

PS3.B	<p><i>Conservation of Energy and Energy Transfer</i></p> <ul style="list-style-type: none"> • Conservation of energy means that the total change of energy in any given system is always equal to the total energy transferred into or out of the system. • Energy cannot be created or destroyed, but it can be transported from one place to another and transferred between systems. • Mathematical expressions, which quantify how the stored energy in a system depends on its configuration (e.g. relative positions of charged particles, compression of a spring) and how kinetic energy depends on mass and speed, allow the concept of conservation of energy to be used to predict and describe system behavior. • The availability of energy limits what can occur in any system. 	✓	✓							
ETS1.A	<p><i>Defining and Delimiting an Engineering Problem</i></p> <ul style="list-style-type: none"> • Criteria and constraints also include satisfying any requirements set by society, such as taking issues of risk mitigation into account, and they should be quantified to the extent possible and stated in such a way that one can tell if a given design meets them. • Humanity faces major global challenges today, such as the need for supplies of clean water and food or for energy sources that minimize pollution, which can be addressed through engineering. These global challenges also may have manifestations in local communities. 	✓				✓				
ETS1.B	<p><i>Developing Possible Solutions</i></p> <ul style="list-style-type: none"> • When evaluating solutions it is important to take into account a range of constraints including cost, safety, reliability, and aesthetics and to consider social, cultural and environmental impacts. 	✓				✓				
ETS1.C	<p><i>Optimizing the Design Solution</i></p> <ul style="list-style-type: none"> • Criteria may need to be broken down into simpler ones that can be approached systematically, and decisions about the priority of certain criteria over others (tradeoffs) may be needed. 	✓				✓				
Crosscutting Concepts										
Energy and Matter	<ul style="list-style-type: none"> • The total amount of energy and matter in closed systems is conserved • Energy cannot be created or destroyed - only moves between one place and another place, between objects and/or fields, or between systems. 	✓	✓							
Systems and System Models	Models can be used to simulate systems and interactions - including energy, matter, and information flows - within and between systems at different scales.	✓	✓			✓		✓		
Structure and Function	Investigating or designing new systems or structures requires a detailed examination of the properties of different materials, the structures of different components, and connections of components to reveal its function and/or solve a problem.	✓	✓			✓		✓	✓	
Common Core Language Arts										
Speaking and Listening										
SL.9-10.1	Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on Grades 9-10 topics, texts, and issues, building on others' ideas and expressing their own clearly and persuasively.	✓	✓			✓		✓	✓	
SL.9-10.1b	Work with peers to set rules for collegial discussions and decision-making (e.g., informal consensus, taking votes on key issues, and presentation of alternate views), clear goals and deadlines, and individual roles as needed.	✓	✓			✓		✓	✓	
SL.9-10.1c	Propel conversations by posing and responding to questions that relate the current discussion to broader themes or larger ideas; actively incorporate others into the discussion; and clarify, verify, or challenge ideas and conclusions.	✓	✓			✓		✓	✓	
SL.9-10.1d	Respond thoughtfully to diverse perspectives, summarize points of agreement and disagreement, and, when warranted, qualify or justify their own views and understanding and make new connections in light of the evidence and reasoning presented.	✓	✓			✓		✓	✓	
SL.11-12.1	Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on Grades 11-12 topics, texts, and issues, building on others' ideas and expressing their own clearly and persuasively.	✓	✓			✓		✓	✓	

SL.11-12.1b	Work with peers to promote civil, democratic discussions and decision-making, set clear goals and deadlines, and establish individual roles as needed.	✓	✓			✓		✓	✓
SL.11-12.1c	Propel conversations by posing and responding to questions that probe reasoning and evidence; ensure a hearing for a full range of positions on a topic or issue; clarify, verify, or challenge ideas and conclusions; and promote divergent and creative perspectives.	✓	✓			✓		✓	✓
SL.11-12.1d	Respond thoughtfully to diverse perspectives; synthesize comments, claims, and evidence made on all sides of an issue; resolve contradictions when possible; and determine what additional information or research is required to deepen the investigation or complete the task.	✓	✓			✓		✓	✓



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