ELEMENTARY EDITION (K-5)

I Look Like a Scientist

5-Day STEM Curriculum



Curriculum by **Dr. Shana K. Benford**

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Curriculum Overview

Designed for elementary learners across Grades K-5, this five-day intensive STEM curriculum centers on the book *I Look Like a Scientist* by Shana K. Benford. It is built to foster a deep sense of curiosity, wonder, and scientific identity in every student. By bridging literacy with the Next Generation Science Standards (NGSS), this framework transforms classrooms into active laboratories where students realize that their questions hold power.

Throughout the week, students will move from identifying as scientists to acting as scientists within their own community. They will learn that science is not merely a collection of facts, but a continuous cycle of inquiry, testing, and discovery.

EMPOWERING YOUNG SCIENTISTS

This program brings three-dimensional learning to life. By asking students to identify local problems and engineer solutions, we cultivate *Creative and Critical Thinkers* who evaluate ideas based on evidence, and *Resilient Lifelong Learners* who understand that failure in an experiment is simply a step toward success.

The Scientific Cycle in Action

We will guide students through the core philosophy of scientific inquiry. They must understand that anyone can be a scientist, and that a true scientist tests their ideas over and over again to find the best solution.

1. OBSERVE	2. QUESTION	3. HYPOTHESIZE	4. TEST	5. DISCOVER

DAY 1: DISCOVERING OUR INNER SCIENTIST

Objective: Establish a STEM identity and introduce the cycle of scientific inquiry.

Activity: Begin the week by reading *I Look Like a Scientist* aloud as a class. Facilitate a discussion exploring the diverse fields of science shown in the book—from marine biology and coding to chemistry and sustainable science. Ask students, *"What type of scientist do you want to be?"* and *"What do you wonder about in the world?"*

Define what a scientist actually does: A scientist observes the world, asks questions, forms hypotheses, tests their ideas, and discovers solutions to problems. Emphasize that they test over and over, learning from every attempt. Ensure every student understands the core message: **Anyone can be a scientist.**

HOMEWORK: Using the mirror prompt from the back of the book, students must draw themselves as a scientist. Additionally, they will select one activity from the "Caregivers" section to complete at home, fostering a strong home-to-school STEM connection.

DAY 2: WONDERING ABOUT OUR WORLD

Objective: Apply the "Observe" and "Question" steps of the scientific method to the local community context.

Activity: Take the students on a "Wonder Walk" around the school grounds, playground, or a safe community space. Give them clipboards or notebooks to act as field journals. Their goal is to make observations and write down (or draw) questions about things they see in their everyday lives.

Prompt them: *"Why does the soil wash away here?", "What types of insects visit these plants?", "Where does the rainwater go?"* Upon returning, create a large "Wonder Wall" where students post their pressing questions using sticky notes. Group similar questions to identify themes.

> **NGSS Facilitation Note:**
> **K-2:** Focus the Science and Engineering Practice (SEP) on *Asking Questions* based on observations. Guide them to look for **Patterns** (Crosscutting Concept - CCC).
> **3-5:** Elevate the SEP to *Asking Questions that can be investigated*. Encourage them to look for **Cause and Effect** relationships (CCC) in their environment.

DAY 3: HYPOTHESIZE & PLAN

Objective: Transition from questioning to predicting and planning an investigation.

Activity: Review the Wonder Wall from Day 2. Break students into small teams (or work as a whole class for K-1) and have them select one question to focus on. Guide them in writing or stating a hypothesis—an educated guess about what the answer might be or how a problem could be solved.

Next, students will collaboratively develop "mini-experiments" to test their hypothesis. They must document a logical plan: What materials will they need? How will they measure success? This teaches them that science requires careful planning and structured thinking before action is taken.

> **NGSS Facilitation Note:**
> **K-2:** Guide the SEP of *Planning Investigations* collaboratively as a group. Focus on simple tests (e.g., does it sink or float?).
> **3-5:** Students must plan a *Fair Test* by defining variables (what stays the same, what changes). Have them create a **System Model** (CCC) of how their experiment will work.

DAY 4: TEST & DISCOVER (SOLVING A PROBLEM)

Objective: Execute an experiment and engage in collaborative engineering design.

Activity: Transition from small-group planning to a unified class initiative. As a class, vote on ONE major problem from the Wonder Wall that you can solve together. This could be engineering a better way to collect classroom recycling, designing a structure to stop playground erosion, or testing materials to keep a lunchbox cold.

Spend the core of the lesson running the experiment or building the prototype. Encourage students to collaborate and share roles. When things don't work perfectly on the first try, pause and remind them: *"Scientists test over and over. A failure is just new data!"*

> **NGSS Facilitation Note:** Ensure the problem selected maps to a grade-appropriate Disciplinary Core Idea (DCI). For K-2, lean toward physical properties of matter or needs of plants/animals. For 3-5, lean toward ecosystems, energy transfer, or earth systems.

DAY 5: SHARE, REFLECT, & ITERATE

Objective: Communicate findings and reflect on the scientific journey.

Activity: Conclude the week with a "Discoveries Symposium." Have the class review the data from their Day 4 project. Did their solution work? What would they change if they had more time? Emphasize that in the real world, an experiment rarely ends; it simply leads to new questions and further iteration.

Have students reflect on their initial self-portraits from Day 1. Ask them how their view of themselves has changed. Wrap up the curriculum by celebrating their success. Remind them that they carry their scientific curiosity with them everywhere they go.

> **NGSS Facilitation Note (SEP - Communicating Information):**
> **K-2:** Have students share drawings or simple sentences about what happened.
> **3-5:** Students should evaluate their design against specific *criteria and constraints*, explaining how the evidence supports their conclusion.

Partnering with Caregivers

To reinforce STEM identity, the learning must extend beyond the classroom. On Day 1, students were tasked with picking an activity from the back of *I Look Like a Scientist*. Teachers should encourage parents to utilize these structured play ideas:

- **Scientific Investigation:** Activities like the *Sink or Float Challenge* or *Nature Journaling* build foundational skills in observation and hypothesizing with simple household items.
- **Logical Sequencing:** *Unplugged Coding* using painter's tape helps young learners understand directional logic and algorithmic thinking without needing a screen.
- **Engineering Design:** *Marshmallow Towers* and *The Egg Drop Challenge* teach structural stability, geometry, and the crucial lesson of embracing mistakes as learning opportunities.
- **Quantitative Play:** *Grocery Store Math* or *Non-Standard Measuring* turns everyday errands and routines into engaging mathematical exercises.

NGSS 3-Dimensional Alignment Guide

Use this matrix to adjust the depth of the daily activities to meet the specific developmental requirements of your grade band.

Dimension	Grades K - 2 Focus	Grades 3 - 5 Focus
Science & Engineering Practices (SEPs)	**Asking Questions & Observations:** Ask questions based on observations to find more information about the natural/designed world. **Planning Investigations:** With guidance, plan and conduct an investigation in collaboration with peers.	**Asking Investigable Questions:** Ask questions that can be investigated and predict reasonable outcomes based on patterns. **Planning Fair Tests:** Plan and conduct an investigation collaboratively to produce data, identifying independent and dependent variables.
Crosscutting Concepts (CCCs)	**Patterns:** Observe that patterns in the natural world can be used as evidence (e.g., seasons, animal behavior). **Cause and Effect:** Learn that events have causes that generate observable patterns.	**Cause & Effect:** Identify and test causal relationships and use these relationships to explain change. **Systems & Models:** Understand that a system is a group of related parts that make up a whole and can carry out functions its individual parts cannot.
Disciplinary Core Ideas (DCIs) *(Suggested targets for Day 4)*	**Physical (PS1):** Matter and its interactions (properties of materials). **Life (LS2):** Interdependent relationships in ecosystems (what plants/animals need to survive). **Engineering (ETS1):** Ask questions, make observations, and gather information about a situation people want to change.	**Physical (PS3):** Energy transfer and forces. **Life (LS2):** Ecosystem dynamics, functioning, and resilience. **Earth (ESS3):** Earth and Human Activity (protecting resources). **Engineering (ETS1):** Define a simple design problem reflecting a need or a want that includes specified criteria for success.

Materials & Resources

To support authentic exploration and the Day 4 prototyping phase, we recommend maintaining a flexible "STEM Makerspace" inventory alongside the core reading.

REQUIRED MATERIALS

- **Core Text:** *I Look Like a Scientist* by Dr. Shana K. Benford
- Clipboards or field notebooks (for Day 2 Wonder Walk)
- Sticky notes (for the classroom Wonder Wall)
- Basic drawing supplies (for Day 1 self-portraits)

SUGGESTED MAKERSPACE INVENTORY

- **Recyclables:** Cardboard, paper towel tubes, clean plastic bottles, caps
- **Connectors:** Masking tape, duct tape, glue sticks, string, rubber bands
- **Building:** Popsicle sticks, straws, paper clips, toothpicks, modeling clay
- **Testing:** Aluminum foil, fabric scraps, sponge pieces, sand, potting soil

Day 5 Assessment Rubrics

Use these NGSS-aligned rubrics to assess students' final engineering solutions and scientific explanations during the Day 5 Discoveries Symposium. They are designed to measure three-dimensional learning, focusing on practices and concepts over memorized facts.

GRADES K-2: OBSERVATION & DESIGN RUBRIC

Criteria (NGSS)	Emerging (1)	Proficient (2) - *Target*	Exemplary (3)
Asking Questions *(SEP)*	Needs prompting to ask a question or notice details.	Asks a relevant question based on observations of a phenomenon.	Asks multiple questions and independently connects them to prior knowledge.
Testing Solutions *(SEP / ETS1)*	Participates passively or struggles to follow the group plan.	Collaborates with peers to test a simple solution or gather data.	Actively suggests ways to change or improve the test based on what happens.
Communicating *(SEP / CCC)*	Shares findings vaguely without connecting to the activity.	Uses a drawing or simple sentences to show what happened (identifying a pattern).	Clearly explains *why* they think it happened, linking cause and effect.

GRADES 3-5: ENGINEERING & EXPLANATION RUBRIC

Criteria (NGSS)	Emerging (1)	Proficient (2) - *Target*	Exemplary (3)
Defining Problems *(ETS1)*	Identifies the problem but misses criteria or constraints.	Clearly defines the problem and identifies specific criteria for success and constraints.	Anticipates potential challenges within the constraints before building begins.
Testing & Iteration *(SEP)*	Tests the design but changes multiple variables at once without tracking.	Plans and conducts a fair test (controlling variables) and uses data to improve the design.	Runs multiple iterations, using precise data measurements to optimize the final solution.
Explanations *(SEP / CCC)*	Describes the final design but lacks evidence from testing.	Constructs an explanation using evidence, identifying cause-and-effect relationships.	Uses systems thinking to explain how individual parts work together to solve the problem.