Full STEAM Ahead:
Connecting Library of Congress Primary Sources and Graphic Novels

Lesson Plan Template	
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Grade Level(s): Fourth	
Subject: Weather	
Length of Class: 50 minutes	
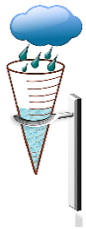	
Image Citation: Artsybee. (2015). *Water meter rainfall equipment* [image]. Pixabay. https://pixabay.com/illustrations/water-meter-rainfall-equipment-927515/	
Lesson Title:	Rain Gauges and Weather Maps

Overview:	Students will reinforce their prior learning about weather tools and maps by creating a rain gauge and mapping data from the school grounds.
Learning Objective:	Students will create a rain gauge and use the rain gauge to map precipitation.
Standards:	4.S.1A.2 Develop, use, and refine models to (1) understand or represent phenomena, processes, and relationships, (2) test devices or solutions, or (3) communicate ideas to others. 4.E.2B.1 Analyze and interpret data from observations, measurements, and weather maps to describe patterns in local weather conditions (including temperature, precipitation, wind speed/direction, relative humidity, and cloud types) and predict changes in weather over time.
Essential Question:	How can a rain gauge be used to record and interpret weather data?
Supporting Question(s):	How can scientists develop accurate rain gauges? How does the location of a meteorological tool affect the data recorded by the tool? How can scientists map data collected by tools?
Digital Primary and Secondary Sources:	List primary and secondary sources and include links. LOC - historical rain gauge https://www.loc.gov/resource/sn83030214/1916-03-19/ed-1/?sp=4&q=rain+gauge&r=0.353,1.002,1.293,0.523,0 https://www.loc.gov/resource/sn83030214/1916-03-19/ed-1/?sp=4 LOC - Egyptian Rain Gauge https://www.loc.gov/item/2016821645/ LOC - Snow Gauge https://www.loc.gov/item/2016821644/ LOC - rain chart(map) https://www.loc.gov/static/classroom-materials/weather-forecasting/documents/rain-chart.pdf How to Build a Rain Gauge video - https://www.youtube.com/watch?v=8qLael2CSKs

	Science Comics Wild Weather: Storms, Meteorology, and Climate.
Required Classroom Materials:	Lesson facilitators will need: a computer, document camera, projection/SMART board, *Science Comics Wild Weather: Storms, Meteorology, and Climate*, and primary sources. Students will need: items to create and develop rain gauges (i.e., graduated cylinders, plastic bottles with volume markings, tape, rulers, sand, markers, any other materials that can be upcycled into a rain gauge), pencils, data record sheets and/or notebooks.
Classroom Environment:	Students will start in a whole group setting for direct instruction (preferably on the carpet), and then break out into small groups of 2-3 students for the development of the rain gauge.
Differentiation and Adaptations:	For students with limitations related to fine motor skills, provide materials that can be used using gross motor skills predominantly. For multilingual students, provide instructional videos about weather tools and engagement directions in the language the student is most proficient.

Lesson Sequence/Procedures	
Estimated Time Needed	**Detailed Description of Teaching and Learning**
15-20 minutes	Activate Prior Knowledge Students will review what they've learned about the water cycle, weather maps, and weather tools through a read aloud of selected sections from *Science Comics Wild Weather: Storms, Meteorology, and Climate.* The lesson facilitator will facilitate conversation throughout the read aloud, allowing students to build off of each others' ideas and the ideas presented in the text. Next, the lesson facilitator will display the primary sources listed in this lesson plan and facilitate a conversation around the supporting questions also listed in this lesson plan. The facilitator should chart the responses to the following question: how can scientists develop accurate rain gauges?
20-25 minutes	Engagement

	The facilitator will tell students that they will be creating their own rain gauge using the upcycled materials provided. The facilitator will remind students of the components of an effective rain gauge. Throughout the engagement, the facilitator will actively monitor and support students by walking around to each small group and asking them if their rain gauge follows the parameters established during the activate prior knowledge of the lesson. Students will work collaboratively to create one functional rain gauge per small group.
5-10 minutes	Reflection At the end of the engagement period, students will come back together in a whole group to reflect on areas of success and areas of growth throughout the experience. The lesson facilitator and classroom teacher will provide opportunities for students to collect naturally occurring data using the rain gauges. See the learning extensions section for one potential idea.

Assessments:	The anchor chart developed with students during the activation of prior knowledge component of the lesson serves as a formative assessment. It allows the facilitator to gauge students' retention of previously taught and reviewed concepts. The facilitator's feedback and support during the engagement will allow opportunities for students to adjust their thinking, clarify misconceptions, and deepen their understanding. The facilitator's presence, monitoring, and feedback are crucial to students achieving the learning objective. The development of a functional rain gauge serves as a summative assessment. It provides evidence as to whether or not students can successfully apply their learning.
Learning Extensions:	Students can plant their rain gauges in various areas on school grounds and collect precipitation data over the course of a given time frame. Students can record their data in a data sheet or their journals. At the end of the data collection time period, students can create a weather map focused on precipitation. Alternatively, students can create a mathematical graph to display their data. Students could also create a more complex tool like an anemometer which could allow for integration of mathematical standards.