

BURCH CHARTER SCHOOL OF EXCELLENCE

2020-2021

1st Grade Science

Approved by the Burch Charter School of Excellence Board of Trustees

August 2020

MISSION STATEMENT OF BURCH CHARTER SCHOOL OF EXCELLENCE:

Burch Charter School of Excellence (BCSE) was founded in September, 2008. Our primal mission is to enable students to reach their intellectual and personal potential. We strive to instill integrity and respect in our students' in partnership with families and the community. We maintain a blended learning environment that enhances positive character traits that ensures our students become productive 21st century world citizens. The Burch Charter School of Excellence, a public school, is committed to providing best practices for educating our students in an environment that enables them to develop into critical thinkers that evolve into digital, life-long learners. Our curriculum emphasizes literacy and mathematics infused with technology.

We believe:

- Our students will be effective communicators, quality producers, self-directed lifelong learners, community contributors, collaborative workers and complex thinkers;
- All students are entitled to opportunities to maximize their talents and abilities;
- Our ethnic and cultural diversity is our strength and prepares students for success in a global society;
- Setting high expectations for students, teachers and administrators ensures that our students successfully meet or exceed the New Jersey Student Learning Standards.
- Parents are essential partners in the education of their children;
- Maintaining a strong partnership with the Irvington community is integral to student success;
- Understanding, implementing and responding to current trends in technology is intrinsic to success in a 21st century world; In ensuring that the district has a well-trained, highly qualified and competent staff; In maintaining a safe and secure learning environment.

The underlying values and principles that drive our mission and vision are our personal responsibility, a strong work ethic, cooperation, respect for others, honesty, integrity and the firm belief that every child can learn.

Burch Charter School of Excellence

1st Grade Science Model Curriculum Overview

Unit 1: Patterns of Change in in the Sky

In this unit of study, students observe, describe, and predict some patterns in the movement of objects in the sky. The crosscutting concept of *patterns* is called out as an organizing concept for the disciplinary core ideas. Students are expected to demonstrate grade-appropriate proficiency in *planning and carrying out investigations* and *analyzing and interpreting data*. Students are also expected to use these practices to demonstrate understanding of the core ideas.

This unit is based on 1-ESS1-1 and 1-ESS1-2.

Unit 2: Characteristics of Living Things

Instructional Days: 15

Instructional Days: 15

In this unit of study, students develop an understanding of how plants and animals use their external parts to help them survive, grow, and meet their needs, as well as how the behaviors of parents and offspring help offspring survive. The understanding that young plants and animals are like, but not exactly the same as, their parents is developed. The crosscutting concept of *patterns* is called out as an organizing concept for the disciplinary core ideas. Students are expected to demonstrate grade-appropriate proficiency in *obtaining*, *evaluating*, *and communicating information* and *constructing explanations*. Students are also expected to use these practices to demonstrate understanding of the core ideas.

This unit is based on 1-LS3-1 and 1-LS1-2.

Unit 3: Mimicking Organisms to Solve Problems

Instructional Days: 25

In this unit of study, students develop an understanding of how plants and animals use their parts to help them survive, grow, and meet their needs. Students also need opportunities to *develop possible solutions*. As students develop possible solutions, one challenge will be to keep them from immediately implementing the first solution they think of and to instead think through the problem carefully before acting. Having students sketch their ideas or make a physical model is a good way to engage them in shaping their ideas to meet the requirements of the problem. The crosscutting concept of *structure and function* is called out as an organizing concept for the disciplinary core ideas. Students are expected to demonstrate grade-

appropriate proficiency in *constructing explanations*, *designing solutions*, and in *developing and using models*. Students are expected to use these practices to demonstrate understanding of the core ideas.

This unit is based on 1-LS1-1 and K-2-ETS1-2.

Unit 4: Light and Sound

In this unit of study, students develop an understanding of the relationship between sound and vibrating materials as well as between the availability of light and the ability to see objects. The idea that light travels from place to place can be understood by students at this level by placing objects made with different materials in the path of a beam of light and determining the effect of the different materials. The crosscutting concept of *cause and effect* is called out as an organizing concept for the disciplinary core ideas. Students are expected to demonstrate grade-appropriate proficiency in *planning and carrying out investigations*, *constructing explanations*, and *designing solutions*. Students are also expected to use these practices to demonstrate understanding of the core ideas.

Instructional Days: 20

Instructional Days: 25

This unit is based on 1-PS4-2, 1-PS4-3, and 1-PS4-1.

Unit 5: Communicating with Light and Sound

In this unit of study, students continue to develop their understanding of the relationship between sound and vibrating materials as well as between the availability of light and the ability to see objects. Students apply their knowledge of light and sound to engage in engineering design to solve a simple problem involving communication with light and sound. The crosscutting concepts of *structure and function and influence of engineering*, technology, and science on society and the natural world are called out as organizing concepts for the disciplinary core ideas. Students are expected to demonstrate grade-appropriate proficiency in constructing explanations and designing solutions, asking questions and defining problems, and developing and using models. Students are also expected to use these practices to demonstrate understanding of the core ideas.

This unit is based on 1-PS4-4, K-2-ETS1-1, and K-2-ETS1-2.

Note: The number of instructional days is an estimate based on the information available at this time. 1 day equals approximately 42 minutes of seat time. Teachers are strongly encouraged to review the entire unit of study carefully and collaboratively to determine whether adjustments to this estimate need to be made.

Grade: 1	Content: Science		
Unit 1: Patterns of Change in in the Sky		Time Frame: 15 Days	
Next Generation Science Standards	Skills	I Can Statements	
 1-ESS1-1: Use observations of the sun, moon, and stars to describe patterns that can be predicted Essential Question:	 Science assumes that natural events happen today as they happened in the past. Many events are repeated. Patterns in the natural world can be observed, used to describe phenomena, and used as evidence. Patterns in the motion of the sun, moon, and stars in the sky can be observed, described, and predicted. 	 I can observe and use patterns in the natural world as evidence and to describe phenomena. I can use observations (firsthand or from media) to describe patterns in the natural world in order to answer scientific questions. I can use observations of the sun, moon, and stars to describe patterns that can be predicted 	
1-ESS1-2: Make observations at different times of year to relate the amount of daylight to the time of year.	Patterns in the natural world can be observed, used to describe phenomena, and used as evidence.	❖ I can observe and use patterns in the natural world as evidence and to describe phenomena.	
Essential Question: What is the relationship between the amount of daylight and the time of year?	Seasonal patterns of sunrise and sunset can be observed, described, and predicted.	I can make observations (firsthand or from media) to collect data that can be used to make comparisons.	
		I can make observations at different times of the year to relate the amount of daylight to the time of year.	
	Resources		

The Dynamic Trio: In this lesson, students will learn about the stars, planets, and moons found in our solar system and how they relate to one another. The video segment enhances the learning. After a non-fiction read aloud, students work in groups to create models of the Solar System.

Our Super Star: This is a three part lesson where students use observations, activities, and videos to learn basic facts about the Sun. Students also model the mechanics of day and night and use solar energy to make a tasty treat. One of the videos is a time-lapse video of a sunrise and a sunset.

Keep a Moon Journal: The National Wildlife Federation's "Keep a Moon Journal" page allows students to get acquainted with the phases of the moon by keeping a moon journal to record their nightly observations for one month. The page has links to diagrams, a student printable, and activities connecting the journal to other content. The page is set up as a "family activity" and could be used as nightly homework for students then discussed weekly in class.

Patterns of Daylight: This is a mini-unit that can be taught directly after Space Part 1 or independently. The author chose to teach the Space Part 1 unit (also available on Better Lesson! at http://betterlesson.com/lesson/613469/introduction-and-pre-assessment) during January, and follows up at the end of the year in a recap in May. This lesson uses prior student knowledge and a video simulation.

Observing the Sun: This lesson is an activity where students create a sun tracker and monitor the sun's position over the course of a day. Examples of student's journals and connections within a larger unit are provided.

Pearson Realize: https://www.savvasrealize.com/index.html#/

Connections to NJSLS – English Language Arts

- W.1.7: Participate in shared research and writing projects (e.g., explore a number of "how-to" books on a given topic and use them to write a sequence of instructions).
- W.1.8: With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question.

Connections to NJSLS – Math

- **MP.2:** Reason abstractly and quantitatively. **MP.4:** Model with mathematics. **MP.5:** Use appropriate tools strategically.
- **1.OA.A.1:** Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using objects, drawings, and equations to represent the problem.
- 1. MD.C.4: Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another.

Grade: 1	Content: Science		
Unit 2: Characteristics of Living Things	Time Frame: 15 Days		
Next Generation Science Standards	Skills	I Can Statements	
that plants and animals have traits inherited from parents and that variation of these traits exists in a	 Patterns in the natural world can be observed, used to describe phenomena, and used as evidence. Individuals of the same kind of plant or animal are recognizable as similar but can also vary in many ways. 	❖ I can make observations to construct an	
Essential Question: ❖ What types (patterns) of behavior can be observed among parents that help offspring survive?	 Scientists look for patterns and order when making observations about the world. Patterns in the natural world can be observed, used to describe phenomena, and used as evidence. 	 I can observe and use patterns in the natural world as evidence and to describe phenomena. I can read grade-appropriate texts and use media to obtain scientific information to determine patterns in the natural world. I can read texts and use media to determine patterns in behavior of parents and offspring that help offspring survive. 	
Resources			

Chip Off the Old Block: In this lesson students compare adult plants with young plants and then match pictures of adult animals with their young. They then are asked to identify specific physical traits of plants and animals that can be used to identify them. Note: The Parent/Offspring photo collection on page three incorrectly states the offspring of a horse is a pony.

Eat Like a Bird! January: This lesson and activity is one of several lessons about birds. In this lesson, students learn that bird beaks come in many different sizes and shape. Each beak has a specific shape and function to help the bird to get and eat food.

Why So Yummy? In this lesson students will investigate how fruits help some plants survive. The background information is important to the overall goals of this lesson. It states, "fruit-bearing plants can be distinguished from other plants, because they contain a reproductive structure that develops into an edible fruit. This reproductive structure is the shelter that protects the seeds until they are mature. This is important, because seeds are not distributed to the earth for germination until they are ripe." The teacher will need to purchase some fruits ahead of time for this lesson. Identifying a variety of fruits and especially fruits children might have less experience with will enhance the experience.

Pearson Realize: https://www.savvasrealize.com/index.html#/

Connections to NJSLS – English Language Arts

- **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.3.2:** Determine the main idea of a text; recount the key details and explain how they support the main idea.)
- **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.
- W.1.7: Participate in shared research and writing projects (e.g., explore a number of "how-to" books on a given topic and use them to write a sequence of instructions).
- **SL.3.4:** Write informative/explanatory texts to examine a topic and convey ideas and information clearly.
- W.3.2: Report on a topic or text, tell a story, or recount an experience with appropriate facts and relevant, descriptive details, speaking clearly at an understandable pace.

Connections to NJSLS – Math

- MP.2: Reason abstractly and quantitatively
- MP.4: Model with mathematics
- 3. MD.B.4: Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate units—whole numbers, halves, or quarters.)

Grade: 1	Content: Science	
Unit 3: Mimicking Organisms to Solve Problems	Time Frame: 25 Days	
Next Generation Science Standards	Skills	I Can Statements
 Use materials to design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs. Essential Question: How can humans mimic how plants and animals use their external parts to help them survive and grow? 	 Every human-made product is designed by applying some knowledge of the natural world and is built using materials derived from the natural world. The shape and stability of structures of natural and designed objects are related to their function(s). 	 I can observe and describe how the shape and stability of structures of natural and designed objects are related to their functions. I can use materials to design a device that solves a specific problem or [design] a solution to a specific problem. I can use materials to design a solution to a human problem that mimics how plants and/or animals use their external parts to help them survive, grow, and meet their needs
K-2-ETS1-2 Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.	Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a problem's solutions to other people.	 I can develop a simple model based on evidence to represent a proposed object or tool. I can develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a
Essential Question: ❖ How can I draw and label a simple diagram?	Because there is always more than one possible solution to a problem, it is useful to compare and test designs.	given problem. I can analyze data from tests of an object or

		tool to determine if it works as intended. I can analyze data from tests of two objects designed to solve the same problem to compare the strengths
Resources		

Eat Like a Bird! January: This lesson and activity is one of several lessons about birds. In this lesson, students learn that bird beaks come in many different sizes and shape. Each beak has a specific shape and function to help the bird to get and eat food.

Why So Yummy: In this lesson students will investigate how fruits help some plants survive. The background information is important to the overall goals of this lesson. It states, "fruit-bearing plants can be distinguished from other plants, because they contain a reproductive structure that develops into an edible fruit. This reproductive structure is the shelter that protects the seeds until they are mature. This is important, because seeds are not distributed to the earth for germination until they are ripe." The teacher will need to purchase some fruits ahead of time for this lesson. Identifying a variety of fruits and especially fruits children might have less experience with will enhance the experience.

Pearson Realize: https://www.savvasrealize.com/index.html#/

Connections to NJSLS – English Language Arts

Participate in shared research and writing projects (e.g., explore a number of "how-to" books on a given topic and use them to write a sequence of instructions.

SL.2.5: Create audio recordings of stories or poems; add drawings or other visual displays to stories or recounts of experiences when appropriate to clarify ideas, thoughts, and feelings.

Grade: 1	Content: Science		
Unit 4: Light and Sound		Time Frame: 20 Days	
Next Generation Science Standards	Skills	I Can Statements	
 1-PS4-2: Make observations to construct an evidence-based account that objects in darkness can be seen only when illuminated Essential Question: ♦ How can you prove that you can only see something when someone shines a light on it or if the object gives off its own light? 	 Support or refute student ideas about causes. Objects can be seen if light is available to illuminate them or if they give off their own light. 	 I can design simple tests to gather evidence to support or refute ideas about cause and effect relationships. I can make observations (firsthand or from media) to construct an evidence-based account for natural phenomena. I can make observations (e.g., in a completely dark room, using a pinhole box, using video of a cave explorer with a flashlight) to construct an evidence-based account that objects can be seen only when illuminated (from an external light source or by an object giving off its own light). 	
 1-PS4-3: Plan and conduct investigations to determine the effect of placing objects made with different materials in the path of a beam of light. Essential Question: How can light pass through objects? 	 Simple tests can be designed to gather evidence to support or refute student ideas about causes. Some materials allow light to pass through them, others allow only some light through, and others block all the light and create a dark shadow on any surface beyond them, where the light cannot reach. Mirrors can be used to redirect a light beam. 	 I can design simple tests to gather evidence to support or refute ideas about cause and effect relationships. I can plan and conduct investigations collaboratively to produce data to serve as the basis for evidence to answer a question. I can plan and conduct an investigation to determine the effect of placing objects made with different materials in the path of a beam of light. 	

1-PS4-1:

Plan and conduct investigations to provide evidence that vibrating materials can make sound and that sound can make materials vibrate.

- Sound can make matter vibrate, and vibrating matter can make sound.
- Simple tests can be designed to gather evidence to support or refute student ideas about causes.

I can plan and conduct investigations to provide evidence that vibrating materials can make sound and that sound can make materials vibrate.

Essential Question:

How do instruments (band) make sound?

Resources

The "What it Looks Like in the Classroom" section of this document describes several student sense-making tasks.

The <u>Utah Education Network</u> has created several resources for fourth grade science teachers.

Michigan NGSS Moodle: The purpose of this website to provide K-5 Science teachers with resources, lessons, and activities based on the NGSS which were created by teachers in our region.

Pearson Realize: https://www.savvasrealize.com/index.html#/

Connections to NJSLS – English Language Arts

- W.1.2: Write informative/explanatory texts in which they name a topic, supply some facts about the topic, and provide some sense of closure.
- W.1.7: Participate in shared research and writing projects (e.g., explore a number of "how-to" books on a given topic and use them to write a sequence of instructions).
- W.1.8: With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question.
- **SL.1.1:** Participate in collaborative conversations with diverse partners about grade 1 topics and texts with peers and adults in small and larger groups.

Grade: 1	Content: Science		
Unit 5: Communicating with Light and Sound		Time Frame: 25 Days	
Next Generation Science Standards	Skills	I Can Statements	
 1-PS4-4: Use tools and materials to design and build a device that uses light or sound to solve the problem of communicating over a distance. Essential Question: ♦ How can light or sound be used to communicate over a distance? 	 The shape and stability of structures of natural and designed objects are related to their function(s). People also use a variety of devices to communicate (send and receive information) over long distances. 	❖ I can describe how the shape and stability of structures are related to their function.	
K-2-ETS1-1: Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool. Essential Question: → How can I define a simple problem that can be solved through the development of a new or improved object or tool?	 every day. People depend on various technologies in their lives; human life would be very different without technology. Before beginning to design a solution, it is important 	 I can read grade-appropriate texts and/or use media to obtain scientific information to describe patterns in the natural world. I can ask questions based on observations to find more information about the designed world. I can ask questions to obtain information about the purpose of weather forecasting to prepare for and respond to severe weather. I can define a simple problem that can be solved through the development of a new or improved object or tool. I can ask questions, make observations, and gather information about a situation people want to change in order to define a simple problem that can be solved through the development of a new or improved object or tool. 	

K-2-	ETS1	-2

Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.

Essential Question:

* How can I draw and label a simple diagram?

- Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a problem's solutions to other people.
 - Because there is always more than one possible solution to a problem, it is useful to compare and test designs.
- I can develop a simple model based on evidence to represent a proposed object or tool.
- ❖ I can develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.
- I can analyze data from tests of an object or tool to determine if it works as intended.
- ❖ I can analyze data from tests of two objects designed to solve the same problem to compare the strengths

Resources

Assessing Light Knowledge- Two Lessons: In these lessons the students work as partners planning and designing a communication device that will signal across the gym or hallway from one partner to the other partner. The communication device must only use light and objects that block or change the light.

Pearson Realize: https://www.savvasrealize.com/index.html#/

Connections to NJSLS – English Language Arts

- W.1.7: Participate in shared research and writing projects (e.g., explore a number of "how-to" books on a given topic and use them to write a sequence of instructions).
- **RI.2.1:** Ask and answer such questions as who, what, where, when, why, and how to demonstrate understanding of key details in a text.
- W.2.6: With guidance and support from adults, use a variety of digital tools to produce and publish writing, including in collaboration with peers.
- W.2.8: Recall information from experiences or gather information from provided sources to answer a question.
- **SL.2.5:** Create audio recordings of stories or poems; add drawings or other visual displays to stories or recounts of experiences when appropriate to clarify ideas, thoughts, and feelings.

Connections to NJSLS – Math

- **MP.2:** Reason abstractly and quantitatively.
- **MP.4:** Model with mathematics.
- **MP.5:** Use appropriate tools strategically.
- 1. MD.A.1: Order three objects by length; compare the lengths of two objects indirectly by using a third object.
- 1. MD.A.2: Express the length of an object as a whole number of length units, by layering multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same-size length units that span it with no gaps or overlaps. Limit to contexts where the object being measured is spanned by a whole number of length units with no gaps or overlaps.
- **2. MD.D.10:** Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems using information presented in a bar graph.

Differentiated Instruction

(content, process, product and learning environment)			
At Risk Students	English Language Learners		
Modifications for Classroom	Modifications for Classroom		
Pair visual prompts with verbal presentations	Native Language Translation		
Use of lab or experiments to give visual representation of concept	(peer, online assistive technology, translation device, bilingual dictionary)		
Ask students to restate information, directions, and assignments.	Preteach vocabulary		
Work within group or partners	Use graphic organizers or other visual models		
Repetition and practice	Use of manipulatives to visualize concept		
Model skills / techniques to be mastered.	Highlight key vocabulary-chart or vocabulary bank		
Use metacognitive work	Use of nonverbal responses		
Extended time to complete class work	(thumbs up/down)		
Provide copy of class notes	Use sentence frames		
Student may request to use a computer to complete assignments.	Design questions for different proficiency levels		
Use manipulatives to examine concepts	Utilize partners and partner talk		
Assign a peer helper in the class setting			
Provide oral reminders and check student work during independent work time			
Special Education	Gifted and Talented		

Modifications for Classroom

Pair visual prompts with verbal presentations

Use of lab or experiments to give visual representation of concept

Ask students to restate information, directions, and assignments.

Preteach vocabulary

Repetition and practice

Model skills / techniques to be mastered.

Use manipulatives and visual representation to examine Breakdown large assignments into smaller tasks

Extended time to complete class work

Provide copy of class notes

Preferential seating to be mutually determined by the student and teacher

Use of online component of book

Extra textbooks for home. Student may request books on tape / CD / digital media, as available and appropriate.

Assign a peer helper in the class setting

Provide oral reminders and check student work during independent work time

Assist student with long and short term planning of assignments

Extension Activities

Conduct research and provide presentation of cultural topics.

Design surveys to generate and analyze data to be used in discussion.

Use of Higher Level
Questioning Techniques

Provide assessments at a higher level of thinking

Create alternative assessment which requires writing, research and presentation