

Power of Play

Teacher's Guide

The Rock by Rock Changemaker projects are focused on empowering kids to become changemakers that better our world. Our interdisciplinary projects focus on developing strong word and world knowledge that accelerates reading, writing, listening and speaking skills through science content. Each project can be done whole class, in small groups, or as a self directed learning opportunity.

At Rock by Rock, we believe that children learn best when they are learning relevant content and are deeply engaged in rigorous, hands-on learning that has real-world application. We also believe that habits and character education are a core part of instruction. By infusing habits with academics we can better prepare children to thrive in our ever-changing world while helping to make the world a better place.

The Hybrid Learning Series is ideal for students in 3rd-5th grade..

Classroom Application and Module Structure:

Each module in the Hybrid Learning Series can be done together as a class, in small groups or individually as a self-directed project. Each project centers around one mission that is focused on how we can take small actions to address environmental or social challenges.

Each Project has a real-world mission that empowers students to take action. Each project follows an inquiry arc:

1. **Invest:** Invest students in the Mission / Project.
2. **Reflect:** Reflect on the life habit focus: Student, Creativity, Curiosity, Empathy, Courage, Kinship, Impact Awareness.
3. **Explore:** Understand the problem and real-world needs through reading, video and activities that enable students to connect personally to the issue or problem through reading, writing and art.
4. **Take Action:** Engage in a take action project that involves taking action through writing, art and making (crafts, performance, etc).
5. **Share:** Enlist others to work towards or rally around a cause.
6. **Reflect:** Reflect on what students learned about themselves as leaders and how they grew in their life habits.



At Rock by Rock, we believe in creating flexible tools teachers can adapt based on student needs. Each project is a teacher-designed, interdisciplinary unit that can be flexibly customized. Teachers can follow our recommended lesson flow, or tailor activities to cater to specific student needs.

Use Case	Integrated as part of ELA instructional time.	Specific Science or Social Studies Learning Time	Self Directed Learning
Grouping	Whole Class , Small Group or Individual		Individual
Purpose	<ul style="list-style-type: none"> ● Authentic Application: Reading is a means to learning - I want kids to see real world applications of reading. ● 21st century literacies: I need my kids to be developing reading and writing skills in modern day multimedia formats (i.e. podcast, videos, dramatic play etc...). ● Word and world Knowledge: My kids need to continue to develop their vocabulary and word and world knowledge to aid in literacy development. 	<ul style="list-style-type: none"> ● Hands-on Learning: I want students to use multiple modes of learning from literacy to hands-on experiments to the arts. ● Real-world Relevance: My kids need to see that what they are learning is relevant to their lives today. ● Global Citizenship/ Science Citizenship: Foster global citizens that are engaged in taking action and developing the life habits that they need. 	<ul style="list-style-type: none"> ● Enrichment: More advanced students can do projects independently to enhance learning. ● Remediation: Teacher use projects with small groups to provide high engagement opportunities for learning.
Time Period	Used during a language art or interdisciplinary/ humanities block.	Used to replace Science or Social Studies time and/or a specific project based learning time during the week.	Used as a learning center during traditional guided reading or small group rotations. Some kids engage independently while teachers pull groups to support as needed.
Structure	Whole Group Reading Lessons - Pre/During/Post Reading Close Reading or Read A-loud	Science and Social Studies Lessons	Guided Reading or Centers Time Independent Learning.

Materials and Technology:

Materials:

- **Student Mission Log:** You have the choice between a print Mission Log where students can write and take notes by hand or a digital Mission Log you can share with students in a variety of ways. Mission Logs have editable text to enable teacher customization.

- **Project Materials:** In the first lesson of the online module we outline all of the materials that students will need for the project and activities. Most materials are things that can be found in a classroom and/or purchased easily online and/or teacher stores (i.e. discount school supplies, dollar store etc...).

Materials List:	
<ul style="list-style-type: none"> - Latex balloon - Funnel (can use top of plastic bottle) - Water - Cornstarch (can use flour as an alternative) - Heavy paper - Paper fastener - Paperclips - Scissors - Coloring tools 	<ul style="list-style-type: none"> - Ruler - Large nail - Copper wire - AA battery - Wire cutter - Glue

Technology: All technology requirements include technology found in most classrooms.

- If doing this as a self directed project, we recommend every student have access to a laptop/computer, wifi, Chrome browser and headphones.
- For teachers who are interested in whole group instruction, we recommend additional technology such as a projector or smartboard and speakers.

Standards Alignment:

Each project is aligned to national and state standards for reading, writing, science, social studies and the arts. Each module was designed to help students progress towards standards holistically. There is not a 1-1 correspondence between each standard and each lesson. Research shows that reading and writing standards develop holistically and more effectively when approached as a whole rather than teaching standards and skills in isolation. Our modules build NGSS aligned science content and practices, CCSS aligned reading, writing, listening and speaking skills, and 21st Century SEL competencies. While many lessons address all clusters of standards, one standard cluster often leads over others.

This modules specifically supports:

Subject	Standards
Reading CCSS	Reading Informational Text: Key Ideas and Details: 1-3

	<p>Craft and Structure: 4, 6 Integration of Knowledge and Ideas: 7, 9 Text Complexity: 10</p>
<p>Writing CCSS</p>	<p>Text Types and Purposes: 1, 2 Product and Distribution: 4-6 Research to Build and Present Knowledge: 7-9 Rang of Writing: 10</p>
<p>Listening and Speaking CCSS</p>	<p>Comprehension and Collaboration: 1-3 Presentation of Knowledge and Ideas: 4-5</p>
<p>Science NGSS</p>	<p>Performance Expectations (PE):</p> <ul style="list-style-type: none"> • 3-PS2-1. Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object. • 3-PS2-2. Make observations and/or measurements of an object's motion to provide evidence that a pattern can be used to predict future motion. • 3-PS2-3. Ask questions to determine cause and effect relationships of electric or magnetic interactions between two objects not in contact with each other. • 3-PS2-4. Define a simple design problem that can be solved by applying scientific ideas about magnets. <p>Science and Engineering Practices (SEP):</p> <ul style="list-style-type: none"> • Planning and Carrying Out Investigations • Asking Questions and Defining Problems <p>Disciplinary Core Ideas (DCI):</p> <ul style="list-style-type: none"> • PS2.A: Each force acts on one particular object and has both strength and a direction. An object at rest typically has multiple forces acting on it, but they add to give zero net force on the object. Forces that do not sum to zero can cause changes in the object's speed or direction of motion. • PS2.B: Objects in contact exert forces on each other. <p>Crosscutting Concepts (CC):</p> <ul style="list-style-type: none"> • Cause and effect relationships are routinely identified, tested, and used to explain change. • Patterns of change can be used to make predictions. • Scientific discoveries about the natural world can often lead to new and improved technologies.
<p>SEL 21st Century Skills/Arts</p>	<p>Life Habit: Courage</p> <p>CASEL:</p> <p>Self-Awareness:</p> <ul style="list-style-type: none"> • I use "I statements" and feeling words to describe how something makes me feel. • I notice behaviors, tones of voice and other personal reactions I might have to certain situations or ideas. <p>Self-Management:</p> <ul style="list-style-type: none"> • I can recognize situations that make me feel stressed and take appropriate steps to change them. I have strategies that can help me self-regulate and calm down when I need to. <p>Responsible Decision-Making:</p>

- Identifying solutions for personal and social problems

This Project's Focus: Power of Play

Real-World Mission	Real-World Project	Character Focus
How can we manage and reduce our stress through play?	Design a toy/game that applies science concepts of forces and motion and focuses on helping us reduce stress in our lives.	Impact Awareness: How can practicing impact awareness help us manage our stress?

Types of Lessons within a module:

Type	Description	Student Output.
Informational Text Based Lessons	<p>Lessons that develop informational text skills (reading, graphic organizers, charts, graphs, science concepts, social studies concepts). All lessons follow a similar flow:</p> <ul style="list-style-type: none"> Pre-reading: Intro/hook During Reading: Interactive Questions Post Reading: Application activity - many times the post activity can lead to a discussion or supplemental activity aligned with particular class or student needs. 	<ul style="list-style-type: none"> Student mission log Group discussion.
Hands-on Activities	<ul style="list-style-type: none"> Experiential learning opportunities that are hands-on and require kids to go offline to learn by doing and making. Focused on leveraging different learning modalities to engage kids and increase motivation, support internalization of content and aid retention. 	<ul style="list-style-type: none"> Student mission log Activity products.
Habit Focus and Reflections	<ul style="list-style-type: none"> Integrated life-habit lessons that develop a 21st century skill/habit. Each project starts and ends with a habit reflection to show growth. 	<ul style="list-style-type: none"> Activity products. Student reflections
Take Action Project	<ul style="list-style-type: none"> Short texts/videos/lessons that develop foundational project content (i.e. what is podcast?) and project skills (i.e. how do I create effective podcasts). Short and quick application of the lesson as a guided practice before applying it to the project to ensure kids have internalized the concepts. Creation of a take action project that leads to genuine impact. Projects use a modern day multimedia form of communication. An opportunity to share with an authentic audience where kids present what they have learned. 	<ul style="list-style-type: none"> Student mission log Take action project Share/presentation

Unit Overview: (Whole Class or Small Group)

In this project students will learn about the power of play and how it can be a helpful tool in managing stress.

Whether running late to school, preparing for a big test, or trying something new - we all have things in our lives that cause us stress. This is why it is important to practice impact awareness to help us identify when we are feeling stressed and how to take action and manage our stress levels. Students will explore the problem of stress, how stress can be both helpful and unhelpful and how play can be one powerful way to manage our stress.

Students will then explore the concepts of forces and motion, unbalanced and balanced forces and magnetism. They will explain how many stress toys apply these scientific concepts and also learn that play can be one way to help us manage our stress. Students will then apply what they have learned to designing a new toy that focuses on the problem of stress.



Virtual Field Trips



Jeff Havlik

In this project, students meet roller coaster designer, Jeff Havlik. Jeff has designed coasters for theme parks and attractions around the world. He'll teach students about how coasters run on the distant force, gravity and rely on patterns of motion and friction. He'll also share how magnets are used in many roller coasters.



Taylor Moreland

In their Take Action Project, students meet Taylor Moreland, owner of Frog Mobility LLC, a company that creates mobility products for young kids. Taylor will teach students three strategies to create prototypes: creating a concept sketch, building a prototype, and user testing.

Sample Unit Goal: Power of Play

1. Define stress and its impact on kids and explain how toys and play can help reduce stress.
2. Explain that force is made up of pushes and pulls that can cause an object to stop, change speed, or change direction.

3. Design examples of toys that demonstrate balanced and unbalanced forces and explain those forces at play in those toys.
4. Observe patterns of movement and conduct trials to demonstrate patterns of motion with that object.
5. Design an electromagnet that can be used in a fishing game and describe which design provides the best strength for the game.
6. Create a toy or game prototype that uses knowledge of forces, motion and/or magnets that, when played, can help reduce stress.

Key Vocabulary

force	motion	stress	pattern	magnet	electromagnet
n. A push or pull capable of changing an object's state of rest or motion.	n. Process of object moving or being moved.	n. The feeling we get when we're under pressure or threatened.	n. Something that happens or appears in a regular and repeated way.	n. A rock or a piece of metal that can pull certain types of metal toward itself.	n. An electromagnet is a material that is made into a magnet when electricity runs through it.



Pro Tip

Before you begin your planning, we suggest you read this teacher's guide, the student Mission Log and that you skim the online course to become familiar with the content. If you want to build your own background knowledge on how force, motion and magnetism are used in stress-reducing toys, you can complete the online module as a student.

At-A-Glance

Module	Description	Activities
1: Your Mission 1-2 Days	Students are introduced to their "Power of Play Mission" mission and are introduced to the concept of using play as a powerful tool to manage stress. They explore different examples of everyday stress that students experience. Then, students are introduced to the concept of using play and toys as one powerful tool to manage stress.	Online: <ul style="list-style-type: none"> ● Mission introduction. ● Listen to examples of student experiences with stress and complete a stress inventory. ● Explore examples of toys designed to relieve stress and reflect on their own experiences with toys.
2: Impact Awareness 1-2 Days	Students learn that impact awareness is also knowing what we are feeling and how we can be aware of our own levels of stress. Students learn that we can grow our awareness muscle and that as we pay attention to our bodies and our feelings we can identify when we are feeling stress and anxiety. Students then learn that everyone experiences stress differently and that there are many ways we can take action to manage everyday	Online: <ul style="list-style-type: none"> ● Students develop a definition of impact awareness to include self awareness. ● Students explore the effects stress can have on the body and how being aware of our body can help us identify stress and anxiety. ● Students reflect on how everyone responds to stress

	challenges or stressors. They end by personally reflecting on how they react to everyday challenges.	differently and how they use different strategies to manage their stress.
3A: Stress Toys in Motion (Force & Motion) 2-4 Days	Students delve into how play can be a great way to manage stress. They learn some basic principles of forces and motion including how the push and pull of force can cause an object to move and stop. They also learn about balanced and unbalanced forces. To grapple with these concepts, students create, test, and observe the concepts of force and motion by creating a stress ball.	Online: <ul style="list-style-type: none"> Engage in a set of activities to explore foundational knowledge about force and motion. Explore key concepts of balanced and unbalanced forces and patterns of motion. Hands on: <ul style="list-style-type: none"> Stress Ball Investigation: Students make a stress ball. Then, they engage in a series of steps to test the impact of force on the motion of the ball.
3B: Speed, Direction and Patterns in Motion 2-4 Days	Students continue to explore concepts of force and motion. Specifically, students will learn about how force can impact speed, direction and motion. Students also understand that friction slows down motion. Students also explore patterns in motion. Students notice that patterns in motion can predict future motion. To grapple with these concepts, students create, test, and observe the concepts of force and motion by exploring more stress toys: fidget spinner, pop it toy, stress spinner and magic tricks.	Online: <ul style="list-style-type: none"> Investigate the impact a force can have on motion. Observe that there are patterns in motion that can also predict future motion. Hands on: <ul style="list-style-type: none"> Stress Spinner Investigation: Students design their own spinner game that includes tips to relieve stress. Then, they use the spinner to conduct observations on speed, direction, and patterns of motion.
3C: Roller Coasters. 2-4 Days	The biggest toy of all. Students learn that roller coaster design is all about putting everything that they learned about force and motion together. They learn how the pieces fit together by meeting roller coaster designer, Jeff Havlik who teaches them about how you apply force and motion patterns to design a thrilling experience. Students then get to apply what they have learned to their own roller coaster design.	Online: <ul style="list-style-type: none"> Putting the pieces together: Roller coaster design. Virtual Field Trip to meet roller coaster designer, Jeff Havlik. Hands on: <ul style="list-style-type: none"> Design your own roller-coaster: Students will learn how different parts of a roller coaster have different patterns of motion. They will design their own roller coaster experience and apply what they learned in terms of force and motion to design their own experience.
3D: Magnets and Electromagnetism 2-4 Days	Students explore the distance force of magnetism, learn about different types of magnets and how they work, and explore how magnets are used in everyday objects and in stress relief toys. Students build and test out their own electromagnet fishing game. Then, Jeff Havlik teaches students how magnets are used in some roller coasters. Finally, students engage in a	Online: <ul style="list-style-type: none"> Students learn about the distance force of magnetism by observing videos of magnets in action. Students learn about the different types of magnets and their uses in everyday items and in stress relief toys. Prepare a case and engage in a debate.

	<p>debate centered around whether or not toys should be permitted during learning time, and they also choose their focus for their prototypes.</p>	<ul style="list-style-type: none"> Virtual field trip to hear from Jeff Havlik how magnets are used in roller coasters. <p>Hands on:</p> <ul style="list-style-type: none"> Design an Electromagnet Fishing Game: Students design an electromagnet fishing game. Then, they conduct different tests to observe how the strength of the magnet changes.
<p>4A+4B: Take Action Project: Create a Prototype</p> <p>3-6 Days</p>	<p>Students will design a prototype for a toy or a game that can be used to reduce stress. Their prototypes will use the principles of force, motion and/or magnetism that they have explored throughout the project. Students will use tools and lessons from a professional prototyper to create their prototypes</p> <p>Virtual Field Trip: Students meet Taylor Moreland, owner of Frog Mobility LLC, a company that creates mobility products for young kids. Taylor will teach students three strategies to create prototypes: creating a concept sketch, building a prototype, and user testing</p>	<p>Online:</p> <ul style="list-style-type: none"> Virtual Field Trip: Meet Tyler Moreland and learn key strategies to create an effective prototype of a toy or game that can be used to reduce stress. <p>Hands on:</p> <ul style="list-style-type: none"> Create a Prototype: Students create a prototype of a toy or game that can be used to reduce stress.
<p>4C: Share & Reflect</p> <p>1 Day</p>	<p>Students present their prototypes to an authentic audience to share with the audience how their prototype works and how it can be used to reduce stress.</p> <p>Finally, students will reflect on what they've learned about courage and how they can extend those skills to other areas of school and life.</p>	<p>Hands on:</p> <ul style="list-style-type: none"> Share: Students share their prototype with an audience. Reflect: Engage in personal reflection (1-1, small group, whole group) to reflect on ways to use creativity beyond the scope of this project.