ALL SAINTS SCHOOL
SCIENCE FAIR

The All Saints School Science Fair is back! Students will have the opportunity to work with the scientific method and create a project for the fair. It gives our kids and families another way to have fun with science!

PROJECT INTRODUCTION:

EXPERIMENTS & OBSERVATIONS

All Saints Science Fair is a chance to encourage a spirit of scientific inquiry. Students look at understanding the world around us through experimentation and problem solving, and develop key skills along the way.

Using the scientific method, students will test a hypothesis around a theme like chemistry, physics or life sciences. The experiments, observations and results are documented to share with students and families at a school-wide fair. Science experts and enthusiasts will review each project with awards given to participants and best in-class.

You can join in by participating in your own scientific explorations with your classroom or at home. The following pages are the details of this years All Saints Science Fair and the first step to getting started.

PARTICIPATION

2nd - 7th Grade:
Science Fair projects are voluntary for students to complete at home with the help of friends and family. Suggestions and resources for creating the hypothesis and experiments are available, as well as help sessions with expert volunteers for support or assistance along the way.

8th Grade:
Ms. Shufelt integrates 8th grade projects in the curriculum. Each student will present at the fair.

IMPORTANT 2023 DATES TO REMEMBER:

Wednesday, February 1st	7-8pm Science Fair Info Night for grade 2-7 parents in the library, students welcome also.
Friday, February 17th	8:30-9:30am Science Fair help session available in the library for grade 2-7 registered participants, parents welcome also.
Friday, March 3rd	8:30-9:30am Science Fair help session available in the library for grade 2-7 registered participants, parents welcome also.
Wednesday, March 22nd	All Saints Science Fair in the gym! Project drop off in morning and open house and awards from 6:30 - 7:30pm.

PLANNING

The science fair uses the scientific method to present experiments that ask a question, make a prediction, test and research, form a conclusion and then report the data in a compelling way to share what you have learned.

You can tell you have an experiment if you are testing something several times and changing a variable to see what will happen. An independent variable is changed or controlled to evaluate the effect on a dependent variable.

Students are required to use the scientific model for their projects. This includes:

- Ask questions, research and form hypotheses
- Create experiments to test those hypotheses
- Organize data and draw conclusions
- Share process and results on a display board

Parent involvement is important. Please remember parents' role is to help guide their student, NOT to do the work. Also, project submissions to the science fair are limited to individuals or teams of two maximum.

Please remember some important rules to conducting experiments:

- **Always think safety first.**
- **Respect all life forms**. Do not perform an experiment that could harm humans or animals. If working with animals, students should have adult assistance.
- Be sure to **have permission to experiment with objects that belong to someone else.** Ask first.

OVERVIEW:

STEPS OF THE SCIENTIFIC METHOD

1 FIND A PROBLEM
Ask a question around a theme: “how does...?”

2 RESEARCH THE PROBLEM
Find out all you can and become an expert on your subject

3 MAKE A HYPOTHESIS
Predict what might happen based on what you know

4 CONDUCT AN EXPERIMENT
Create an experiment to find out if you were right

5 COLLECT PROOF BY RECORDING DATA
Test several times and keep a record of the process and results

6 ORGANIZE & ANALYZE YOUR DATA
Uses tools like tables or graphs to review your data to see the results

7 FORM A CONCLUSION
Check your hypothesis against the results - were you right?

8 WRITE ABOUT WHAT YOU LEARNED
Document your process, results and conclusion on a display board

9 SHARE AT THE SCIENCE FAIR
Display your hard work at the fair. Celebrate – you are now a scientist!

RESOURCES & HELP SESSIONS:

Volunteer science experts and enthusiasts are hosting help sessions and have resources at the ready. They are available to answer questions, assist in determining project direction, and provide support throughout the project and presentation build out.

Please join us for the scheduled info and help sessions listed in this document. There are also websites listed below that can be helpful resources.

www.sciencebuddies.org/science-fair-projects/project_ideas.shtml
www.education.com/science-fair/elementary-school/
www.sciencekids.co.nz/projects.html
www.tryscience.org/home.html

Questions? Don’t hesitate to reach out to Keith Zawadzki at keith.e.zawadzki@intel.com or Reniera Eddy at reniera.eddy@gmail.com.

QUICK GUIDE TO STARTING YOUR PROJECT

1. Problem: Ask a question that can be answered by observation, experimentation, or demonstration.
   a) "What is the effect of _____ on _____?"
   b) "How does _____ affect _____?"
   c) "Which _____ (verb) _____?" ("which material conducts electricity?")

   My question: _____
   _____

2. Background and research:
   a) Cite the source of your research. Example https://www.sciencebuddies.org
   b) What scientific facts/laws could help answer your problem or predict the outcome? Example: "Materials that allow electricity to flow through them are conductors. Metals are good conductors."

   My sources: _____
   _____

3. Hypothesis: State what you think the outcome will be.
   Example: "The metal objects will conduct electricity better than the plastic objects."

   My hypothesis: _____
   _____

4. Materials and equipment: List the materials needed to do the experiment or observation.

   Materials I need: _____
   _____

5. Procedure: List the step by step sequence of exactly what is done.
   Example: #1) create a closed circuit using a battery, electrical wires and a light bulb, #2) insert different materials/objects one at a time in the closed circuit to test their conductivity…"

   Sequence I plan to follow: _____
   _____

6. Results and Analysis: Make a complete record of the results and/or observations
   a) Note any unusual results; mistakes; unexpected results
   b) Use graphs and charts, if possible

   My results: _____
   _____

7. Conclusion: Using data from your results, answer the question that you asked above. Was your hypothesis right or wrong?

   My conclusion: _____
   _____

8. Recommendations: From what you learned would you make recommendations for further research?

   My recommendation: _____
   _____

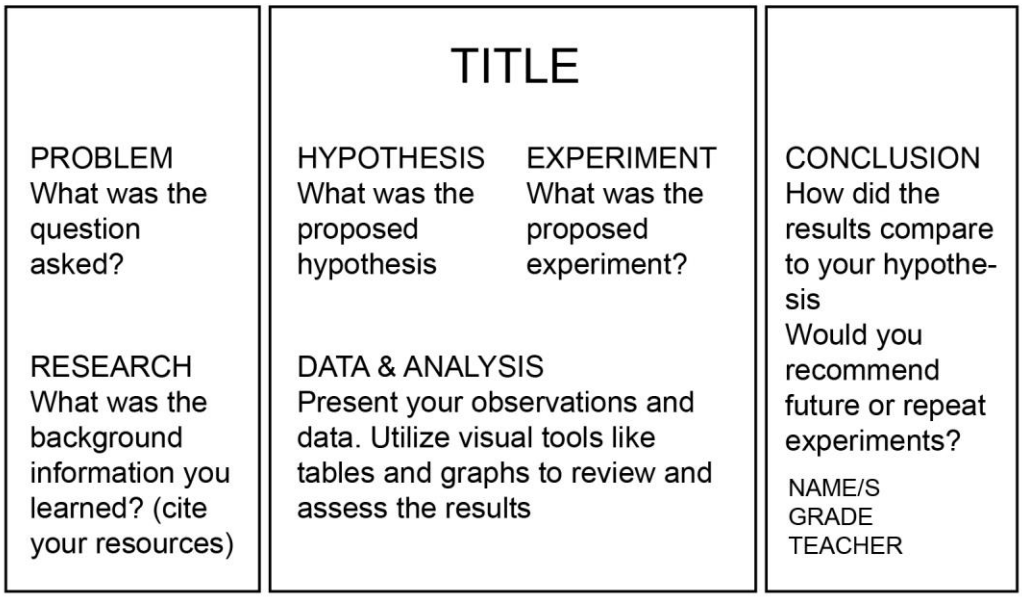
DISPLAYING YOUR PROJECT

The school office will provide each participating student or class a display board. All participants are required to create a display to present at the science fair.

CREATING YOUR PRESENTATION:

- Use the display board provided by All Saints (black tri-fold, self-standing cardboard)
- Take pride in how work is presented. Be neat, pay attention to details, present your data and analysis clearly and carefully, and use correct spelling.
- Include required content for the display board:
  - Title
  - Student name, grade and teacher's name. Class projects should include the name of each student.
  - Brief summaries of the problem, research, hypothesis, experiment, results of data and analysis, and conclusion.
- Dropped off in the All Saints gym the morning of the fair.
- Volunteer science experts and enthusiasts will review each project with awards given to participants and best in-class displays.

SAMPLE DISPLAY BOARD



Considerations for creating your display:

- Well organized and carefully presented with correct spelling
- Clearly stated title, problem and reasonable hypothesis
- Background information on topic with sources cited
- Clearly explained experiment and process
- Measurable data that includes 2 or more trials. The more the better.
- Experiment uses an independent and dependent variable
- Effective analysis of data and clearly stated results (using clear and careful visual aids like graphs, charts and tables)
- Well elaborated conclusion based on results

Evaluation Rubric / Checklist

CATEGORY	CRITERIA
1.PROBLEM	• Creative, unique idea involving an experiment • Has scientific relevance or application • Specific and clearly stated on board
2.RESEARCH	• Has done research that helps address the problem • Includes scientific history, principals or laws • Cites references • Displayed on board clearly and neatly
3.HYPOTHESIS	• States what you think will happen based on research • Includes a picture or plot to help explain expected result • Displayed on board clearly and neatly
4.EXPERIMENT PLAN	• Clearly states how hypothesis was tested including a control group to measure/reference against • Includes detailed materials list • Includes at least one picture or drawing • Displayed on board clearly and neatly
5.DATA & ANALYSIS	• Includes at least one chart or table of results that show how the variable impacts the response • Chart or table clearly labels axis and units • Analysis compares the results to the hypothesis • Analysis states how the research helped or did not help predict the result • Displayed on board clearly and neatly
6.CONCLUSION	• States if hypothesis is right or wrong • Recommends how to improve result or experiment • Displayed on board clearly and neatly

2nd – 7th Grade Oral Presentation Option:

Students can choose to also give an oral presentation of their project the morning of the Science Fair. 3-5 minutes will be allowed for each project and student/s will have an opportunity to give an overview of their work to 1 or 2 judges. It is a great chance to work on presentation skills. Additional awards will be given for best oral presentations.

#	Theme	Question	Data to measure	Reference
1	chemistry: reaction rates	Can you slow down or speed up a chemical reaction?	reaction speed vs reactant size/temperature (alka-seltzer bubbling and dissolving in hot vs cold water)	https://www.education.com/science-fair/article/reaction-speed-particle-size/
2	chemistry: reaction rates	How to change baking soda bubbling reaction with vinegar concentration?	ratio of vinegar in water solution (& temperature) vs height of bubble reaction in a cup (inches) while stirring	
3	chemistry: reactions	Can you make a battery out of fruit or vegetables?	electrical current(Amps) vs fruit type/nail coatings [need ammeter]	https://www.teachengineering.org/activities/view/cub_energy2_lesson04_activity2
4	chemistry: reactions	What percentage of air is oxygen?	perform experiment to estimate about of oxygen in air	https://www.sciencebuddies.org/science-fair-projects/project-ideas/Weather_p004/weather-atmosphere/oxygen-content-of-air-rust#summary
5	physics: gravity, forces, mechanical advantage	How do elevators work and can you increase the maximum weight?	mechanical advantage vs #/size of pulleys [need spring scale]	https://www.teachengineering.org/activities/view/cub_simple_lesson05_activity1
6	physics: gravity, forces	What is the best water dam design to produce the most power?	distance water spouts out vs water depth, hole size	https://www.education.com/science-fair/article/earth-science_squirter1/
7	physics: gravity, forces	What is the best launch angle for height or distance?	catapult launch distance or height vs angle/object weight/force	https://www.sciencebuddies.org/science-fair-projects/project-ideas/Phys_p085/physics/use-a-catapult-to-storm-castle-walls
8	physics: potential vs kinetic energy	How to design a roller coaster?	marble coaster speed or time(kinetic energy) vs tower height(potential energy)	https://www.teachengineering.org/activities/view/duk_rollercoaster_music_act
9	physics: gravity, forces	What is the best airplane design?	flight distance vs wing size/shape/weight	https://www.teachengineering.org/activities/view/cub_airplanes_lesson06_activity1
10	physics: electromagnetism	How do you create an electromagnet?	# of paper clips vs # of coils	https://www.teachengineering.org/activities/view/cub_mag_lesson2_activity1
11	physics: electrical conduction	What materials conduct electricity?	electrical current(Amps) vs material [need ammeter]	https://www.sciencebuddies.org/science-fair-projects/project-ideas/Elec_p018/electricity-electronics/conductors-insulators-basic-circuit
12	physics: thermal conduction	What materials are best for keeping items hot or cold?	Measure how fast heat is lost from various containers – glass, plastic, metal. Do the same materials which conduct electricity also conduct heat?	https://www.steampoweredfamily.com/activities/heat-transfer-projects-for-kids-stem-activities/
13	physics: thermal conduction	How does land affect local temperatures?	Measure temperatures in different environments: NSEW of building, over road, over grass, basement, attic, etc.	
14	physics: gravity, forces, pressure	What is barometric pressure and how does it change versus location?	Measure the barometric pressure at various places (mountain/hill, in valley, various levels of elevator) vs elevation (smart phone app).	https://easysciencefforkids.com/make-your-own-barometer/
15	physics: magnetism	How do you create a magnetic chain reaction?	distance/speed ball travels vs # of magnets	https://www.scienceproject.com/projects/detail/Free/FG043.asp
16	physics: bernoulli's principal	How does wind impact air pressure?	time for objects to collide vs separation distance/temperature/wind speed	https://www.sciencebuddies.org/science-fair-projects/project-ideas/Aero_p039/aerodynamics-hydrodynamics/bernoulli-principle#procedure
17	physics: properties of matter	What objects float versus sink?	Plot sink or float vs density (values > 1 sink, and < 1 float). Density= wt/volume and volume can be determined by displacement of water. Compare different woods, different metals, alloys, pennies before/after 1982.	https://easysciencefforkids.com/all-about-sink-and-float/
18	physics: properties of matter=density	How do dissolved substances change the density of water?	test float or sink objects in tap water. Retest as you add more salt to change the density.	https://sciencing.com/water-density-science-experiments-8029220.html
19	life sciences: photosynthesis	How to optimize plant growth?	plant growth vs amount of water/light/soil pH/color of light	https://education.seattlepi.com/experiment-ideas-photosynthesis-6593.html
20	life sciences: human body	How does heart rate change with exercise?	Measure heart rate (phone app) vs activities, try different sample groups including gender(boy vs girl), age (kids vs adults)	https://www.sciencebuddies.org/science-fair-projects/project-ideas/Sports_p006/sports-science/heart-rate-change-with-exercise#summary
21	life sciences & physics	What is the best sports drink for electrolytes?	electrical current(Amps) vs sports drink or amount of salt added to water [need ammeter]	https://www.sciencebuddies.org/science-fair-projects/project-ideas/Chem_p053/chemistry/electrolyte-challenge-orange-juice-vs-sports-drink#summary
22	biology	What household objects have the most germs?	bateria growth after X days vs sample [need purchase petri dishes prefilled with agar]	https://www.scienceproject.com/projects/detail/Free/FG043.asp
23	Physics: mechanical advantage	Can an adult teeter-totter(see-saw) with a child?	weight of children, adults and distance from fulcrum/pivot to find equilibrium	
24	physics: pressure	how does pressure and or temperature inside a basketball impact the bounce?	pressure (psi) and/or temperature of bball vs bounce height when dropped from height	
25	chemistry: reactions	Amount of baking soda vs baking power impact muffins rising?	amount of baking soda or baking powder added to muffin recipe (grams or teaspoons) vs height (inches) of muffins after cooking	