How do KiwiCo projects and activities align with academic standards?

Many of our projects can be used to align with the Next Generation Science Standards and Common Core standards. Here are a few sample projects by grade.

Grades 3–5, 6–8
Drawbot Classroom Pack Robot Crawler Classroom Pack Automaton Classroom Pack Mechanical Claw Classroom Pack Automaton Hydraulic Claw Walking Robot Planetarium Bottle Rocket Color-Mixing LED Crystal Paper Circuits Pulley Crane Vortex Cannon Arcade Catapult

GRADES 3–5, 6–8

DRAWBOT CLASSROOM PACK	
NGSS	**Activity Applications**
Motion and Stability: Forces and Interactions **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.	• Make observations and collect data about how clay shape impacts the motor's speed and vibration. • Investigate unbalanced forces that act on the spinning clay and cause changes in the motor's speed. • Identify how forces acting on the motor cause the drawbot to vibrate, and how those vibrations in turn cause the drawbot to draw.
Engineering Design **3-5-ETS1-1** Define a simple design problem reflecting a	• Modify the drawbot to recreate a specific drawing. • Adjust predetermined variables to

need or want that includes specific criteria for success and constraints on time, material, or cost.	produce unique drawings.
Engineering Design **3-5-ETS1-2** Generate and compare multiple solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.	• Change variables of the drawbot, test, and observe in order to create unique drawings.
Engineering Design **3-5-ETS1-3** Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.	• Investigate the drawbot's movement and discover which modifications produce the desired result — a specific drawing.
Common Core	**Activity Applications**
English Language Arts > Reading: Informational Texts **RI.3.1** Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers. **RI.4.1** Refer to details and examples in a text when explaining what the text says explicitly and when drawing inferences from the text.	• Ask and answer questions of your peers and teacher while referring to the technical instructions.
RI.3.3 Describe the relationship between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text, using language that pertains to time, sequence, and cause/effect. **RI.4.3** Explain events, procedures, ideas, or concepts in a historical, scientific, or technical text, including what happened and why, based on specific information in the text. **RI.5.3** Explain the relationships or interactions between two or more individuals, events, ideas, or concepts in a historical, scientific, or technical text based on specific information in the text.	• Explain connections between steps in the technical instructions, as well as relationships between how the drawbot moves and key science topics.
RI.3.4 Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a grade 3 topic or subject area. **RI.4.4** Determine the meaning of general academic and domain-specific words or phrases in a text relevant to a grade 4 topic or subject area. **RI.5.4** Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a grade 5 topic or subject area.	• Acquire and use new vocabulary related to balanced and unbalanced forces, motion, and engineering design.
RI.3.7 Use information gained from illustrations (e.g., maps, photographs) and the words in a text to demonstrate understanding of the text (e.g., where, when, why, and how key events occur).	• Analyze illustrations, diagrams, and text to build the drawbot.

English Language Arts > Speaking & Listening **SL.3.1** Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 3 topics and texts, building on others' ideas and expressing their own clearly. **SL.4.1** Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 4 topics and texts, building on others' ideas and expressing their own clearly. **SL.5.1** Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 5 topics and texts, building on others' ideas and expressing their own clearly.	• Participate in teacher-led and group-led discussions about the project and how it works.
English Language Arts > Writing **W.3.8** Recall information from experiences or gather information from print and digital sources; take brief notes on sources and sort evidence into provided categories.	• Draw on knowledge of balanced and unbalanced forces and gather data about how the drawbot moves.

ROBOT CRAWLER CLASSROOM PACK	
NGSS	**Activity Applications**
Energy **4-PS3-4** Apply scientific ideas to design, test, and refine a device that converts energy from one form to another.	• Build, modify, and optimize a robot crawler that uses electrical energy to walk.
Engineering Design **3-5-ETS1-1** Define a simple design problem reflecting a need or want that includes specific criteria for success and constraints on time, material, or cost.	• Use the given materials to create a robot that can walk forward or backward for a period of time and be used for experimentation.
Engineering Design **3-5-ETS1-2** Generate and compare multiple solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.	• Adapt the robot crawler to walk as fast as possible by modifying the legs and cranks.
Engineering Design **3-5-ETS1-3** Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.	• Investigate multiple variables and improve the robot crawler's design to pull as many marbles as possible.

Common Core	Activity Applications
English Language Arts > Reading: Informational Texts **RI.3.1** Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers. **RI.4.1** Refer to details and examples in a text when explaining what the text says explicitly and when drawing inferences from the text.	• Ask and answer questions of your peers and teacher while referring to the technical instructions.
RI.3.3 Describe the relationship between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text, using language that pertains to time, sequence, and cause/effect. **RI.4.3** Explain events, procedures, ideas, or concepts in a historical, scientific, or technical text, including what happened and why, based on specific information in the text. **RI.5.3** Explain the relationships or interactions between two or more individuals, events, ideas, or concepts in a historical, scientific, or technical text based on specific information in the text.	• Explain connections between steps in the technical instructions, as well as relationships between how the robot crawler walks and key science topics.
RI.3.4 Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a grade 3 topic or subject area. **RI.4.4** Determine the meaning of general academic and domain-specific words or phrases in a text relevant to a grade 4 topic or subject area. **RI.5.4** Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a grade 5 topic or subject area.	• Acquire and use new vocabulary related to energy, friction, and engineering design.
RI.3.7 Use information gained from illustrations (e.g., maps, photographs) and the words in a text to demonstrate understanding of the text (e.g., where, when, why, and how key events occur).	• Analyze illustrations, diagrams, and text to build the robot crawler.
English Language Arts > Speaking & Listening **SL.3.1** Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 3 topics and texts, building on others' ideas and expressing their own clearly. **SL.4.1** Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 4 topics and texts, building on others' ideas and expressing their own clearly. **SL.5.1** Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 5 topics and texts, building on others' ideas and expressing their own clearly.	• Participate in teacher-led and group-led discussions about the project and how it works.
English Language Arts > Writing **W.3.7** Conduct short research projects that build knowledge about a topic.	• Make observations, analyze cause and effect, and experiment with the robot

W.4.7 Conduct short research projects that build knowledge through investigation of different aspects of a topic.	crawler over several class periods to learn more about mechanics, energy, and friction.

AUTOMATON CLASSROOM PACK	
NGSS	**Activity Applications**
Motion and Stability: Forces and Interactions **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.	• Observe and compare motions on the automaton, as well as predict how those motions repeat themselves.
Engineering Design **3-5-ETS1-1** Define a simple design problem reflecting a need or want that includes specific criteria for success and constraints on time, material, or cost.	• Define the objective, materials, and design before creating mechanical art for the automaton.
Engineering Design **3-5-ETS1-2** Generate and compare multiple solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.	• Experiment with cams and followers to recreate a given set of motions.
Common Core	**Activity Applications**
English Language Arts > Reading: Informational Texts **RI.3.1** Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers. **RI.4.1** Refer to details and examples in a text when explaining what the text says explicitly and when drawing inferences from the text.	• Ask and answer questions of your peers and teacher while referring to the technical instructions.
RI.3.3 Describe the relationship between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text, using language that pertains to time, sequence, and cause/effect. **RI.4.3** Explain events, procedures, ideas, or concepts in a historical, scientific, or technical text, including what happened and why, based on specific information in the text. **RI.5.3** Explain the relationships or interactions between two or more individuals, events, ideas, or concepts in a historical, scientific, or technical text based on specific information in the text.	• Explain connections between steps in the technical instructions, as well as relationships between how the automaton moves and key science topics.

RI.3.4 Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a grade 3 topic or subject area. **RI.4.4** Determine the meaning of general academic and domain-specific words or phrases in a text relevant to a grade 4 topic or subject area. **RI.5.4** Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a grade 5 topic or subject area.	• Acquire and use new vocabulary related to patterns of motion, cams and followers, and mechanical engineering.
RI.3.7 Use information gained from illustrations (e.g., maps, photographs) and the words in a text to demonstrate understanding of the text (e.g., where, when, why, and how key events occur).	• Analyze illustrations, diagrams, and text to build the automaton.
English Language Arts > Speaking & Listening **SL.3.1** Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 3 topics and texts, building on others' ideas and expressing their own clearly. **SL.4.1** Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 4 topics and texts, building on others' ideas and expressing their own clearly. **SL.5.1** Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 5 topics and texts, building on others' ideas and expressing their own clearly.	• Participate in teacher-led and group-led discussions about the project and how it works.
English Language Arts > Writing **W.3.8** Recall information from experiences or gather information from print and digital sources; take brief notes on sources and sort evidence into provided categories.	• Draw on real-life patterns of motion and gather data about how the drawbot moves.

MECHANICAL CLAW CLASSROOM PACK	
NGSS	**Activity Applications**
Engineering Design **3-5-ETS1-1** Define a simple design problem reflecting a need or want that includes specific criteria for success and constraints on time, material, or cost.	• Build and modify the mechanical claw, taking into account constraints on the number of fingers and joints that can be built with the given materials.
Engineering Design **3-5-ETS1-2** Generate and compare multiple solutions to a problem based on how well each is likely to meet the criteria and constraints of the	• Compare how successful each claw redesign is in solving a specific problem like recreating a movement or picking up an object.

problem.	
Engineering Design **3-5-ETS1-3** Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.	• Conduct multiple trials and iterate the claw's design to successfully pick up a wood ball, foam ball, and marble.
Common Core	**Activity Applications**
English Language Arts > Reading: Informational Texts **RI.3.1** Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers. **RI.4.1** Refer to details and examples in a text when explaining what the text says explicitly and when drawing inferences from the text.	• Ask and answer questions of your peers and teacher while referring to the technical instructions.
RI.3.3 Describe the relationship between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text, using language that pertains to time, sequence, and cause/effect. **RI.4.3** Explain events, procedures, ideas, or concepts in a historical, scientific, or technical text, including what happened and why, based on specific information in the text. **RI.5.3** Explain the relationships or interactions between two or more individuals, events, ideas, or concepts in a historical, scientific, or technical text based on specific information in the text.	• Explain connections between steps in the technical instructions, as well as relationships between how the claw works and key science topics.
RI.3.4 Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a grade 3 topic or subject area. **RI.4.4** Determine the meaning of general academic and domain-specific words or phrases in a text relevant to a grade 4 topic or subject area. **RI.5.4** Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a grade 5 topic or subject area.	• Acquire and use new vocabulary related to tension, joints, and friction.
RI.3.7 Use information gained from illustrations (e.g., maps, photographs) and the words in a text to demonstrate understanding of the text (e.g., where, when, why, and how key events occur).	• Analyze illustrations, diagrams, and text to build the mechanical claw.
English Language Arts > Speaking & Listening **SL.3.1** Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 3 topics and texts, building on others' ideas and expressing their own clearly. **SL.4.1** Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 4 topics and texts, building on others' ideas and expressing	• Participate in teacher-led and group-led discussions about the project and how it works.

their own clearly. **SL.5.1** Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 5 topics and texts, building on others' ideas and expressing their own clearly.	
English Language Arts > Writing **W.3.8** Recall information from experiences or gather information from print and digital sources; take brief notes on sources and sort evidence into provided categories.	• Draw connections between how the mechanical claw looks and works, as well as human hands and robotic arms.

AUTOMATON	
NGSS	**Activity Applications**
Motion and Stability: Forces and Interactions **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.	• Observe up-and-down and round-and-round motions that repeat with each crank of the automaton.
Engineering Design **3-5-ETS1-1** Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.	• Build an automaton with a specific pattern of motion in mind, using only materials from the crate or home.
Common Core	**Activity Applications**
English Language Arts > Reading: Informational Texts **RI.3.3** Describe the relationship between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text, using language that pertains to time, sequence, and cause/effect. **RI.4.3** Explain events, procedures, ideas, or concepts in a historical, scientific, or technical text, including what happened and why, based on specific information in the text. **RI.5.3** Explain the relationships or interactions between two or more individuals, events, ideas, or concepts in a historical, scientific, or technical text based on specific information in the text.	• Explain connections between steps in the technical instructions, as well as relationships between scientific ideas presented in the Tinker Zine.
RI.3.4 Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a grade 3 topic or subject area. **RI.4.4** Determine the meaning of general academic and domain-specific words or phrases in a text relevant to a grade 4 topic or subject area. **RI.5.4** Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a grade 5 topic or subject area.	• Acquire and use new vocabulary related to automaton design and history, mechanics, and engineering.

RI.6.4 Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings.	
RI.3.5 Use text features and search tools (e.g., key words, sidebars, hyperlinks) to locate information relevant to a given topic efficiently.	• Use bold print, tip text, headings, and icons to locate key information in the Tinker Zine and Blueprint.
RI.3.7 Use information gained from illustrations (e.g., maps, photographs) and the words in a text to demonstrate understanding of the text (e.g., where, when, why, and how key events occur). **RI.4.7** Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, time lines, animations, or interactive elements on Web pages) and explain how the information contributes to an understanding of the text in which it appears. **RI.5.7** Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently. **RI.6.7** Integrate information presented in different media or formats (e.g., visually, quantitatively) as well as in words to develop a coherent understanding of a topic or issue.	• Refer to technical instructions, illustrations, and diagrams, as well as informational articles in the Tinker Zine, to explain scientific concepts.
RI.4.9 Integrate information from two texts on the same topic in order to write or speak about the subject knowledgeably. **RI.5.9** Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably.	• Compare and synthesize information presented in articles (such as "Cabinet of Curiosities" and "The Anonymous Automaton") and technical instructions to demonstrate fluency in scientific concepts.

HYDRAULIC CLAW	
NGSS	**Activity Applications**
Engineering Design **3-5-ETS1-1** Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.	• Use the hydraulic claw to solve design challenges, like lifting as much weight as possible and moving a cup as far as possible.
Engineering Design **3-5-ETS1-2** Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.	• Modify and test the hydraulic claw while recording data and finding an optimal design to complete each task.

Engineering Design **3-5-ETS1-3** Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.	• Complete multiple trials to identify success and failure points in the hydraulic claw's design.
Common Core	**Activity Applications**
English Language Arts > Reading: Informational Texts **RI.3.3** Describe the relationship between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text, using language that pertains to time, sequence, and cause/effect. **RI.4.3** Explain events, procedures, ideas, or concepts in a historical, scientific, or technical text, including what happened and why, based on specific information in the text. **RI.5.3** Explain the relationships or interactions between two or more individuals, events, ideas, or concepts in a historical, scientific, or technical text based on specific information in the text.	• Explain connections between steps in the technical instructions, as well as relationships between scientific ideas presented in the Tinker Zine.
RI.3.4 Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a grade 3 topic or subject area. **RI.4.4** Determine the meaning of general academic and domain-specific words or phrases in a text relevant to a grade 4 topic or subject area. **RI.5.4** Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a grade 5 topic or subject area. **RI.6.4** Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings.	• Acquire and use new vocabulary related to hydraulics, states of matter, and engineering.
RI.3.5 Use text features and search tools (e.g., key words, sidebars, hyperlinks) to locate information relevant to a given topic efficiently.	• Use bold print, tip text, headings, and icons to locate key information in the Tinker Zine and Blueprint.
RI.3.7 Use information gained from illustrations (e.g., maps, photographs) and the words in a text to demonstrate understanding of the text (e.g., where, when, why, and how key events occur). **RI.4.7** Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, time lines, animations, or interactive elements on Web pages) and explain how the information contributes to an understanding of the text in which it appears. **RI.5.7** Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently. **RI.6.7** Integrate information presented in different media or formats (e.g., visually, quantitatively) as well	• Refer to technical instructions, illustrations, and diagrams, as well as informational articles in the Tinker Zine, to explain scientific concepts.

as in words to develop a coherent understanding of a topic or issue.	
RI.4.9 Integrate information from two texts on the same topic in order to write or speak about the subject knowledgeably. **RI.5.9** Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably.	• Compare and synthesize information presented in articles (such as "Big Hydraulics" and "Water at Work") and technical instructions to demonstrate fluency in scientific concepts.

WALKING ROBOT	
NGSS	**Activity Applications**
Energy **4-PS3-4** Apply scientific ideas to design, test, and refine a device that converts energy from one form to another.	• Build, test, and modify a walking robot that converts electrical energy to mechanical energy.
Engineering Design **3-5-ETS1-1** Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.	• Construct a robot that's able to walk forward or backward for a period of time using only the crate materials.
Common Core	**Activity Applications**
English Language Arts > Reading: Informational Texts **RI.3.3** Describe the relationship between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text, using language that pertains to time, sequence, and cause/effect. **RI.4.3** Explain events, procedures, ideas, or concepts in a historical, scientific, or technical text, including what happened and why, based on specific information in the text. **RI.5.3** Explain the relationships or interactions between two or more individuals, events, ideas, or concepts in a historical, scientific, or technical text based on specific information in the text.	• Explain connections between steps in the technical instructions, as well as relationships between scientific ideas presented in the Tinker Zine.
RI.3.4 Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a grade 3 topic or subject area. **RI.4.4** Determine the meaning of general academic and domain-specific words or phrases in a text relevant to a grade 4 topic or subject area. **RI.5.4** Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a grade 5 topic or subject area. **RI.6.4** Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings.	• Acquire and use new vocabulary related to robotics, mechanics, and engineering.

RI.3.5 Use text features and search tools (e.g., key words, sidebars, hyperlinks) to locate information relevant to a given topic efficiently.	• Use bold print, tip text, headings, and icons to locate key information in the Tinker Zine and Blueprint.
RI.3.7 Use information gained from illustrations (e.g., maps, photographs) and the words in a text to demonstrate understanding of the text (e.g., where, when, why, and how key events occur). **RI.4.7** Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, time lines, animations, or interactive elements on Web pages) and explain how the information contributes to an understanding of the text in which it appears. **RI.5.7** Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently. **RI.6.7** Integrate information presented in different media or formats (e.g., visually, quantitatively) as well as in words to develop a coherent understanding of a topic or issue.	• Refer to technical instructions, illustrations, and diagrams, as well as informational articles in the Tinker Zine, to explain scientific concepts.
RI.4.9 Integrate information from two texts on the same topic in order to write or speak about the subject knowledgeably. **RI.5.9** Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably.	• Compare and synthesize information presented in articles (such as "The Technologic Today" and "Red Planet Rover") and technical instructions to demonstrate fluency in scientific concepts.

PLANETARIUM	
NGSS	**Activity Applications**
Earth's Systems **5-ESS1-2** Represent data in graphical displays to reveal patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky.	• Construct a light-up planetarium to model how the night sky changes throughout the year. • Create a quadrant to measure the motion of the stars.
Engineering Design **3-5-ETS1-1** Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.	• Create a planetarium that can successfully rotate views and produce star maps, using only the crate materials.
Common Core	**Activity Applications**
English Language Arts > Reading: Informational Texts	• Explain connections between steps in the

RI.3.3 Describe the relationship between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text, using language that pertains to time, sequence, and cause/effect. **RI.4.3** Explain events, procedures, ideas, or concepts in a historical, scientific, or technical text, including what happened and why, based on specific information in the text. **RI.5.3** Explain the relationships or interactions between two or more individuals, events, ideas, or concepts in a historical, scientific, or technical text based on specific information in the text.	technical instructions, as well as relationships between scientific ideas presented in the Tinker Zine.
RI.3.4 Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a grade 3 topic or subject area. **RI.4.4** Determine the meaning of general academic and domain-specific words or phrases in a text relevant to a grade 4 topic or subject area. **RI.5.4** Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a grade 5 topic or subject area. **RI.6.4** Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings.	• Acquire and use new vocabulary related to astronomy, star navigation, and latitude and longitude.
RI.3.5 Use text features and search tools (e.g., key words, sidebars, hyperlinks) to locate information relevant to a given topic efficiently.	• Use bold print, tip text, headings, and icons to locate key information in the Tinker Zine and Blueprint.
RI.3.7 Use information gained from illustrations (e.g., maps, photographs) and the words in a text to demonstrate understanding of the text (e.g., where, when, why, and how key events occur). **RI.4.7** Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, time lines, animations, or interactive elements on Web pages) and explain how the information contributes to an understanding of the text in which it appears. **RI.5.7** Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently. **RI.6.7** Integrate information presented in different media or formats (e.g., visually, quantitatively) as well as in words to develop a coherent understanding of a topic or issue.	• Refer to star maps, illustrations, and diagrams, as well as informational articles in the Tinker Zine, to explain scientific concepts.
RI.4.9 Integrate information from two texts on the same topic in order to write or speak about the subject knowledgeably. **RI.5.9** Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably.	• Compare and synthesize information presented in articles (such as “Motion of the Stars” and “Celestial Navigation”) and technical instructions to demonstrate fluency in scientific concepts.
Math > Measurement & Data **4.MD.C.5** Recognize angles as geometric shapes that	• Make a quadrant to calculate latitude

are formed wherever two rays share a common endpoint, and understand concepts of angle measurement.	and measure the motion of the stars.
4.MD.C.6 Measure angles in whole-number degrees using a protractor. Sketch angles of specified measure.	• Measure angles using a quadrant as a protractor.

BOTTLE ROCKET	
NGSS	**Activity Applications**
Motion and Stability: Forces and Interactions **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.	• Mix up a chemical reaction to launch a rocket. The rocket remains on the launcher until an unbalanced force is exerted. When pressure inside the rocket becomes too great, it pushes the rocket off the launcher and into the air.
Engineering Design **3-5-ETS1-3** Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved. **MS-ETS1-3** Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.	• Test the rocket and modify as needed to help it fly higher. Adjust the fins to change how the rocket flies.
Common Core	**Activity Applications**
English Language Arts > Reading: Informational Texts **RI.3.3** Describe the relationship between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text, using language that pertains to time, sequence, and cause/effect. **RI.4.3** Explain events, procedures, ideas, or concepts in a historical, scientific, or technical text, including what happened and why, based on specific information in the text. **RI.5.3** Explain the relationships or interactions between two or more individuals, events, ideas, or concepts in a historical, scientific, or technical text based on specific information in the text. **English Language Arts > Science & Technical Subjects**	• Make connections between steps in the technical instructions, as well as explain how a chemical reaction causes the rocket to fly.

RST.6-8.3 Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.	
RI.3.4 Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a grade 3 topic or subject area. **RI.4.4** Determine the meaning of general academic and domain-specific words or phrases in a text relevant to a grade 4 topic or subject area. **RI.5.4** Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a grade 5 topic or subject area. **RI.6.4** Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings. **RST.6-8.4** Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6-8 texts and topics.	• Acquire and use new vocabulary related to chemical reactions, air pressure, and engineering.
RI.3.5 Use text features and search tools (e.g., key words, sidebars, hyperlinks) to locate information relevant to a given topic efficiently.	• Use bold print, tip text, headings, and icons to locate key information in the Tinker Zine and Blueprint.
RI.3.7 Use information gained from illustrations (e.g., maps, photographs) and the words in a text to demonstrate understanding of the text (e.g., where, when, why, and how key events occur). **RI.4.7** Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, time lines, animations, or interactive elements on Web pages) and explain how the information contributes to an understanding of the text in which it appears. **RI.5.7** Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently. **RI.6.7** Integrate information presented in different media or formats (e.g., visually, quantitatively) as well as in words to develop a coherent understanding of a topic or issue. **RST.6-8.7** Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).	• Refer to technical instructions, illustrations, and diagrams, as well as informational articles in the Tinker Zine, to explain scientific concepts.
RI.4.9 Integrate information from two texts on the same topic in order to write or speak about the subject knowledgeably. **RI.5.9** Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably.	• Compare and synthesize information presented in articles (such as “Fizz, Fizz” and “Pop Trivia”) and technical instructions to demonstrate fluency in scientific concepts.

COLOR-MIXING LED CRYSTAL

NGSS	Activity Applications
Energy **4-PS3-4** Apply scientific ideas to design, test, and refine a device that converts energy from one form to another.	• Build and test circuits that convert chemical energy to electrical energy to light.
Energy **4-PS3-2** Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents.	• Observe that a circuit must be closed for electric current to flow from the power source to the LEDs.
Engineering Design **3-5-ETS1-3** Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved. **MS-ETS1-3** Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.	• Turn LED circuits on or off to mix light, observe the results, and apply them to create specific colors.
Common Core	**Activity Applications**
English Language Arts > Reading: Informational Texts **RI.3.3** Describe the relationship between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text, using language that pertains to time, sequence, and cause/effect. **RI.4.3** Explain events, procedures, ideas, or concepts in a historical, scientific, or technical text, including what happened and why, based on specific information in the text. **RI.5.3** Explain the relationships or interactions between two or more individuals, events, ideas, or concepts in a historical, scientific, or technical text based on specific information in the text. **English Language Arts > Science & Technical Subjects** **RST.6-8.3** Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.	• Draw connections between steps in the technical instructions, as well as explain how colors of light mix to create new colors.
RI.3.4 Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a grade 3 topic or subject area.	• Acquire and use new vocabulary related to additive mixing, LEDs, and resistors.

RI.4.4 Determine the meaning of general academic and domain-specific words or phrases in a text relevant to a grade 4 topic or subject area. **RI.5.4** Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a grade 5 topic or subject area. **RI.6.4** Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings. **RST.6-8.4** Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6-8 texts and topics.	
RI.3.5 Use text features and search tools (e.g., key words, sidebars, hyperlinks) to locate information relevant to a given topic efficiently.	• Use bold print, tip text, headings, and icons to locate key information in the Tinker Zine and Blueprint.
RI.3.7 Use information gained from illustrations (e.g., maps, photographs) and the words in a text to demonstrate understanding of the text (e.g., where, when, why, and how key events occur). **RI.4.7** Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, time lines, animations, or interactive elements on Web pages) and explain how the information contributes to an understanding of the text in which it appears. **RI.5.7** Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently. **RI.6.7** Integrate information presented in different media or formats (e.g., visually, quantitatively) as well as in words to develop a coherent understanding of a topic or issue. **RST.6-8.7** Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).	• Refer to technical instructions, illustrations, and diagrams, as well as informational articles in the Tinker Zine, to explain scientific concepts.
RI.4.9 Integrate information from two texts on the same topic in order to write or speak about the subject knowledgeably. **RI.5.9** Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably.	• Compare and synthesize information presented in articles (such as "In Living Color" and "Mixed-Up Colors") and technical instructions to demonstrate fluency in scientific concepts.

PAPER CIRCUITS	
NGSS	**Activity Applications**
Energy **4-PS3-4** Apply scientific ideas to design, test, and refine	• Build and test circuits that convert chemical energy to electrical energy to light.

a device that converts energy from one form to another.	
Energy **4-PS3-2** Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents.	• Observe that a circuit must be closed for electric current to flow from the power source to the LEDs.
Common Core	**Activity Applications**
English Language Arts > Reading: Informational Texts **RI.3.3** Describe the relationship between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text, using language that pertains to time, sequence, and cause/effect. **RI.4.3** Explain events, procedures, ideas, or concepts in a historical, scientific, or technical text, including what happened and why, based on specific information in the text. **RI.5.3** Explain the relationships or interactions between two or more individuals, events, ideas, or concepts in a historical, scientific, or technical text based on specific information in the text. **English Language Arts > Science & Technical Subjects** **RST.6-8.3** Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.	• Draw connections between steps in the technical instructions, as well as explain how electricity flows through a circuit.
RI.3.4 Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a grade 3 topic or subject area. **RI.4.4** Determine the meaning of general academic and domain-specific words or phrases in a text relevant to a grade 4 topic or subject area. **RI.5.4** Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a grade 5 topic or subject area. **RI.6.4** Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings. **RST.6-8.4** Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6-8 texts and topics.	• Acquire and use new vocabulary related to series and parallel circuits, electrons, and static electricity.
RI.3.5 Use text features and search tools (e.g., key words, sidebars, hyperlinks) to locate information relevant to a given topic efficiently.	• Use bold print, tip text, headings, and icons to locate key information in the Tinker Zine and Blueprint.
RI.3.7 Use information gained from illustrations (e.g., maps, photographs) and the words in a text to demonstrate understanding of the text (e.g., where,	• Refer to technical instructions, illustrations, and diagrams, as well as informational articles in the Tinker Zine,

when, why, and how key events occur). **RI.4.7** Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, time lines, animations, or interactive elements on Web pages) and explain how the information contributes to an understanding of the text in which it appears. **RI.5.7** Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently. **RI.6.7** Integrate information presented in different media or formats (e.g., visually, quantitatively) as well as in words to develop a coherent understanding of a topic or issue. **RST.6-8.7** Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).	to explain scientific concepts.
RI.4.9 Integrate information from two texts on the same topic in order to write or speak about the subject knowledgeably. **RI.5.9** Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably.	• Compare and synthesize information presented in articles (such as "Electrons on the Move" and "Circuit Detective") and technical instructions to demonstrate fluency in scientific concepts.

PULLEY CRANE	
NGSS	**Activity Applications**
Motion and Stability: Forces and Interactions **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. **MS-PS2-2** Plan an investigation to provide evidence that the change in an object's motion depends on the sum of the forces on the object and the mass of the object.	• Use pulleys to change the direction of force and lift heavy objects.
Engineering Design **3-5-ETS1-1** Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost. **MS-ETS1-1** Define the criteria and constraints of a design problem with sufficient precision to ensure a	• Modify the pulley to lift different weights with the least amount of work.

successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.	
Engineering Design **3-5-ETS1-2** Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem. **MS-ETS1-2** Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.	• Experiment with fixed and compound pulleys to lift the heaviest possible weight.
Common Core	**Activity Applications**
Mathematics > Ratios & Proportional Relationships **6.RP.A.3** Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.	• Use ratios to think about mechanical advantage. With more pulleys, you spread out the work and decrease how much force is applied.
English Language Arts > Reading: Informational Texts **RI.3.3** Describe the relationship between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text, using language that pertains to time, sequence, and cause/effect. **RI.4.3** Explain events, procedures, ideas, or concepts in a historical, scientific, or technical text, including what happened and why, based on specific information in the text. **RI.5.3** Explain the relationships or interactions between two or more individuals, events, ideas, or concepts in a historical, scientific, or technical text based on specific information in the text. **English Language Arts > Science & Technical Subjects** **RST.6-8.3** Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.	• Draw connections between steps in the technical instructions, as well as explain how mechanical advantage makes work easier.
RI.3.4 Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a grade 3 topic or subject area. **RI.4.4** Determine the meaning of general academic and domain-specific words or phrases in a text relevant to a grade 4 topic or subject area. **RI.5.4** Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a grade 5 topic or subject area.	• Acquire and use new vocabulary related to simple machines, fixed and compound pulleys, and mechanical advantage.

RI.6.4 Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings. **RST.6-8.4** Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6-8 texts and topics.	
RI.3.5 Use text features and search tools (e.g., key words, sidebars, hyperlinks) to locate information relevant to a given topic efficiently.	• Use bold print, tip text, headings, and icons to locate key information in the Tinker Zine and Blueprint.
RI.3.7 Use information gained from illustrations (e.g., maps, photographs) and the words in a text to demonstrate understanding of the text (e.g., where, when, why, and how key events occur). **RI.4.7** Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, time lines, animations, or interactive elements on Web pages) and explain how the information contributes to an understanding of the text in which it appears. **RI.5.7** Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently. **RI.6.7** Integrate information presented in different media or formats (e.g., visually, quantitatively) as well as in words to develop a coherent understanding of a topic or issue. **RST.6-8.7** Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).	• Refer to technical instructions, illustrations, and diagrams, as well as informational articles in the Tinker Zine, to explain scientific concepts.
RI.4.9 Integrate information from two texts on the same topic in order to write or speak about the subject knowledgeably. **RI.5.9** Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably.	• Compare and synthesize information presented in articles (such as "Built by Giants" and "Lift and Load") and technical instructions to demonstrate fluency in scientific concepts.

VORTEX CANNON	
NGSS	**Activity Applications**
Engineering Design **3-5-ETS1-1** Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost. **MS-ETS1-1** Define the criteria and constraints of a design	• Use the air-powered cannon to shoot targets at different distances.

problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.	
Common Core	**Activity Applications**
English Language Arts > Reading: Informational Texts **RI.3.3** Describe the relationship between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text, using language that pertains to time, sequence, and cause/effect. **RI.4.3** Explain events, procedures, ideas, or concepts in a historical, scientific, or technical text, including what happened and why, based on specific information in the text. **RI.5.3** Explain the relationships or interactions between two or more individuals, events, ideas, or concepts in a historical, scientific, or technical text based on specific information in the text. **English Language Arts > Science & Technical Subjects** **RST.6-8.3** Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.	• Draw connections between steps in the technical instructions, as well as describe the connection between the vortex cannon and vortices in nature.
RI.3.4 Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a grade 3 topic or subject area. **RI.4.4** Determine the meaning of general academic and domain-specific words or phrases in a text relevant to a grade 4 topic or subject area. **RI.5.4** Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a grade 5 topic or subject area. **RI.6.4** Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings. **RST.6-8.4** Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6-8 texts and topics.	• Acquire and use new vocabulary related to vortices, tornadoes, and hurricanes.
RI.3.5 Use text features and search tools (e.g., key words, sidebars, hyperlinks) to locate information relevant to a given topic efficiently.	• Use bold print, tip text, headings, and icons to locate key information in the Tinker Zine and Blueprint.
RI.3.7 Use information gained from illustrations (e.g., maps, photographs) and the words in a text to demonstrate understanding of the text (e.g., where, when, why, and how key events occur). **RI.4.7** Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, time lines, animations, or interactive elements on	• Refer to technical instructions, illustrations, and diagrams, as well as informational articles in the Tinker Zine, to explain scientific concepts.

Web pages) and explain how the information contributes to an understanding of the text in which it appears. **RI.5.7** Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently. **RI.6.7** Integrate information presented in different media or formats (e.g., visually, quantitatively) as well as in words to develop a coherent understanding of a topic or issue. **RST.6-8.7** Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).	
RI.4.9 Integrate information from two texts on the same topic in order to write or speak about the subject knowledgeably. **RI.5.9** Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably.	• Compare and synthesize information presented in articles (such as "Vortex Power" and "Vortex Hunting") and technical instructions to demonstrate fluency in scientific concepts.

ARCADE CATAPULT	
NGSS	**Activity Applications**
Energy **4-PS3-4** Apply scientific ideas to design, test, and refine a device that converts energy from one form to another.	• Build a tension-powered catapult that converts potential energy into kinetic energy.
Common Core	**Activity Applications**
Mathematics > Number & Operations in Base Ten **3.NBT.A.2** Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction. **4.NBT.B.4** Fluently add and subtract multi-digit whole numbers using the standard algorithm.	• Add or subtract point values while playing games with the Arcade Catapult.
Mathematics > Number & Operations in Base Ten **3.NBT.A.3** Multiply one-digit whole numbers by multiples of 10 in the range 10-90 (e.g., 9 × 80, 5 × 60) using strategies based on place value and properties of operations.	• Multiply the number of tally marks by the point value while playing games with the Arcade Catapult.
English Language Arts > Reading: Informational Texts **RI.3.3** Describe the relationship between a series of historical events, scientific ideas or concepts, or steps	• Draw connections between steps in the technical instructions, as well as explain the relationship between potential and kinetic energy.

in technical procedures in a text, using language that pertains to time, sequence, and cause/effect. **RI.4.3** Explain events, procedures, ideas, or concepts in a historical, scientific, or technical text, including what happened and why, based on specific information in the text. **RI.5.3** Explain the relationships or interactions between two or more individuals, events, ideas, or concepts in a historical, scientific, or technical text based on specific information in the text. **English Language Arts > Science & Technical Subjects** **RST.6-8.3** Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.	
RI.3.4 Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a grade 3 topic or subject area. **RI.4.4** Determine the meaning of general academic and domain-specific words or phrases in a text relevant to a grade 4 topic or subject area. **RI.5.4** Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a grade 5 topic or subject area. **RI.6.4** Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings. **RST.6-8.4** Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6-8 texts and topics.	• Acquire and use new vocabulary related to energy and engineering.
RI.3.5 Use text features and search tools (e.g., key words, sidebars, hyperlinks) to locate information relevant to a given topic efficiently.	• Use bold print, tip text, headings, and icons to locate key information in the Tinker Zine and Blueprint.
RI.3.7 Use information gained from illustrations (e.g., maps, photographs) and the words in a text to demonstrate understanding of the text (e.g., where, when, why, and how key events occur). **RI.4.7** Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, time lines, animations, or interactive elements on Web pages) and explain how the information contributes to an understanding of the text in which it appears. **RI.5.7** Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently. **RI.6.7** Integrate information presented in different media or formats (e.g., visually, quantitatively) as well as in words to develop a coherent understanding of a topic or issue. **RST.6-8.7** Integrate quantitative or technical information expressed in words in a text with a	• Refer to technical instructions, illustrations, and diagrams, as well as informational articles in the Tinker Zine, to explain scientific concepts.

version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).	
RI.4.9 Integrate information from two texts on the same topic in order to write or speak about the subject knowledgeably. **RI.5.9** Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably.	• Compare and synthesize information presented in articles (such as "Engineering Your Own Arcade" and "Powered by Potential") and technical instructions to demonstrate fluency in scientific concepts.