> None <input type="checkbox"/> Inadequate <input checked="" type="checkbox"/> Adequate <input type="checkbox"/> Extensive</p>	<p><input type="checkbox"/> None <input type="checkbox"/> Inadequate <input checked="" type="checkbox"/> Adequate <input type="checkbox"/> Extensive</p>	<p>(All 3 dimensions must be rated at least "adequate" to mark "adequate" overall)</p>

Evidence needs to be at the element level of the dimensions (see rubric introduction for a description of what is meant by "element")

<p>C. Integrating the Three Dimensions: Student sense-making of phenomena and/or designing of solutions requires student performances that integrate elements of the SEPs, CCCs, and DCIs.</p>	<p>3 elements are integrated in order to develop understanding of phenomena</p>	<p><input type="checkbox"/> None <input type="checkbox"/> Inadequate <input checked="" type="checkbox"/> Adequate <input type="checkbox"/> Extensive</p>	<p>Student driven questions • Opportunity for Elaboration design</p>
<p>Rating for Category I. NGSS 3D Design—lessons After carefully weighing the evidence, reasoning, and suggestions for improvement, rate the degree to which there is enough evidence to support a claim that the lesson meets these criteria. If you are evaluating an instructional unit rather than a single lesson, continue on to evaluate criteria D-F and rate Category I overall below.</p>	<p>Lesson Rating scale for Category I (Criteria A–C only): 3: Extensive evidence to meet at least two criteria (and at least adequate evidence for the third) 2: Adequate evidence to meet all three criteria in the category 1: Adequate evidence to meet at least one criterion in the category, but insufficient evidence for at least one other criterion 0: Inadequate (or no) evidence to meet any of the criteria in the category</p>	<p>Circle Rating</p> <p>0 1 2 3</p> <p>After rating the lesson, read below for next steps</p>	

What's next if the lesson rating is less than a 2?

If the rubric is being used to approve or vet resources and the lesson or unit does not score at least a "2" in **Category I: NGSS 3D Designed**, the review should stop and feedback should be provided to the lesson developer(s) to guide revisions. If the rubric is being used locally for revising and building lessons, professional judgment should guide whether to continue reviewing the lesson. Categories II and III may be time consuming to evaluate if Category I has not been met and the feedback may not be useful if significant revisions are needed in Category I, but evaluating these criteria in a group may support deeper and more common understanding of the criteria in these categories and more complete feedback to the lesson developer (if they are not in the room) so that Categories II and III are more likely to be met with fewer cycles of revision.

What's next if the lesson rating is a 2 or 3?

If you are evaluating a lesson that shows sufficient evidence of quality to warrant a rating of either a 2 or a 3 for Category I, proceed to Category II: NGSS Instructional Supports

Category I: NGSS 3D Design (additional criteria for units only):

If you are evaluating a lesson, it is not necessary to evaluate criteria D-F. Please enter your rating for a single lesson above (after C).

Unit Criteria	Specific evidence from materials and reviewers' reasoning	Evidence of Quality?	Suggestions for improvement
<p>A unit or longer lesson designed for the NGSS will also include clear and compelling evidence of the following:</p> <p>D. Unit Coherence: Lessons fit together to target a set of performance expectations.</p> <ul style="list-style-type: none"> i. Each lesson builds on prior lessons by addressing questions raised in those lessons, cultivating new questions that build on what students figured out, or cultivating new questions from related phenomena, problems, and prior student experiences. ii. The lessons help students develop toward proficiency in a targeted set of performance expectations. 	<p>Flow of unit builds well on prior lessons, however, lessons are not driven by student-led questions. Definite set of targeted PEs</p>	<input type="checkbox"/> None <input checked="" type="checkbox"/> Inadequate <input type="checkbox"/> Adequate <input type="checkbox"/> Extensive	<p>Student-driven questioning/inquiry</p>
<p>E. Multiple Science Domains: When appropriate, links are made across the science domains of life science, physical science and Earth and space science.</p> <ul style="list-style-type: none"> i. Disciplinary core ideas from different disciplines are used together to explain phenomena. ii. The usefulness of crosscutting concepts to make sense of phenomena or design solutions to problems across science domains is highlighted. 	<p>Links are not spelled out; however, could be related to earth science (pollution, energy conservation, environmental effects, etc)</p>	<input type="checkbox"/> None <input checked="" type="checkbox"/> Inadequate <input type="checkbox"/> Adequate <input type="checkbox"/> Extensive	<p>Purposefully link DCIs</p>
<p>F. Math and ELA: Provides grade-appropriate connection(s) to the Common Core State Standards in Mathematics and/or English Language Arts & Literacy in History/Social Studies, Science and Technical Subjects.</p>	<p>CCC used well to make sense of phenomena Intentional links to ELA are evident - provided book is above grade-level. Intentional links to math.</p>	<input type="checkbox"/> None <input checked="" type="checkbox"/> Inadequate <input checked="" type="checkbox"/> Adequate <input type="checkbox"/> Extensive	<p>Link to history, social studies</p>
<p>Rating for Category I. NGSS 3D Designed—units After carefully weighing the evidence, reasoning, and suggestions for improvement, rate the degree to which the criteria are met across the unit.</p>		<p>Unit Rating Scale for Category I (Criteria A-F): 3: At least adequate evidence for all of the unit criteria in the category; extensive evidence for criteria A-C 2: At least some evidence for all unit criteria in Category I (A-F); adequate evidence for criteria A-C 1: Adequate evidence for some criteria in Category I, but inadequate/no evidence for at least one criterion A-C 0: Inadequate (or no) evidence to meet any criteria in Category I (A-F)</p> <p>Circle Rating</p> <p style="text-align: center;">0 1 2 3</p>	

If the rubric is being used to approve or vet resources and the unit does not score at least a "2" overall in Category I: NGSS 3D Design, the review should stop here and feedback should be provided to the unit developer(s) to guide revisions. If the rubric is being used locally for revising and building units, professional judgment should be used on whether or not to continue reviewing the unit. For example, a unit that is weak in one aspect of criterion A, but that the reviewers think is easy to fix, might warrant continued review to provide more complete feedback to the unit developer(s).

Category II: NGSS Instructional Supports (lessons and units): The lesson/unit supports three-dimensional teaching and learning for ALL students by placing the lesson in a sequence of learning for all three dimensions and providing support for teachers to engage all students.

Lesson and Unit Criteria Lessons and units designed for the NGSS include clear and compelling evidence of the following:	Specific evidence from materials and reviewers' reasoning	Evidence of Quality?	Suggestions for improvement
<p>A. Relevance and Authenticity: Engages students in authentic and meaningful scenarios that reflect the practice of science and engineering as experienced in the real world.</p> <ul style="list-style-type: none"> i. Students experience phenomena or design problems as directly as possible (firsthand or through media representations). ii. Includes suggestions for how to connect instruction to the students' home, neighborhood, community and/or culture as appropriate. iii. Provides opportunities for students to connect their explanation of a phenomenon and/or their design solution to a problem to questions from their own experience. 	<p>Experience phenomena</p>	<p> <input type="checkbox"/> None <input checked="" type="checkbox"/> Inadequate <input type="checkbox"/> Adequate <input type="checkbox"/> Extensive </p>	<p>Connect to culture, community No strong connections to own experience, very superficial</p>
<p>B. Student Ideas: Provides opportunities for students to express, clarify, justify, interpret, and represent their ideas and respond to peer and teacher feedback orally and/or in written form as appropriate.</p>	<p>Notebook does good job of allowing students opportunity to reflect on daily basis. Guiding questions, turn and talk opportunities, pair observing, sharing</p>	<p> <input type="checkbox"/> None <input type="checkbox"/> Inadequate <input checked="" type="checkbox"/> Adequate <input type="checkbox"/> Extensive </p>	<p>Authentic reflection on scientific principles</p>
<p>C. Building Progressions: Identifies and builds on students' prior learning in all three dimensions, including providing the following support to teachers:</p> <ul style="list-style-type: none"> i. Explicitly identifying prior student learning expected for all three dimensions ii. Clearly explaining how the prior learning will be built upon. 	<p>PDF provided on background/prior knowledge. Unit explanation of how unit builds Opportunities for review of what has been learned so far, reflection of new material learned</p>	<p> <input type="checkbox"/> None <input type="checkbox"/> Inadequate <input type="checkbox"/> Adequate <input checked="" type="checkbox"/> Extensive </p>	

<p>D. Scientific Accuracy: Uses scientifically accurate and grade-appropriate scientific information, phenomena, and representations to support students' three-dimensional learning.</p>	<p>Video - Misconception (exaggeration) of true representation of train: hours too high Final chapter is teacher demo, rather than student exploration</p>	<p><input type="checkbox"/> None <input type="checkbox"/> Inadequate <input type="checkbox"/> Adequate <input type="checkbox"/> Extensive</p>	<p>Making Concrete do abstract - more student led, gradual release of responsibility is inhibited with teacher demo at end of unit</p>
<p>E. Differentiated Instruction: Provides guidance for teachers to support differentiated instruction by including:</p> <ol style="list-style-type: none"> Appropriate reading, writing, listening, and/or speaking alternatives (e.g., translations, picture support, graphic organizers, etc.) for students who are English language learners, have special needs, or read well below the grade level. Extra support (e.g., phenomena, representations, tasks) for students who are struggling to meet the targeted expectations. Extensions for students with high interest or who have already met the performance expectations to develop deeper understanding of the practices, disciplinary core ideas, and crosscutting concepts. 	<p>ELL, differentiated suggestions provided space for drawing, large lines; Challenge suggestions</p>	<p><input type="checkbox"/> None <input type="checkbox"/> Inadequate <input type="checkbox"/> Adequate <input type="checkbox"/> Extensive</p>	<p>Need wider variety of leveled texts Online diagram could use feedback for incorrect inputs "oops! Try again!"</p>
<p>Rating for Category II: Instructional Supports—lessons After carefully weighing the evidence, reasoning, and suggestions for improvement, rate the degree to which the lesson met this category.</p> <p>If you are evaluating an instructional unit rather than a single lesson, continue on to evaluate criteria F–G and rate Category II overall below.</p>		<p>Lesson Rating scale for Category II (Criteria A-E only): 3: At least adequate evidence for all criteria in the category; extensive evidence for at least one criterion 2: Some evidence for all criteria in the category and adequate evidence for at least four criteria, including A 1: Adequate evidence of quality for at least two criteria in the category 0: Adequate evidence of quality for no more than one criterion in the category</p>	
<p>Circle Rating</p> <p>0 1 2 3</p> <p style="text-align: center;">(1)</p>			

Category II: NGSS Instructional Supports (additional criteria for units only)

if you are evaluating a lesson, it is not necessary to evaluate criteria F-G. Please enter your rating for a lesson above (after E).

Unit Criteria	Specific evidence from materials and reviewers' reasoning	Evidence of Quality?	Suggestions for improvement
<p>A unit or longer lesson designed for the NGSS will also include clear and compelling evidence of the following:</p> <p>F. Teacher Support for Unit Coherence: Supports teachers in facilitating coherent student learning experiences over time by:</p> <ol style="list-style-type: none"> Providing strategies for linking student engagement across lessons (e.g. cultivating new student questions at the end of a lesson in a way that leads to future lessons, helping students connect related problems and phenomena across lessons, etc.). Providing strategies for ensuring student sense-making and/or problem-solving is linked to learning in all three dimensions. 	<p>Does not invite student questions to lead to next lesson</p> <p>Daily reflection page is before the day's lesson</p> <p>Student workbook provides ample opportunities for sense-making</p>	<p><input type="checkbox"/> None</p> <p><input checked="" type="checkbox"/> Inadequate</p> <p><input type="checkbox"/> Adequate</p> <p><input type="checkbox"/> Extensive</p>	<p>• more reflection to end of lesson</p> <p>• student-generated questions/inquiry rather than teacher generated/directed</p>
<p>G. Scaffolded differentiation over time: Provides supports to help students engage in the practices as needed and gradually adjusts supports over time so that students are increasingly responsible for making sense of phenomena and/or designing solutions to problems.</p>	<p>Scaffolded differentiation is present.</p> <p>Decrease of supports over time</p> <p>Lead students to make sense of floating brain</p>	<p><input type="checkbox"/> None</p> <p><input checked="" type="checkbox"/> Inadequate</p> <p><input type="checkbox"/> Adequate</p> <p><input type="checkbox"/> Extensive</p>	<p>Students are explaining why their solution is Okay.</p> <p>Give students opportunity to design and test solutions</p>
<p>Rating for Category II: NGSS Instructional Supports—units</p> <p>After carefully weighing the evidence, reasoning, and suggestions for improvement, rate the degree to which the criteria are met across the unit.</p>	<p>Unit rating scale for Category II (Criteria A-G):</p> <p>3: At least adequate evidence for all criteria in the category; extensive evidence for at least two criteria</p> <p>2: Some evidence for all criteria in the category and adequate evidence for at least five criteria, including A</p> <p>1: Adequate evidence for at least three criteria in the category</p> <p>0: Adequate evidence for no more than two criteria in the category</p> <p style="text-align: right;">Circle Rating</p> <p style="text-align: center;">0 1 2 3</p> <p style="text-align: center;">(1)</p>		

Category III: Monitoring NGSS Student Progress (lessons and units) The lesson/unit supports monitoring student progress in all three dimensions of the NGSS as students make sense of phenomena and/or design solutions to problems.

Lesson and Unit Criteria Lessons and units designed for the NGSS include clear and compelling evidence of the following:	Specific evidence from materials and reviewers' reasoning	Evidence of Quality?	Suggestions for improvement
A. Monitoring 3D student performances: Elicits direct, observable evidence of three-dimensional learning; students are using practices with <u>core ideas</u> and <u>crosscutting concepts</u> to make sense of <u>phenomena</u> and/or to design solutions.	Student workbook provides ample evidence of making sense of design phenomena	<input type="checkbox"/> None <input type="checkbox"/> Inadequate <input checked="" type="checkbox"/> Adequate <input type="checkbox"/> Extensive	Increase opportunity for design solutions
B. Formative: Embeds formative assessment processes throughout that evaluate student learning to inform instruction.	Cues for formative assessments given. Workbook	<input type="checkbox"/> None <input type="checkbox"/> Inadequate <input checked="" type="checkbox"/> Adequate <input type="checkbox"/> Extensive	
C. Scoring guidance: Includes aligned rubrics and scoring guidelines that provide guidance for interpreting student performance along the three dimensions to support teachers in (a) planning instruction and (b) providing ongoing feedback to students.	"Look for ... Now what", Rubric + Scoring guide provided in end of unit assessment Contains anchor responses Provides written and drawing opportunities	<input type="checkbox"/> None <input type="checkbox"/> Inadequate <input checked="" type="checkbox"/> Adequate <input type="checkbox"/> Extensive	
D. Unbiased tasks/items: Assesses student proficiency using methods, vocabulary, representations, and examples that are accessible and unbiased for all students.		<input type="checkbox"/> None <input type="checkbox"/> Inadequate <input checked="" type="checkbox"/> Adequate <input type="checkbox"/> Extensive	
Rating for Category III. Monitoring NGSS Student Progress—lessons After carefully weighing the evidence, reasoning, and suggestions for improvement, rate the degree to which the lesson met this category. If you are evaluating an instructional unit rather than a single lesson, continue on to evaluate criteria E-F and rate Category III overall below.	Lesson Rating scale for Category III (Criteria A–D only): 3: At least adequate evidence for all criteria in the category; extensive evidence for at least one criterion 2: Some evidence for all criteria in the category and adequate evidence for at least three criteria, including A 1: Adequate evidence for at least two criteria in the category 0: Adequate evidence for no more than one criterion in the category		Circle Rating 0 1 2 3

Category III: Monitoring NGSS Student Progress (additional criteria for units only)

If you are evaluating a lesson, it is not necessary to evaluate criteria E-F. Please enter your rating for a lesson above (after D).

Unit Criteria	Specific evidence from materials and reviewers' reasoning	Evidence of Quality?	Suggestions for improvement
<p>A unit or longer lesson designed for the NGSS will also include clear and compelling evidence of the following:</p> <p>E. Coherent Assessment system: Includes pre-, formative, summative, and self-assessment measures that assess three-dimensional learning.</p>	<p>All are included</p>	<p><input type="checkbox"/> None <input type="checkbox"/> Inadequate <input checked="" type="checkbox"/> Adequate <input type="checkbox"/> Extensive</p>	
<p>F. Opportunity to learn: Provides multiple opportunities for students to demonstrate performance of practices connected with their understanding of disciplinary core ideas and crosscutting concepts and receive feedback</p>	<p>Students are actively engaged in performance demonstration, explanations and reflection</p>	<p><input type="checkbox"/> None <input type="checkbox"/> Inadequate <input checked="" type="checkbox"/> Adequate <input type="checkbox"/> Extensive</p>	
<p>Rating for Category III: Monitoring NGSS Student Progress—units After carefully weighing the evidence, reasoning, and suggestions for improvement, rate the degree to which the criteria are met across the unit.</p>	<p>Unit Rating scale for Category III (Criteria A-F): 3: At least adequate evidence for all criteria in the category; extensive evidence for at least one criterion 2: Some evidence for all criteria in the category and adequate evidence for at least five criteria, including A 1: Adequate evidence for at least three criteria in the category 0: Adequate evidence for no more than two criteria in the category</p>		<p>Circle Rating</p> <p>0 1 2 3</p>

Category Ratings:

Transfer your team's ratings from each category to the following chart and add the scores together for the overall score:

Category ratings				Total Score
Category I: NGSS 3D Design	Category II: NGSS Instructional Supports	Category III: Monitoring NGSS Student Progress		
0 1 <u>2</u> 3	0 <u>1</u> <u>2</u> 3	0 <u>1</u> <u>2</u> 3		11 <u>5</u>

Overall ratings:

The score total is an *approximate* guide for the rating. Reviewers should use the evidence of quality across categories to guide the final rating. In other words, the rating could differ from the total score recommendations if the reviewer has evidence to support this variation.

E: Example of high quality NGSS design—High quality design for the NGSS across all three categories of the rubric; a lesson or unit with this rating will still need adjustments for a specific classroom, but the support is there to make this possible; exemplifies most criteria across Categories I, II, & III of the rubric. (total score ~8–9)

E/I: Example of high quality NGSS design if Improved—Adequate design for the NGSS, but would benefit from some improvement in one or more categories; most criteria have at least adequate evidence (total score ~6–7)

R: Revision needed—Partially designed for the NGSS, but needs significant revision in one or more categories (total ~3–5)

N: Not ready to review—Not designed for the NGSS; does not meet criteria (total 0–2)

Circle the overall rating below:

E E/I R N

Overall Summary Comments: