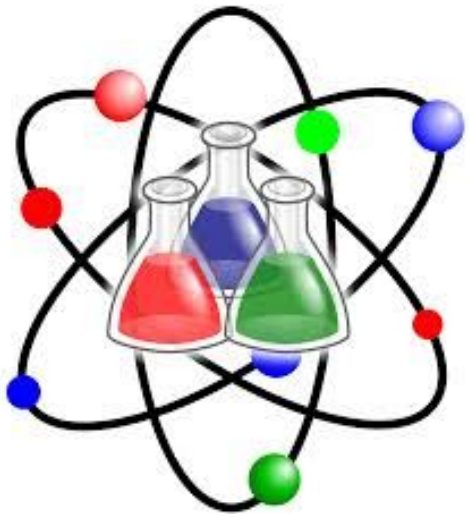
Sci-Con



Science Convention

The Colorado STEM Academy

January 11, 2019

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Dear parents and students,

At CSA, we know the importance of investigating science projects that are both interesting to the students and provide scientific research to the community. We are excited to announce our annual SciCon (Science Convention). At our SciCon, students will be able to participate in three different events: traditional science fair, science demonstration, and/or original invention. (All 5th and 8th graders must complete a traditional science fair project, but all students are welcome to also complete an invention or demonstration.)

The CSA SciCon will be held on January 11th. It will be an exciting event and, as a STEM school, it is an expectation that all students to participate in some capacity. Kindergarten, first, second and third grades will be completing a science demonstration with their class, but may also participate on their own in the science fair or invention categories if they choose.

The SciCon will be open to families and the community on January 11th from 2:30-3:15. Please bring your friends and family to view the science fair presentations, inventions, and demonstrations! It is sure to be a fantastic time!

Thanks in advance for your help in making this event a success! If you are available to help volunteer on the day of the SciCon or if you have any questions, please contact the SciCon coordinators below.

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SciCon Schedule

Monday, January 7th
SciCon projects are due. Students will be practicing their presentation skills and making final revisions during class.

Thursday, January 10th
3:15pm-4:00pm: The middle school gym will be open for middle school students to set up their projects.
All projects must be set up by 8:20 am on January 11th.

Friday,January 11th
8:00am-8:20am: The gym will be open for students to set up their projects.

8:30-12:30 Judging & Feedback

12:30-2:30 Classroom Tours

2:30-3:15pm SciCon Community Showcase-- COMMUNITY IS INVITED!!

3:15pm Clean up

Winners will be notified the following week.

What is a Science Project and How Should it be Done?

Participants: All 5th & 8th grade students **must** complete a science project individually. Students in grades K-4 and 6-7, may choose to complete a science fair project. Students must complete this project individually as they may advance to the district competition.

All students

1. **Choose a problem** to solve.
2. State your problem as a **specific question**.
3. **Research** your problem.
4. Form a **hypothesis** (If/then/because statement).
5. *****FILL OUT PROPOSAL FORM AND OBTAIN YOUR TEACHER'S SIGNATURE.*****
6. **Plan** your project.
7. Set up a time **schedule**.
8. Make a list of all the **materials** you will need.
9. **Collect** all the materials.
10. **Conduct** the experiment several times for reliability.
11. **Record** the data (chart/thinking map).
12. **Organize** the data in a more orderly form (graph).
13. **Draw conclusions** from the data.
14. **Analyze** how the data and conclusions have real world applications.
15. **Prepare reports**, graphs, photographs, drawings, and diagrams.
16. **Construct** an appealing and a eye-catching **science project display**.
17. **Practice** presenting your project for the day of judging.

What is Not a Science Project?

1. a display of an event or an occurrence i.e. an exploding volcano
2. a collection of related or unrelated objects
3. a list of things
4. a report not supported by data or an experiment
5. a model, illustration, or piece of equipment unrelated to an experiment

Science Fair Project Requirements

Consider using thinking maps for various parts of your project.

RULES:

1. PROJECT SHOULD NOT EXCEED THE FOLLOWING DIMENSIONS: Width: 3 ft (92 cm) Depth: 1.5 ft (45 cm) Height: 5 ft. (152 cm)
2. Make a sturdy display. Before the fair, test your display to make sure it stands alone. Display boards will be provided as part of the fee for the science fair. Students may also choose to present their projects using technology.
3. CSA cannot be responsible for the loss of any items. We advise that students not display items of value.
4. You must remove your project by the end of the day on January 11th, 2019. Any unclaimed projects will be recycled.
5. The following items are NOT allowed to be part of the display:
    a. Live animals or cultures of microorganisms/fungi (including molds)
    b. Other potentially hazardous biological agents
    c. Open flame, flammable liquids or gasses
    d. Poisons or poisonous plants
    e. Hazardous chemicals or radioactive materials
    f. Prescription medication
    g. Offensive audio/visual displays

6. Teacher/Science Fair Committee permission required for experiments involving animals.

How will the students be evaluated? See below for the judging rubric for Primary (K-2), Intermediate (3rd-5th grade) and for Middle School (6th-8th grade).

WPS Primary (K-2)Science Fair Scoring Rubric

Student Name: Project Title:

Directions: Score this project from a low score of zero (0) to a high score of four (4) for each category below:

TESTABLE QUESTION	*To what degree is the question new or different? Is it testable?*
_ 0	No testable question
_ 1	Incomplete testable question
_ 2	Complete testable question
_ 3	Complete, well-written testable question which reflects an original idea from the student
_ 4	Complete testable question which reflects an original idea from student. The project includes a title in addition to the testable question.

VISUAL DISPLAY	*How well is project constructed and organized? Clarity? Neatness?*
_ 0	Poor display /incomplete project
_ 1	One technique is used to present information
_ 2	One technique to present information, display is neat and easy to understand
_ 3	Multiple techniques to present information, display is neat and easy to understand and includes all parts of the scientific process
_ 4	A variety of techniques are used to present information, display is neat and easy to understand, includes all parts of the scientific process. Display is well done and clearly labeled.

HYPOTHESIS	*To what degree does the hypothesis match the testable question?*
_ 0	No hypothesis
_ 1	Incomplete hypothesis
_ 2	Hypothesis complete but does not match the testable question
_ 3	Hypothesis is complete and matches the testable question
_ 4	Hypothesis well-written, matches testable question and includes reasoning behind the hypothesis

CONCLUSION	*How well are the conclusions and/or products identified and interpreted?*
_ 0	No conclusions identified
_ 1	Incomplete conclusions identified
_ 2	Clear conclusion identified
_ 3	Clear conclusion and simple explanation of results
_ 4	Clear conclusion and extensive explanation of results

	PROCEDURE	*How well is a plan developed to test the hypothesis?*
_ _	0	Experimental procedures not listed
_ _	1	States what was done using basic terminology, no steps listed
_ _	2	Lists most steps of the scientific process followed with a simple explanation using basic terminology
_ _	3	Includes all steps in the procedure in step- by-step fashion using correct scientific terminology
_ _	4	Includes all steps in step-by-step fashion, in the correct order, using correct scientific terminology and acknowledges the reasoning behind the experimental design

	EXPLANATION	*Can the student clearly explain what was done, what happened and why?*
_ _	0	Unable to explain experiment
_ _	1	Partial or incomplete explanation of investigation or results.
_ _	2	Student can clearly explain parts of the investigation.
_ _	3	Student can clearly explain what was done, what happened and why.
_ _	4	Student can clearly explain what was done, what happened, why, and can generate new questions or propose additional investigations.

	DATA	*How well do graphs, tables, charts, logs, etc., present the data?*
_ _	0	No presentation of
_ _	1	data Data is
_	2	incomplete Data is complete but unclear or flawed
_ _	3	Data sufficiently and clearly presented
_	4	Data is presented in multiple ways, clearly explained, and include labels / captions.

_ _ COLUMN TOTAL (maximum 16)

_ COLUMN TOTAL (maximum 12)

TOTAL SCORE (maximum 28)

D50 Intermediate (3-5) Science Fair Scoring Rubric

Student Name: Project Title:

Directions: Score this project from a low score of zero (0) to a high score of four (4) for each category below:

TESTABLE QUESTION

To what degree is the question new or different? Is it testable?

_____	0	No testable question
_____	1	Incomplete testable question
_____	2	Complete testable question
_____	3	Complete, well-written testable question which reflects an original idea from the student
_____	4	Complete testable question which reflects an original idea from student. The project includes a title in addition to a well-written and original testable question.

VISUAL DISPLAY

How well is project constructed and organized? Clarity? Neatness?

_____	0	Poor display /incomplete project
_____	1	One technique is used to present information
_____	2	One technique to present information, display is neat and easy to understand
_____	3	Multiple techniques to present information, display is neat and easy to understand and includes all parts of the scientific process
_____	4	A variety of techniques are used to present information, display is neat and easy to understand and includes all parts of the scientific process. Display is very well done and clearly labeled.

HYPOTHESIS

To what degree does the hypothesis match the testable question?

_____	0	No hypothesis
_____	1	Incomplete hypothesis
_____	2	Hypothesis complete but does not match the testable question
_____	3	Hypothesis is complete and matches the testable question

VARIABLES / CONTROLS

How well are the variables identified and controlled?

_____	0	No variables or controls present
_____	1	Variables / control present but unclear
_____	2	Variables and control are present and clear
_____	3	Variables are present, clear, and identified
_____	4	Variables are present, clear, identified and carefully controlled and explanation is present.

PROCEDURE	*How well is a plan developed to test the hypothesis?*
_____ 0	Experimental procedures not listed
_____ 1	States what was done using basic terminology, no steps listed
_____ 2	Lists most steps of the scientific process followed with a simple explanation using basic terminology
_____ 3	Includes all steps in the procedure in step-by-step fashion using correct scientific terminology
_____ 4	Includes all steps in step-by-step fashion, in the correct order, using correct scientific terminology and acknowledges the reasoning behind the experimental design

EXPLANATION	*Can the student clearly explain what was done, what happened and why?*
_____ 0	Unable to explain experiment
_____ 1	Partial or incomplete explanation of investigation or results.
_____ 2	Student can clearly explain parts of the investigation.
_____ 3	Student can clearly explain what was done, what happened and why.
_____ 4	Student can clearly explain what was done, what happened, why, and can generate new questions or propose additional investigations.

DATA	*How well do graphs, tables, charts, logs, etc., present the data?*
_____ 0	No presentation of data
_____ 1	Data is incomplete
_____ 2	Data is complete but unclear or flawed
_____ 3	Data sufficiently and clearly presented
_____ 4	Data is presented in multiple ways, clearly explained, and include labels / captions.

CONCLUSION	*How well are the conclusions and/or products identified and interpreted?*
_____ 0	No conclusions identified
_____ 1	Incomplete conclusion identified
_____ 2	Clear conclusion identified
_____ 3	Clear conclusion and simple explanation of results
_____ 4	Clear conclusion and extensive explanation of results

____ COLUMN TOTAL (maximum 16)

____ COLUMN TOTAL (maximum 16)

D50 Middle School Science Fair Scoring Rubric

Student Name: **Project Title:**

Directions: Score this project from a low score of zero (0) to a high score of four (4) for each category below:

TESTABLE QUESTION	*To what degree is the question new or different? Is it testable?*
_____ 0	No testable question
_____ 1	Incomplete testable question
_____ 2	Complete testable question
_____ 3	Well-written testable question which reflects an original idea from the student
_____ 4	Complete testable question which reflects an original idea from student. The project also includes a clear and effective title.

VISUAL DISPLAY	*How well is project constructed and organized? Clarity? Neatness?*
_____ 0	Poor display /incomplete project
_____ 1	One technique is used to present information
_____ 2	One technique to present information, display is neat and easy to understand
_____ 3	Multiple techniques to present information, neat and easy to understand ,includes all parts of process
_____ 4	A variety of techniques are used, neat and easy to understand, includes all parts of the scientific process. Display is well done and clearly labeled.

HYPOTHESIS	*To what degree does the hypothesis match the testable question?*
_____ 0	No hypothesis
_____ 1	Incomplete hypothesis
_____ 2	Hypothesis is complete but does not match testable question
_____ 3	Hypothesis is complete and matches testable question
_____ 4	Hypothesis is well-written, matches testable question and includes reasoning

RESEARCH	*To what degree was the scientific literature researched and referenced?*
_____ 0	No scientific literature was researched or referenced
_____ 1	Partial or inaccurate research of scientific literature
_____ 2	Scientific literature was researched but not connected to student project
_____ 3	Scientific literature was researched, student connected research to project
_____ 4	Scientific literature was researched, connected to student project and clearly referenced and cited appropriately

PROJECT DESIGN	*How well is a plan developed to test the hypothesis?*
_____ 0	Experimental procedures not listed
_____ 1	States what was done using basic terminology, no steps listed
_____ 2	Lists steps of the scientific process using a simple explanation / basic terminology
_____ 3	Includes all steps in the procedure in sequence using correct terminology
_____ 4	Includes all steps in proper sequence, using correct terminology and acknowledges the reasoning behind the experimental design

EXPLANATION	*Can the student clearly explain what was done, what happened and why?*
_____ 0	Unable to explain experiment
_____ 1	Partial or incomplete explanation of investigation or results.
_____ 2	Student can clearly explain parts of the investigation.
_____ 3	Student can clearly explain what was done, what happened and why.
_____ 4	Student can clearly explain what was done, what happened, why, and can generate new questions or propose additional investigations.

DATA COLLECTION / AND DISPLAY	*To what degree are the method, number of trials and quantity of data appropriate?*
_____ 0	No presentation of data
_____ 1	Data is incomplete
_____ 2	Data is complete but unclear or flawed
_____ 3	Data sufficiently and clearly presented
_____ 4	Data is presented in multiple ways, clearly explained, and include labels / captions

CONCLUSION	*How well are the conclusions and/or products identified and interpreted?*
_____ 0	No conclusions identified
_____ 1	Incomplete conclusions identified
_____ 2	Clear conclusions identified
_____ 3	Clear conclusions and simple explanations of results
_____ 4	Clear conclusion and extensive explanation of results, reference to hypothesis

CONTROL/ VARIABLES	*How well are the variables identified and controlled?*
____ 0	No variables or controls present
_____ 1	Variables / control present but unclear
_____ 2	Variables and control are present and clear
_____ 3	Variables are present, clear, and identified
_____ 4	Variables are present, clear, identified and

_____ **COLUMN ONE TOTAL (maximum 20)**

_____ **COLUMN TWO TOTAL (maximum 16)**

TOTAL SCORE (maximum 36)

INVENTION

What is an Invention and How Should it be Done?

Participants: Any student grades K-4 and 6-7 may create an invention. Students may form partnerships with students from other grades and/or classes.

1. Choose a **problem** that could be solved by creating an invention.
2. State the problem/ idea as a specific question.
3. **Analyze**, research and explore how an invention could solve this problem.
4. ***FILL OUT PROPOSAL FORM AND OBTAIN YOUR TEACHER'S SIGNATURE.***
5. **Design** your invention. Brainstorm ideas with multiple design sketches.
6. Set up a time schedule for completion.
7. Make a list of all the materials you will need.
8. Collect all the materials.
9. **Develop** a prototype of your invention.
10. Keep a log of your design attempts, failures and successes in your engineering book.
11. **Implement** it to see if it will solve your problem. If it does not, go back to your sketches and see where you can improve your design.
12. Set up a display to show case with
    a. The research you conducted when you **analyzed** your problem.
    b. Your labeled **design** sketches.
    c. Your actual invention.
    d. An **evaluation** of your invention. Did it work? Why? Use your log for support.
    e. Information about other inventions similar to yours, and how yours is different.
        i. This could be a compare and contrast, flow chart, comparative analysis...

How an Invention is Different from a Science Project

1. Involves creating an invention to solve a problem.
2. The ADDIE (Analyze, Design, Develop, Implement, Evaluate) process is used
3. Still includes the problem, research, and test of a project, but the student comes up with the problem, method of testing it, and ultimate final product themselves, showcasing how they have "fixed" the problem their invention was meant to solve.
4. Explains in-depth the science behind the experiment, and what was learned throughout the process, and why this invention is a more logical solution to other previous attempts.
5. Must be a working invention.

Invention Success Criteria

See below for the criteria needed to create a successful invention/engineering project.

QUESTION: To what degree is the question creative and engaging?	Complete question which reflects a creative idea from student. The project includes a creative title that reflects the question they are trying to solve by their invention.
VISUAL DISPLAY: How well is project constructed and organized? Clarity? Neatness?	A variety of techniques are used to present information, display is neat and easy to understand and includes all parts of the scientific process. Display is very well done and clearly labeled. Components to be included in visual: question, research, hypothesis, materials/procedure, results, and information about the problem being solved by the invention. Why does this problem need to be solved? What is the benefit to society by this invention?
DEMONSTRATION OF INVENTION AND EXPLANATION: Can the student clearly explain what was done, what happened and why?	Student can clearly explain what was done, what happened, why, and can generate new questions or propose additional investigations. All supplies are present and organized and student(s) adhere to proper science safety procedures.
CONCLUSION: How well are the conclusions and/or products identified and interpreted?	Clear conclusion and extensive explanation of results

DEMONSTRATION

What is a Science Demonstration and How Should it be Done?

Participants: Any student grades K-4 and 6-7 may complete a demonstration. Students may form partnerships with students from other grades and/or classes.

1. **Choose a problem** that has already been solved.
2. State the problem that was solved as a **specific question.**
3. **Research** how the problem was solved originally.
4. Write the hypothesis that the scientist used when researching.
5. *****FILL OUT PROPOSAL FORM AND OBTAIN YOUR TEACHER'S SIGNATURE.*****
6. **Plan** your hands-on demonstration.
7. **Determine** if you will do the demonstration or let audience members do so.
8. Set up a time **schedule**.
9. Make a list of all the **materials** you will need.
10. **Collect** all the materials.
11. Set up your demonstration so that it can be **repeated** at least 50 times. (This might mean buying additional materials if some are consumed!)
12. Set up a **display** to show case with
    a. Procedure you will follow in your demonstration.
    b. The science discovered when the original test was run
    c. Information about the original scientist who ran the experiment
13. Practice your demonstration until you can do it blindfolded.

How a Demonstration is Different from a Science Project

1. Involves a scientific test which has already been performed.
2. A hands-on presentation is given, where the test is repeated in front of an audience.
3. Still includes the problem, hypothesis, research, and test of a project, but the student does not come up with the problem and method of testing it themselves but instead uses one they have found.
4. Explains in-depth the science behind the experiment, and what was learned by the original scientists.

Demonstration Success Criteria

See below for the criteria needed to create a successful demonstration project.

QUESTION: To what degree is the question creative and engaging?	The student has a complete question which reflects a creative idea from student. The project includes a creative title that reflects the question they are demonstrating.
RESEARCH: How deeply has the question been researched?	The student has at least three different sources of information that tell about how this demonstration was originally performed. The student should include information about the experiment, scientist, and it's historical importance.
VISUAL DISPLAY: How well is project constructed and organized? Clarity? Neatness?	A variety of techniques are used to present information, display is neat and easy to understand and includes all parts of the scientific process. Display is very well done and clearly labeled. Components to be included in visual: question, research, hypothesis, materials/procedure, results, and information about the scientist who originally conducted this experiment.
DEMONSTRATION/ EXPLANATION: Can the student clearly explain what was done, what happened and why?	Student can clearly explain what was done, what happened, why, and can generate new questions or propose additional investigations. All supplies are present and organized and student(s) adhere to proper science safety procedures.
CONCLUSION: How well are the conclusions and/or products identified and interpreted?	The project has a clear conclusion and extensive explanation of results.

SciCon Project/Demonstration/Invention Proposal Form

Student name: _____

I intend to complete a (circle one) Science Project Demonstration Invention

The SciCon presentation that I intend to showcase is (please write question/problem you are investigating below):

_____

_____

_____

SciCon Presentation Question Checklist:

1. Your teacher may have put some restrictions on SciCon presentations. Has your presentation met your teacher's requirements?	
2. Is the topic interesting enough to read about and work on for the next couple months?	
3. Do you have at least three written sources of information on your subject?	
4. Is your SciCon Presentation based on a problem or question that you are trying to solve or understand?	
5. Is your Scicon Presentation clearly showing a change in the important factors (variables) using a number that represents a quantity such as a count, percentage, length, width, voltage, velocity, energy, time, etc.? For Example: • 1st trial uses a height of 1 meter, 2nd uses 1.5 meters, 3rd uses 2 meters • 1st trial uses 3 beans, 2nd trial uses 4 beans, 3rd uses 5 beans	
6. Is your SciCon Presentation safe to share? It needs to be safe both for YOU and for ALL viewers.	
7. Do you have access to all of the materials you will need to complete your SciCon Presentation?	
8. Can you explain the exact science that is being shown by your SciCon Presentation using precise vocabulary? (e.g. The hand appears to be in a different place when put into water because the light refracts when it hits the water and bends slightly. When the hand is placed in oil the light does not refract, so it does not appear in a slightly different place.)	
10. Have you received approval of your SciCon Presentation from your guardians and teacher to begin your SciCon presentation?	

I have discussed my SciCon presentation idea and this checklist with my guardian(s) and I am willing to commit to following through with this SciCon Presentation.

_____ _____

Student Signature Guardian Signature

_____ _____

Teacher Approval Signature Date

Science Fair Student Timeline and Checklist

Due Date	Scientific Method Item	Assignment
Oct. 22-26	**Topic/Question**	Conduct in-class research to come up with a specific question you will be investigating in the science fair project. Students fill out the project proposal form. You and your parents must sign the form and bring it back to your teacher. **Teachers collect Proposal Form by Oct. 26th.**
Oct. 29-Nov. 2	**Variables/Hypothesis**	An explanation of which factors will be changed while conducting the experiment and a hypothesis on the resulting impact of the change.
Nov. 5-9	**Materials/Procedure**	A detailed materials list and detailed steps of the procedure are due
Nov. 12- 30	**Experiment**	Conduct the experiment. A minimum of 4 trials should be performed. (If you are using plants, you should have 4 plants for each variable tested.)
Dec. 3-7	**Observations**	Observation section due (typed)
Dec. 10-14	**Data Analysis**	Data (charts, graphs, etc.) due. The analysis of the experimental data. A summary of the findings of the experiment.
Dec. 17-20	**Display**	Please be working on your display for the project.
Jan. 7	**DUE**	**Project due: Jan. 7th**
Jan. 7-10	**In-class presentations**	Be prepared to give your presentation to your class to practice for the fair!
Jan. 11	**SciCon**	**SciCon**