

5th Annual Manatee Elementary STEM Competition 2019



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Elementary STEM Competition Committee Members

Ms. Patricia Zalo - Teacher at Manatee High School – zalop@manateeschools.net

Mr. Steven Craig - Teacher at Southeast High School – craigs@manateeschools.net

Schedule of STEM Competition Activities

August 6, 2018 – Materials sent to all principals and contacts

September – February – Projects supported in classrooms - Submit forms for district review PRIOR to experimentation for projects dealing with hazardous, human, mold or vertebrate to Patricia Zalo

February, 15, 2019 – Deadline to submit registration spreadsheet to Patricia Zalo. Also paper or scanned copies of approved forms for hazardous, human, mold, or vertebrate must also be sent.

After registration is completed passes for each student and teacher will be sent to the school contact organized by teacher.

March 1, 2019 – 3:00 to 6:00 PM - Deliver projects to South Florida Museum

March 1, 2019 – 6:30-9:00 PM – Project judging (students are NOT present during judging)

March 2, 2019 – 10:00 AM to 7:00 PM – Museum is open to all families with the pass

March 2, 2019 – 4:30 PM to 6:00 PM - Award Ceremonies (separated by grade level or type)

All projects must be removed from the museum after the awards ceremonies

Any materials left after 7 PM will be taken by Patricia Zalo to Manatee High School

Who can participate?

All elementary students in the Manatee School District. Teachers coordinate class projects in Kindergarten – Second Grade, Group projects with 2-5 students are completed by Third and Fourth grade students, and Fourth and Fifth grade students conduct individual projects.

Home Schooled or Virtual students are to submit their entries to the public school where the child would attend according to the Office of Student Assignment. The home school entry must contact the public school about their fair and then be judged along with all the other entries from the public school. If the project is equivalent to the winning entry from the public school the School contact would include the information in their registration for mark the entry with a contact number.

Elementary STEM Competition Guidelines

1. BEFORE EXPERIMENTATION: Students' research plans and testing procedures must be reviewed and approved by their teacher. A suggested form is found on page 7. Teachers, students and parents must work together to review and complete this form, so everyone has an understanding of the project and is aware of any potentially dangerous or unethical situations before the student begins any testing.
Any changes to the research plan must be reviewed again before conducting the revised experimentation.
2. Students are NOT ALLOWED to experiment with the following:
 - firearms, knives or other items that could be considered weapons.
 - fireworks or other explosives.
 - controlled substances including prescription drugs, alcoholic beverages, and tobacco.
 - bacteria.
3. The use of hazardous chemicals, devices, or activities; human participants, mold, and vertebrate animals REQUIRE review by the STEM Competition committee PRIOR to experimentation AND the direct supervision by a Designated Supervisor. Suggested forms are found on pages 7-11.
All animals MUST be treated humanely. Projects must NOT be designed to harm humans or animals, whether invertebrate or vertebrate.
4. A logbook, or notebook, should be used to keep all of the important information:
 - Question and Hypothesis
 - Independent (changed or manipulated) and Dependent Variables (measured or responding) in addition to those conditions that are held Constant
 - Data tables, charts, and observations
 - Students should repeat the experiment and/or have multiple samples.
5. Group and individual projects must be developed by the students with the help of teachers to make sure they are safe and can compete. After approval, parents and teachers should supervise as needed but the project and display board MUST be the work of the student(s).
6. Pictures should be taken throughout the process. The student(s) can be in the pictures but NOT other people without written permission.
7. After experimentation: Student(s) should produce graphs and state whether the data supports the hypothesis.
8. The Display Board should include the following items: (See page 3 for more information)
 - Problem – write as question
 - Hypothesis – predict results before experimentation
 - Materials – list all items/materials used
 - Procedure – steps followed to test predictions (pictures are helpful)
 - Results – what happens during the experiment (data tables, charts, and graphs)
 - Conclusion – compare results to the hypothesis
9. Each School can submit their BEST project in each of the 4 categories and 4 types: Class for K-2nd grades; Group in 3rd-4th grades; Individual in 4th grade; and Individual in 5th grade; for a total of 16 projects. If the Committee determines space is available in some categories and types, a second project may be accepted.

Guidelines for Approving Research Plans

It is the teacher's responsibility to help the student develop a research plan that would keep all involved safe and the student would be able to compete at both the school competition and the Manatee Elementary STEM Competition. The teacher **MUST** be knowledgeable of these guidelines and should ask questions of the School contact or STEM Competition committee.

Projects involving the following items require a ***Designated Supervisor and approval*** by the Manatee Elementary STEM Competition Committee **before** the student begins experimentation.

Hazardous Chemicals, Activities, or Devices: All of these require direct supervision by a Designated Supervisor, which may be a parent, familiar with the safety risks and precautions.

- ***Hazardous Chemicals:*** Many household chemicals are hazardous including 3% hydrogen peroxide, 70% isopropyl alcohol (rubbing alcohol), fingernail polish remover, dishwasher/laundry detergent, fertilizers, and others. A Materials Safety Data Sheet (MSDS) or Safety Data Sheet (SDS) should be read to insure that safe procedures are followed and the chemicals are disposed of properly or properly stored for later intended use.
- ***Hazardous Activities:*** The use of fire, electricity around liquids (water), riding in a boat, and others require safety precautions identified in the research plan and a Designated Supervisor.
- ***Hazardous Devices:*** ALL power tools, laser pointer, light sources (heat, halogen, UV), etc. require that safety manuals should be read. Parents or the Designated Supervisor can perform all procedures requiring the power tools to make sure the student is safe.

Human participants: Students should describe how they will contact the potential participants **AFTER** approval by the STEM Competition Committee.

- No names or other private information can be collected.
- Pictures can **NOT** be taken of the participants.
- ALL projects require an Informed Consent Form (see page 10) which includes signatures of the participants **and** their parent/guardian if the participant is 18 years old or under.
- **AFTER EXPERIMENTATION:** The teacher must help the student complete the Verification of Informed Consent Form (refer to page 11). Only the Verification of Informed Consent and a **copy** of one of the signed and dated Informed Consent Forms with the printed and signed names blacked out should be included with the forms submitted before the STEM Competition.

Mold: Students can grow mold for their project as long as the food items are placed in one sealed freezer-strength baggie and then inside another sealed-freezer strength baggie at the beginning of the experiment and **NEVER** opened. As soon as mold is seen the **SEALED** baggies **MUST** be thrown away.

Vertebrate animals: Experiments can **NOT** be conducted that put vertebrate animals at risk to stress or pain. The normal food and feeding schedule can **NOT** be changed. If a vertebrate animal gets sick or dies the student's family is responsible to take the animal to a veterinarian and pay for the visit.

Project Display Board Hints

The board and any additional items must fit within the following **MAXIMUM** dimensions:

- 3 feet wide when the board is open, 4 feet high, and 1 foot deep.
- Items used in the experiment may be displayed during judging but will be removed before the museum is open to the public due to safety concerns. Please see suggestion for the board design and restrictions below.

	Title	
Problem/Question	Data Tables/Charts	Analysis/Results
Hypothesis	Graphs	Conclusions
Materials	Photos	
Procedure		

*The following items may **NOT** be displayed or brought to the STEM Competition:*

- Living or dead organisms, including plants, shells, fossils, insects
- Human or animal food
- All chemicals including water, dry ice, etc
- Awards and/or acknowledgments (graphic or written)
- Photographs of vertebrate animals in other than natural conditions. Photographs of other people without a signed permission form from the individual. Human participants can NOT be pictured.
- Glass or glass objects
- All hazardous substances or devices
 - ✓ Sharp items
 - ✓ Flames or highly flammable materials
 - ✓ Batteries with open-top cells

Any apparatus or pictures considered unsafe or inappropriate by the STEM Competition Committee will be removed before judging. The committee's decision is final.

All materials brought to the competition will be removed by the committee after the judging process EXCEPT for the board. These items will be organized by school and available after the Awards Ceremonies.

Projects dealing with hazardous chemicals, activities, and devices; humans, mold, or vertebrate animals MUST submit the research plan and approval forms or they will NOT be judged or allowed to display.

Category Descriptions

Earth and Environmental Sciences

These projects should focus on biological or physical interactions with the natural surroundings. Projects may include studies of the ocean and atmosphere in addition to human interaction with the Earth and its resources.

Engineering

These projects test the efficiency of different devices or try to improve their function. It should be more than "Can I build...." but instead, "How can I improve..." Engineering goes beyond gadgetry. All prototypes should be tested for their intended purpose and then revised and retested.

Life Sciences

These projects deal with processes of living organisms: plants, mold, and animals (including humans). Processes may include growth, maintenance, breathing rate, pulse, learning, memory, vision, etc. Animals (including invertebrates) must be treated humanely. Additional forms and reviews are required for any project dealing with humans, mold, and vertebrate animals. These MUST be reviewed PRIOR to experimentation by the STEM Competition Committee and approved.

Physical Sciences

These projects involve chemistry, math, physics and space sciences which deal primarily with non-living materials. Topics may include properties of matter, physical and chemical changes, various forms of energy, forces, motion, etc.

The student should discuss the proper category with the teacher. The STEM Competition Committee is available to assist with this decision.

Duties of School Contacts

1. Communicate information from the district to teachers.
2. Provide guidance to all teachers involved with projects. Make sure that the forms of projects dealing with hazardous chemicals, activities, or devices; humans, mold and vertebrate animals are forwarded to the STEM committee for approval PRIOR to experimentation.
3. Review class project Research Plans
4. Plan and hold a school STEM competition
5. Submit the registration spreadsheet by February 16th to zalop@manateeschools.net
It is critical that the EXACT title on the board is typed on the spreadsheet.
Make sure that the forms of winning projects dealing with hazardous chemicals, activities, or devices; humans, mold and vertebrate animals are forwarded to the STEM committee. Otherwise these projects will NOT be judged.
6. Complete the School Report and send it to the STEM Committee.
7. Distribute the Museum passes to the teachers and students.
8. Make sure projects have Entry forms secured to the center back of the board and the provided labels are attached to all additional materials that will be brought to the STEM Competition.

Judging Criteria

I. Creative Ability

Does the project show creative ability and originality in:

- The question asked
- The approach to solving the problem
- The experimental design
- The analysis of data
- The use of equipment

Collections are not creative unless they are used to support an investigation and help to answer a question in an original way.

Engineering projects should have a goal or objectives and not the production of gadgets – the most efficient way to solve a problem, etc...

II. Scientific Thought

- Is the problem clearly stated?
- Is the problem limited so that it was possible to attack it?
- Was there a procedure for reaching the solution?
- Are the variables recognized and defined?
- Are there adequate data to support the conclusions?

III. Thoroughness

- Was the project carried to completion?
- Were there enough samples or repetitions
- How complete is the student's daily log?
- How much time was spent on the project?

IV. Clarity

- Does the display board explain its purpose, procedure, and conclusions clearly?
- Do the Data, Results, and Display tell the whole story?

V. Knowledge Gained

- What knowledge has the student gained as a result of doing this project?
- How would the student change the project if starting over?
- What would the student do differently?
- What were the most interesting and exciting things about the project?
- How can this project be applied to a "real life" situation (direct scientific application)?

****Important:** All Judges' decisions are final.

First Place, Second Place, Third Place and Honorable Mention Ribbons are awarded by the judges in each category and type. The number of awards will be determined by the number of entries and the quality of the projects. All students will receive certificates for their participation in the STEM Competition. Some Special Awards may also be presented by local organizations using their own criteria.

Elementary STEM Science Project Research Plan and Approval Form

This form is completed by ALL students conducting either a group or individual project.

Students, teachers and parents **MUST** work together to complete and review this form so everyone has a complete understanding of the intended project and is aware of any potentially dangerous or unethical situations *before* the student begins any testing. Any questions concerning this form or experiment should be referred to the STEM Competition Committee.

Student(s) Name(s): _____

School: _____

Grade: _____

Question:

Hypothesis:

Materials needed for the experiment:

Procedures you will follow: (List each step separately and give enough detail to ensure safety. Add additional pages if necessary)

- Teacher Approval.** I have reviewed this research plan and approve this project as written.
- This project involves humans, mold, vertebrate animals, or hazardous chemicals, devices or activities and will be sent to the district committee for approval before student experimentation.

Printed Teacher's Name

Signature

Date

Elementary Designated Supervisor Form and STEM Committee Pre-Approval Form

This form MUST be completed for projects involving humans, mold, vertebrate animals and hazardous chemicals, devices or activities which REQUIRE direct supervision. Submit this form with the completed Elementary STEM Research Plan and Approval Form to STEM committee member.

The Adult who will directly supervise the student during the experiment should assist the student with the completion of this form and **train the student in appropriate safety procedures.**

Identify all *chemicals*, *devices* or *activities* that can put the researcher, participants or vertebrate animals at risk:

Describe the *precautions* that must be taken to reduce the risk to the researcher, participants or vertebrate animals.

Describe the *methods to dispose* of any chemicals or organisms (mold). For vertebrates describe what will happen to the animals after experimentation.

I certify that I have been trained or are experienced in the techniques listed above and will **DIRECTLY** supervise the student when the student conducts the experiment.

Printed name of Designated Supervisor

Signature

Date

After reviewing the Research Plan and Designated Supervisor Form, this project dealing with
 Hazardous chemical, activities, or devices humans mold vertebrates
has been approved. Any changes to the approved plan should be resubmitted for review.

STEM Competition Committee

Signature

Date

Elementary STEM Competition Informed Consent Form

Student(s) Name(s): _____

Teacher Name: _____ School: _____

This form is required for any projects using human participants. The UNSIGNED form is submitted with the Research Plan BEFORE contacting potential participants

All potential participants for this student’s experiment MUST complete a copy of this Form BEFORE participating in the research. To protect the participant’s privacy NO names will be recorded or identifying information with the data and this form will NOT be attached to any data collected during the investigation.

This project has been reviewed and approved by the district as designated by the coordinator’s signature below.

STEM Competition Committee member Date

What will the participants do in the experiment?

How long will the procedure take for each participant?

What are the potential discomforts that participants may experience?

How will the participant benefit from participating in the experiment?

If you have any questions you can contact (teacher) at _____ @manateeschools.net or the district STEM Competition Committee member at zalop@manateeschools.net.

I/we have read and understand the information above and consent to participate in the procedure. I/we realize that we are free to withdraw consent at any time.

Participant’s printed name Participant’s signature Date

If the participant is 18 or under this form must ALSO be completed by the parent or guardian.

Parent’s/Guardian’s Printed name Signature Date

Elementary STEM Competition Verification of Informed Consent

This form confirms the number of human participants involved in the study conducted by

_____ during the 2018-2019 school year.

Student Name

(The teacher initials the first blanks below signifying verification of each statement or writes "NA" if the statement was not applicable to the student's project.)

_____ I verify that the identified student collected _____ appropriately completed Informed Consent Forms signed by both the minor and the parent dated from _____, 201_ to _____, 201__.

_____ I verify that the identified student collected _____ appropriately completed forms that were signed by the adult participants dated from _____ to _____, 201__.

_____ A **copy** of one of the completed Informed Consent Forms is attached with the printed and signed names redacted (blacked out). These two forms will remain with the Research Plan in the Project Notebook.

_____ The student understands that they must keep the original forms for a period of no less than 3 years in a secure location.

Teacher Name

Signature

Date

Student Researcher Name

Signature

Date

Parent Name

Signature

Date

Elementary STEM Competition Entry Form - secured to the back of the board

Student Name(s): _____

School: _____ **Teacher:** _____

Circle Category: Earth/Environmental Engineering Life Physical

Circle Type: Group (3rd – 4th) Individual 4th Individual 5th

By signing below you agree that:

- All work on this project, including experiment and production of the display board, was completed by the student(s) and NOT adults.
- Proper supervision was provided to ensure the safety of the student(s).
- Projects were pre-approved by teacher and if the experiment used humans, vertebrates, mold or hazardous chemicals, activities or devices the STEM Competition Committee had approved the project BEFORE experimentation.

Parent/Guardian Signature

Teacher Signature

Student(s) signature(s)

*****cut here*****

Elementary STEM Competition Class Entry Form - secured to the back of the board

Teacher's Name: _____

School: _____ **Grade:** _____ **# in Class:** _____

Circle Category: Earth/Environmental Engineering Life Physical

By signing below you agree that:

- All work on this project, including experiment and production of the display board, was completed by the students.
- Teacher provided supervision to ensure the safety of all students.
- Project was pre-approved by the school contact and if the experiment used humans, mold, vertebrates, or hazardous chemicals, activities or devices the STEM Competition Committee had approved the project BEFORE experimentation.

Teacher Signature