

Appendix: STEM Standards and Practices

Next Generation Science Standards (NGSS)

<https://www.nextgenscience.org/>

Alignment of Activities With NGSS Disciplinary Core Ideas				
Motion and Stability (MS) Standard	Analyze the Geometry of a Spacecraft	Design a Crew Module	Model a Spacecraft Docking System	Build a Heat Shield
Forces and Interactions				
MS-PS2-2			✓	
Energy				
MS-PS3-3				✓
MS-PS3-4				✓
Engineering Design				
MS-ETS1-1		✓		✓
MS-ETS1-2		✓		✓
MS-ETS1-4		✓		

Alignment of Activities With NGSS Crosscutting Concepts				
Concept	Analyze the Geometry of a Spacecraft	Design a Crew Module	Model a Spacecraft Docking System	Build a Heat Shield
Patterns				
Cause and Effect				
Scale, Proportion, and Quantity				
System and System Models		✓	✓	✓
Energy and Matter				
Structure and Function		✓	✓	✓
Stability and Change				
Interdependence of Science, Engineering, and Technology	✓	✓		✓
Influence of Engineering, Technology, and Science on Society and the Natural World				

NGSS Science and Engineering Practices

<https://ngss.nsta.org/PracticesFull.aspx>

Alignment of Activities With NGSS Science and Engineering Practices				
Practice	Analyze the Geometry of a Spacecraft	Design a Crew Module	Model a Spacecraft Docking System	Build a Heat Shield
Asking Questions and Defining Problems		✓		✓
Developing and Using Models		✓	✓	✓
Planning and Carrying out Investigations		✓		✓
Analyzing and Interpreting Data	✓			✓
Using Mathematics and Computational Thinking	✓		✓	
Constructing Explanations and Designing Solutions		✓		
Engaging in Argument From Evidence				
Obtaining, Evaluating, and Communicating Information				

International Society for Technology in Education (ISTE) Standards for Students

<https://www.iste.org/standards/for-students>

Alignment of Activities With ISTE Standards for Students				
Standard	Analyze the Geometry of a Spacecraft	Design a Crew Module	Model a Spacecraft Docking System	Build a Heat Shield
Knowledge Constructor				
3d				✓
Innovative Designer				
4a		✓		✓
4c		✓		✓
4d		✓		✓
Computational Thinker				
5c	✓		✓	
Global Collaborator				
7c		✓	✓	✓

Common Core State Standards (CCSS) for Mathematics

<http://www.corestandards.org/Math/>

Alignment of Activities With CCSS Grade Level Content Standards by Domain				
Standard	Analyze the Geometry of a Spacecraft	Design a Crew Module	Model a Spacecraft Docking System	Build a Heat Shield
6th Grade				
CCSS.MATH.CONTENT.6.RP.A.1			✓	
CCSS.MATH.CONTENT.6.NS.B.3	✓		✓	
CCSS.MATH.CONTENT.6.G.A.1	✓			
7th Grade				
CCSS.MATH.CONTENT.7.NS.A.3	✓		✓	
CCSS.MATH.CONTENT.7.G.A.1			✓	
CCSS.MATH.CONTENT.7.G.A.3	✓			
CCSS.MATH.CONTENT.7.G.B.6	✓			
8th Grade				
CCSS.MATH.CONTENT.8.G.C.9	✓			

Alignment of Activities With CCSS Standards for Mathematical Practice				
Practice	Analyze the Geometry of a Spacecraft	Design a Crew Module	Model a Spacecraft Docking System	Build a Heat Shield
CCSS.MATH.PRACTICE.MP1		✓		✓
CCSS.MATH.PRACTICE.MP2	✓			
CCSS.MATH.PRACTICE.MP3		✓		✓
CCSS.MATH.PRACTICE.MP4	✓			
CCSS.MATH.PRACTICE.MP5	✓		✓	
CCSS.MATH.PRACTICE.MP6	✓		✓	
CCSS.MATH.PRACTICE.MP7				
CCSS.MATH.PRACTICE.MP8				