Warwick Valley Middle School
STEM Fair

Tuesday February 25, 2025 6:00-7:30PM

Snow date: March 4, 2025 6:00-7:30PM

2024-2025 Handbook

Warwick Valley Middle School STEM Fair

INTRODUCTION

The Warwick Valley Middle School STEM Fair is a school-sponsored activity that supplements the regular curriculum of classroom instruction. The purpose of the STEM Fair is to encourage students' interest in the sciences, to develop their inquiry and investigation skills, and to enhance children's pride in completing research projects.

STEM fairs:

- Enable students to exhibit their projects and share ideas with other students and community members;
- Provide opportunities for students to receive feedback from scientists, teachers, and peers.
- Provide students with exciting opportunities to work with science process skills and the scientific method on a topic of their own choosing that relates to the science curriculum in their grade (5-8) as it connects to real life.

What is a STEM Project?

A STEM fair project is a unique way for students to pose questions for which they must seek out answers and to satisfy their own curiosity about the world around them. A STEM fair project is an experiment, a research effort, a collection of scientific items, or display of scientific apparatus presented for viewing. It represents the efforts of a student's investigation into some area of interest and provides a way for the student to share the results of those investigations. Through the development of a science fair project, students gain a first-hand appreciation of the work of scientists and the value of their discoveries.

PRIZES

The top 1-3 investigations and the top 1-3 inventions will all get prizes. The top 4-5 investigations and inventions will get honorable mention ribbons. All winners and honorable mentions will be asked to display their projects at the district wide STEAM Fair on May 20th.

All entrants will earn certificates and prize bags for particpating.

Warwick Valley Middle School STEM Fair
RULES AND GUIDELINES

1. Individual projects or partners with parental permission slip signed by parent/guardian.
2. Only two types of projects may be entered; they are a scientific investigation or an invention.
3. Projects must fit in one of the 11 science fair project category criteria listed in this handbook.
4. **No mold growth, or bacteria projects are allowed.**
5. **No use of vertebrate animals is allowed except for human observational projects.**
6. **No use of prescription drugs, harmful, or illegal substances are allowed.** Grocery items (i.e., baking soda, vinegar, salt, lemon juice, etc.) are appropriate.
7. No Human subjects used to test (i.e., taste test, poking, pain reaction, sniffing, etc.)
8. Any projects that promote violence, weapons, or instill fear to the public, the exhibitor, or other exhibitors and the use of fire are PROHIBITED.
9. Project display boards must follow safety guidelines listed in this handbook.
10. Projects must be approved by the classroom teacher.

Project Selection and Approval

All project ideas must be submitted to the classroom teacher on a Project Proposal form. The proposal should contain a topic and problem statement for the project. Projects must follow the WVMS STEM fair rules and guidelines outlined in this handbook. Projects will be approved by the classroom teacher or the school's STEM Fair Committee. Projects without prior approval, projects inconsistent with the prior approved proposal, or projects that have been substantially changed from what was previously approved will only be displayed at the teacher's discretion and cannot be submitted to the school STEM fair competition.

YOUR Finished project does not come to school until the night of the STEM Fair.

Warwick Valley Middle School

STEM FAIR CATEGORIES

	**Physical Science:** Projects that study the nature and properties of nonliving matter, energy and/or force and motion.
	**Behavioral Science:** Projects that observe the behavior of invertebrate animals. The use of vertebrate animals is not allowed except for human observational projects.
	**Botany:** Projects that use subjects such as plants (mosses, seed plants), agriculture, conservation, and forestry. NO LIVE PLANTS may be displayed. Experiments using mold or fungi are NOT allowed.
	**Chemistry:** Projects that examine chemical reactions, the chemistry of living things, photosynthesis, solubility, heat capacity, etc. No prescription drugs, dangerous or illegal substances should be used in the experiments.
	**Earth and Space Science**: These are projects investigating principles of geology (for example, weathering and erosion), geography, astronomy, meteorology, and related fields.
	**Engineering:** Projects can develop technological devices, which are useful to the global society within an engineering-related field, such as electricity, mechanical, chemical, aeronautical, and geological.
	**Environmental Science:** Projects that deal with global change, issues related to Earth, such as water, air, climate, waste and pollution, green living, human health, ecosystems and related fields.
	**Medicine and Health**: The project's emphasis will be on human health. (STUDIES ARE LIMITED TO OBSERVATIONAL PROJECTS ONLY.)
	**Zoology:** Projects that observe and record the growth or behavior of animals (INVERTEBRATES). VERTEBRATE STUDIES ARE LIMITED TO OBSERVATIONAL PROJECTS ONLY.
	**Mathematics:** Projects are developed that demonstrate any theory or principle of mathematics.
	**Inventions:** projects that use design and engineering processes to find a practical solution to a problem that addresses a need that exists for people in general or a person with a specific handicap.

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TYPES OF PROJECTS

1. **SCIENTIFIC INVESTIGATION:** In this type of experimental project, you ask a question, construct a hypothesis, test your hypothesis using an experiment and draw conclusions from your experiment. It involves using the scientific method. It must follow an experimental design.
    A. **Experiment:** In this kind of investigation, your purpose is to change something (test or independent/manipulated variable) and record the outcome of this change (outcome or dependent/responding variable). EXAMPLE: Which material, aluminum foil or plastic wrap, will insulate cold water better?
    B. **Experiment with a Control Group:** This kind of investigation involves a more complex investigation that is designed to test the effects of a single condition or factor on a system. For example, you might have a group of plants as an experimental group and another group of the same type of plants as a control group. The test or independent variable in this experiment is the amount of chemical fertilizer added only to the experimental plant group. No fertilizer would be added to the control group. Both the control group and the experimental group would have the same constants (the normal conditions) such as amount of water and sunlight. The outcome or dependent variable is the difference observed in the growth of the plants.
2. **INVENTION:** In this type of project, you design and engineer a practical solution to a real problem. It is something that no one has ever thought of before. It cannot be purchased in a store or found in a book. Sometimes an invention is an improvement to an object that was already invented. You can think of a need that exists for people in general or a person with a specific handicap. Then think about a device that could make a difficult task easier or think of an inconvenience that could be made easier with a simple device.

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Scientific Investigation Project Guidelines

THE SCIENTIFIC METHOD:

1. Asking a question.
2. Forming a hypothesis.
3. Designing an experiment.
    a. Identifying variables
    b. Developing procedures
    c. Gathering materials and equipment
4. Collecting data.
5. Analyzing the data.
6. Forming a conclusion.

Step 1 – Choose a Topic and Problem Statement

Begin by exploring a scientific concept in which you are interested. This can be something that was read about or was introduced in the classroom. Go to the library or internet to learn more about your topic. Write a brief summary of the background information you gather for your science fair topic. Keep a record of where the background information came from. This information will be listed in your bibliography in Step 12.

- At this point, your brain will start asking "What if...." questions. One of these questions is what you will use to design your experiment. It is called the "TESTABLE QUESTION". This will become your problem statement. Make sure that this has been approved by your teacher.
- Anything to do with your project should be recorded in your lab notebook.

Step 2 – Form a Hypothesis

Once you have a testable question, you have some decisions to make that should be recorded in your notebook.

- How do you design the experiment to answer your question?
- What measurements do you need to take to record your results?
- Think about what might happen in your experiment. This is called a HYPOTHESIS. Write down what you think will happen BEFORE actually doing the experiment.
- Be specific.
- Written in If_____, then_____.

Warwick Valley Middle School STEM Fair

Step 3 – Experimental Design

The experimental design is a plan to test your hypothesis. This is not a specific item on your display board; but it is determined by what your hypothesis is, the variables (test or independent, outcome or dependent, and control) and the materials that you need and the procedures that you will carry out.

Step 4 – Materials/Equipment

Now that you have planned your experiment, gather all the materials you will need to do the experiment. As you begin the experiment, make detailed observations of what is happening. Take your measurements carefully. Keep written notes about what you do and how you do it. Display a list of materials used in column form with metric units identified. Make sure materials are available.

Step 5 – Procedure

Write a detailed description of how to do your experiment. As you work through it, you may find that you have to change it. Make notes and change your procedure afterwards, to show the changes. Remember, any scientist should be able to take your procedure and repeat your experiment following your instructions.

- It is easier to use a numbered list, like in a cookbook rather than write a paragraph.
- Start each sentence with an action verb: mix, stir, get, measure, etc.
- Include quantities or amounts that you will measure using metric units.

Step 6 – Variables and Control Group

- Identify the **test variable** (independent/manipulated). This is the variable that you are changing on purpose in your experiment to observe what will happen. For example, the temperature of the water or the battery strength.
- Identify the **outcome variable** (dependent/responding variable), this is the one that reacts or changes in response to the test or independent/manipulated variable, i.e., amount of salt that dissolves or number of paper clips held by a magnet.
- Identify the **constant variables** in your experiment. These are the variables in your experiment that you do not change so that you can compare the effects from only one test (independent/manipulated) **variable**. Constant variables are quantities that a scientist wants to remain the same or be held constant. Most experiments have more than one constant variable. Some people refer to controlled variables as "constant variables."
- Use a **control group** if applicable in your experiment. A control group is the group that does not receive the experimental variable. Both it and the experimental group have what is usually considered normal conditions, i.e., room temperature, normal amount of water,

normal amount of sunlight (constants). A control group helps you to be sure that what YOU DO in your experiment is affecting the test results.

Step 7 – Experiment

- Design a data table to keep track of your results.
- Carry out your experiment following your written procedures.
- Observe and record the results in a data table using metric units i.e., centimeters (cm); grams (g); or degrees Celsius (˚C).
- If qualitative observations are made, a numbered scale must be developed to quantify the observations.
- Use photographs whenever possible to record observations. **(NO FACES IN PHOTOS)**. These can be shown on the display board.

Then, **REPEAT THE EXPERIMENT** at least two more times. Record your results as carefully as you did the first time. ALL scientists repeat their experiments; we **INSIST** you repeat yours as well. All experiments must have a minimum of three trials.

Step 8 – Results

- When you have all of your results, you need to design the way that you will report the data.
- Many students use graphs, charts and written summaries of what happened in the experiment.
- Determine averages or the mean when appropriate.
- Use photographs whenever possible to show changes (**NO FACES IN PHOTOS**).
- Display all your data in charts, graphs, and/or pictures even if it does not match what you thought was going to happen under the heading Data on your display board.
- Explain your results in words and display this narrative under the heading Results on the display board.

Step 9 – Compare your results with your Hypothesis

Look again at your HYPOTHESIS and at the results of your experiment. Think about what happened and why it happened that way. Determine if your hypothesis was supported or not supported. You will use your observations to help you write your Conclusion in the next step.

Warwick Valley Middle School STEM Fair

Step 10 – Draw Conclusions

Answer the following questions to summarize what you have learned from the experiment.

- What was the purpose of the investigation?
- Was your hypothesis supported by the data? (Indicate evidence and reasoning that supports your conclusion. This is called Conclusion Evidence Reasoning (CER).
- What were the major findings? What are possible reasons for the results?

Step 11 – Applications

Answer the following questions to complete the Application.

- How can you use the findings from this investigation in your day-to-day life? How can the investigation be improved?
- What new question(s) has your experiment lead you to ask that could be tested in a new

It's important to cite your sources for a science fair project. Put your bibliography of at least 3 different sources on the same page. Here are some examples of how to cite books, online references, and conversations.

1. Here is an example for a book or magazine -- Jones, Jenny R., "Science Experiments to Try" Science Time, New York: Sterling Pub. Co., May 2004, Vol. 3:12-15. 2.
2. Here is an example for a Web site -- Helmenstine, Anne, About Chemistry Website, http://chemistry.about.com, Oct. 4, 2005. 3.
3. Here is an example for a conversation -- Smith, John, Telephone Conversation, Mar.5, 2013.

Warwick Valley Middle School STEM Fair

Investigation Project EXHIBIT and SAFETY DISPLAY GUIDELINES

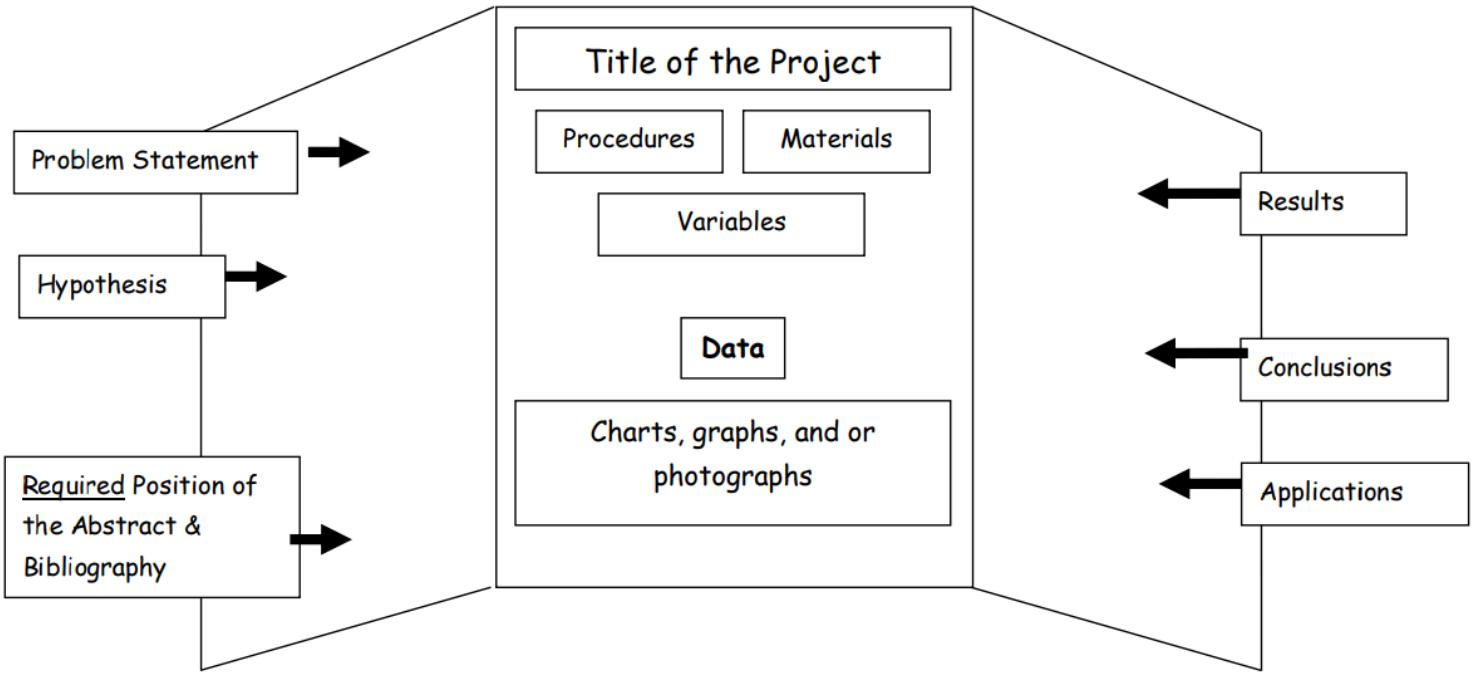
1. Keep the exhibit neat, uncluttered and to the point.
2. All posters, charts, etc. must be attached to the science fair board.
3. No part of an exhibit may be attached to walls or tables.
4. The science fair board must be self-supporting (FREE STANDING).
5. Be sure to make everything sturdy so it can be safely transported. Fasten everything well.
6. The science fair board displays your project. Use attractive lettering.
7. Use one-color printing to avoid confusion.
8. Spell correctly. Your name, science teacher, and period should go on the back of the board.
9. Main points should be large and simple. Details must be clear and legible from three feet away.
10. The bibliography must be placed on the board's lower left-hand corner (as you face the board).

Safety Display Guidelines

1. Anything which could be hazardous to the public, the exhibitor, or other exhibitors are PROHIBITED. Nothing sharp or pointed.
2. Organisms: **No invertebrate organisms** live or dead or plants may be displayed, **(Reminder: No vertebrates, fungi, mold, bacteria were allowed to be part of the experiment.)**
3. No chemicals of any kind may be displayed. (**No** prescription drugs, dangerous and illegal substances were allowed as part of the experiment.) For example:
    - No acids, dilute or strong (i.e., vinegar, lemon juice)
    - No bases, dilute or strong (i.e., baking soda)
    - No salt solutions
4. No flammable substances may be displayed.

*An **alternative solution** to displaying any of the above items that were allowed as part of the project is to take photographs of the substances that were used or use a digital camera and create large pictures with a computer printer for display on your board. No identifiable humans or their parts may be displayed in photos. All projects will be inspected for adherence to STEM Fair Safety Guidelines by the classroom teacher or the school STEM Fair Committee. Failure to follow these guidelines will be grounds for exclusion from the school STEM Fair. In addition, it will also affect the final project grade.*

Warwick Valley Middle School STEM Fair



Investigation Project Board Set-up in Spanish

Problem Statement

(Problema o Pregunta)
Esta es la pregunta que el estudiante va a investigar. Incluye lo que el estudiante va a hacer y como van a medir los resultados.

Title (Titulo)

El titulo refleja el tópico de el experimento. Debe ser simple e interesante.

Results (Resultados)
Esta sección describe que pasó al final del experimento. Los resultados deben resumir y reflejar los datos y observaciones que se vieron en el experimento (cantidades y calidades)

Hypothesis (Hipótesis)

Esto es lo que el estudiante piensa que es la solución del Problema o la Pregunta. Es una conjetura educada basada en conocimientos previo o investigaciones. Tambien explica lo que el estudiante va hacer y lo que esperan observar como resultado. Se usan las palabras "**If**" y "**Then**". "Si hago esto...**entonces** pasa esto."

Materials

(Materiales)

Esta sección es una lista numerada que incica todos los materiales y los instrumentos que el estudiate va a usar. La lista incluye tipos y cantidades de los materiales que se van a usar. La lista es detallada y especifica.

Procedures

(Procedimiento)

Esta seccion es una lista de los pasos que hay que seguir para el experimento. Los pasos son numerados y bien detallados. Haga una lista de las cantidades especificas, tiempos de espera, etc. y todos los detalles de lo que hay que hacer. El experimento se repite un mínimo de 3 veces

Conclusion

(Conclusiones)

En esta sección, el estudiante tiene que referirse a la hipótesis de nuevo y explicar si la hipótesis tiene validez o no basado en los resultados del experimento. Tambien debe contener un análisis de las razones por las cuales el experimento resulto o no resultó como se esperaba

Abstract (Resumen)

Esta sección es un párrafo que describe:

1. El propósito del experimento
2. Los pasos que se usaron para resolver el Problema o la Pregunta
3. Los resultados y la conclusión de el experimento

Variables (Variables)

Variables : Un evento, condicion o factor que se cambia o controla para estudiar uno hipótesis.

Dependiente: La variable que se observa y que es causada por la variable independiente

Independiente : La variable que se ~~cambia~~ escoje para el experimento

Constantes: Todas las otras variables que affectan el experimento, por lo que tienen que mantenerse iguales todo el tiempo.

Application (Aplicacion)

Esta sección es un párrafo o reporte que describe como la información aprendida del experimento puede ser aplicada a situaciones reales sea en la industria o en la vida cotidiana en forma generalizada.

Bibliography (Bibliografia)

Listas en orden alfabético de todos los libros, revistas, videos, enciclopedias, documentales, paginas del Internet, etc. Estudiantes tienen que usar un formato bibliográfico correcto

Data (Datos)

Esta es la información que se acumuló durante el experimento:

* Notas de observaciones
*Tablas y Gráficas
*Fotografias
*Dibujos hechos por el estudiante
*Reporte

Toda la información acumulada y relevante se muestra en ésta sección. Esta es el área mas prominente de el experimento.

Acknowledgements

(Reconocimientos)
En esta sección, el estudiante agradece y da crédito a todas las personas o u organizaciones que ayudaron con el experimento. Debe ser especifico indicando como cada entidad ayudó.

Warwick Valley Middle School Science Fair

RUBRIC FOR JUDGING INVESTIGATION PROJECTS

Directions: Enter the score for each category in the last column.

Project # _____ **Judge #_____**

1. Problem Statement To what degree is the problem statement new and/or different for a student at this grade level and how well is it written?	0 = No Problem Statement 1 = Attempted, but not a problem statement. 2 = Incomplete Problem Statement 3 = Poorly written or not in a question form 4 = Complete well- written Problem Statement in question form	
2. Hypothesis To what degree is this a testable prediction?	0 = No hypothesis 1 = Attempted, but not a hypothesis. 2 = Statement is not in an "If ____ then_____" format, and is not testable. 3 = Hypothesis is well written in an "If ____ then_____" statement. The statement is missing one of the following: detailed, well-written, testable. 4 = Hypothesis is well written in an "If ____ then_____" statement. The statement is detailed, well-written, and testable.	
3. Procedures - Numbered step by step - Sentences begin with verbs - Quantities to measure are listed in metric units	0 = No overall procedural plan to confirm hypothesis 1 = Partial procedural plan to confirm hypothesis 2 = Sufficient procedural plan to confirm hypothesis 3 = Well-written plan, numbered step by step, sentences beginning with verbs 4 = Well-written as above and detailed including repeatability and specified measurements in metric units of materials used in experiment	
4. How well are all variables recognized? -Test (independent/manipulated) -Outcome (dependent/responding) -Control (if applicable) -Constants	0 = No variables or constants are recognized 1 = Some variables or some constants are recognized 2 = All variables are recognized, but not all constants and controls (if applicable) or vice versa 3 = All variables & constants and controls (if applicable) are recognized 4 = All variables & constants and controls (if applicable) are clearly and appropriately recognized by listing specific examples	
5. Materials and Equipment Were the items: - listed in column form - equipment specifically named - metric units are used	0 = No materials identified or used 1 = Materials not specifically identified and/or used properly 2 = Materials specifically identified but used improperly 3 = Materials specifically identified in column form and used properly 4 = Materials specifically identified in column form & metric units used properly	
6. Results To what degree have the results been interpreted?	0 = No written narrative interpretation of data 1 = Partial written narrative interpretation of data 2 = Correct written narrative interpretation of data 3 = Comprehensive narrative interpretation of data including averaging after completing your three trials 4 = Comprehensive and significant interpretation of data above expectations	
7. Conclusion To what degree are the conclusions recognized and	0 = No problem statement or interpretation of data support for hypothesis identified 1 = Incomplete problem statement or interpretation of data support for	

Warwick Valley Middle School Science Fair

interpreted? Including: - the purpose of the investigation - hypothesis supported/not supported - the major findings	hypothesis 2 = Correct/complete conclusion/interpretation of data support for hypothesis written in minimum 1 sentence. 3 = Well-written conclusion/interpretation of data support for hypothesis 4 = Well-written conclusion/interpretation of data support for hypothesis with major findings and possible explanations for them written using a minimum of 3 sentences /paragraph.	
8. Application To what degree are the applications recognized and interpreted? Including: -Improvements to the investigation - Use of the findings - New question(s) to be investigated	0 = No recommendations, applications, or new question recognized 1 = Incomplete or vague recommendations, applications, or new question recognized 2 = Apparent recommendations, applications, or new question recognized 3 = Recommendations, applications, and new question clearly recognized 4 = Significant well-written recommendations, applications, and new question recognized	
9. Display Attributes - free standing -correct grammar/ spelling clear and legible - attractive visual display	0 = Unsatisfactory quality of display - five or more attributes are missing 1 = Poor quality of display - three or four attributes are missing 2 = Average quality- two attribute missing with minor errors and of fair quality 3 = Good quality – twelve to thirteen attributes present and/or with few if any minor grammatical/spelling errors 4= Superior display – all thirteen attributes present and of exemplary quality	
10. Oral Presentation or Interview -How clear, well prepared and organized is the presentation? -How complete is the student's understanding of the experimental work?	0 = Poor presentation/No Presentation; cannot answer questions 1 = Poor presentation; partially answers questions 2 = Fair presentation; adequately answers most questions 3 = Good presentation; precisely answers most questions 4 = Exemplary presentation and knowledge; precisely answers all questions	
11. Abstract & Bibliography To what degree does the abstract and bibliography describe the project and support the research?	0 = No Abstract/No documentation of research 1 = Poorly written and no research. 2 = Poorly written and less than 3 sources cited. 3 = Well-written but does not describe all components of the project 4 = Well-written and meets full requirements including - purpose, hypothesis, conclusion & application, 3 sources are cited.	
	TOTAL POINTS	

Warwick Valley Middle School STEM Fair
INVENTIONS
Invention Project Guidelines

1. Inventions must fit into the following definition:
    - An invention can be anything that solves a real problem. It is something that no one has ever thought of before. It cannot be purchased in a store or found in a book.
    - Sometimes an invention is an improvement to an object that was already invented. An invention must serve a purpose.
2. Inventors are encouraged to use recycled materials.

The Invention Process

How do you use creative problem solving to go from problem to invention idea?

Creative problem solving is a process for finding workable solutions to problems. However, finding the right problem to solve is often the most difficult part of the process.

Getting Ideas

It can be said that need is the mother of invention. Your idea for an invention will come from something that you or someone you know needs. There are several ways to find ideas for inventions. One way is to ask if there is anything they may need.

Another method is called brainstorming. You can brainstorm alone or with others. Here is an example of how brainstorming works. Name an object such as a lunchbox. Take ten minutes to list everything you can that is wrong with lunchboxes. Next, find a way to correct some of the problems. Your ideas for solving the problems can be a big step toward inventing a new or improved product. Keep in mind that your invention does not have to be a product. Instead, it can be a new process for doing something. For example, it may be a better way of memorizing a list of objects or a new card game. Brainstorm a list of possible solutions and record this information. Review the list and eliminate all of the solutions that are impossible and those that already exist. Reasons for eliminating a solution include lack of knowledge, insufficient technical ability, and lack of necessary materials.

Warwick Valley Middle School STEM Fair

Find a Problem
Focus on problems that you may have noticed during your daily life, i.e., opening a can of dog food, reaching the top shelf in your closet, having a place to sit as you wait in line.

Consider the Situation
What do you already know? Focus on originality. If an inventor has an idea, it is important to know what already exists so that the inventor does not waste time "reinventing the wheel." Call around to stores and do research in catalogs to find out if the invention already exists. Your parents may have to help you call stores because they will be taken more seriously. Be sure to record all this information in your notebook log.

Research and Planning
Before an invention can be successful, you must make a plan. Your plan should include all the steps you can think of, from beginning to end. When writing your plan, ask yourself questions such as these.

- What can I read about that will help me with my invention?
- Who can I talk to about solving problems and planning properly?
- What materials will I need?
- How can I control the cost of my invention?
- What steps should I follow?
- How much time should I allow for each step?
- How can I test my invention?
- Do not be surprised if you need to change your plans along the way. Sometimes a plan will not work as well as you first thought it would. So, keep an open mind for change. You may even discover a better way of completing a certain step.

Developing and Testing
Now the work begins. Follow your plan step-by-step. If you have difficulty with a certain part of your invention, find an expert to ask questions. Try different things until you overcome the difficulty. Most of all, do not give up! As Henry Ford, one of the inventors of the automobile, once said, "Failure is only an opportunity to start again more intelligently."

If your invention is a new way to do something, describe your process in a written report. Give all the important details of your process. To show that your idea works, you should test it. The results of your test should be written into your report.

Warwick Valley Middle School STEM Fair

Naming the Invention

Develop a name for your product using the following guidelines:

- Do not make your brand name too similar to others.
- Do not make your brand name too descriptive. You want your name to be a unique eyecatcher.
- Be creative. Brand names that use rhyming or alliteration will grab people's attention. For example, Kit-Kat® or Cap'n Crunch®.
- Remember when you are brainstorming to go for a bunch of ideas.

Invention Display Guidelines

1. Each invention must be accompanied by a self-standing display board.
2. The Board needs to include the following information:
    - The title of the invention
    - A description of the problem the invention solves
    - A description of how the invention works
3. Each inventor must submit a log or report, which includes the following information:
    - A written statement of the purpose of the invention and the problem it solves.
    - A list of materials used.
    - A list of all the steps taken to complete the invention
    - A description of the problems encountered and include drawings or photographs of attempts that failed
    - A written statement proving originality, in addition to parent verification, students should also describe what they did to ensure that their invention does not already exist
4. Table display space is limited to the area in front of your display board. A working model should represent inventions that are too large for the display.

Please note that failure to follow these invention project guidelines will be grounds for exclusion from the WVMS STEM Fair. In addition, it will also affect the final project grade.

Warwick Valley Middle School STEM Fair

Project or Investigation Bibliography Form

- **Student's Name:** _____
- **Project/Invention Title:** _____

Bibliography

Bibliography SAMPLE

- **Student's Name:** Raquel Rodriguez
- **Invention Title:** Ear Mutts

Bibliography

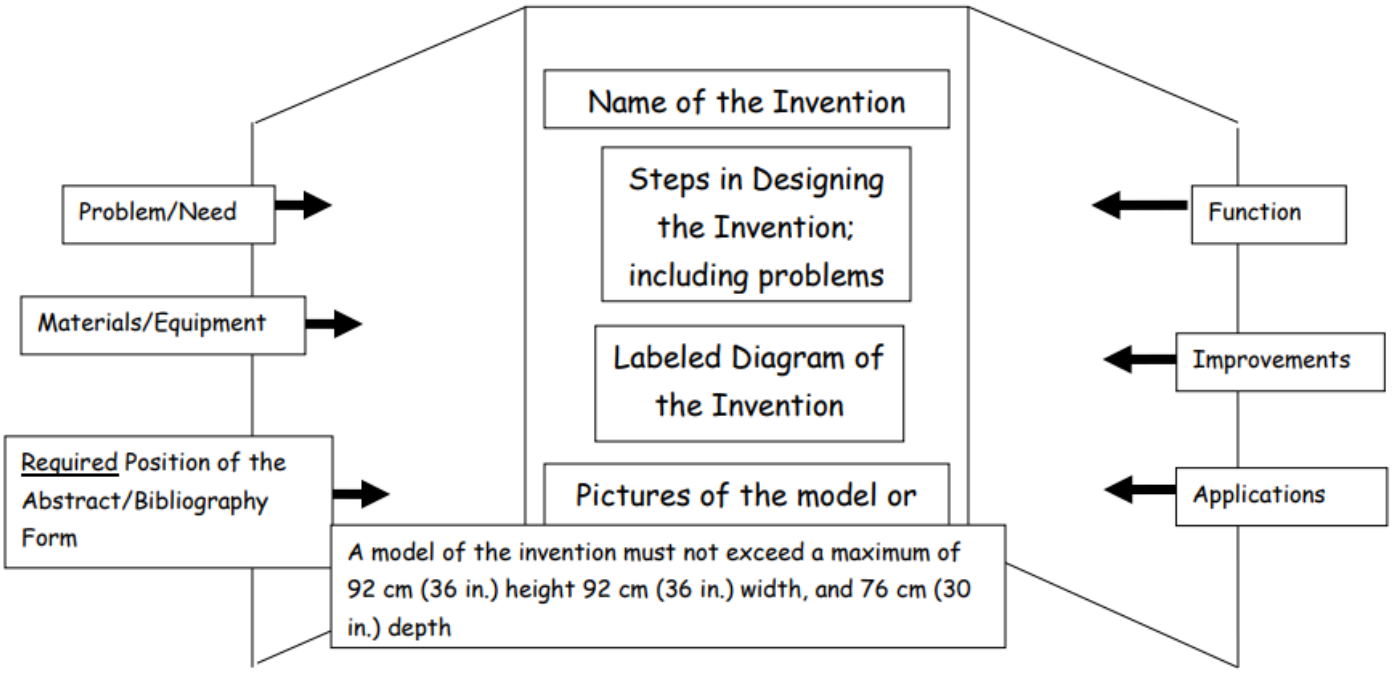
http://bestfriends.com/members/health/canineears1.htm.

Krull, Kathleen, The Boy Who Invented TV. McGraw-Hill Reading Wonders Literature Anthology, McGraw-Hill Education, 2014 pp. 86-89

"Students of Invention", Science & Children. Vol. 42 No. 1, Arlington: National Science Teachers Association, September 2004, pp. 38-41

Warwick Valley Middle School STEM Fair

Board Setup for an Invention



The Inventor's Log, a step-by-step progression of what was done by the "inventor" to make the invention, must accompany the invention. A report of background information, and/or a literature search may be submitted with the Inventor's Log.

Warwick Valley Middle School STEM Fair

RUBRIC FOR JUDGING INVENTION PROJECTS

Directions: Enter the score for each category in the last column.

Project # _____ Judge #_____

1. Problem Does the invention identify a problem and address a problem or a need?	0 = No problem to solve or no need for the invention 1 = Poor invention or little need for it 2 = Unoriginal invention, questionable need 3 = Shows insight and address a problem or need 4 = Original, unique project/invention, that addresses or solves a real problem	
2. Experimental Design Does the design/model of the invention have the functionality and practicality to address or solve the problem?	0 = No design or model to address or solve the problem 1 = Poor quality design, not functional nor practical 2 = Average quality design, functional but not practical 3 = Sufficient quality, functional, practical design 4 = Exemplary quality, very functional, practical design	
3. Experimental Procedures How complete are sequential steps of the procedures?	0 = Steps in the design of the invention are not listed or are not clear 1 = Steps in the design of the invention are listed but are incomplete or vague 2 = Steps in the design of the invention are clear but hard to follow 3 = Steps in the design of the invention are clear and complete 4 = Steps in the design of the invention are clear, complete, and easy to follow	
4. Materials/Equipment How were the items utilized in appropriate and/or new ways?	0 = No materials/equipment identified/used 1= Materials not appropriately identified and/or used unsafely 2 = Materials appropriately identified and used safely 3 = Materials carefully and used above expectations 4 = Materials carefully identified, used above expectations, and costs kept down	
5. Scientific Process How well has this experimenter done research and provided evidence to show that no similar project/invention exists?	0 = No documentation of research 1 = One source of documentation of research from resources 2 = Two sources of documentation of research 3 = Carefully documented, but limited research with three or less resources 4 = Carefully documented with extensive research from four or more resources	
6. Data Presentation Are there labeled diagrams or data tables, which represent the project/invention?	0 = No labeled diagram(s) or data tables 1 = Partially labeled diagrams or data tables 2 = Unclear or messy labeled diagram(s) or data tables 3 = Sufficiently labeled diagram(s) or data tables 4 = Exemplarily labeled diagram(s)(diagrams are in color) or data tables	
7. Data Analysis What problems were encountered in the development of the project/invention? What additions could be made to this project/invention to	0 = No improvements/additions to the invention were attempted 1 = Limited improvements/additions to the invention were attempted 2 = Some improvements/additions to the invention were attempted 3 = Very good improvements/additions to the invention were made during its development 4 = Excellent improvements/additions to the invention were made during its development	

Warwick Valley Middle School STEM Fair

make it better?		
8. Outcomes Can the function of the invention be easily identified? How well does the project/invention meet the need for which it was created?	0 = The function of the invention is not easily identified and it does not meet the need 1 = The function of the invention can be identified, but the need is not met 2 = The function of the invention can be identified and the need is partially met 3 = The function of the invention is identified and the need is met 4 = The function of the invention is exemplary and the need is completely met	
9. Project/Invention Design/Construction How well is this invention designed and constructed?	0 = Poorly designed and constructed 1 = Poorly designed or poorly constructed 2 = Adequate design and constructed 3 = Good design and constructed 4 = Well designed and constructed, shows attention to detail	
10. Visual Display How well is the invention displayed, constructed, and organized? Are spelling and sentence structure correct?	0 = Unsatisfactory quality of display - more than five attributes are missing 1 = Poor quality of display - three to four attributes are missing 2 = Average quality- two attributes are missing with minor errors and of fair quality 3 = Good quality – all attributes present and with few if any minor errors 4= Superior display – all attributes present and of exemplary quality	
11. Oral Presentation or Interview How clear, well prepared and organized is the presentation? -How complete is the student's understanding of the invention?	0 = Poor display or No presentation 1 = One of the following attributes is done poorly: display; construction; grammar 2 = Fair display/construction/grammar 3 = Good display/construction/grammar 4 = Exemplary display/construction/grammar	
	TOTAL POINTS	

Warwick Valley Middle School STEM Fair

STEM Project Proposal Form

Student Name _____

Problem Statement (The question I plan to investigate in my experiment.)

STEM Fair Project Question Checklist	
1. Is the topic interesting enough to read about and work on for the next few weeks?	Yes / No
2. Can you find at least 3 sources of written information on the subject?	Yes / No
3. Can you design a "fair test" to answer your question (problem statement)? In other words can you change only one variable (test/manipulated/independent) at a time, and control other factors that might influence your experiment, so that they do not interfere?	Yes / No
4. Can you measure the outcome/dependent/responding variable, which are the changes in response to the independent/responding variable using a number that represents a quantity such as a count, length, width, weight, percentage, time, etc.?	Yes / No
5. Did you read the STEM fair rules and guidelines? Is your experiment safe to perform?	Yes / No
6. Will you be able to obtain all the materials and equipment you need for your STEM fair project quickly and at a very low cost?	Yes / No
7. Do you have enough time to do your experiment and repeat it at least 2 more times before the school STEM fair?	Yes / No

I have discussed the project problem statement and the checklist with my parent(s) and I am willing to commit to following through on this project.

_____

Student Signature **Date**

I have discussed the project idea and the checklist with my child, and I believe he or she can follow through with this project.

_____

Parent Name & Signature **Date**

I have reviewed this proposal, and accept it into the STEM Fair.

_____

Teacher Name & Signature **Date**