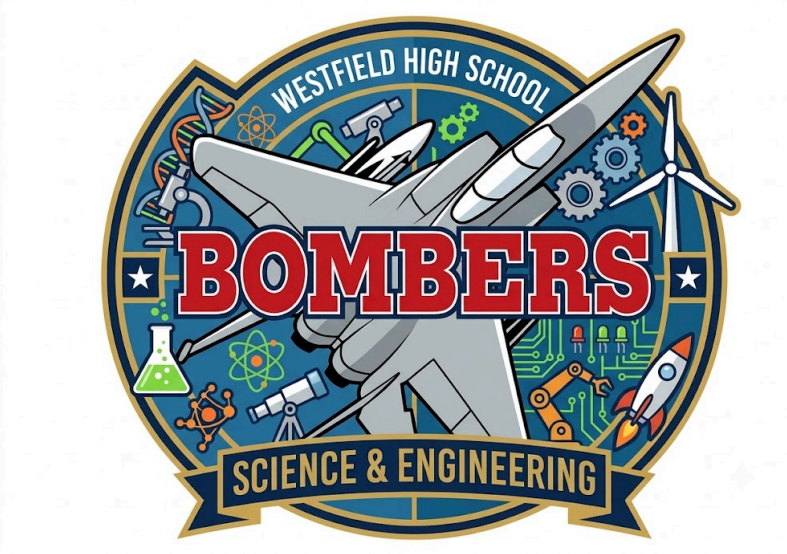
Science and Engineering Fair
Westfield High School
Summer Assignment 2026



Part 1

Read and understand the **WHS Science and Engineering Far Information Guide** (p.2-7), and be prepared for **a quiz on this material during the first week of school.** Students who have thoroughly read these policies and successfully taken this practice quiz (p.8-10) will be adequately prepared.

Part 2

Complete this assignment (p. 11-13) which will guide you through some initial research and brainstorming of project ideas. This is individual work, not partner work. The use of generative AI is prohibited for this assignment. **This is due on the first day of school, Monday, August 31st, 2026**.

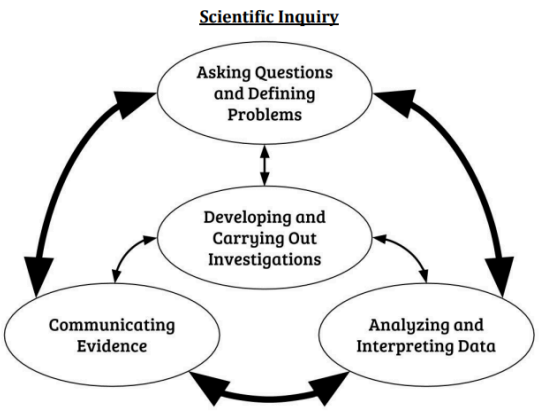
Westfield High School Science and Engineering Fair Information Guide

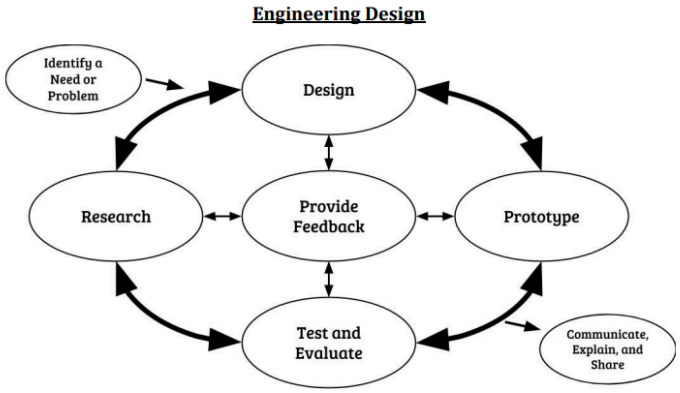
1. Why is participation in the Science & Engineering Fair beneficial?

Students designing and carrying out their own investigations is an approach to learning known as **true inquiry**, and it is the gold standard in science education. The Science & Engineering Fair is the most authentic true inquiry experience we offer to students in Westfield Public Schools.

The Fair gives students the chance to meaningfully engage in the **Science and Engineering Practices** as outlined in the Massachusetts Curriculum Frameworks. The practices are:

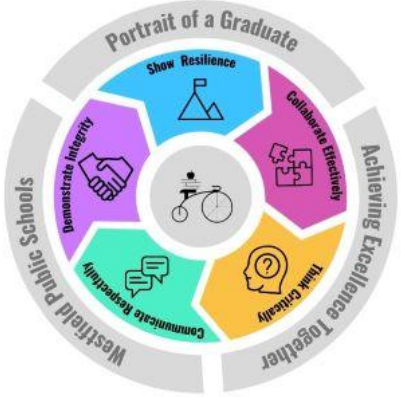
- Asking questions (for science) and defining problems (for engineering).
- Developing and using models.
- Planning and carrying out investigations.
- Analyzing and interpreting data.
- Using mathematics and computational thinking.
- Constructing explanations (for science) and designing solutions (for engineering).
- Engaging in argument from evidence.
- Obtaining, evaluating, and communicating information.





The Fair also allows all students to develop the competencies of Westfield Public Schools' **Portrait of a Graduate**:

- Show resilience
- Collaborate effectively
- Think critically
- Communicate respectfully
- Demonstrate integrity



Beyond these learning benefits, students who are successful in the fair may have the opportunity to progress to the Regional, State, or even International Science Fair, where they may make industry connections and earn accolades, prizes or scholarships.

Students are expected to understand and follow all guidelines described below, including embedded links. Your understanding of the following policies will be assessed via a quiz during the first week of school. Students who have thoroughly read these policies and successfully taken this practice quiz will be adequately prepared.

2. **Can I work with a partner?**

Students may work individually or with a partner on their final project. Specific partner policies — including whether partners must be in the same class — will be explained by teachers at the start of the school year. Students may not work with a partner on the summer assignment. Every student's summer work should be unique.

3. **Can I use AI?**

The WPS fair is aligned to the standards of the International Science and Engineering Fair (ISEF) and has adopted **ISEF's Guidelines for the Use of Generative AI** (p. 5-6). All WPS students are responsible for familiarizing themselves with these guidelines and following them. Failure to do so will result in academic consequences consistent with classroom teacher policies and the WHS Honor Code.

4. **What type of project can I do?**

Students will complete either a **science or engineering project** (p. 7). You are encouraged to explore a topic that is interesting to you and that has real world applications and relevance. Your project must be realistic given the materials and equipment at your disposal, and must be something you can complete safely.

Experimentation with bacteria or other potentially hazardous biological agents is generally allowed, but must be conducted at school with science teacher supervision.

Experimentation involving household chemicals or power tools is generally allowed, with proper safety protocols and adult supervision.

All projects must be approved by your teacher before experimentation can begin. In some cases, approval from the Massachusetts Statewide Scientific Review Committee will also be required.

5. **What type of project <u>can't</u> I do?**

Projects involving prescription drugs, alcohol, tobacco, firearms or explosives are generally prohibited.

Projects involving human subjects and vertebrate animals are prohibited, with very rare exceptions. This includes gathering <u>any</u> data from people, including giving them surveys. In rare cases where human or vertebrate animal research is allowed, neither humans nor animals may ever ingest any substance.

6. **What are some common mistakes I should try to avoid?**

Make sure you have a way to measure your data - you must be able to prove your results with numbers, not pictures.

If you choose to work with a partner, select that person wisely. Ensure that you will share the work equally, will have similar standards for the effort that you will put into your project, and will be able to get together outside of school.

Don't procrastinate. This is a large-scale project, and much of the learning happens from navigating unexpected problems as they arise. Give yourself time for this. Start experimentation as soon as you have your teacher's approval.

Use of generative AI to support a research project

Artificial Intelligence applications are evolving quickly and the Society for Science and the Regeneron ISEF Scientific Review Committee have created the table below to indicate our guidance on when it is acceptable to use generative AI in the development and execution of a research project and how to properly cite this usage. The table below is adapted from an AHA Ad Hoc Committee on AI in History Education.[1] This is a preliminary model; Affiliated fairs may adopt their own, more strict, policies.

Task	Could this be acceptable use?	Under what conditions?
Ask generative AI to identify or summarize key points in an article before you read it. Use this as a starting point for your literature review.	Yes	Acceptable without explicit citation
Ask AI to summarize a book or article in your field. Reproduce that summary in your literature review without reading the book or article	No	Never acceptable, as there has been no engagement with the book or source itself
Use an AI chatbot as a writing tool to help generate and develop ideas	Yes	Acceptable, may require explicit citation depending on circumstances. Maintain a logbook of your prompts as part of your research notebook.
Use generative AI to initially write the research plan, abstract, paper or poster.	No	Never acceptable. This must be the independent work of the student. Guidance or refinement after the initial document has been completed can be done with explicit citation and a log.
Ask generative AI to write an abstract or section of your research paper. Submit as your own work	No	Never acceptable
You write an abstract. Ask AI to sharpen the language but not modify, add to, or replace the main points	Yes	Acceptable use without explicit citation only if changes suggested by AI are limited to grammar and syntax

Use AI to write initial code for your project	Yes	Acceptable, only with explicit citation stating which portions of the code were AI generated and with a log of the prompts.
Ask generative AI to produce a flowchart, graphic, or image for a paper or presentation	Yes	Image should be clearly marked as AI-generated and with explicit citation as to how the image was created.
Write your research paper. Ask AI to add additional points to your research paper	No	Never acceptable.
Use AI to produce your conclusions, future steps, etc.	No	Never acceptable
Use AI to help identify appropriate statistical tests or software tools. (Interpretation of data must be done by the student researcher).	Yes	Acceptable, requires a log of your prompts as part of your research notebook.
Use AI to collect data and write research plan. Use AI to provide citations that back up your claims	No	Never acceptable
Ask generative AI to produce a starter bibliography	No	Never acceptable.
Ask generative AI to fix the structure or formatting of your bibliography	Yes	Acceptable without explicit citation. You must review and verify all citations as valid.

[1]Adapted from: Guiding Principles for Artificial Intelligence in History Education
Approved by AHA Council, July 29, 2025

Science Project vs. Engineering Project

	Science Project	Engineering Project
Goal	Understand how or why something happens in the natural world.	Solve a problem by designing or improving a product, process, or system.
Starts with	A question.	A problem or need.
Process	The Scientific Method.	The Engineering Design Process.
Planning	Forms a hypothesis that can be tested.	Develops design criteria and constraints for a successful solution.
Procedure	Conducts experiments to collect data.	Builds and tests a prototype, model, or solution.
Focuses on	Discovering new knowledge or relationships.	Creating, improving, or optimizing something.
Results show	Whether the hypothesis was supported.	How well the solution met the design goals.
Example	How does soil type affect water retention?	How can I design a garden system that conserves water while supporting plant growth?

Ask yourself	Am I trying to answer a question? **→ Science Project**	Am I trying to solve a problem? **→ Engineering Project**

Both Types of Projects

- Require background research.
- Require data collection and analysis.
- Require a project notebook or record of your work.
- Require clear communication of results.
- Often involve creativity, perseverance, and multiple revisions.

Google. (2026). *Gemini* (June 15 version) [Large language model]. https://gemini.google.com/

Science Fair Summer Assignment Practice Quiz (Google Form Version)
Total points
10/10
Please take this quiz as many times as you wish. Your responses will not be recorded.

1. According to the guidelines, when are students allowed to work with a partner?

On both the summer assignment and the final project
Only on the summer assignment
Partners are not allowed at any point during the school year
Only on the final project

2. What will happen if a student does not follow the ISEF guidelines regarding generative AI?

They will be required to change their project topic.
They will have to complete their project individually without a partner.
They will face academic consequences aligned with the WHS Honor Code.
They will be disqualified from the science fair automatically without review.

3. Where must experimentation involving bacteria or other potentially hazardous biological agents take place?

At school with science teacher supervision
At home with parental supervision
In a certified state laboratory outside of school
Anywhere, as long as proper protective gear is worn

4. Which of the following projects is generally prohibited under the guidelines?

A project testing household cleaning chemicals
A project involving prescription drugs
A project using school power tools
A project measuring water retention in soils

5. If a project involving human subjects is granted a rare exception, what is strictly forbidden?

The human subjects cannot be asked to fill out surveys.
The student must work entirely without a teacher's approval.
The human subjects may never ingest any substance.
The project cannot use numbers to measure data.

6. What type of project starts with a 'problem or need' and uses a process to design or improve a product?

A Science Project
A Biological Project
A Theoretical Project
An Engineering Project

7. What type of project starts with a 'question' and focuses on discovering new knowledge about the natural world?

A Science Project
An Engineering Project
A Prototype Project
A Physics Project

8. What is a key difference between the results of a Science Project versus an Engineering Project?

Science project results require data collection, while engineering results do not.
Science results show if a hypothesis was supported, while engineering results show how well a solution met design goals.
Science results must be proven with numbers, while engineering results are proven with pictures.
Science results do not require a project notebook, but engineering results do.

9. Which of the following is an example of an Engineering Project?

How does soil type affect water retention?
How much water does an average household use in a week?
How can I design a garden system that conserves water while supporting plant growth?
Which chemical compound dissolves quickest in water?

10. Which of the following is required for BOTH Science Projects and Engineering Projects?

Testing a hypothesis
A project notebook or record of your work
Building and testing a prototype
Developing design criteria and constraints

Science Fair Summer Assignment Practice Quiz
Answer Key

1. According to the guidelines, when are students allowed to work with a partner?
Only on the final project

2. What will happen if a student does not follow the ISEF guidelines regarding generative AI?
They will face academic consequences aligned with the WHS Honor Code.

3. Where must experimentation involving bacteria or other potentially hazardous biological agents take place?
At school with science teacher supervision

4. Which of the following projects is generally prohibited under the guidelines?
A project involving prescription drugs

5. If a project involving human subjects is granted a rare exception, what is strictly forbidden?
The human subjects may never ingest any substance.

6. What type of project starts with a 'problem or need' and uses a process to design or improve a product?
An Engineering Project

7. What type of project starts with a 'question' and focuses on discovering new knowledge about the natural world?
A Science Project

8. What is a key difference between the results of a Science Project versus an Engineering Project?
Science results show if a hypothesis was supported, while engineering results show how well a solution met design goals.

9. Which of the following is an example of an Engineering Project?
How can I design a garden system that conserves water while supporting plant growth?

10. Which of the following is required for BOTH Science Projects and Engineering Projects?
A project notebook or record of your work

Click here to make your own copy of this assignment

Westfield High School Science and Engineering Fair
Summer Assignment 2026

Science and Engineering Project
Initial Research & Brainstorming

Your name:

This is individual work, not partner work. The use of generative AI is prohibited for this assignment.

Research

Visit Science News Explores or Google Scholar and conduct a search related to a topic that interests you. You may read any article you choose, but remember that some areas of research are restricted, so you may not be able to explore them further through experimentation. Select an article to read, then fill in the template below.

Article title, author, and date of publication	
Link to article	
What did you learn from the article? List at least two things.	
What questions do you have after reading this article? List at least two.	

Idea Generation

You will brainstorm an idea for a science project **AND** an engineering project (refer to p. 7). The two ideas do not have to be related to each other. It's ok if your ideas are simplistic, what is most important is that they are your own.

Science Project		
Question Should be specific and testable (able to be	*Example:* *Do colored lights enhance*	

answered by doing an experiment)	*the growth of seedlings?*	
Hypothesis Write your hypothesis using this format **If** [Independent Variable] is [describe the change you are making], **then** [Dependent Variable] will [predict the direction of the change/result], **because** [give your scientific reason or background knowledge].	*If radish seedlings are placed under red light versus blue light, the seedlings under the blue light will grow taller, because plants can use blue light for photosynthesis more easily than red light.*	
How specifically will you measure your dependent variable? Describe the tools, method, and units of measurement.	*I will use a ruler to measure the height of the seedlings in centimeters.*	
What makes this a science project, as opposed to an engineering project?		

Engineering Project		
Problem or need Should be specific and something that you can realistically explore using a model or a prototype	*Example:* *Seedlings grown on windowsills often die because they get too cold at night.*	
Solution, criteria and constraints Describe your solution. List two things your solution should be able to achieve, and one limitation that it must not violate	*I will make a container that insulates the seedlings. It must keep the plants 5 degrees warmer overnight and allow sunlight to pass through. It must cost less than $10 to build, using readily available household materials.*	
How specifically will you		

measure the success of your solution? Describe the tools, method, and units of measurement.	*I will use two thermometers that continuously record the temperature of the air around the seedlings in degrees Celsius. I will compare the temperature from the container to the temperature of seedlings not in a container.*	
What makes this an engineering project, as opposed to a science project?		