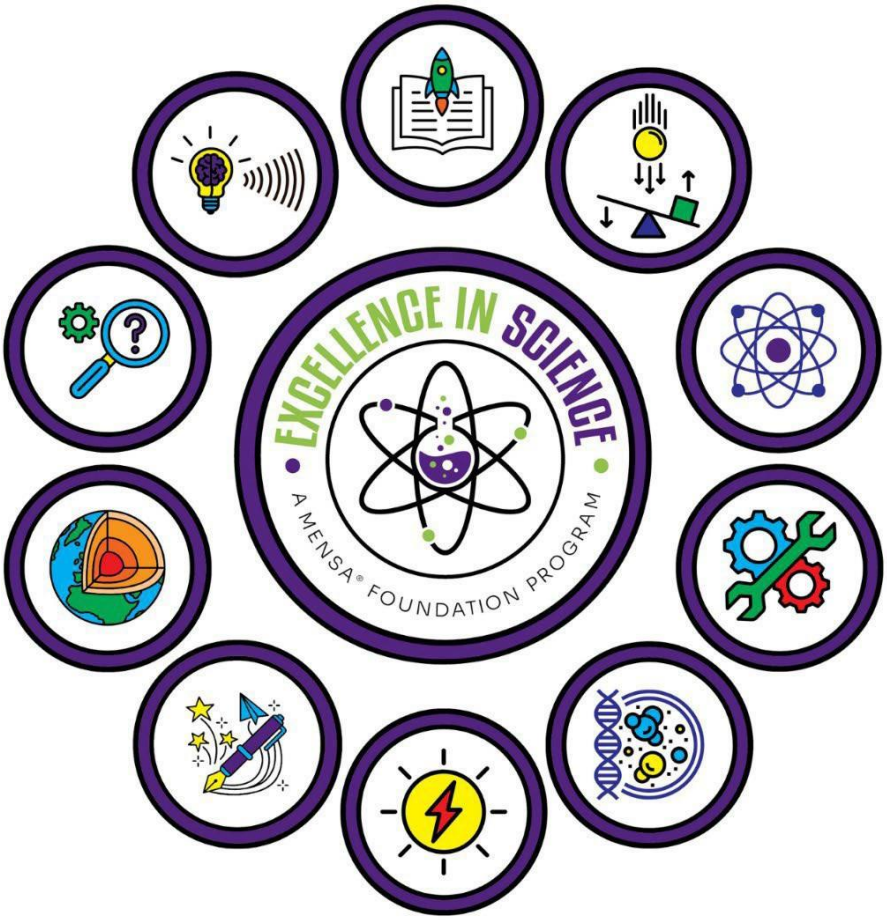
EXCELLENCE IN SCIENCE AWARD PROGRAM



GRADES 3-5 BADGE WORKBOOK

NAME: _____

MENSA® FOUNDATION

MENSA FOUNDATION EXCELLENCE IN SCIENCE AWARD PROGRAM

To encourage curiosity and exploration in STEM-related fields, the Mensa Foundation has developed the **Excellence in Science Award Program** - complete science activities, earn a commemorative certificate in recognition of your outstanding achievement and get an Excellence in Science T-shirt, too!

The Mensa Foundation recognizes and encourages education, gifted youth, and lifelong learning through resources like the Mensa for Kids website and other programs for youth and those who support them.

While these activities were written or selected for children in grades K-12, this program is open to all (including parents and teachers!) – the only requirement is an interest in science.

Inspired by the principles of the Next Generation Science Standards (NGSS), the *Excellence in Science* program invites learners to complete hands-on, research-based, creative, and real-world activities across a variety of science topics. The Mensa Foundation aims to help every participant build a lasting passion for science, one badge at a time.

To participate in the Mensa Foundation Excellence in Science Program, follow these steps:

1. Select a workbook from the grade level bands available. Participants can choose any workbook that best fits their skills and interests.

2. Print the appropriate workbook and track each activity you complete by checking it off as you go. When you finish all the activities for a given badge, record the completion date on your badge sheet. Please complete the form by hand. We operate on the honor system, and we encourage honesty in this way.

3. Once you've completed an entire workbook by finishing every badge, both the participant and an adult will need to sign the badge sheet as verification and return it and the order form to the Mensa Foundation at the address provided. Once we've received your signed badge sheet and verified it, we'll send you a recognition certificate and T-shirt. Please allow 6 weeks for delivery.

MENSA FOUNDATION

MENSA FOUNDATION EXCELLENCE IN SCIENCE AWARD PROGRAM

Important Questions Answered

Is Mensa membership required?
No, the program is open to anyone, regardless of Mensa affiliation or membership.

Do I have to use the workbook for my grade level?
No, participants can pick the workbook that's best for them.

Do I have to complete the activities exactly as written?
No, feel free to make adjustments to any activity as needed. This program is meant to be flexible and inclusive – if you can adapt the activity while keeping the scientific concepts intact, go for it!

Do I need to complete the activities in order?
No, activities can be completed in any order. Just make sure all badge requirements on the workbook are checked off before submitting your form.

Do I have to submit my completed projects?
No, all you need to submit is your signed badge sheet. We operate on the honor system, and we trust parents/teachers to verify that each badge was completed in its entirety.

Can the same activity be used satisfy multiple badge requirements?
Yes, we recommend reading the workbook in its entirety before you begin so you can make note of any activities that can be combined or modified to use across two or more badges.

Can I redo the program if I already completed it at a younger grade level?
Yes! We encourage participants to continue exploring science at any age or level, and we're happy to issue additional awards for each new badge workbook completed.

Can school projects or classroom assignments count toward badge activities?
Yes, if a school project or classroom activity aligns with one of the badge requirements, it absolutely counts.

I'm a teacher – can I swap some of these for similar activities that are already part of my school curriculum?
Please do! We trust teachers to make the right decisions for their students' educational needs while maintaining the integrity of the Excellence in Science Award Program.

If a teacher does an activity with the whole class, does every student in the class get credit for completing the activity?
Yes, as long as the student is present for the activity. Students who are absent must complete the activity another time before checking it off their workbook.

Can a teacher/parent submit a form and be recognized as well?
Of course!

Will you send my students' awards to our school?
Yes, just include your school's name, address, and who to attention it to.

Do you ship awards internationally?
Yes! We're happy to send certificates and T-shirts to participants outside the U.S. Please note that international delivery may take longer than the standard 6-week timeline.

The pages that follow contain the activities for each Excellence in Science badge. These activities are designed to help you explore science through hands-on experiments, creative projects, and real-world investigations.

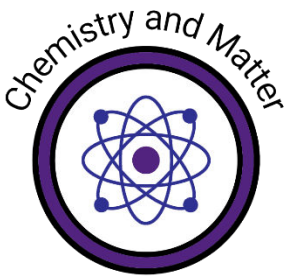
There are **10 badges** needed to complete the Excellence in Science Award Program:

- Chemistry and Matter
- Earth and Space Science
- Energy
- Engineering
- Forces and Motion
- Life Sciences
- Sound, Light, and Waves
- Science Literacy
- Science Exploration
- Arts and Science

Complete each activity to the best of your ability. You don't need to be perfect; the most important thing is to have fun, stay curious, and try something new. Some activities include suggested links to websites with examples, videos, or how-to instructions.

If you're viewing this workbook on a screen, you can click those links directly.
If you're using a printed workbook, **scan the QR code below** to visit a webpage with all the activity links in one place. If you experience any issues with the QR code or links provided, please let us know by emailing giftedyouth@mensafoundation.org.

Look for the □ symbol next to activities that have a suggested online resource.



CHEMISTRY AND MATTER

Use these activities to reinforce learning concepts related to matter and how it behaves. Investigate properties of matter and how it can change through physical and chemical reactions, and understand that everything is made of particles, even if we can't see them. Check off each activity as you go, and when you've completed them all, record the date on your badge sheet.

- ☐ Test the solubility of various materials (sugar, salt, oil, sand, flour, etc.) by adding them to water and observing how they behave.

- ☐ Use baking soda and vinegar to inflate a balloon – experiment with different amounts of each and chart how it relates to the size of the inflated balloon.

- ☐ Investigate temperature changes and mass by completing two of the following:
  - Weigh a cup of water at room temperature, then freeze it and weigh it again after it is frozen solid. Compare your findings.
  - Weigh a pot of water at room temperature, then bring the water to a boil for a few minutes. Let it return to room temperature and weigh the pot again. Compare your findings.
  - Weigh a bag of popcorn before and after popping. Compare your findings.
  - Make your favorite cake or brownie recipe – weigh the pan of batter before and after baking and compare your findings.

- ☐ Explore how temperature affects the speed and movement of molecules by adding food coloring to a cup of very hot water and a cup of very cold water. Describe what you observe.

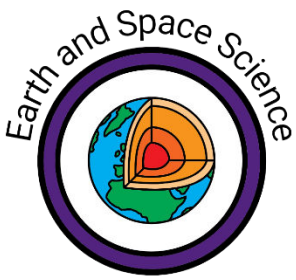
- ☐ Compare how an M&M's candy coating dissolves in plain water versus a sugar solution. Make sure the water and sugar solution are the same temperature and use the same color M&M in each solvent. ☐

- ☐ Demonstrate an understanding of chemical elements and their properties and behaviors by completing one of the following:
  - Create a "Chemistry Superhero" with powers based on real elements.
  - Make a comic strip featuring an element as a major character.

- ☐ Create a chemical or physical reaction at home, explain what happened and why, and create a flipbook or storyboard about it. Choose from the following at-home chemical reaction experiments: ☐
  - Oobleck or slime
  - Mentos and soda
  - Ice cream in a bag
  - Invisible ink
  - Elephant toothpaste

- ☐ Identify at least 10 elements you see, use, or interact with and create a trading card for each, including important facts and everyday uses

DATE COMPLETED: _____



EARTH AND SPACE SCIENCE

Use these activities to reinforce learning concepts related to our planet, its place in the solar system, and its relationship with the moon and the sun. Learn about Earth's systems and processes, how landforms change over time, and how people and the environment impact each other. Check off each activity as you go, and when you've completed them all, record the date on your badge sheet.

- ☐ Select a season and record the daily temperature and precipitation for a specific location over the course of one month. Make a graph, table, or other visual representation of your data.

- ☐ Keep a record of the number of daylight hours by tracking sunrise and sunset times over the course of several days. Repeat this for each season (summer, fall, winter, spring). When you've finished recording, create a visual representation of your data and use it to explain how Earth's orbit around the sun influences daylight patterns on Earth.

- ☐ Explore climate science by completing one of the following:
  - Select two different regions from the world, research their climates, and create a travel brochure for both locations with information about what visitors can expect and how they should prepare for their trip.
  - Choose a climate zone and record a video of yourself as a climate reporter describing the region.

- ☐ Explore the concept of erosion by completing one of the following:
  - Use a watering can, rocks, and a tray of soil to simulate water erosion caused by rainfall. ☐
  - Use a fan, pebbles, twigs, and leaves, and sand to simulate wind erosion.
  - See how mechanical weathering, such as ice wedging, can break rocks using plaster of Paris or chalk. ☐

- ☐ Investigate Earth's features by completing one of the following:
  - Make a map of volcano and earthquake hotspots using data about recent and past volcanic and seismic activity.
  - Create a 3D model of the ocean floor, including features like ridges, trenches, and seamounts.
  - Make a collage, poster, or infographic that illustrates Earth's systems (geosphere, biosphere, hydrosphere, and atmosphere) and how they interact.

- ☐ Explore different properties of saltwater and freshwater by completing one of the following:
    - Demonstrate that saltwater and freshwater have different densities by dissolving salt and food coloring in a cup of water, then adding it to a cup of plain water and observing the effects.
    - Filling one dish with freshwater and one dish with saltwater in equal amounts and recording how much water evaporates from each dish over the course of several days.

- ☐ Design and test a solution for a weather-related hazard by completing one of the following:
    - Use household materials and craft supplies to build a shelter that can withstand damage from rain and hail.
    - Build a paper house then test a variety of materials (cotton balls, sponges, sandbags, rocks, clay, etc.) to create an effective flood barrier.
    - Use paper, straws, tape, and rubber bands to build a structure that can withstand strong winds.

- ☐ Demonstrate an understanding of Earth's geological makeup by completing one of the following:
    - Create a 3D stratigraphy model of the Earth's rock layers using clay/craft supplies, LEGO or other building toys, or food.
    - Create a 3D model of the Earth's soil layers using clay/craft supplies, LEGO or other building toys, or food.

- ☐ Use flashlights of varying size to demonstrate the relationship between a star's relative brightness and its distance from Earth.

- ☐ Select a constellation that is visible in your location and create a poster, infographic, research project, or presentation about it. Include its history, name meaning, major features, mythology, and visibility information. View the constellation yourself and create a visual representation of it.

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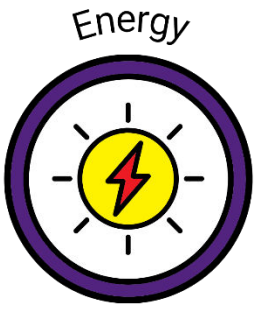

ENERGY

Use these activities to reinforce learning concepts related to energy. Learn about the fundamental properties of energy (like how it cannot be created or destroyed and how it changes form), the different types of energy (like heat energy, chemical energy, and electrical energy), and how we use energy in our everyday lives. Check off each activity as you go, and when you've completed them all, record the date on your badge sheet.

- ☐ Investigate how heat is transferred by conduction by placing utensils made of different materials (metal, wood, plastic, silicone, etc.) in hot water and observing which utensils retain more heat.

- ☐ Demonstrate an understanding of the transfer of energy by completing and summarizing one of the following:
  - Build a solar oven and use it to make s'mores. Then, write or explain the transfer of energy involved. ☐
  - Make a basic series circuit. ☐
  - Design and build a water wheel using cups, straws/skewers, and other household/craft supplies. ☐

- ☐ Observe and model how plants use sunlight to create food for energy by placing fresh leaves in a water-filled container, leaving it in the sun for at least 30 minutes, and observing the changes. Repeat with less sunlight and record the differences.

- ☐ Search your home or classroom and look for examples of renewable energy, nonrenewable energy, and energy-efficient appliances and behavior.

- ☐ Identify five examples of energy you use in your daily life, what type of energy it is, and how it changes form.

- ☐ Go on a scavenger hunt at home or at school and try to identify things that use or produce energy. Some examples may include:
  - Something that moves
  - Something that produces heat
  - Something that needs batteries
  - Something that uses a plug
  - Something that uses fuel
  - Something that gives energy to people

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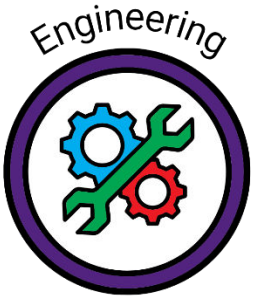

ENGINEERING

Use these activities to reinforce learning concepts related to engineering. Learn about the history of engineering and how it's changed over time and understand the engineering process and how it's used to solve real-world problems. Check off each activity as you go, and when you've completed them all, record the date on your badge sheet.

- ☐ Think about a product, invention, or piece of technology that was engineered to solve a problem. Research its history, how it works, and how it has changed over time. Then, write a paper or create a video, poster, or infographic presenting your findings. Be sure to include key figures and important dates.

- ☐ Research a famous engineering structure from around the world, explain why it was built, and recreate it using blocks, LEGO, or household materials.

- ☐ Identify all six simple machines (lever, wheel and axle, pully, inclined plane, screw, wedge) and create a booklet with a drawing, explanation, and real-world example of each.

- ☐ Use the engineering process to complete one of the following:
  - Design and build a shelter for a toy animal that is comfortable, sturdy, and can hold the toy animal inside.
  - Design and build a carrier that can safely move an object down a string zipline.
  - Design and create plans for a new toy that is safe for kids to play with, teaches them something while they play with it, and uses only recyclable materials.

- ☐ Create a paper airplane launcher to achieve maximum distance that uses only paper, rubber bands, straws, tape, stapler, paper clips, and/or cardboard.

- ☐ Design and build a paper bridge (at least 1ft long) that can support as many pennies as possible using only two pieces of paper and 6 inches of tape.

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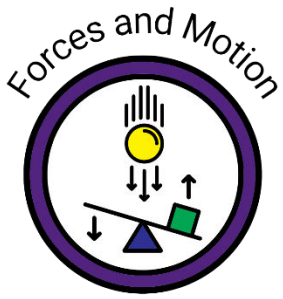

FORCES AND MOTION

Use these activities to reinforce learning concepts related to forces and motion. Learn about forces like gravity, friction, and magnetism and experiment with how they make things move. Check off each activity as you go, and when you've completed them all, record the date on your badge sheet.

☐ Experiment with air and thrust by completing one of the following:
- Make a balloon rocket, inflating it to varying sizes, and testing how far it flies.
- Make a balloon-powered car and measure the distance and speed it travels when the balloon is inflated to various sizes.

☐ Explore how energy is transferred during a collision by completing one of the following:
- Use a toy car (or build your own) and a doll as a crash test dummy and record how much your crash test dummy moves when your car crashes at different speeds.
- Demonstrate the difference between energy transfer in elastic collisions versus inelastic collisions by bouncing a ball on a hard surface and a soft surface. Record and compare your observations.
- Use two blocks and a hammer or mallet to demonstrate how energy is transferred between two objects in a collision. Place the blocks next to each other, then strike one with a hammer and observe what happens to the other block. Repeat with varying force and observe the differences in the resulting collisions.

☐ Conduct a friction test by rolling a toy car down a ramp covered in materials with different textures (fabric, sandpaper, aluminum foil, etc.). Record how each material affects the car's distance and speed.

☐ Make predictions about force and motion by completing one of the following:
- Make a pendulum and record how many times it swings in 10 seconds. Predict and test how many times it will swing in longer and shorter intervals. Repeat this process using varying degrees of force for each trial. Identify and discuss any patterns you notice about the pendulum's motion.
- Spin a top and record how long it takes for it to stop spinning. Repeat with varying degrees of force to establish your data points. Then, use your data to estimate how long your top will spin depending on the amount of force used to spin it.

- ☐ Using what you know about magnetism, brainstorm at least 10 items in your home or classroom you think may be magnetic and 10 you think are not magnetic. Then, use a magnet to test your hypothesis.

- ☐ Understand how objects can be moved without applying direct force by completing one of the following:
    - Tie a paperclip to a string and tape it to a table or other surface so it hangs freely. Then, use a magnet to move the paperclip without touching it. Explain what happens to the paperclip when the magnet is closer and farther away from the paperclip.
    - Use a balloon and static electricity to pick up small pieces of paper. Experiment by rubbing the balloon for more or less time and on different objects to see how it affects attraction.

- ☐ Identify different types of forces (gravitational, frictional, magnetic, electrical, etc.), select one, and write a journal entry speculating about what would happen if suddenly one of those forces no longer existed.

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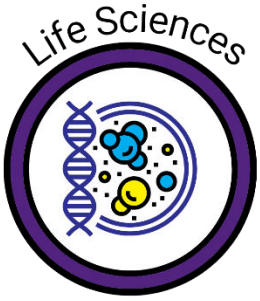

LIFE SCIENCES

Use these activities to reinforce learning concepts related to life sciences. Learn about the structure and function of living things (like cells, organs, and systems), how living things interact with the world around them (like food chains and ecosystems), and life cycles (including inheritance and adaptations). Check off each activity as you go, and when you've completed them all, record the date on your badge sheet.

- ☐ Investigate inherited traits by planting several seeds of the same type in separate pots. As they grow, observe their characteristics and compare them between each plant. Draw conclusions about their heritable traits based on their similarities and differences.

- ☐ Select an insect and create a visual model of its life cycle.

- ☐ Select an animal that lives in a group (ants, penguins, bees, etc.). Research their behavior and how living in a group helps them survive. Present your findings with a poster, infographic, presentation, or research paper.

- ☐ Create a model food web out of craft supplies.

- ☐ Demonstrate how animal adaptations aid in their survival by completing one of the following:
    - Build a model or illustration of an organism and identify, label and explain key internal and external adaptations that help it survive in its environment.
    - Research different animals with camouflage patterns, then select one and build a diorama or illustrate a picture of your chosen animal in its environment. Demonstrate how its camouflage pattern helps it survive in its environment.

- ☐ Explore what fossils can teach us about life on Earth by choosing and completing one of the following:
    - Look at pictures of different types of fossils, categorize them based on their characteristics (plant fossils, marine fossils, terrestrial fossils, etc.), and draw conclusions about the types of environments they might have lived in.
    - Create a visual timeline of periods in Earth's history and use it to illustrate when different fossilized organisms lived.

- ☐ Pick at least 10 local plants, animals, and/or insects (or select an environment and pick 10 organisms that live there) and create a local field guide, including pictures, descriptions, behaviors, and fun facts.

- ☐ Identify a current or future threat to an environment (climate change, pollution, deforestation, etc.) and design a conservation plan to help the plants and animals that live there.

DATE COMPLETED: _____

SOUND, LIGHT, AND WAVES

Use these activities to reinforce learning concepts related to sound, light, and waves. Explore how waves move energy from place to place, how waves behave, and how waves are used in technology and communication. Check off each activity as you go, and when you've completed them all, record the date on your badge sheet.

- ☐ Observe and model how waves move by completing one of the following:
  - Create waves in a pan of water and observe what happens when you place objects of varying sizes, weights, and densities with different degrees of force in the water.
  - Make waves with a coiled spring toy by wiggling it at different speeds and compressing different numbers of coils, then observe how long it takes the wave to reach your partner.
  - Build a candy wave machine to explore how energy travels through waves, and experiment with amplitude and frequency to see how changes affect wave speed and motion. ☐

- ☐ Explore how light helps us see by completing two of the following:
  - Shine a flashlight on an object in front of a mirror to see how light reflects off the object and into your eyes, even when you're not looking at it directly. Then, draw a diagram to show how light travels and helps us see.
  - Explore how light travels through different materials by building a simple setup that makes water appear to glow using a flashlight, cup, and water. ☐
  - Use a flashlight to test how different materials reflect, absorb, or transmit light, and compare your observations to your predictions.

- ☐ Create a poster or diagram showing the electromagnetic spectrum. Include visible light, radio waves, microwaves, X-rays, etc.

- ☐ Create a visual timeline that shows how humans have used wave-based tech through history, from drums and smoke signals to telegraphs, radios, and fiber optics.

- ☐ Watch a video or simulation of seismic waves during an earthquake. Draw or describe how these waves move through Earth.

- ☐ Translate a message or series of words into Morse code. Then, share it with a partner and see if they can decode it. Have them do the same for you.

- ☐ Research different ways animals use sound to communicate, hunt, and avoid predators. Share what you learned by making a comic, diagram, infographic, or other visual.

DATE COMPLETED: _____

SCIENCE LITERACY

Use the following activities to think and talk about science like a real scientist. You'll build skills like asking questions, analyzing what you see and read, and talking with others about scientific concepts. Check off each activity as you go, and when you've completed them all, record the date on your badge sheet.

Complete at least 5 of the following:

- ☐ Keep a science journal while working on your badges to record your observations.
- ☐ Read at least 10 science-related books. Write or record a video review of at least two books.
- ☐ Make a list of at least 20 vocabulary words you learned while working on your badges.
- ☐ Watch a science documentary or video and write or draw about something you learned.
- ☐ Select a topic you learned about and design a poster or infographic about it.
- ☐ Interview a scientist (or watch one in a video) and write about why their job is important.
- ☐ Teach a science concept to someone else or make a short video of yourself explaining a science concept.
- ☐ Read and summarize a science article from a reputable source (e.g., National Geographic for Kids).
- ☐ Select a scientist and write a journal entry from their perspective.
- ☐ Write an article or blog post about how science has impacted you, your family, or your community.
- ☐ Select and research a popular science-related myth or misconception. Present your findings in a paper, blog post, presentation, infographic, or video.

DATE COMPLETED: _____

SCIENCE EXPLORATION

Use the following activities to connect science to the real world and see how science is used in everyday life. Check off each activity as you go, and when you've completed them all, record the date on your badge sheet.

Complete at least 3 of the following:

- ☐ Visit a science museum or natural history museum. Write or draw your favorite exhibit and explain what you learned.
- ☐ Visit a zoo, aquarium, or botanical garden. Observe an animal or plant and record 3 facts about it in your science journal.
- ☐ Visit a planetarium or stargazing event. Write or draw about something you learned about space.
- ☐ Attend or participate in a science fair. Take notes on 3 interesting projects or present your own project.
- ☐ Take a nature walk or go on a hike. Collect data or take pictures of interesting rocks, insects, plants, or animals and describe them.
- ☐ Do a virtual field trip to a science lab, museum, or NASA site. Reflect on something new you discovered.
- ☐ Interview a scientist, zookeeper, astronomer, or science educator about their work and share what you learned.
- ☐ Visit a farm or environmental center. Learn about ecosystems, food production, or conservation and write about it.
- ☐ Volunteer at or attend a science outreach event (e.g., STEM night, Earth Day festival, robotics competition).
- ☐ Design your own science field trip—research and visit a local place of scientific interest and explain why it's important.

DATE COMPLETED: _____

ARTS AND SCIENCE

Use the following activities to blend scientific thinking with creativity and explore the beauty of science through artwork. Check off each activity as you go, and when you've completed them all, record the date on your badge sheet.

Complete at least 5 of the following:

- ☐ Make a nature journal with sketches and notes.
- ☐ Make an art piece out of recycled materials.
- ☐ Research a scientist and create a piece of art inspired by their work.
- ☐ Create a collage, photo album, or photo essay using pictures related to one of the scientific concepts you've learned.
- ☐ Create a calligram related to a science topic.
- ☐ Make a piece of digital data art using data collected from one of your experiments/ projects.
- ☐ Create a wearable science project, such as a piece of jewelry or clothing, inspired by one of the scientific concept's you've learned.
- ☐ Write a poem, song, skit, or monologue related to one of the scientific concepts or science innovators you've learned about.
- ☐ Build a diorama of a science scene related to one of the concepts you've learned.
- ☐ Create a piece of process art using the scientific concepts you've learned so far. Examples may include:
  - Chemical reaction art
  - Spin Art
  - Magnet painting
  - Sun prints
  - Leaf prints
  - Soundwave art

- ☐ Write and illustrate a fiction story or record a short film about a science-related topic. Examples might include:
  - The moon, stars, or planets
  - A severe weather event
  - A plant or animal that is native to your area
  - An invention that could change the world

DATE COMPLETED: _____

EXCELLENCE IN SCIENCE
A MENSA® FOUNDATION PROGRAM

BADGE SHEET (GRADES 3-5)

Record the date you completed each badge, then sign below. Mail this page to the Mensa Foundation, along with your award order form. **This page is required to receive your award.**

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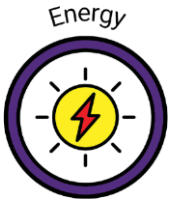

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By signing, we attest that _____ has completed all the activities required to earn each Excellence in Science badge and that this record is true.

_____ _____

Participant's signature Adult's signature

EXCELLENCE IN SCIENCE AWARD ORDER FORM

Thank you for participating in the Mensa Foundation's **Excellence in Science Award Program!** Participants who complete an entire badge workbook are eligible to receive a commemorative certificate and an Excellence in Science T-shirt. We're excited to celebrate your achievement and love of science!

To receive your awards, complete this form and mail it along with your signed badge sheet to the address below. **Both the badge sheet and order form are required to receive your certificate and T-shirt.** Please allow up to 6 weeks for processing and delivery.
Send your badge sheet and order form to:

Mensa Foundation
Excellence in Science
1315 Brookside Dr
Hurst, TX 76053.

(Completed lists must be mailed. We do not accept scans or faxes.)

Scientist's Name	Scientist's Age	Mensa Membership Number (if applicable)
House Address (City, State ZIP code)		
Email Address		Phone Number

Scientist's T-shirt Size

❑ Youth S ❑ Youth M ❑ Youth L ❑ Youth XL ❑ Adult S ❑ Adult M ❑ Adult L ❑ Adult XL

Parent/Teacher's Name	Mensa Membership Number (if applicable)

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