CSP's Science & Engineering VIRTUAL Fair 20-21

This year at CSP, students in Science <u>will be given an opportunity</u> to complete an independent science project during the first semester. The project is completely optional and will not impact the students grade in any science class. The project involves following the scientific processes and teaches students how scientists approach problems. The project will include a google slides presentation and a video presentation of the student going over the google slides presentation and presenting other findings they would like to share with the judges. This video will be presented to other students, faculty, and community members, and will become public for viewing purposes.

Our Science Fair follows the rules designed by the Intel National Science and Engineering Fair (ISEF). Students may choose a topic from any of the eighteen categories recognized by ISEF. Students will have the opportunity to enter their project in the county and regional science fairs if they score well at the school level. There are prizes, awards, and scholarships available to students who do well at the school, county, and regional fairs.

If you are interested in completing a science fair project this year, please complete the following steps as soon as possible.

1) Register for the google classroom using the enrollment code: lsmki3v
2) Complete the Science fair intent form found here--->   Intent Form
3) Come visit Mr. Vadalia for information, clarification, or other help during either 2A(Tuesdays 10:40-11:25) or 4A Flex (Fridays 10:40-11:25) using the google classroom meet link.

Please refer to the next page for the rubrics and how the grades will be entered into the grade book. Here is a timeline for the project:
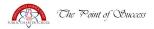
Task	Documents to Hand In	Due Date
Choose topic & research question **Complete the google form outlining the students intent to complete a project.**	● Google Form (same as intent form) ● https://forms.gle/XC85ewj36sa9UHSs7	10/30/20
Complete background section of the slides presentation **Define hypothesis & variables**	● No documents due but student should be updating their presentations	
Plan & design experiment	1. Checklist for Adult Sponsor (1) 2. Student Checklist (1A) 3. Approval Form (1B) 4. And any addition safety forms specific to your project	
Conduct experiment & collect data check	● No documents due but student should be updating their presentations	
Finish presentation & film presentation video for submission	● Project presentation slides ● Project video ● Project due to Mr. Vadalia on this date. **IF PROJECT IS NOT TURNED IN BY THIS DATE, IT WILL NOT GET ENTERED INTO THE SCHOOL FAIR.**	12/21/20
Scores/ Prizes (voluntary)	A live google meet will occur on 12/23/20 (details to follow)that will outline the winners and those advancing to the county fair.	12/23/20

NAME: _____   DATE: _____

PERIOD: 1 2 3 4   A B

Science Projects Tally Sheet

Judging Category: _____

Project Number: _____   **Project Title:** _____

Scoring Tool for Science Projects

Criteria	Points Possible	
Research Question	10	_____
Design and Methodology	15	_____
Execution: Data Collection, Analysis and Interpretation	20	_____
Creativity	20	_____
Slides presentation	10	_____
Student Video Presentation of Research	25	_____
Total	100	_____

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Students, & Parents
Please see the VERY important documents below.

Intel Rules and Guidelines Link
https://sspcdn.blob.core.windows.net/files/Documents/SEP/ISEF/2019/Rules/Rules-Only.pdf
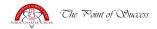
Fillable PDF Forms
https://sspcdn.blob.core.windows.net/files/Documents/SEP/ISEF/2019/Forms/All.pdf

AACPS Rules and Regulations for Science Fair
https://www.aacps.org/Page/1428

YouTube Videos on how to properly Complete INTEL Safety Forms
https://www.youtube.com/channel/UCBSF9VL3FrQHv8ecnqtLbww/videos

THE FOLLOWING PAGES ARE FOR YOUR SUPPORT AND PACING ONLY. They NOT DUE THIS YEAR!

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Purpose/Research Question
Science Fair Think Sheet 1

> *The universe if full of magical things*
> *patiently waiting for our wits to grow sharper.*
>
> -   Eden Phillpots

Selecting a topic for your science fair project is probably the most difficult step. However, if you begin your research with a field of science in which you are already interested, this first step will be greatly simplified. The kind of project you need is one that produces measurable data; your project must deal with an effect that can be measured with numbers and units. The best projects pose a question and use scientific techniques to answer it.
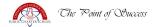
Newspapers, science magazines, and science television programs offer many ideas for science fair projects. Adults in your life may also have some ideas for you. Topics may be found in the many books and magazines in your school library and in your science classroom.

The following list shows the kind of ideas you can develop from a topic of interest. General topic: algae. Possible projects:
-   The Responses of Algae to Ultraviolet Light
-   The Effect of Metals on Transport Within Algae
-   The Effect of Water Pollution on Algae
-   The Sulfur Requirements of Algae Used for Human Food
-   Factors Influencing the Development of Colonies of Algae
-   A Study of Intracellular Algae in Hydras
-   How Uniform is the Thallus of U*lva*, a Green Alga?

Keep in mind that your project will have to be limited in scope. You cannot do a project on all there is to know about algae as a food source. You would have to limit the range of your projects, as shown in the list of projects on algae.
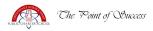
Using vertebrate animals requires the completion of multi-paged protocols that describe your entire experiment in great detail. You will also need to complete numerous forms and certifications in order to use human subjects. The use of either vertebrate animals or humans will require the approval of the district science fair before you may begin your experimentation. There are many other organisms that would bhe just as interesting to work with, such as algae, ants, bacteria, beetles, crabs, crayfish, crickets, protists (*Daphania*, or water fleas, Cyclops, brine shrimp, hydra, etc.), fruit flies, houseflies, sowbugs, lichen, yeast, vinegar eels, slugs, earthworms, planaria, and mealworms.

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NAME: _____ DATE: _____

PERIOD: 1 2 3 4 A B

Explain the idea you would like to investigate for your science fair project. Include a statement of your scientific **research question** (RQ) along with your **purpose** for doing the project.

To be filled out by your teacher:

Teacher comments:

extra Safety Forms needed (obtained from http://www.aacps.org/science/secondscifair.asp) or see your teacher:
☐ Qualified Scientist form (2)   ☐ Vertebrate Animal form (5A and 5B)
☐ Risk Assessment form (3)   ☐ Potentially Hazardous Biological Agents form (6A)
☐ Human Subjects form and Informed Consent form (4)   ☐ Human and Vertebrate Animal Tissue form (6B)

Project Approved: _____ Date: _____

Criterion Inquiring and designing	Achievement Levels				
	0	**1-2**	**3-4**	**5-6**	**7-8**
i. explain a problem or question to be test by a scientific investigation	The student does not reach a standard identified by any descriptors to the right.	The student **states** a problem or question to be tested by a scientific investigation.	The student **outlines** a problem of question to be tested by a scientific investigation.	The student **describes** a problem or question to be tested by a scientific investigation.	The student **explains** a problem or question to be tested by a scientific investigation.

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Intel ISEF Categories and Subcategories

The categories have been established with the goal of better aligning judges and student projects for the judging at the Intel ISEF. Local, regional, state and country fairs may or may not choose to use these categories, dependent on the needs of their area. Please check with your affiliated fair(s) for the appropriate category listings at that level of competition.

Please visit our website at student.societyforscience.org/intel-isef-categories-and-subcategories for a full description and definition of the Intel ISEF categories:

ANIMAL SCIENCES
Animal Husbandry
Development
Ecology
Pathology
Physiology
Populations Genetics
Systematics
Other

BEHAVIORAL & SOCIAL SCIENCES
Clinical & Developmental Psychology
Cognitive Psychology
Physiological Psychology
Sociology
Other

BIOCHEMISTRY
General Biochemistry
Metabolism
Structural Biochemistry
Other

CELLULAR & MOLECULAR BIOLOGY
Cellular Biology
Cellular and Molecular Genetics
Immunology
Molecular Biology
Other

CHEMISTRY
Analytical Chemistry
General Chemistry
Inorganic Chemistry
Organic Chemistry
Physical Chemistry
Other

COMPUTER SCIENCE
Algorithms, Data Bases
Artificial Intelligence
Networking and Communications
Computational Science, Computer Graphics
Computer System, Operating System
Software Engineering., Programming Languages
Other

EARTH & PLANETARY SCIENCE
Climatology, Weather
Geochemistry, Mineralogy
Paleontology
Geophysics
Planetary Science
Tectonics
Other

ENGINEERING: Electrical & Mechanical
Electrical Engineering, Computer Engineering, Controls
Mechanical Engineering,
Robotics
Thermodynamics, Solar
Other

ENGINEERING: Materials & Bioengineering
Bioengineering
Chemical Engineering
Civil Engineering, Construction Eng.
Industrial Engineering, Processing
Material Science
Other

ENERGY & TRANSPORTATION
Aerospace and Aeronautical Engineering, Aerodynamics
Alternative Fuels
Fossil Fuel Energy
Vehicle Development
Renewable Energies
Other

ENVIRONMENTAL MANAGEMENT
Bioremediation
Ecosystems Management
Environmental Engineering
Land Resource Management, Forestry
Recycling, Waste Management
Other

ENVIRONMENTAL SCIENCES
Air Pollution and Air Quality
Soil Contamination and Soil Quality
Water Pollution and Water Quality
Other

MATHEMATICAL SCIENCES
Algebra
Analysis
Applied Mathematics
Geometry
Probability and Statistics
Other

MEDICINE & HEALTH SCIENCES
Disease Diagnosis and Treatment
Epidemiology
Genetics
Molecular Biology of Diseases
Physiology and Pathophysiology
Other

MICROBIOLOGY
Antibiotics, Antimicrobials
Bacteriology
Microbial Genetics
Virology
Other

PHYSICS & ASTRONOMY
Astronomy
Atoms, Molecules, Solids
Biological Physics
Instrumentation and Electronics
Magnetics and Electromagnetics
Nuclear and Particle Physics
Optics, Lasers, Masers
Theoretical Physics, Theoretical or Computational Astronomy
Other

PLANT SCIENCES
Agriculture/Agronomy
Development
Ecology
Genetics
Photosynthesis
Plant Physiology (Molecular, Cellular, Organismal)
Plant Systematics, Evolution
Other

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Hypothesis and Variables

Science Fair Think Sheet 2

Question

With the teacher feedback from *Think Sheet 1*, restate your scientific research question:

Hypothesis

Write a hypothesis for your scientific research question.

Variables

Independent variable (what you will change each time you experiment):
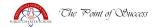
Dependent variable (what you will monitor or measure each time you experiment):

Constants (items that need to be kept the same each time you experiment)

Control group: (group in your experiment where the experimental treatment is NOT applied)

To be filled out by your teacher:

Criterion : Inquiring and designing	Achievement Levels				
	0	**1-2**	**3-4**	**5-6**	**7-8**
ii. formulate a testable hypothesis and explain it using scientific reasoning	The student does not reach a standard described by any of the descriptors to the right.	The student **outlines** a testable hypothesis.	The student **formulates** a testable hypothesis **using scientific reasoning.**	The student **formulates and explains** a testable hypothesis **using scientific reasoning.**	The student **formulates and explains** a testable hypothesis **using correct scientific reasoning.**
iii. explain how to manipulate the variables, and explain how data will be collected	The student does not reach a standard described by any of the descriptors to the right.	The student **outlines** the variables.	The student **outlines** how to manipulate the variables, and **outlines** how **relevant data** will be collected.	The student **describes** how to manipulate the variables, and **describes** how **sufficient, relevant data** will be collected.	The student **explains** how to manipulate the variables, and **explains** how **sufficient, relevant data** will be collected.

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Design
Science Fair Think Sheet 3

You may attach extra pages if you need more room.
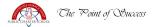
Question:

Hypothesis:

Complete Materials List:
Include all materials with exact amounts (ie. "10 g of salt" as opposed to "salt").

Procedure:
This needs to be in a list-form and must be detailed (ie. "Pour 50 mL of water into the 250 mL beaker" as opposed to "pour the water into the beaker")

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Safety

Identify materials or procedures that may contain risks or safety concerns. Explain the steps you will take to alleviate these risks to you or others involved in the project. (Be sure all forms are completed prior to beginning the project)
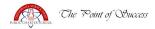
Data Collection and Processing

Construct a data table for which you will record your collected data in. You do not need to fill in the data table with made-up numbers; we just want the skeleton of your table! What will you do with this data (find the average, etc.)

Bibliography:

What resources have you utilized? Are your resources varied (ie. Internet, book, journals, etc.)? Are your resources reliable (ie. do not cite Wikipedia as a source of information)?

To be filled out by your teacher:

Criterion Inquiring and designing	Achievement Levels				
	0	**1-2**	**3-4**	**5-6**	**7-8**
iv. design scientific investigations	The student does not reach a standard described by any of the descriptors to the right.	The student **designs** a method **with limited success**.	The student designs a **safe method** in which he or she **selects materials and equipment.**	The student designs a **complete and safe method** in which he or she selects **appropriate materials and equipment.**	The student designs a **logical, complete, and safe method** in which he or she **selects appropriate materials and equipment.**

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