

Spinning Earth + Scratch Jr.

1st Grade Computation Thinking Unit Add On

2023-2024

Unit Overview:

In this unit, students learn that the primary source of light on Earth is the Sun. The Sun is the star at the center of our solar system. They examine Earth as a round, ball-shaped planet and develop an understanding of the orientation of Earth and the sun in space, allowing them to figure out that daytime and nighttime are the result of Earth facing or not facing the sun. Students explore the position of the sun in the sky throughout the day and notice the arc-like pattern that the sun makes in the sky during the daytime. They explore what they see in the sky at sunset, closely examining the change from daytime to nighttime. They gather data that shows that these patterns repeat from one day to the next in an ongoing cycle. Students develop an understanding that Earth is always spinning to explain these patterns. Next, students investigate why the lengths of daytime and nighttime change throughout the year, drawing conclusions about seasonal differences of daytime and nighttime.

This unit builds on in teaching students how to use Scratch Jr. and block based coding in order to represent the patterns that they see throughout the day and year.

NOTE: If using Scratch Jr. for chromebooks, students will need to use the same chromebook daily to access their work.

Unit at a Glance

Unit Question: How do programmers model the real world?



Assessment








Hands On Prep Required



Computer Use












Big Question #1: How are computers and robots programmed?

Progress Build 1: A programmer is someone who uses computers or technology to solve a problem. Decomposition is the act of breaking down tasks into simpler tasks. Creating an algorithm is combining smaller tasks into more complex tasks. When programming, programmers use decomposition and algorithm writing in order to create a product that accomplishes their goal.

1	2	3	4
Decomposing a problem and writing an algorithm 	Intro to Scratch Jr. 	Dance Party Project 	Finish Dance Scene and Reflect  

Big Question #2: How do programmers make programs that show patterns in the real world?

Progress Build 2: The design process is a list of steps that engineers go through to design solutions to solve problems. First they ask a question, then they imagine possible solutions or answers, then they plan a possible solution, then they try that solution, and finally they reflect and improve a solution. When programmers model the real world, they think about what happens in real life and how they can best use tools like computers or robots to best show that process.

5	6	7	8	9
Showing the real world through programming  	Final Project introduction and model 	Project Work Day  	Test, Present, Reflect   	Showcase!   

Standards Overview:

<u>CT Standards:</u>	<u>ELA Standards:</u>	<u>NGSS Standards:</u>
<p>1A-AP-11 Decompose (break down) the steps needed to solve a problem into a precise sequence of instructions.</p> <p>1A-AP-08 Model daily processes by creating and following algorithms (sets of step-by-step instructions) to complete tasks.</p> <p>1A-AP-10 Develop programs with sequences and simple loops, to express ideas or address a problem</p> <p>1A-AP-12 Develop plans that describe a program's sequence of events, goals, and expected outcomes</p>	<p>CCSS.ELA-LITERACY.RI.1.10 With prompting and support, read informational texts appropriately complex for grade 1.</p> <p>CCSS.ELA-LITERACY.W.1.8 With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question.</p>	<p>1-ESS1-1 Use observations of the sun, moon, and stars to describe patterns that can be predicted.</p> <p>1-ESS1-2 Make observations at different times of year to relate the amount of daylight to the time of year.</p> <p>1-LS1-1 Use tools and 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.</p>

Assessments:

Lesson	Assessment:	Grading Support
6-9	<p>You have been learning so much about the earth and why we notice different patterns on earth. In fact, the principal of the school wants you to show what you have learned at an upcoming parent/grandparent showcase. Your job is to use Scratch Jr. to create a project that uses appropriate background and character blocks to show a pattern found on Earth. You can choose from the following patterns.</p> <ul style="list-style-type: none"> <input type="checkbox"/> Day/Night <input type="checkbox"/> Seasons <input type="checkbox"/> Shadows <p>After you create and code your project in Scratch Jr., you will need to write an explanation that...</p> <ul style="list-style-type: none"> <input type="checkbox"/> Identifies and explains the earth pattern in real life <input type="checkbox"/> Explains how your project shows the pattern 	<p>Exemplars and Rubric</p> <p>Exemplar Projects (teacher facing)</p>

Unit Vocabulary

(vocab cards for word wall available [here](#))

- **Programmer** - someone who uses computers or technology to solve a problem
- **Decomposition** - breaking a big problem down into smaller steps
- **Algorithm** - a list of steps to solve a problem
- **Pattern** - something that happens over and over
- **Design Process** - the steps scientists take to solve a problem (Ask, Imagine, Plan, Try, Improve)
- **Cause and Effect** - when one thing causes another thing to happen

Unit Materials:

(see here for [the whole material list](#))

Type of Material:	Material:	Quantity:	Price per unit:	Total Price:
Hardware	computer or tablet	15-30	varies	
Classroom supplies	Scissors	5	\$4.88	\$24.40
Classroom supplies	Gluesticks	3	\$11.99	\$35.97
Consumable	computer paper	1	\$31.99	\$31.99
Consumable	anchor chart paper	1	\$41.58	\$41.58
Classroom supplies	anchor chart markers	1	\$10.51	\$10.51
Consumable	tape	1	\$12.76	\$12.76

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Hardware	My First Coding Book	1	\$12.99	\$12.99
Consumable	11x17 paper	1	\$12.62	\$12.62
Classroom supplies	markers	1	\$40.44	\$40.44
Consumable	index cards	1	\$11.99	\$11.99
Optional for Showcase:	nametags	1	\$4.99	\$4.99
Optional for Showcase:	refreshments	depends		
Print Materials	Investigation Notebook			
Print Materials	Lesson 1 Handout			
Print Materials	Scratch Jr. interface			
Print Materials	Vocabulary Wall			
Print Materials	Scratch Jr. Blocks			
Print Materials	Feedback sheet			
Print Materials	Final Project Handout			

Day by Day Materials Prep:

Day:	Task and Outline:	Materials Needed:
1	<ul style="list-style-type: none"> Introduce new unit + programming Decomposing problems and writing algorithms Creating a paper plane algorithm 	Investigation Notebook Daily Powerpoint Paper Plane Algorithms Video Lesson 1 Handout - print separately for each student/pair/group For each pair/group: <ul style="list-style-type: none"> Scissors Paste/gluestick
2	<ul style="list-style-type: none"> Introduce Scratch Jr! Explore Scratch Jr.! Review blocks and how to write an algorithm to get a character to move Group coding challenge (optional) Simon Says practice 	Investigation Notebook Daily Powerpoint Scratch Jr. interface Vocabulary Wall Scratch Jr. Blocks
3	<ul style="list-style-type: none"> Introduce new blocks Co-create dance party project Students iterate on dance party project 	Computers/tablets Investigation Notebook

		Daily Powerpoint Vocabulary Wall Exemplar Dance Party Project - you should create your own before class to ensure you understand each component Coding: Creating a conversation (Scratch Jr)
4	<ul style="list-style-type: none"> • My First Coding Book • Idea Walk • Share exemplars 	My First Coding Book - read aloud here Computers/tablets Investigation Notebook Daily Powerpoint Vocabulary Wall Feedback sheet Tape
5	<ul style="list-style-type: none"> • Zip Zap Zop • The Design Process • Reading: How do plants grow? • Create Scratch Jr. program to show plant growing • Cause and Effect chart 	Computers/tablets Investigation Notebook Daily Powerpoint Vocabulary Wall Design Process Anchor Chart: <ol style="list-style-type: none"> Ask: Ask a question. Imagine: Think about possible solutions. Plan: Choose your best idea and plan how you could try it. Try: Do it! Improve: Make it better or try again. Anchor chart paper for Cause and Effects Examples of plant growing projects
6	<ul style="list-style-type: none"> • Introduce final project • Model Day and Night project (co-create) • Review project rubric + other options • Students choose project and begin brainstorming (Ask, Imagine, Plan) 	Computers/tablets Investigation Notebook Daily Powerpoint Vocabulary Wall

		Final Project Handout
7	<ul style="list-style-type: none"> Work time to create projects 	Computers/tablets Investigation Notebook Daily Powerpoint Vocabulary Wall Final Project Handout
8	<ul style="list-style-type: none"> Finish projects and prepare presentations 	Computers/tablets Index cards Posters or computer paper + markers
9	<ul style="list-style-type: none"> Showcase! 	Computers/tablets with student projects loaded on them. Space for showcase <ul style="list-style-type: none"> Space for computers to be set up and for participants to circulate in small groups to projects Optional: <ul style="list-style-type: none"> Nametags Posters with names or project descriptions Refreshments Welcome address from teacher, student, or leader
10	FLEX - students may need more time to finish their projects. You may also insert this flex day earlier in the unit if students need more time exploring with Scratch Jr.	n/a