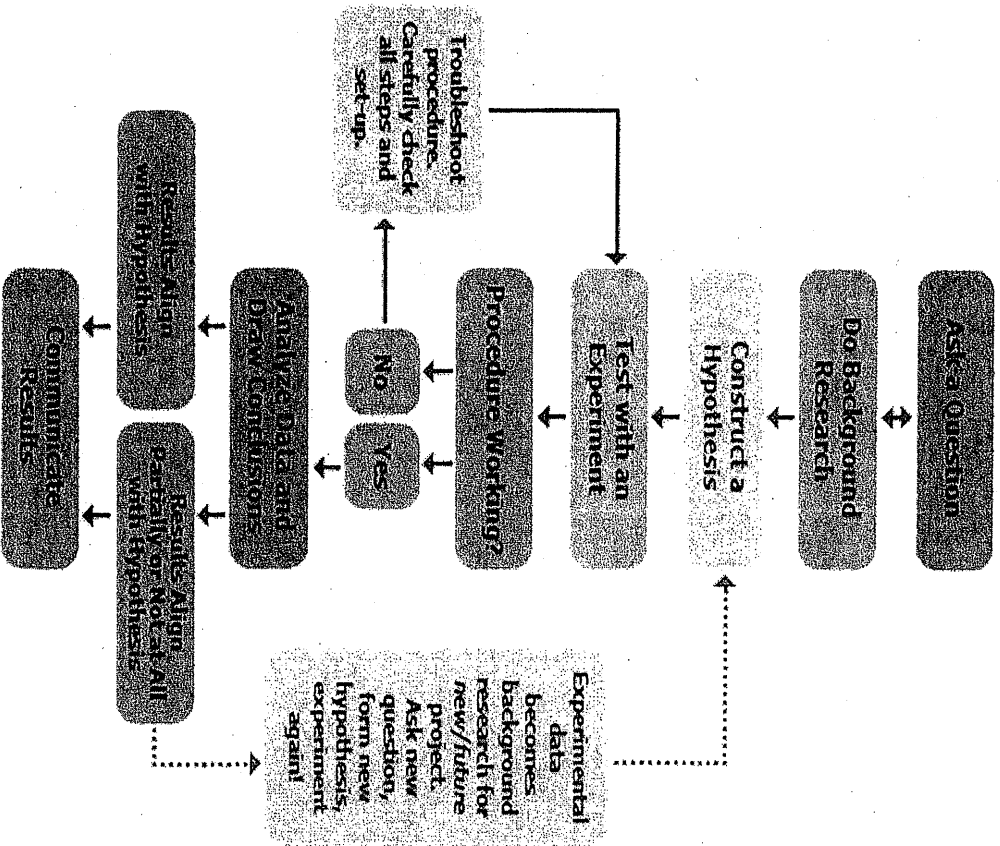
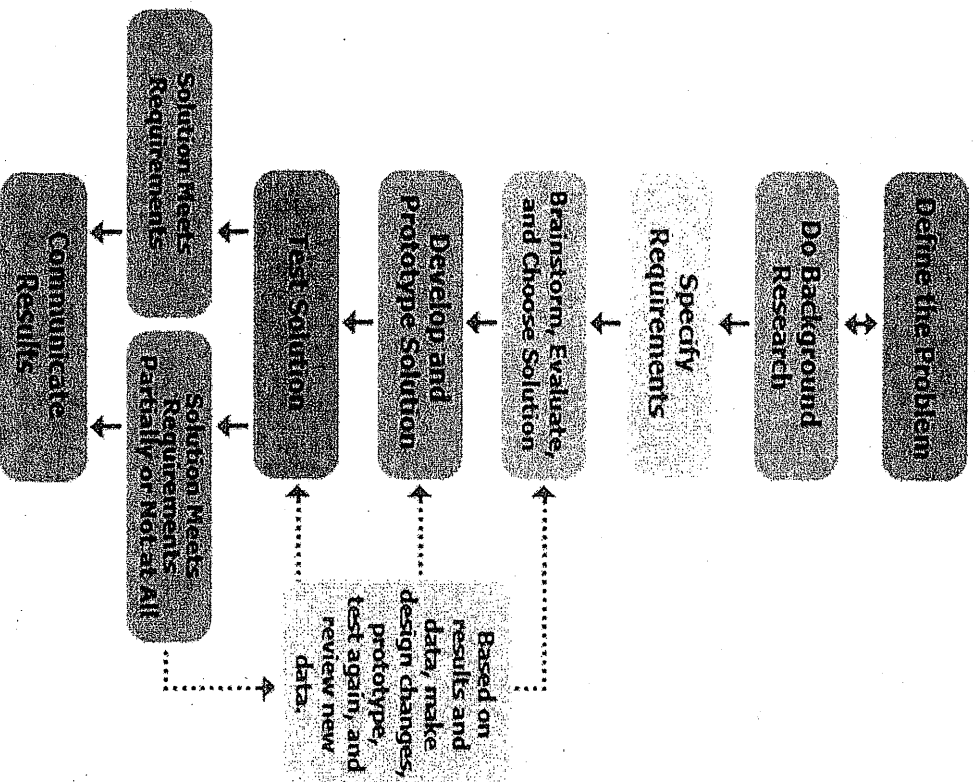


Memorial Middle School 2016-2017 Science and Engineering Fair

Scientific Method



Engineering Method





Project Categories & Subcategories

Each GSEF project is entered in one of the twenty categories below. You may optionally also select a subcategory (listed in *italics*). Your school, local, or regional fair may use different categories. Please check with those fairs for the appropriate category listings at that level of competition. If you are not sure which category to choose, ask yourself which group of judges would be most qualified to understand your research. **Every category listed below also has a subcategory option of "Other".**

ANIMAL SCIENCES

Animal Behavior
Cellular Studies
Development
Ecology
Genetics
Nutrition & Growth
Physiology
Systematics & Evolution

BEHAVIORAL & SOCIAL SCIENCES

Clinical & Developmental Psychology
Cognitive Psychology
Physiological Psychology
Sociology & Social Psychology

BIOCHEMISTRY

Analytical Biochemistry
General Biochemistry
Medicinal Biochemistry
Structural Biochemistry

BIOMEDICAL & HEALTH SCIENCES

Cell, Organ, & Systems Physiology
Genetics & Molecular Biology of Disease
Immunology
Nutrition & Natural Products
Pathophysiology

CELLULAR & MOLECULAR BIOLOGY

Cell Physiology
Cellular Immunology
Genetics
Molecular Biology
Neurobiology

CHEMISTRY

Analytical Chemistry
Computational Chemistry
Environmental Chemistry
Inorganic Chemistry
Materials Chemistry
Organic Chemistry
Physical Chemistry

COMPUTATIONAL BIOLOGY & BIOINFORMATICS

Computational Biomodeling
Computational Epidemiology
Computational Neuroscience
Computational Pharmacology
Genomics

EARTH & ENVIRONMENTAL SCIENCES

Atmospheric Science
Climate Science
Environmental Effects on Ecosystems
Geosciences
Water Science

EMBEDDED SYSTEMS

Circuits
Internet of Things
Microcontrollers
Networking & Data Communications
Optics
Sensors
Signal Processing

ENERGY: CHEMICAL

Alternative Fuels
Computational Energy Science
Fossil Fuel Energy
Fuel Cells & Battery Development
Microbial Fuel Cells
Solar Materials

ENERGY: PHYSICAL

Hydro Power
Nuclear Power
Solar
Sustainable Design
Thermal Power
Wind

ENGINEERING MECHANICS

Aerospace & Aeronautical Engineering
Civil Engineering
Computational Mechanics
Control Theory
Ground Vehicle Systems
Industrial Engineering-Processing
Mechanical Engineering
Naval Systems

ENVIRONMENTAL ENGINEERING

Bioremediation
Land Reclamation
Pollution Control
Recycling & Waste Management
Water Resources Management

MATERIALS SCIENCE

Biomaterials
Ceramic & Glasses
Composite Materials
Computation & Theory
Electronic, Optical & Magnetic Materials

Nanomaterials
Polymers

MATHEMATICS

Algebra
Analysis
Combinatorics, Graph Theory, & Game Theory
Geometry & Topology
Number Theory
Probability & Statistics

MICROBIOLOGY

Antimicrobials & Antibiotics
Applied Microbiology
Bacteriology
Environmental Microbiology
Microbial Genetics
Virology

PHYSICS & ASTRONOMY

Atomic, Molecular, & Optical Physics
Astronomy & Cosmology
Biological Physics
Computational Physics & Astrophysics
Condensed Matter & Materials
Instrumentation
Magnetics, Electromagnetics & Plasmas
Mechanics
Nuclear & Particle Physics
Optics, Lasers, Masers
Quantum Computation
Theoretical Physics

PLANT SCIENCES

Agriculture & Agronomy
Ecology
Genetics & Breeding
Growth & Development
Pathology
Plant Physiology
Systematics & Evolution

ROBOTICS & INTELLIGENT MACHINES

Biomechanics
Cognitive Systems
Control Theory
Machine Learning
Robot Kinematics

SYSTEMS SOFTWARE

Algorithms
Cybersecurity
Databases
Human/Machine Interface
Languages & Operating Systems
Mobile Apps
Online Learning

2016-2017 Memorial Middle School Science & Engineering Fair

Modified/ Updated Schedule

Week 1 September 5th- 10th	www.sciencebuddies.org sciencemag.org	Decide if you are going to conduct an experimental project or an engineering project. Choose your topic or identify your problem. Use your log book.	Decide if you are going to conduct an experimental project or an engineering project. Choose your topic or identify your problem. Use your log book.
Week 2 September 12th -17th		Conduct some research Record your findings in your log book	Conduct some research Record your findings in your log book
Week 3 September 19th-24th	See your Science, STEM, or Research teacher for support or questions.	Conduct some additional research, and state your Hypothesis Record in your log book.	Conduct some additional research State the Problem and Hypothesis Record in your log book.
Week 4 September 26th- 1st	See your Science, STEM, or Research teacher for support or questions.	Generate a list of materials. Identify your variables, constants, and control. Record in your log book.	Generate a list of materials. Identify and explain your constraints.
Fall Break			
Week 5 October 10th -15th	See your Science, STEM, or Research teacher for support or questions.	Conduct more research Conduct your experiment or Engineer Design Process-materials list. Record in your log book.	Conduct more research Conduct your experiment or Engineer Design Process-materials list
Week 6 October 17th- 22st	See your Science, STEM, or Research teacher for support or questions.	Conduct more research Conduct your experiment Record in your log book.	Conduct more research Engineer Design Process- Start sketch of prototype.
Week 7 October 24th-28th	nces.ed.gov/nceskids/createAgraph tommitland.net/graphpaper	Collecting and Recording data in log books. Identify variables.	Continue to work on Prototype. Discuss measurement constraints.
Week 8 October/November 31st – 4th		Research paper in school. 1 st rough draft of paper due. Begin Display boards	Research paper in school. 1 st rough draft of paper due. Begin Display boards
Week 9 November 7th-11th	See your Science, STEM, or Research teacher for support or questions.	Research paper in school. Continue working on Display Board at home.	Research paper in school. Continue working on Display Board at home.

2016-2017 Memorial Middle School Science & Engineering Fair

Modified/ Updated Schedule

Week 10 November 14th-18th	See your Science, STEM, or Research teacher for support or questions.	Type up your hypothesis, purpose, procedures, and conclusion.	Refine your prototype if needed. Make sure you have your problem. Solutions, target audience, research, constraints, and prototype.
Week 11 November 21st – 25th		Optional: Continue to work as needed. (research, display board, and or EDP research and product)	Optional: Continue to work as needed. (research, display board, and or EDP research and product)
Week 12 November 28th – December 2nd	See your Science, STEM, or Research teacher for support or questions	Finalize display boards. Complete anything that you have not done so far.	Finalize display boards. Complete anything that you have not done so far .
Week 13 December 5th		Bring Projects to school. We may house some in the STEM lab until the fair December 8 th , 2016	Bring Projects to school. We may house some in the STEM lab until the fair December 8 th , 2016

Congratulations! Our local fair will be held December 8, 2016

In the cafeteria.

2016-2017 Memorial Middle School

Memorial Middle School Regional Science & Engineering Fair Project Evaluation Form

Adapted from Georgia Science & Engineering Fair Scoring Sheet

Teachers and students should consider these new judging criteria when planning 2015-16 science projects and school-level fairs. They are based on the new Intel ISEF and Georgia Science and Engineering Fair criteria. ISEF and GSEF now offer a second set of criteria that may be applied to projects in engineering, mathematics and computer science, where appropriate. Overall, the criteria changes include:

- Increased emphasis on the ability to discuss the project effectively during the oral interview.
- Increased emphasis on originality of project topics and on research plans that demonstrate creativity, imagination, discovery, and inventiveness.

Judging Categories	Maximum Points	Science Projects	Engineering Projects (may be applied to projects in mathematics and computer science)
Research Question or Problem	10	<ul style="list-style-type: none"> • clear and focused purpose • identifies a specific contribution to field of study • testable using scientific methods 	<ul style="list-style-type: none"> • description of a practical need or problem to be solved • definition of criteria for proposed solution • explanation of constraints
Design and Methodology	15	<ul style="list-style-type: none"> • well-designed plan and data collection methods • variables and controls defined, appropriate and complete 	<ul style="list-style-type: none"> • exploration of alternatives to answer need or problem • identification of a solution • development of a prototype/model
Execution of Project	20	<p>Data Collection, Analysis & Interpretation</p> <ul style="list-style-type: none"> • systematic data collection and analysis • reproducibility of results • appropriate application of mathematical and statistical methods • sufficient data 	<p>Construction & Testing</p> <ul style="list-style-type: none"> • prototype demonstrates intended design • prototype has been tested in multiple conditions/trials • prototype demonstrates engineering skill and completeness
Creativity	20	<ul style="list-style-type: none"> • project demonstrates significant creativity/originality/inventiveness in one or more of the above criteria 	
Poster	10	<ul style="list-style-type: none"> • logical organization of material • clarity of graphics and legends • supporting documentation is well selected and displayed 	
Presentation	25	<ul style="list-style-type: none"> • clear, concise, thoughtful responses to questions • understanding of basic science relevant to project • understanding of interpretation and limitations of results and conclusions • degree of independence in conducting project • recognition of potential impact in science, society and/or economics • quality of ideas for further research • for team projects, contributions to and understanding of project by all members 	
TOTAL	100		

08.24.15