

Adaptable rubrics for science and engineering practices

This document includes adaptable rubrics for science and engineering practices that students and the teacher may use to support the Portfolio Assessment and other work completed throughout the year. Student-facing and teacher-facing rubrics are provided for each of the following practices: Constructing Explanations, Engaging in Argument from Evidence, and Developing and Using Models.

Constructing explanations: Student rubric			
Criterion	Description of level	Yes	Not yet
Responsive	My explanation answers a question about how or why something happened.		
Causal and explanatory	My explanation goes beyond describing the things I can easily observe to explain <i>why</i> or <i>how</i> those things happened.		
Clear and well-organized	My explanation is written in a way that my audience can understand and uses scientific language appropriately.		
Grounded in evidence	My explanation uses what I learned from investigations and from reading.		

Constructing explanations: Teacher rubric				
Criterion	Description of level	No evidence	Limited evidence	Clear evidence
Responsive	Student writing answers a question about how or why something happened.			
Causal and explanatory	Student writing goes beyond describing the observable phenomenon to explain <i>why</i> or <i>how</i> that phenomenon came to be.			
Clear and well-organized	Student writing is written with the audience in mind. It meets the expectations for writing emphasized in the classroom (e.g., using appropriate vocabulary, using transition words). It uses scientific language appropriately.			
Grounded in evidence	Student writing is consistent with accepted scientific concepts and data encountered in the unit.			

Engaging in argument from evidence: Student rubric			
Criterion	Description of level	Yes	Not yet
Responsive	My argument includes a claim that answers the question.		
Provides supporting evidence	My argument includes evidence that supports my claim.		
Justified by the reasoned use of evidence	My argument uses scientific concepts to interpret data and to explain how the evidence I've included supports my claim.		
Clear and well-organized	My argument is written in a way that my audience can understand. My argument uses scientific language appropriately.		
Engages with alternative claims	My argument considers alternative claims and critiques them.		

Engaging in argument from evidence: Teacher rubric				
Criterion	Description of level	No evidence	Limited evidence	Clear evidence
Responsive	Arguments include a claim that fully addresses the problem or question at hand. The argument should go beyond describing an observed phenomenon by proposing a claim that accounts for <i>how</i> or <i>why</i> the observed phenomenon occurred.			
Provides supporting evidence	Argument employs high-quality information as evidence to support the claim.			
Justified by the reasoned use of evidence	Argument connects available evidence to the claim in a way that will convince the audience that the proposed explanation is the best one available.			
Clear and well-organized	Argument is written with a structure that makes it easy for the intended audience to understand, and uses scientific language appropriately.			
Engages with alternative claims	The argument considers alternative claims and critiques them.			

Developing and using models: Student rubric			
Criterion	Description of level	Yes	Not yet
Representative: Does my model accurately reflect the aspects of the natural world being investigated or tested or of the designed world being tested?	My model includes the variables that are important to the idea I am testing, or to the phenomenon I am trying to explain.		
	My model accurately represents interactions among the parts of the system I am investigating, or among the elements of the solution I am proposing.		
	[If relevant to the model] I am able to use my model to test relationships among variables, or to make predictions about natural or designed systems.		
Explanatory: Does my model serve to clarify the system, mechanism, or design solution I am proposing?	My model clearly communicates to the intended audience how a system functions, why a phenomenon occurs, or how my design will solve a problem.		
	My model includes all necessary variables and information in a clear way, and avoids unnecessary, distracting, or confusing elements.		
Aware of limitations: Do I understand what predictions or conclusions are appropriate to draw from my model?	I am able to identify and describe the limitations of my model.		
Responsive to evidence: Do I know how to revise my model in the face of new evidence or test data?	My model reflects revision and refinement based on evidence from testing or about the phenomenon under investigation.		

Developing and using models: Teacher rubric				
Criterion	Description of level	No evidence	Limited evidence	Clear evidence
Representative: Does the model accurately reflect the aspects of the natural world being investigated or of the designed world being tested?	The model includes the variables or parts of the system that are important to the idea being tested, or to the phenomenon being explained.			
	The model accurately represents the interactions and relationships among the parts of the system being investigated, or among the elements of the solution being proposed.			
	[If relevant to the model] Student is able to use the model to test relationships among variables, or to make predictions about natural or designed systems.			
Explanatory: Does the model serve to clarify the system, mechanism, or design solution being proposed?	The model clearly communicates to the intended audience how a system functions, why a phenomenon occurs, or how the student's design will solve a problem.			
	The model includes all necessary variables and information in a clear way, and avoids unnecessary, distracting, or confusing elements.			
Aware of limitations: Does the student understand what predictions or conclusions are appropriate to draw from the model?	The student is able to identify and describe the limitations of the model.			
Responsive to evidence: Does the student know how to revise the model in the face of new evidence or test data?	The model reflects revision and refinement based on evidence from testing, or about the phenomenon under investigation.			