



Introduction to Assessment

The Twig Science Assessment System has been developed in partnership with the Stanford University's SCALE team. It is designed to provide a three-dimensional assessment system that allows teachers to evaluate student attainment of the NGSS three dimensions and Performance Expectations (PEs).

The assessment strategies measure students' knowledge and ability, favoring Performance Tasks over rote memorization and include a variety of measures such as written assignments, collaborative engineering design challenges and oral presentations. There are frequent opportunities to evaluate student progress against the standards in each module. The G3 M1 Assessment Module Overview offers details of where and how those dimensions are assessed.

Near the start of each module students complete a Pre-Exploration (diagnostic pre-assessment) that supports teachers and students to identify prior knowledge and misconceptions about the dimensions addressed in the module. Teachers are supported to track how students address their misconceptions as they gain new understanding as the module unfolds. Additional Pre-Explorations are integrated at strategic points through the module.

Ongoing assessment opportunities are woven into each lesson. They are quick and easy to implement and support teachers to tailor their instruction to the class requirements. They include class discussions, constructed responses (written and drawn), self- and peer assessment, and teacher observations.

Summative Performance Tasks allow students to demonstrate their attainment level of the module PEs. These rich and highly engaging activities vary from written reports, to project work and oral presentations. Rubrics are provided to support assessment.

The Ultimate Playground also includes a summative Benchmark Assessment developed in partnership with SCALE, that allows students to apply the knowledge and skills gained in this module to new contexts, giving them exposure to the types of assessment items they will face in the Grade 5 state test.

In addition, a summative Multiple Choice Assessment gives teachers the opportunity to quickly assess student understanding of a range of dimensions covered in this module. An extended section C has been designed to stretch GATE students.

The Ultimate Playground Assessment Story

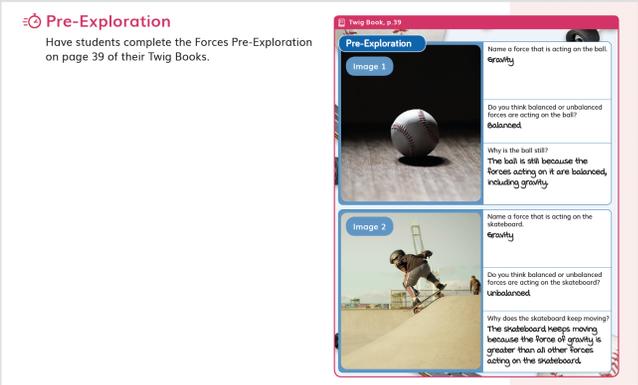
In this module students figure out the Module Phenomenon: How are objects affected by the forces of push and pull? Through a series of investigations, students observe and explain how push and pull forces affect the motion of objects, such as playground equipment, and soccer balls. They carry out investigations to figure out how balanced and unbalanced forces affect objects, how forces can act upon a stationary object, and work like engineers to test roller coaster cars. Students develop and use models to collect and analyze data, and identify patterns that help them to predict a swing's motion. They then explore non-contact forces, focussing on magnetic forces. In the final Performance Task, students design, build, test and refine a Dragon Ride for their Ultimate Playground, using magnets to solve the problem of how the ride will be exciting and fun. Students are assessed on their ability to evaluate multiple design solutions, and ensuring that the final design meets criteria and constraints.

Designed for the NGSS: Student Progress Rubric

Evidence Chart

Directions

1. Review your assigned materials to identify assessments of and for learning. Complete an evidence chart for each identified assessment.
2. Respond to the prompts or answer the questions in the space provided.
3. Be prepared to represent your responses visually on a public chart.

Assessment Description				
<p>DQ2L1 Reflect TE p. 119 / TB p. 39</p> 	<p>Describe the assessment (e.g., how many questions, presence of tables/charts, graphs).</p> <p>Two images, each with three writing prompts</p>	<p>Purpose of Assessment (i.e., peer, self, formative, summative, per/post)</p> <p>Pre-assessment/ formative</p>	<p>Type of Measure (e.g., Performance Task, discussion, multiple choice, constructed response)</p> <p>Images with written response</p>	<p>Note evidence of bias or problems with accessibility.</p>
Match among Assessment, Phenomena/Problem, and Three Dimensions				
<p>What phenomenon or problem, if any, are students trying to figure out in this assessment?</p>		<p>What is the 2-3 dimensional learning goal assessed in this task?</p>		
<p>Students use prior knowledge to work out whether balanced or unbalanced forces are affecting the motion of a skateboarder and a stationary baseball.</p>		<p>Students are pre-assessed on their knowledge of push and pull forces, and the effects of balanced and unbalanced forces on objects' motion. They apply the concept of cause-and-effect to construct their responses. (PS2.A, PS2.B, CCC-2)</p>		

Assessment Description

DQ1L2 Reflect TE p. 68 / TB p. 20

English Learners
Have students go back to the picture they described in the previous lesson to anchor their sentence. Have them verbalize the sentence before writing it, or ask them to dictate the sentence to a partner.

Special Needs
Social-Emotional Functioning
Ask students to recall which piece of equipment they used in the previous lesson if they are struggling to choose what to write about.

Formative Assessment
Have students complete a cause-and-effect statement about using a piece of playground equipment on page 20 of their Twig Books.

Use the Formative Assessment
Read student responses and identify students who may need extra support with cause-and-effect relationships. Work with them to identify explicit causes and effects during the next few lessons.

Twig Book, p.20
Reflect
Construct Explanations
• Choose a piece of playground equipment. Complete the sentence to explain how you can make it move.
If you push a swing, then it moves forward.

Describe the assessment (e.g., how many questions, presence of tables/charts, graphs).

One question prompt to construct an explanation.

Purpose of Assessment (i.e., peer, self, formative, summative, per/post)

Formative

Type of Measure (e.g., Performance Task, discussion, multiple choice, constructed response)

Constructed written response

Note evidence of bias or problems with accessibility.

No evidence of bias. Extra measures are taken to provide the teacher with ways to modify the task for English Learners and students with special needs. Text to speech function is available.

Match among Assessment, Phenomena/Problem, and Three Dimensions

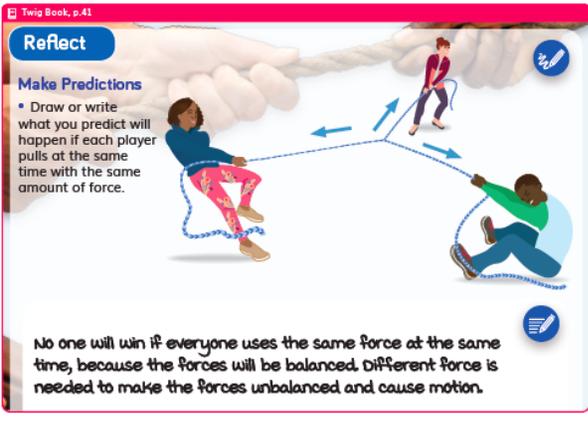
What phenomenon or problem, if any, are students trying to figure out in this assessment?

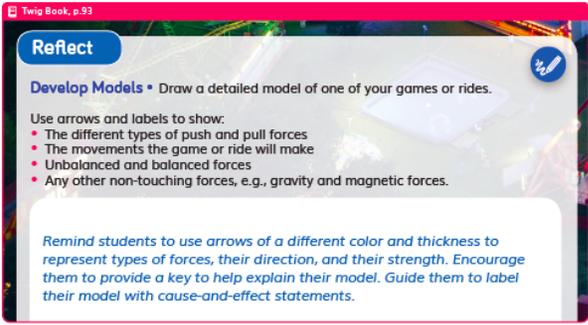
Students construct a cause-and-effect statement explaining how push and pull forces cause a piece of playground equipment to move.

What is the 2-3 dimensional learning goal assessed in this task?

Communicating information in the form of a scientific explanation (SEP-8) about how push and pull forces can cause an object's motion to change (CCC-2, PS2.A).

Students are assessed on their understanding of cause and effect, and their ability to base their explanation on evidence and observations.

Assessment Description				
<p>DQ2L2 Reflect TE p. 129 / TB p. 41</p> <div style="border: 1px solid #ccc; padding: 10px; margin-top: 10px;"> <p>Formative Assessment</p> <p>Have students respond to the picture of a three-way tug-of-war on page 41 of their Twig Books.</p>  </div>	<p>Describe the assessment (e.g., how many questions, presence of tables/charts, graphs).</p> <p>One question prompt asking students to make a prediction about the outcome of a game of tug-of-war. Students annotate a diagram or write what they think will happen.</p>	<p>Purpose of Assessment (i.e., peer, self, formative, summative, per/post)</p> <p>Formative</p>	<p>Type of Measure (e.g., Performance Task, discussion, multiple choice, constructed response)</p> <p>Constructed written response</p>	<p>Note evidence of bias or problems with accessibility.</p> <p>No evidence of bias. Text to speech function. The assessment can be completed by either annotating a diagram to show the forces and motion or causes and effects, or by writing a statement.</p>
Match among Assessment, Phenomena/Problem, and Three Dimensions				
What phenomenon or problem, if any, are students trying to figure out in this assessment?	What is the 2-3 dimensional learning goal assessed in this task?			
Students are asked to predict the effects balanced forces will have on the motion of a tug-of-war rope.	Students are assessed on their understanding of balanced and unbalanced forces (PS2.A) and the cause-and-effect relationship (CCC-2) between forces and motion. Students demonstrate their understanding by annotating a model (SEP-2) or constructing a statement based on evidence and reasoning (SEP-8).			

Assessment Description				
<p>Formative Assessment</p> <p>Have students choose one ride or game and make a detailed pictorial model on page 93 of their Twig Books.</p> <p>Remind students to use arrows of a different color and thickness to represent different types of forces, their direction, and their strength. They should also use arrows to show the movements the ride will make. Encourage them to provide a key showing what each color of arrow represents.</p> <p>Ask students to write cause-and-effect sentences describing when the game or ride uses balanced and unbalanced forces, and identify the non-touching forces.</p>  <p>DQ5L8 Reflect TE p. 287 / TB p. 93</p>	<p>Describe the assessment (e.g., how many questions, presence of tables/charts, graphs).</p> <p>Prompt for students to draw a detailed model of one of the rides in the module. It includes a list of details to include.</p>	<p>Purpose of Assessment (i.e., peer, self, formative, summative, per/post)</p> <p>Formative, post</p>	<p>Type of Measure (e.g., Performance Task, discussion, multiple choice, constructed response)</p> <p>Constructed written and drawn response</p>	<p>Note evidence of bias or problems with accessibility.</p> <p>No evidence of bias. Text to speech function is available.</p>
Match among Assessment, Phenomena/Problem, and Three Dimensions				
<p>What phenomenon or problem, if any, are students trying to figure out in this assessment?</p>		<p>What is the 2-3 dimensional learning goal assessed in this task?</p>		
<p>Students are assessed on the Module Phenomena: How are objects affected by the forces of push and pull?</p>		<p>Students are assessed on their ability to develop and use detailed pictorial models (SEP-2), and their ability to write cause-and-effect sentences (CCC-2) describing the relationship between forces and motion (PS2.A).</p>		

Assessment Description				
<p>DQ2L5 Reflect TE p. 148 / TB p. 47</p> <div style="border: 1px solid black; padding: 5px;"> <p>Special Needs</p> <p>Social-Emotional Functioning For reluctant writers, and students who may feel overwhelmed by the number of bulleted questions and amount of writing space, orally model how you would take one question at a time and turn it into a statement (e.g., The ride looks like _____ when it is not moving.). Provide a specific time frame for each response before moving on to the next question.</p> <p>Challenge</p> <p>Have students turn to page 48 in their Twig Books and elaborate on the forces that cause their ride to stop moving, and on the forces that cause their ride to remain at rest.</p> </div> <div style="border: 1px solid black; padding: 5px; margin-top: 5px;"> <p>Introduce the Activity</p> <p>Today, students will write about one of the Ultimate Playground rides or games they have explored so far. Their writing will focus on balanced and unbalanced forces. They will also draw the ride and use arrows to demonstrate how forces make the ride or game work.</p> <p>Review the information students should include in their writing.</p> <p>Students should:</p> <ul style="list-style-type: none"> Describe the ride or game when it is at rest and not moving and identify the forces acting on it. Describe the ride or game when it is in motion and identify the forces acting on it. <p>Remind students that cause-and-effect sentences should be used to describe and explain changes in motion.</p> <p>Write About a Ride</p> <p>Have students open to page 47 in their Twig Books and read through the questions that they must try to answer in their writing. They should begin by deciding which of the Ultimate Playground rides or games they will write about:</p> <ul style="list-style-type: none"> A gravity-based game or ride A roller coaster track and cars A kicking-based game A tug-of-war game </div>	<p>Describe the assessment (e.g., how many questions, presence of tables/charts, graphs).</p> <p>Writing prompt with 4 questions</p>	<p>Purpose of Assessment (i.e., peer, self, formative, summative, per/post)</p> <p>Summative</p>	<p>Type of Measure (e.g., Performance Task, discussion, multiple choice, constructed response)</p> <p>Performance Task, written</p>	<p>Note evidence of bias or problems with accessibility.</p> <p>No evidence of bias. Modifications suggested for students with special needs, gifted and ELA students.</p>
Match among Assessment, Phenomena/Problem, and Three Dimensions				
<p>What phenomenon or problem, if any, are students trying to figure out in this assessment?</p>		<p>What is the 2-3 dimensional learning goal assessed in this task?</p>		
<p>Students describe and explain how amusement park rides move, showing how unbalanced forces change their motion.</p>		<p>Students are assessed on their ability to describe the way amusement park rides move, and explain how unbalanced forces cause their motion to change (PS2.A, CCC-2, SEP-8)</p>		

Assessment Description				
<p>DQ5L7 Investigate TE p. 278 / TB p. 89</p> <div style="border: 1px solid black; padding: 5px;"> <p>Special Needs</p> <p>Social-Emotional Functioning For reluctant writers, and students who may feel overwhelmed by the number of bulleted questions and amount of writing space, orally model how you would take one question at a time and turn it into a statement (e.g., <i>The ride looks like _____ when it is not moving.</i>). Provide a specific time frame for each response before moving on to the next question.</p> <p>Challenge</p> <p>Have students turn to page 48 in their Twig Books and elaborate on the forces that cause their ride to stop moving, and on the forces that cause their ride to remain at rest.</p> </div> <p>Introduce the Activity</p> <p>Today, students will write about one of the Ultimate Playground rides or games they have explored so far. Their writing will focus on balanced and unbalanced forces. They will also draw the ride and use arrows to demonstrate how forces make the ride or game work.</p> <p>Review the information students should include in their writing.</p> <p>Students should:</p> <ul style="list-style-type: none"> Describe the ride or game when it is at rest and not moving and identify the forces acting on it. Describe the ride or game when it is in motion and identify the forces acting on it. <p>Remind students that cause-and-effect sentences should be used to describe and explain changes in motion.</p> <p>Write About a Ride</p> <p>Have students open to page 47 in their Twig Books and read through the questions that they must try to answer in their writing. They should begin by deciding which of the Ultimate Playground rides or games they will write about:</p> <ul style="list-style-type: none"> A gravity-based game or ride A roller coaster track and cars A kicking-based game A tug-of-war game 	<p>Describe the assessment (e.g., how many questions, presence of tables/charts, graphs).</p> <p>Developing model rides using a criteria and design.</p>	<p>Purpose of Assessment (i.e., peer, self, formative, summative, per/post)</p> <p>Summative</p>	<p>Type of Measure (e.g., Performance Task, discussion, multiple choice, constructed response)</p> <p>Performance Task</p>	<p>Note evidence of bias or problems with accessibility.</p> <p>No evidence of bias. Modifications suggested for students with special needs, gifted and ELA students.</p>
Match among Assessment, Phenomena/Problem, and Three Dimensions				
<p>What phenomenon or problem, if any, are students trying to figure out in this assessment?</p>		<p>What is the 2-3 dimensional learning goal assessed in this task?</p>		
<p>Over the course of three lessons, students research, design, build and test a magnetic ride. They figure out how magnetic interactions can create an amusement park ride that moves in exciting and fun ways.</p>		<p>Students are assessed on their ability to research, design and build a dragon ride to test. They define criteria and constraints and measure their success using a rubric. They apply knowledge of forces and motion, non-contact forces, and generate solutions to an engineering problem. (PS2.A, PS2.B, ETS1.B, ETS1.C, CCC-1, CCC-2, SEP-2, SEP-3, SEP-6)</p>		

Assessment Description

Multiple Choice Assessment

Multiple Choice Assessment - Student View

Your students will see the following for this Multiple Choice Assessment. For you this page is currently in 'read-only' mode.

[← Exit Student View](#) [Show Answers](#)

Part A: True or False Questions

Select True or False for each statement.

	True	False
1 If there is no force on an object, it cannot move.	<input type="radio"/>	<input type="radio"/>
2 If an object is at rest, the forces acting on it must be balanced.	<input type="radio"/>	<input type="radio"/>
3 You need a force to keep an object moving.	<input type="radio"/>	<input type="radio"/>
4 Friction is a force that can stop motion.	<input type="radio"/>	<input type="radio"/>
5 Gravity only acts on objects when they move.	<input type="radio"/>	<input type="radio"/>
6 If gravity acts on an object, it will fall.	<input type="radio"/>	<input type="radio"/>
7 Static electricity can make things move.	<input type="radio"/>	<input type="radio"/>
8 All silver-colored things are attracted to magnets.	<input type="radio"/>	<input type="radio"/>
9 Magnets can push each other.	<input type="radio"/>	<input type="radio"/>
10 Magnets can push paper clips.	<input type="radio"/>	<input type="radio"/>

Describe the assessment (e.g., how many questions, presence of tables/charts, graphs).

Multiple Choice Assessment:
 Part A: 10 True or False questions
 Part B: 17 Multiple Choice questions
 Part C: 5 Extended questions.
 Suggested pacing: 20-30 minutes

Purpose of Assessment (i.e., peer, self, formative, summative, per/post)

Summative

Type of Measure (e.g., Performance Task, discussion, multiple choice, constructed response)

Multiple Choice

Note evidence of bias or problems with accessibility.

No bias. A good mix of image-based and text questions, with text to speech function available.

Extended questions in part C for GATE students.

Match among Assessment, Phenomena/Problem, and Three Dimensions

What phenomenon or problem, if any, are students trying to figure out in this assessment?

Students figure out the Module Phenomenon: How are objects affected by the forces of push and pull? using a number of question types, and answering the Driving Questions covered in the module.

What is the 2-3 dimensional learning goal assessed in this task?

Students are assessed on their ability to answer questions applying the SEPs, CCCs, DCIs and engineering skills covered across the module.

Assessment Description

Benchmark Assessment: What Are Magnetic Forces?

Assessment: What Are Magnetic Forces? ⌚ 20–30 minutes

This assessment can be printed or completed online. For your students to complete this assessment digitally please select Assign. To use printed versions please select Print Student View.

Assign Grade Assessment View Class Scores Student View Print Student View

1. Ride Above the Rails
2. Design Magnetic Games
3. Build Magnetic Games
4. Test Magnetic Games
5. Dragon Ride Research
6. Dragon Ride Criteria
7. Build a Dragon Ride
8. The Ultimate Playground
9. What Are Magnetic Forces?
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Overview

Depth of Knowledge 2

Students watch a video about cleaning up oil spills and then answer questions about cause-and-effect relationships between a magnet and another object. They then ask their own questions around how this cause-and-effect relationship in the laboratory setting might work in an ocean environment.

This assessment is to be completed individually, but you should spend time with the class reviewing the format and the student rubrics. Provide 20–30 minutes for students to complete the assessment.

Resources

Digital

- What Are Magnetic Forces? Benchmark Assessment
- What Are Magnetic Forces? Teacher Rubric 1
- What Are Magnetic Forces? Student Rubric 1
- What Are Magnetic Forces? Teacher Rubric 2
- What Are Magnetic Forces? Student Rubric 2
- What Are Magnetic Forces? Teacher Rubric 3
- What Are Magnetic Forces? Student Rubric 3
- Magnetite video

Before the Assessment

⌚ Prior to starting, take a few minutes to review the assessment and the associated What Are

Describe the assessment (e.g., how many questions, presence of tables/charts, graphs).

Benchmark Assessment: Students watch a video about cleaning up oil spills and answer questions about cause-and-effect relationships between a magnet and another object. They then ask their own questions about how this cause-and-effect relationship in the laboratory setting might work in an ocean environment.

Purpose of Assessment (i.e., peer, self, formative, summative, per/post)

Summative

Type of Measure (e.g., Performance Task, discussion, multiple choice, constructed response)

Constructed response, written and drawn

Note evidence of bias or problems with accessibility.

No evidence of bias. Text to speech is available.

Match among Assessment, Phenomena/Problem, and Three Dimensions

What phenomenon or problem, if any, are students trying to figure out in this assessment?

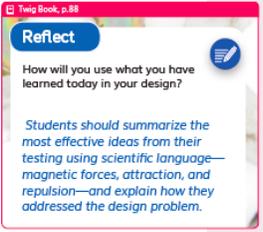
Students figure out how non-contact forces, such as magnetism, can be used to solve engineering problems, such as cleaning up an oil spill.

What is the 2-3 dimensional learning goal assessed in this task?

Students are assessed on their ability to use what they have learned throughout the module to solve a real-world problem—cleaning up oil spills (PS2.B, SEP-2, SEP-6, CCC-2, ETS1.B).

Assessment Description				
<p>🕒 Establish a Swings KLEW Chart</p> <p>Introduce the Swings KLEW Chart you made before the lesson.</p> <p>Ask students to focus on what they already know about the physical properties of swings, the forces involved, and the way swings move.</p> <ul style="list-style-type: none"> • Swings use rope or chains to hang from something. • Swings have something to sit or stand on. • Swings require pushes or pulls to start moving. • The force of gravity makes the swing come back down. • Swings can move up and down. • Swing can move side to side. • Swings can twist. • When a swing is in motion, and there is no other force acting on it, we can predict how it will move. There is a pattern. <p>After recording what they already know, have students share some things they wonder about swings.</p> <ul style="list-style-type: none"> • Why are ropes or chains, rather than poles, used for most swings? • Why do some swings have one rope or chain while others have two? • Is it possible to go up and over the top of a swing set? • If the length of the rope or chain changes, how does it affect the way the swing moves? • Does the shape of the seat change how a swing moves? <p>DQ3L1 Investigate TE p. 161</p>	<p>Describe the assessment (e.g., how many questions, presence of tables/charts, graphs).</p> <p>Prior Knowledge Assessment: KLEW Chart (Know, Learned, Evidence, Wonder)</p>	<p>Purpose of Assessment (i.e., peer, self, formative, summative, per/post)</p> <p>Self-reflection</p>	<p>Type of Measure (e.g., Performance Task, discussion, multiple choice, constructed response)</p> <p>Discussion</p>	<p>Note evidence of bias or problems with accessibility.</p> <p>No evidence of bias.</p>
Match among Assessment, Phenomena/Problem, and Three Dimensions				
<p>What phenomenon or problem, if any, are students trying to figure out in this assessment?</p>		<p>What is the 2-3 dimensional learning goal assessed in this task?</p>		
<p>Diagnostic assessment to allow students and teachers to identify the prior knowledge, and adapt support as necessary.</p>		<p>Students are assessed on their prior knowledge of forces, and communicate questions they want to answer about the Module Phenomenon.</p>		

Assessment Description				
<p>DQ3L3 Report TE p. 175</p> <div style="border: 1px solid #ccc; padding: 10px; margin-top: 10px;"> <p>Discuss Observations</p> <p>Have students discuss the findings from their swing model investigations.</p>  <ul style="list-style-type: none"> What question did you test to understand the motion of the swing? How did you investigate the question? What data did you collect in your investigation? What pattern did you observe? What did you do to find the pattern? How did you use that pattern to make a prediction? <p>Ask students what specific evidence from their investigations can be added to the Evidence column of the Swings KLEW Chart.</p> <ul style="list-style-type: none"> When we pushed the swing harder, the swing went higher. Pushing harder did not change how fast the swing swung. When we measured the time for one back and forth, we could use that to predict the time for many back and forths. </div>	<p>Describe the assessment (e.g., how many questions, presence of tables/charts, graphs).</p> <p>Two writing prompts.</p>	<p>Purpose of Assessment (i.e., peer, self, formative, summative, per/post)</p> <p>Self-reflection</p>	<p>Type of Measure (e.g., Performance Task, discussion, multiple choice, constructed response)</p> <p>Constructed written</p>	<p>Note evidence of bias or problems with accessibility.</p> <p>No evidence of bias.</p>
Match among Assessment, Phenomena/Problem, and Three Dimensions				
<p>What phenomenon or problem, if any, are students trying to figure out in this assessment?</p>		<p>What is the 2-3 dimensional learning goal assessed in this task?</p>		
<p>Students summarize what they have learned about the phenomena of how swings move and about identifying patterns in their motion.</p>		<p>Students are assessed on their ability to reflect on what they have learned, and define questions for investigation (SEP-3, CCC-1, 3-5-ETS1-3).</p>		

Assessment Description				
<p>Formative Assessment Have students write a response to the question on page 88 of their Twig Books.</p> <p>Use the Formative Assessment Identify students who describe how they will choose ideas from their research to help them design their Dragon Rides. Also identify students who do not express this idea. Check in with them during the next lesson to ensure they use their research as they design their rides.</p>  <p>DQ5L5 Reflect TE p. 267</p>	<p>Describe the assessment (e.g., how many questions, presence of tables/charts, graphs).</p> <p>One writing prompt.</p>	<p>Purpose of Assessment (i.e., peer, self, formative, summative, per/post)</p> <p>Self-reflection</p>	<p>Type of Measure (e.g., Performance Task, discussion, multiple choice, constructed response)</p> <p>Written response</p>	<p>Note evidence of bias or problems with accessibility.</p> <p>No evidence of bias.</p>
Match among Assessment, Phenomena/Problem, and Three Dimensions				
<p>What phenomenon or problem, if any, are students trying to figure out in this assessment?</p>		<p>What is the 2-3 dimensional learning goal assessed in this task?</p>		
<p>Students figure out the most effective ideas from their ride designs, models and testing. They use scientific language—magnetic forces, attraction, and repulsion—to explain how they addressed the design problem.</p>		<p>Students are assessed on their ability to generate and compare multiple solutions to a design problem based on how well it meets criteria. (3-PS2-4, 3-5-ETS1-2)</p>		

Assessment Description				
<p>DQ5L7 Investigate TE p. 279</p> <div style="border: 1px solid black; padding: 5px;"> <p>Evaluate Models</p> <p>As pairs finish building their rides, have them take turns to:</p> <ul style="list-style-type: none"> • Invite other pairs who have also finished to observe and evaluate their Dragon Ride • Visit other pairs' Dragon Ride models to observe and evaluate them. <p>Have students open their Twig Books to the Criteria for Dragon Ride chart on page 89. Have visitors check "Met" or "Not Met" for each criterion.</p> <p>Note: Remind students not to touch other pairs' rides without permission.</p> </div>	Describe the assessment (e.g., how many questions, presence of tables/charts, graphs).	Purpose of Assessment (i.e., peer, self, formative, summative, per/post)	Type of Measure (e.g., Performance Task, discussion, multiple choice, constructed response)	Note evidence of bias or problems with accessibility.
	Evaluation of models with criteria.	Peer	Discussion, written	No evidence of bias.
Match among Assessment, Phenomena/Problem, and Three Dimensions				
What phenomenon or problem, if any, are students trying to figure out in this assessment?		What is the 2-3 dimensional learning goal assessed in this task?		
Students evaluate model rides and designs against criteria.		Students are assessed on their ability to generate design solutions to an engineering problem applying a set of criteria, and assess their peers. (3-5-ETS1-2)		

Designed for the NGSS: Foundations	High Quality 5	Medium Quality 3	Low Quality 1
<p>SP1. Three-dimensional Performances. Materials include assessments designed to:</p> <ul style="list-style-type: none"> ● match the targeted learning goals; ● elicit observable evidence of students' use of grade-appropriate elements of the three dimensions to make sense of phenomena and/or to design solutions to problems. 	<p>Materials include assessments that are consistently designed to connect to learning goals and require students to apply appropriate elements of the three dimensions to make sense of the phenomenon/ solve the problem.</p>	<p>Materials include assessments that are sometimes designed to connect to learning goals and require students to apply appropriate elements of the three dimensions to make sense of the phenomenon/solve the problem.</p>	<p>Materials include assessments that are designed such that they have limited connection to learning goals and/or they require students to apply elements of only one dimension to demonstrate their understanding of the phenomenon/solve the problem.</p>
<p>SP2. Variety of Measures. Assessments within a unit of instruction are matched to the targeted learning goals and elicit a full range of student thinking through:</p> <ul style="list-style-type: none"> ● use of a variety of measures (e.g., Performance Tasks, discussion questions, constructed response questions, project- or problem- based tasks, portfolios, justified multiple choice); ● multiple assessment opportunities so that students can demonstrate their understanding of the same learning goals in a variety of ways. 	<p>Materials include assessments that include a wide variety of formats with clear expectations that allow students to demonstrate their understanding of the learning goals in multiple ways.</p>	<p>Materials include assessments that include some variety of formats with clear expectations that allow students to demonstrate their understanding of the learning goals in multiple ways.</p>	<p>Materials include assessments that use just one format and/or the expectations for students to demonstrate their knowledge are absent or unclear.</p>
<p>SP3. Student Progress Over Time. The unit of instruction includes assessments that serve a variety of purposes (e.g., pre/post; formative, summative, peer, self) to measure students' progress over time. The assessments:</p> <ul style="list-style-type: none"> ● provide opportunities to see growth and development in the use of the dimensions over time; ● allow students to reflect on and monitor their sense-making/problem-solving over time. 	<p>Materials include assessments that offer multiple opportunities, using more than one type of measure to demonstrate learning, and these measures are strongly connected to show student progress both in and across the three dimensions.</p>	<p>Materials include assessments that offer multiple opportunities, using more than one type of measure to demonstrate learning, and these measures are somewhat connected to show student progress in or across the three dimensions.</p>	<p>Materials include assessments that offer limited opportunities for students to demonstrate progress on the three dimensions.</p>
<p>SP4. Equitable Access. Assessments within the unit of instruction are designed to:</p> <ul style="list-style-type: none"> ● be free from bias (e.g., gender, racial, socioeconomic status, cultural, etc.); ● be accessible to all students (e.g., reading level, accommodations). 	<p>Most assessments in the materials are free from bias and are accessible.</p>	<p>Some assessments in the materials are free from bias and are accessible.</p>	<p>Few assessments in the materials are free from bias and are accessible.</p>

Designed for the NGSS: Student Progress Rubric

Analyze Evidence

Directions

1. Review the Designed for NGSS: Student Progress Rubric.
2. Reflect on the evidence (or lack of evidence) that you and your team gathered.
3. Record strengths and limitations for each criterion based on your observations. Cite specific examples.

Strengths	
<p>SP1: Three-Dimensional Performance</p> <p>The materials are High Quality 5 in regards to SP1. They include assessments that are consistently designed to connect to learning goals and require students to apply appropriate elements of the three dimensions to make sense of the Module Phenomenon.</p>	
<p>Evidence</p> <ul style="list-style-type: none"> ● Assessments are well-matched to the learning goals and require students to demonstrate observable use of three dimensions to make sense of phenomenon and solve problems. For example: <ul style="list-style-type: none"> ○ DQ2 Performance Task, students describe the way amusement park rides move, and explain how unbalanced forces cause their motion to change (PS2.A, CCC-2, SEP-8). (DQ2L5 Investigate TE p. 148) ○ DQ5 Performance Task, students research, design and build a dragon ride to test. They define criteria and constraints and measure their success using a rubric. They apply knowledge of forces and motion, non-contact forces, and generate solutions to an engineering problem (PS2.A, PS2.B, ETS1.B, ETS1.C, CCC-1, CCC-2, SEP-2, SEP-3, SEP-6). (DQ5L7 Investigate TE p. 278) 	<div style="border: 1px solid #ccc; padding: 5px;"> <p>Special Needs</p> <p>Social-Emotional Functioning For reluctant writers, and students who may feel overwhelmed by the number of bulleted questions and amount of writing space, orally model how you would take one question at a time and turn it into a statement (e.g., The ride looks like _____ when it is not moving.). Provide a specific time frame for each response before moving on to the next question.</p> <p>Challenge</p> <p>Have students turn to page 48 in their Twig Books and elaborate on the forces that cause their ride to stop moving, and on the forces that cause their ride to remain at rest.</p> </div> <div style="border: 1px solid #ccc; padding: 5px; margin-top: 5px;"> <p>Introduce the Activity</p> <p>Today, students will write about one of the Ultimate Playground rides or games they have explored so far. Their writing will focus on balanced and unbalanced forces. They will also draw the ride and use arrows to demonstrate how forces make the ride or game work.</p> <p>Review the information students should include in their writing.</p> <p>Students should:</p> <ul style="list-style-type: none"> • Describe the ride or game when it is at rest and not moving and identify the forces acting on it. • Describe the ride or game when it is in motion and identify the forces acting on it. <p>Remind students that cause-and-effect sentences should be used to describe and explain changes in motion.</p> <p>Write About a Ride</p> <p>Have students open to page 47 in their Twig Books and read through the questions that they must try to answer in their writing. They should begin by deciding which of the Ultimate Playground rides or games they will write about.</p> <ul style="list-style-type: none"> • A gravity-based game or ride • A roller coaster track and cars • A kicking-based game • A tug-of-war game </div> <div style="border: 1px solid #ccc; padding: 5px; margin-top: 5px;"> <p>Introduce the Activity</p> <p>Today, students will use their final Dragon Ride designs to guide them as they build their rides.</p> <p>Each pair will then test their design, referring to their criteria chart as a way of determining whether their ride meets all the design criteria for success. They will invite another pair to watch a demonstration of their ride and evaluate it using the same criteria chart.</p> <p>Build Models</p> <p>Have students meet with their partners from the previous lesson. Provide each pair with the materials they specified so they can build their final Dragon Ride model.</p> <p>Ask pairs to build their Dragon Ride models according to their designs, documented on pages 89–90 in their Twig Books. Remind them to use only the materials listed in their final design as they build their models.</p> <p>Circulate and provide support as needed. If any pairs are struggling, let them know that they should continue building to the best of their ability.</p> </div> <div style="text-align: right; margin-top: 10px;"> <p>DQ2L5 Investigate TE p. 148</p> </div>
<p>DQ5L7 Investigate TE p. 278</p>	

SP2: Variety of Measures

The materials are High Quality in regards to SP2.

Materials include assessments that include a wide variety of formats with clear expectations that allow students to demonstrate their understanding of the learning goals in multiple ways.

Evidence

- Assessments allow students to demonstrate their understanding of the learning goals in a variety of way including:
 - Performance Tasks (written, drawn, and hands-on **DQ2L5 Investigate TE p. 148**, **DQ5L7 Investigate TE p. 27**),
 - Discussions (**DQ3L1 Investigate TE p. 161**),
 - Constructed response (written and drawn **DQ5L8 Reflect TE p. 287**),

 - Self and peer assessment (**DQ3L3 Reflect TE p. 175**, **DQ5L5 Reflect TE p. 267**, **DQ5L7 Investigate TE p. 279**),
 - Multiple choice (**DQ5**, Multiple Choice Questions).

- Student versions of rubrics for the Performance Tasks and Benchmark Assessment are shared with the class so they have a clear understanding of what success looks like (available online).

Special Needs

Social-Emotional Functioning
For reluctant writers, and students who may feel overwhelmed by the number of bulleted questions and amount of writing space, orally model how you would take one question at a time and turn it into a statement (e.g., The ride looks like _____ when it is not moving.) Provide a specific time frame for each response before moving on to the next question.

Challenge

Have students turn to page 48 in their Twig Books and elaborate on the forces that cause their ride to stop moving, and on the forces that cause their ride to remain at rest.

Introduce the Activity

Today, students will write about one of the Ultimate Playground rides or games they have explored so far. Their writing will focus on balanced and unbalanced forces. They will also draw the ride and use arrows to demonstrate how forces make the ride or game work.

Review the information students should include in their writing.

Students should:

- Describe the ride or game when it is at rest and not moving and identify the forces acting on it.
- Describe the ride or game when it is in motion and identify the forces acting on it.

Remind students that cause-and-effect sentences should be used to describe and explain changes in motion.

Write About a Ride

Have students open to page 47 in their Twig Books and read through the questions that they must try to answer in their writing. They should begin by deciding which of the Ultimate Playground rides or games they will write about:

- A gravity-based game or ride
- A roller coaster track and cars
- A kicking-based game
- A tug-of-war game

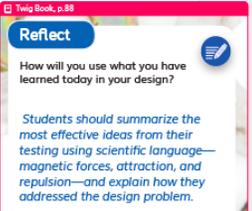
DQ2L5 Investigate TE p. 148

Formative Assessment

Have students write a response to the question on page 88 of their Twig Books.

Use the Formative Assessment

Identify students who describe how they will choose ideas from their research to help them design their Dragon Rides. Also identify students who do not express this idea. Check in with them during the next lesson to ensure they use their research as they design their rides.



DQ5L5 Reflect TE p. 267

Evaluate Models

As pairs finish building their rides, have them take turns to:

- Invite other pairs who have also finished to observe and evaluate their Dragon Ride
- Visit other pairs' Dragon Ride models to observe and evaluate them.

Have students open their Twig Books to the Criteria for Dragon Ride chart on page 89. Have visitors check "Met" or "Not Met" for each criterion.

Note: Remind students not to touch other pairs' rides without permission.

DQ5L7 Investigate TE p. 279

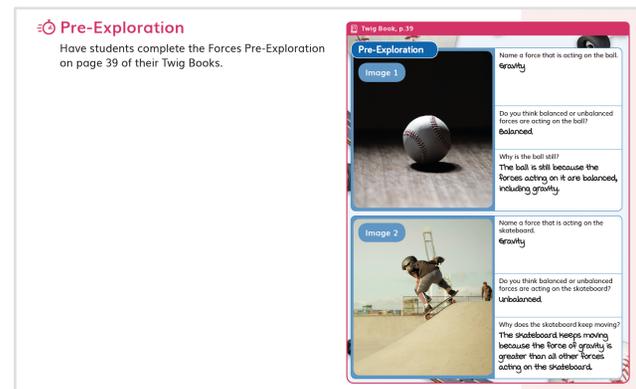
SP3: Student Progress Over Time

The materials are High Quality in regards to SP3.

Materials include assessments that offer multiple opportunities, using more than one type of measure, to demonstrate learning and these measures are strongly connected to show student progress both in and across the three dimensions.

Evidence

- There are four diagnostic pre-assessments called Pre-Explorations at strategic points in the module that assess prior knowledge and misconceptions (DQ2L1 Reflect TE p. 119). Notes in the TE and Progress Trackers support teachers to monitor students as they clear up their misconceptions and master the three dimensions, giving suggestions for how to tailor instruction accordingly.
- Formative assessments are frequent and varied, supporting students and teachers to understand how their learning journey is progressing (DQ1L2 Reflect TE p. 68, DQ2L2 Reflect p. 129, DQ5L8 Reflect p. 287).
- The DQ5 Benchmark Assessment (TE p. 288) allows students to demonstrate their ability to apply their growing skills and knowledge to new contexts.
- The performance tasks at the end of DQs 2, 3, and 5 allow students to demonstrate their attainment of the PEs in a variety of ways.
- A module-level Multiple Choice assessment supports teachers to assess all three dimensions targeted in the module.



DQ2L1 Reflect TE p. 119

SP4: Equitable Access

The materials are High Quality in regards to SP4.

Most assessments in the materials are free from bias and are accessible.

Evidence

- The digital Twig Book and digital assessment items (Benchmark, Multiple Choice, Rubrics) have a text-to-speech function allowing students of all reading levels to access the assessments.
- Assessments of the three dimensions are multimodal and include multiple choice, writing, drawing, physical models, posters, and oral presentations, giving all students access to a range of assessment types to suit their learning style and/or reading level.
- The rubrics for the Performance Tasks (e.g., the Balanced and Unbalanced Forces Writing Rubric in DQ2L5 TE p. 148) and the Benchmark Assessment (TE p. 288, online, DQ5) have four levels—emerging, developing, proficient, and advanced, allowing all students to demonstrate their current level of attainment.
- The multiple choice assessment (DQ5) contains questions targeting different DoK levels, with an extended section available to further challenge GATE students.
- Writing, Reading, Listening and Speaking domain tasks dedicated to monitor English language development are integrated into the core instructional resources (DQ1L7 Extension TE p. 108, DQ5L1 TE p. 241) and the on-level reader lessons (Chapter 3 Second Read TE p. 313).