



6th Grade STEM Academy Summer Project 2026

Summer Preparatory STEM Academy Project (5th grade into 6th grade year)

Project DUE the First Week of School to Your Science Teacher on 9/3/26

6th Grade Science & Mathematics STEM Academy Project: Design a Laboratory

6th GRADE STUDENT NAME: _____

(First & Last Name)

Welcome, young scientists and designers! In this project, you'll step into the shoes of architects, engineers, and lab techs to design your very own science laboratory. You'll use your math skills, research real lab spaces, and even build a model of something cool you'd find in your science lab. Let's get started!

Part 1: Laboratory Measurements – Math in Action - Your first task is to **plan and sketch out** your laboratory space. You'll decide on the size and shape of different parts of your lab and calculate:

- ☐ **Area** (length $\times$ width) of rooms, tables, or workspaces
- ☐ **Perimeter** (distance around the edges) of rooms or benches
- ☐ **Volume** (length $\times$ width $\times$ height) of things like storage cabinets or containers

To Do in Part 1:

1. Draw a **floor plan** (top-down view) of your lab on graph paper.
2. Label and name 10 different parts of your lab (see page 2 for a list of typical lab items).
3. Choose at least **5 different objects or spaces** in your lab.
4. Measure or estimate their dimensions and calculate:
 - a. **Area** of at least 3 objects
 - b. **Perimeter** of at least 1 object
 - c. **Volume** of at least 1 object ($V = L \times W \times H$)

Example:

- Lab Table: 2 m $\times$ 1.5 m $\rightarrow$ Area = 3 m²
- Storage Cabinet: 1 m $\times$ 0.5 m $\times$ 2 m $\rightarrow$ Volume = 1 m³

5. Add your floor plan of your lab to your presentation in Part 2.

Part 2: Learn About Real Laboratories – Research & Reading - Before designing the details of your lab, let's learn about how real labs are set up and what they contain!

To Do in Part 2:

1. Look up, read, and summarize at least 3 short excerpts and/or articles with subjects found in the resource section about:
 - ☐ Different types of science labs (biology, chemistry, physics, etc.)
 - ☐ Common lab tools and safety features
2. Record the following:
 - ☐ The titles & web addresses (urls) of the articles you used (at least 3)
 - ☐ The authors' names of the used articles
3. Include notes/sentences on:
 - ☐ 3 types of materials or tools you want to include in your lab
 - ☐ 2 safety features every lab should have
 - ☐ 1 new thing you learned about science labs
4. Conduct your own research about a field of science that interests you. Answer these Research Questions:
 - ☐ What does the scientist study?
 - ☐ Where do they work (field, lab, observatory)?
 - ☐ What tools or models do they use?
 - ☐ What does their lab look like?
5. Create a Presentation for the above 4 parts:
 - ☐ Students create a poster, slideshow, or 1-pager to share their findings.



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Research About Real Labs and Scientists Resource: Science Laboratory Materials and Supplies:

General Overview: Common Lab Materials: Most science laboratories, no matter the field, share several basic tools and safety supplies. These common materials help scientists observe, measure, test, and record their findings accurately and safely.

Typical Lab items include:

- Workbenches & Tables – Sturdy surfaces for experiments
- Sinks & Water Supply – For cleaning tools and handling spills
- Storage Cabinets & Shelves – To keep chemicals, tools, and samples organized
- Microscopes – For viewing small objects and organisms
- Glassware – Beakers, test tubes, flasks, and graduated cylinders used for mixing and measuring liquids
- Thermometers – To measure temperature
- Digital Scales – For precise measurement of mass
- Measuring Tools – Rulers, calipers, and timers
- Computers or Tablets – For recording data, running simulations, or using digital models
- Safety Equipment – Goggles, gloves, lab coats, fire extinguishers, first-aid kits, eye wash stations

While all labs have core tools, different types of science focus on specific investigations and require specialized equipment:

Biology Labs - Focus on living organisms, cells, and ecosystems. <u>Examples of Special Supplies:</u> Microscopes with slides and cover slips Petri dishes and culture tubes Dissection tools (scalpels, tweezers, trays) Incubators and refrigerators Biological specimens or samples	Chemistry Labs - Deal with chemical reactions, elements, and compounds. <u>Examples of Special Supplies:</u> Bunsen burners and hot plates Fume hoods for ventilation Chemical-resistant glassware pH meters and litmus paper Safety storage for acids and flammable substances
Earth Science Labs - Study rocks, soil, weather, and Earth's processes. <u>Examples of Special Supplies:</u> Rock and mineral kits Erosion trays and soil sifters Topographic maps and globes Models of tectonic plates and layers of Earth Weather tools (barometers, anemometers)	Astronomy/Space Science Labs - Explore space, stars, planets, and the universe. <u>Examples of Special Supplies:</u> Telescopes and star charts Solar system models Software or simulations for sky observations Moon phase kits and planetary data logs Light and spectrum tools (prisms, spectroscopes)

Part 3: Build a Model – Bring It to Life- Scientists use models every day to study Earth and space phenomena that may be too large, too small, too far away, or too dangerous to observe directly. For this part, students will create their own scientific model to demonstrate an Earth or Space Science concept and share their learning with classmates during the first weeks of school. This would be a model that would fit right into your designed lab in parts 1 & 2.

Example Model Choices (Student-Picked):

- Erosion model (water washing over land)
- Volcano or earthquake model (tectonic plate movement)
- Moon phases or the solar system
- Telescope or observatory model
- Weather system model
- Earth's layers model
- Crater formation model
- Renewable energy or climate model

Part 3 To Do:

1. **Design:** Students sketch a plan and list materials (add to your presentation from parts 1 & 2).
2. **Build:** Build the model using household/classroom/recycled materials. (Use recycled materials, cardboard, clay, LEGOs, or anything safe you have at home or in class)

Part 3 To Do (continued):

3. **Label & Description:** Be sure to label parts of your model and create a description of what the model represents.
4. **Presentation (add this onto your poster or presentation from parts 1 & 2):**

Students explain:

- ☐ What process does your model represent?
- ☐ What type of scientist might use a model like this?
- ☐ How it connects to the laboratory they designed in Part 1 & research in Part 2.

Summary: Science labs are built for observation, experimentation, and discovery. While all labs need basic tools for measuring, recording, and staying safe, the specific focus of the lab determines the specialized tools used. Whether it's dissecting a frog, analyzing minerals, or modeling the solar system, every science lab is a place where learning meets hands-on exploration. ****Be prepared to participate in a gallery walk during the first week of school to present and explain your project****

This project is worth one summative grade and will be scored using the following rubric:

Project Grading Checklist: A Math & Science Exploration Project (Total: 100 Points)

Part 1: Lab Measurements Criteria – Math in Action (35 points total)

Floor plan is neatly drawn and labeled	/5 points
At least 10 parts of the lab are clearly labeled	/5 points
Area calculated and work shown for 3 objects	/6 points
Perimeter calculated and work shown for 1 object	/4 points
Volume calculated and work shown for 1 object	/4 points
All measurements are labeled with units (ex- meters, centimeters)	/3 points
Creativity and realism of the lab design	/4 points
Effort and neatness	/4 points

Part 2: Research About Real Labs and Scientists Criteria (30 points total)

Notes include 3 tools/materials, 2 safety features, and 1 new fact	/4 points
Includes notes and cites at least 3 articles used in research	/4 points
Answers to the 4 research questions are clear and complete	/6 points
Student shows understanding of the scientist's work and lab setting	/6 points
Visual presentation (poster, slideshow, or 1-pager) is complete	/6 points
Creativity, organization, and effort	/4 points

Part 3: Scientific Model Criteria– Bring It to Life (35 points total)

Model represents a real Earth/Space science concept	/5 points
Sketch/plan and material list is included	/4 points
Model includes a label and written description	/5 points
Student clearly explains the science behind the model	/6 points
Connection to lab design in Part 1 and research in Part 2 is explained	/5 points
Model shows attention to detail, effort, and creativity	/6 points
Safe and appropriate materials used	/4 points

Be creative and have fun with this assignment. If you have any questions during the summer, you can email Mrs. Hughes (khughes@kent.k12.md.us) or Dr. Markosian (amarkosian@kent.k12.md.us)

DUE DATE FOR SUMMER WORK IS: Thursday, September 3, 2026

You will need to turn in everything to your STEM Academy Science teacher on this date.

* Any researched information must be cited to avoid plagiarism. Please include all references (books, websites, etc.) that you used for the project. Students may not use AI (ChatGPT) to help write for the project- we will be checking for this and want original thought*

Any slideshow presentation must be done on Google Slides or another easily accessible format and shared with your science teacher

Project support will be offered on Monday, July 6, and Monday, July 13 (2026) at HHGES from 9:30 am- 1:00 pm.

Dr. Markosian will be at HHGES to provide clarification and assistance for starting these projects.

