Screen Machines

A cardboard movie screen for a learner's own story.

GRADES 1 THROUGH 8 | AGES 6 TO 14 | ABOUT 60 MIN

These are the standards listed in the Screen Machines educator guide. Under each one is where you will see it in the activity.

Next Generation Science Standards (NGSS)

CODE	WHAT IT COVERS
K-2-ETS1-1	Ask questions, make observations, and gather information about a situation people want to change
WHERE YOU'LL SEE IT (GRADES K-2): Learners **ask questions about why the scroll comes out blank on the first try** and gather information by flipping the strip over, re-rolling it, and observing which way the illustration must face - using a real failure to build the habit of diagnosing a problem instead of giving up.	
K-2-ETS1-2	Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function
WHERE YOU'LL SEE IT (GRADES K-2): Learners **sketch their story on the blank scroll strip in pencil** before drawing with marker, creating a physical model of a narrative that depends on the long, narrow rectangular shape of the strip and the framing of the viewing window to reveal one frame at a time.	
3-5-ETS1-2	Generate and compare multiple possible solutions to a problem
WHERE YOU'LL SEE IT (GRADES 3-5): Learners **generate and compare multiple ways to tell the same story across different blank scroll strips** - horizontal versus vertical, three frames versus five, starting close-up versus wide-shot - then choose the version that best communicates the story's beginning, middle, and end to a classmate who has never seen it.	
3-5-ETS1-3	Plan and carry out fair tests to identify failure points
WHERE YOU'LL SEE IT (GRADES 3-5): Learners **test their Screen Machine by cranking the handle and watching the scroll unroll**, identifying failure points like the art appearing blank (threaded wrong), drawings cut off at the edges (no blank margin), or the handle slipping (loose thread) - then isolate and fix one issue at a time.	
MS-ETS1-3	Analyze data from tests of different solutions to identify the best characteristics
WHERE YOU'LL SEE IT (GRADES 6-8): Learners **compare the performance of a short three-frame story to a longer extended-strip story**, analyzing which pacing holds a viewer's attention, which direction (horizontal vs. vertical) fits the action better, and which method of joining strips (tape vs. glue) produces the smoothest scroll - then combine the best features into an improved design.	
MS-ETS1-4	Develop a model to generate data for iterative testing and modification of a proposed object
WHERE YOU'LL SEE IT (GRADES 6-8): Learners **treat each blank scroll strip as an iteration of a single design**, using feedback from how the first scroll reads on the frame to adjust frame count, drawing scale, or color contrast on the second strip - developing a cheap, reusable paper model that supports multiple test-and-modify cycles inside one class period.	

Common Core State Standards (Math and ELA)

CODE	WHAT IT COVERS
RL.K-2.2	Retell familiar stories, including key details
WHERE YOU'LL SEE IT (GRADES K-2): Learners **retell their Screen Machine story in the correct order**, describing what happens first, next, and last as they crank the scroll across the frame - turning the three-beat structure from the story design worksheet into a spoken narrative for a classmate.	
SL.K-2.5	Add drawings to provide additional detail
WHERE YOU'LL SEE IT (GRADES K-2): Learners **add drawings to their scroll strip to show what the narrator cannot say out loud** - the expression on the character's face, the color of the sky, or the shape of the monster behind the door - using the visual frames of the scrolling story to carry meaning alongside spoken words.	
W.3-5.3	Write narratives to develop real or imagined experiences or events
WHERE YOU'LL SEE IT (GRADES 3-5): Learners **plan a narrative using the story design worksheet** - identifying a main character (WHO), a setting (WHERE), and an action or conflict (WHAT) - then sequence it into a beginning, middle, and end across a single scroll strip, producing a visual narrative with clear event ordering.	
SL.3-5.4	Report on a topic or present an opinion, sequencing ideas logically
WHERE YOU'LL SEE IT (GRADES 3-5): Learners **present their finished Screen Machine to a classmate** while cranking the handle, narrating each frame of the scroll in order and explaining why they chose horizontal versus vertical scroll direction for the story - practicing logical sequencing and reasoning about visual choice.	

CODE	WHAT IT COVERS
W.6-8.3	Write narratives with effective technique, relevant descriptive details, and well-structured event sequences
WHERE YOU'LL SEE IT (GRADES 6-8): Learners **write a narrative that takes advantage of the Screen Machine's linear, one-way reveal** - using pacing, blank frames, and the tension of not yet knowing what comes next to shape the reader's experience - then revise the sequence on a second blank strip after seeing how the first draft scrolls.	
SL.6-8.5	Integrate multimedia and visual displays in presentations to clarify information
WHERE YOU'LL SEE IT (GRADES 6-8): Learners **use their Screen Machine as a visual display alongside a short spoken narration**, synchronizing each turn of the handle with a beat of the story - integrating a hand-operated visual medium with live speech to strengthen their narrative presentation.	
K.G.A.1	Describe objects using names of shapes and relative positions
WHERE YOU'LL SEE IT (GRADES K-2): Learners **describe the cardboard frame's rectangle shape and the oval holes** that hold the scroll handles, using positional language like "above," "below," "between," and "next to" as they assemble the frame and install the scroll in the correct slots.	
1.MD.A.1	Order three objects by length; compare the lengths of two objects indirectly
WHERE YOU'LL SEE IT (GRADES K-2): Learners **compare the length of their scroll strip to the width of the frame's viewing window**, reasoning about how many story frames can fit end-to-end along the strip and how far they must leave blank on each end so the story is not hidden by the handles.	
3.MD.B.4	Generate measurement data by measuring lengths
WHERE YOU'LL SEE IT (GRADES 3-5): Learners **measure the blank scroll strip in inches and divide it into equal story frames**, planning how much of the strip each frame takes up and recording the measurements on the back of the strip before committing pencil marks - turning narrative pacing into a measurement problem.	
4.MD.A.3	Apply the area and perimeter formulas for rectangles in real world problems
WHERE YOU'LL SEE IT (GRADES 3-5): Learners **calculate the area of the frame's viewing window and the total area of the scroll strip** to determine how many story frames (rectangles of drawing) they can fit while still leaving blank margins at each end - applying area reasoning to a real design constraint.	
6.G.A.1	Find the area of polygons by composing into rectangles or decomposing into triangles and other shapes
WHERE YOU'LL SEE IT (GRADES 6-8): Learners **treat the blank scroll strip as one long rectangle and decompose it into equal-area story-frame rectangles**, using a ruler to measure the strip's length, subtracting the hidden end margins, and dividing the remainder into three, four, or five equal frames so each beat of the story gets the same drawable area. Then they compare that to the area of the frame's rectangular viewing window to check that a whole frame fits on screen at once.	
7.G.B.6	Solve real-world problems involving area of two-dimensional objects composed of triangles, quadrilaterals, and polygons
WHERE YOU'LL SEE IT (GRADES 6-8): Learners **calculate the total drawable area of the scroll strip by subtracting the two hidden-margin rectangles at each end from the full strip rectangle**, then use that area to decide how many story frames they can fit and how much detail each frame can hold without crowding. A second iteration on a fresh blank strip lets them test whether a different frame count gives a better-paced story.	

LEARNERS EXPLORE

narrative sequencing (beginning, middle, end); mechanical scrolling systems; measurement and area planning for story frames; iterative story-and-mechanism design; collaborative storytelling