

2018 CCA Science Expo

5th-6th Grade GUIDEBOOK

Science Expo, Thursday, October 18
From 6:00pm-7:30pm

Registration- August 6th through September 17th

Table of Contents

- Note for Parents _____ Page 4
- Experiments _____ Page 8
- Inventions _____ Page 10
- Collections _____ Page 14
- Studies _____ Page 17
- Display Boards _____ Page 21
- Nameplate _____ Page 23

Calling all Scientists!! *It's time to put on your white coat and engage your curiosity about our world!*

Our mission is to offer students an opportunity to practice scientific investigation and see God's wonderful world through an invention, study, collection or experiment. At Covenant Christian Academy, we have the ability to recognize and celebrate our Creator in our lives and in our study!



CCA Bible verse of the year:

“Worthy are You, our Lord and our God, to receive glory and honor and power; for You created all things, and because of Your will they existed, and were created.”

Revelation 4:11

WHICH GUIDEBOOK DO I USE?

To be developmentally appropriate, the steps to a science fair project are different for each grade group. Each group is comprised of different grade levels and thus different expectations.

We have created two age-appropriate Science Project Guidebooks K5-4th grades & 5th-6th grades. Make sure you are using the correct Guidebook for your grade!

Important Dates

- August 6th - Registration begins
- September 17th - Final Registration deadline
All registration forms are due by this date. Turn your form into your teacher or the office.
- Thursday, October 18 from 6:00-7:30pm - Science Expo! *All participants must stand by their project from 6:00PM – 6:20PM during the Science Expo.*



Science Expo Activities

- Families are encouraged to view projects and enjoy activities at the Science Expo!
- Hands-on Pumpkin Catapult will be available for all who come. Please bring a pumpkin with your name, the pumpkin's weight, and your grade written in permanent marker to see how far it launches.
- Experts will be demonstrating activities related to their field.

AN IMPORTANT NOTE FOR PARENTS

We ask that the science project be a realistic reflection of the child's knowledge and skill level. We want parents to be involved, but please let the project be the child's own. It is understood that parents may need to assist more with some children than others, based on the child's abilities and the complexity of the project. In general, we expect that 5th-6th graders will do most of the project on their own.

There are ways parents can help their child without “taking over”, as needed:

- Help your child focus the project question
- Guide in accessing reliable information sources
- Assist with typing
- Facilitate gathering materials and supplies
- Provide an extra set of hands
- Encourage, support, and give feedback throughout the process
- Ask your child questions to stimulate their thinking rather than give them the answers



NOTE ON JUDGING:

The main purpose of the Science Expo project is to give students exposure to science in a fun, hands-on way. Our Science Expo is not competitive.

Science Expo RULES

1. Students must bring their projects to school on the morning of **Thursday, October 18**, no sooner please.
2. Each Science Expo participant receives one white, 48" x 36" tri-fold display board. If you would like to use a colored tri-fold board and would like to purchase that yourself that is fine.
3. Label **THE BACK** of your display board with the Project Nameplate at the end of this packet. **Be sure that your name is also included somewhere on the front of the board.**
4. You will be given 3 feet of space on a table. Please do not use more than your allotted space on the top of the table.
5. Please feel free to bring samples that are secured and labeled.
6. Please bring items for the students/parents to touch or look at with your project. ***But please make sure they are labeled and if item(s) are lost that it does not matter.*** An example would be to show some of your leaf collection or some of the wires you used to create a charge.

7. A computer is a tool for research and writing, not for copying someone else's work. When using books, magazines, information you find online, be sure to use your own words and to document your sources to avoid plagiarism (using someone else's words as your own work). Include your resources for your research (which may include where you got your project idea) and any sources for images you use.
8. **All participants must stand by their project from 6:00PM – 6:20 PM during the Science Expo.**



Do Not Bring

Projects with items from the following list will not be accepted or displayed

1. Explosives, open liquid containers, bubbles, glass, bacteria, actual flames, chemicals or active volcano models are not allowed. If you used these items, you can use pictures to show your materials.
2. "Live" experiments (where you complete your project at the event), such as an erupting volcano.
3. Live animals are NOT allowed as part of your display at the Science Expo. If you used a live animal, you can use pictures to show your subject. Do not bring them to the school.
4. An item that needs to plug in, electrical outlets are not available. Do not bring generators or any other form to power your project.
5. Items that are valuable or breakable. The CCA Science Expo is not responsible for items that are lost or broken. If you used an item that is valuable or breakable, take a picture to show it. Do not bring it to school.
6. Projects that are potentially harmful or dangerous to people or animals.

HOW I GET STARTED?

ASK A QUESTION

First thing you need to ask yourself is **what interests you?** Do you have a hobby, sport, or activity that you especially like? Go to the library and look at science books; do a search for science fair topics on the Internet; visit places like the Tellus Science Center, the zoo, the aquarium, or local museums; consider what you have studied during science in school that you might want to learn even more about.

The library has many books on a variety of science topics that may be helpful. Once you have a general idea, brainstorm questions that you can investigate. Consider the time needed, what supplies you might require, how complicated (or simple) the project would be, and talk with your parents/teachers about the suitability of your idea.

Determine which of the four types of projects will fit with your topic and question; see the following pages for specific information on each type. Map out a timeline for completing your project on time, get started, and have fun!

Here's an example of a Science Expo Project: I like dogs and I am interested in what the best breed would be for a family? Or I want to know more about the Moon and why it looks different in the sky sometimes. Or I heard you can cook food using just solar energy, is that true?

ASK A TEACHER, PARENT...

If you still aren't sure of a question or are having trouble narrowing it down to one idea, ask your parents, teacher or friends.

What topics have you been discussing in class? Is there a way to extend any class projects further?

Topic Suggestions...

- Natural Science: water, light, earth movement, solar system, moon, animals, habitats
- Geography and Travel: migrating birds, flash floods, survey of mountain peaks
- Arts: origami, carpentry, special effects, perspective
- Animals: dogs, fish, cats
- Biblical: Biblical foods; Weights, Measures and Money from Biblical Times
- Creation: gemstones, orchids, chocolate, root beer
- Economy and Money: money, metals, the cost of going to a movie in 2050
- Scientists or Inventors: Tesla, Einstein, Marie Curie....



Types of Science Projects, Choose One: For 5th-6th Grade

The Science Expo at CCA is held to celebrate God’s creation. All students are encouraged to select a topic for scientific inquiry; this should be something you don’t already know a lot about. You will share at the Expo what you learned while doing your project. **Choose one of the following project types:**

- **Do an experiment.** In doing an experiment, you will use the Scientific Method. You begin by asking a question about the subject you are interested in. You’ll do some research, and then come up with your hypothesis—your best guess on what you think will happen in your experiment. The next step is to design and then conduct your experiment. At the end, you compare your results to what your hypothesis was. Some examples of this type of project: “How much methane is produced by different types of food scraps?” or “Which type of pulley system lifts heavy loads the easiest?”
- **Make an invention.** Do you have ideas of how to make something better or to even create something brand new? If so, take your question about how to fix a problem or make an item better and try to create the solution with an invention. You will follow the Engineering Design Process while developing your invention. Some examples of problems that an invention could solve: “Can I make a better tool to empty a tube of toothpaste?” or “Can I make a better food scrap container?” or “Can I make a better box to securely hold my valuables?”
- **Make a collection.** In a collection, you will collect items with similar properties. These objects need to be natural science items, like leaves, tree bark, rocks, or fossils. You will need to group the objects into categories, looking for similarities and differences, and then explain how and why you grouped certain objects. Some ways to group objects are by appearance, texture, use, or location. Some examples of what you can learn from a collection: “What minerals are common in Georgia?” or “What types of pine cones can be found in Georgia?”
- **Do a study.** By doing a study, you will become an “expert” in the topic you choose. You may study a disease, a physical phenomenon like weather or electricity, the population of living organisms in an environment, an advanced math concept, or the work of a notable scientist. You will research what is known about the topic or scientist’s work and present what you learned from this study. Some questions you may explore through a study: “What is asthma and how does it affect breathing?” or “How do the different kinds of electrical circuits work?” or “What birds can be viewed in this marsh?” or “What did Nikola Tesla discover?”

If you want to do an **EXPERIMENT**: 5th-6th Grade

METHODOLOGY:

QUESTION:

Determine what you are going to test, and then state that in the form of a question.

RESEARCH:

Read about your topic to find out more about the idea you are investigating. Check out 2 or more sources.

HYPOTHESIS:

Based on what you learned in your research, make your predication about your results—your best guess about what you think will happen in your experiment.

EXPERIMENT:

Materials: Determine what materials you need to do your experiment and collect them.

Procedure: Plan how you will conduct your experiment. What steps do you need? Are there safety precautions that will be needed? What factors will you change or manipulate to understand their effects? What are you looking for, and how will you measure the effects or changes? Consider whether your experiment should have a control—something you don't change or manipulate—to help confirm that what you see is from your experiment and not just by chance. Conduct your experiment. You likely will need to do multiple runs of your experiment to be confident about your results (this is called reliability).

Data Recording: Take careful notes (observations, measurements) on what happens during your experiment.

Results: Take your data and document it in charts, tables, and graphs.

ANALYSIS:

Compare your results to your initial hypothesis. Did what you expected actually happen? (It's okay if not; scientists learn from unexpected results too!) If it isn't, what might be the reason? For example, were there variables you couldn't control? Could your procedure have been improved? What did you learn from your experiment?

SOURCES:

List any sources you used in your research or to make your display board.

BIBLE VERSE:

Select a Bible verse that relates in some way to your experiment. Look for ways to see God in science.

PROJECT NOTEBOOK for 6th grade only:

Share about your project in a project notebook or folder. Your folder should be neat and orderly and include the following:

- Title Page
- Table of Contents
- Hypothesis: State your prediction, and why you chose to test this hypothesis.
- Facts: Make sure to include all information that you gathered to use in your project. For example: “Airplanes fly because of lift and thrust, which have to be more than their weight and drag.”
- Materials: Give a detailed list of all the materials used in your project. Include with the list any sizes or measurements of the materials used; for example, 3 cups of oil or 5 inches of string.
- Experiment: Describe the steps you used. Include your observations along with photos, drawings, or graphs. The steps should be detailed so that an outside reader can understand exactly what you did.
- Conclusion: Compare the results from your project to your hypothesis. Note whether they are the same or not. If not, what are the possible reasons for the difference? Explain what you learned from this study, and what factors are important for causing the effects that you observed.
- Bible Verse: Include the Bible verse you chose. State in 1-2 sentences how this verse relates to your study.
- Resources: Make a detailed list of all the books, websites, magazines, interviews, etc. used in developing your project. Include the sources for any images you have used in your report as well.

This project notebook will be placed in front of your display board.

DISPLAY BOARD:

See the sample on a previous page in this packet for general information. The information for the board will be excerpts or summaries from your Project Notebook. Items to include:

- The project title
- Your name and type of project (An Experiment by...)
- Your question
- Your hypothesis
- Some interesting facts from your research
- The procedure you followed in doing your experiment
- Any pictures taken or drawn of the experiment
- Your results (use charts, tables, or graphs as appropriate)
- Your conclusion/analysis
- The Bible verse you selected
- The list of references used
- Who helped you on your project
- Put your completed nameplate on back of the board (the nameplate is at the end of this packet)

Along with your display board, you may include some of the items used in your experiment. ***Please check the “Do Not Bring” list in the Guidebook on what objects cannot be brought to the Science Expo.***

If you want to make an **INVENTION**: 5th-6th Grade

METHODOLOGY:

PROBLEM:

Identify a problem you would like to solve or a need you see that could be met. Everyday items were all originally created by someone's invention. What can you create or improve to address that problem?

RESEARCH:

Find out what solutions to the problem (or similar situations) are already in existence. How have others tried to solve the problem? Talk to possible users about what they would like to see in a new product. Interview engineers or inventors you know about the process of developing new products.

POSSIBLE SOLUTIONS:

Brainstorm ideas of what you could create to address your identified problem. Look at the positive and negative sides of each solution *before* choosing which solution you will attempt.

PLAN & CREATE:

Draft Plan: Sketch out your idea for your invention; include diagrams and labels for the parts. Explain how you think your invention will work.

Materials: Determine what materials you will need to build your invention and collect them.

Build: Construct your invention, following your plan.

Obstacles: Note the problems you face while working on your invention and what you do to solve them.

TEST & IMPROVE:

Test: Try out your invention. Does it work as you had intended? If it works initially, repeat your testing to confirm. What could be made better about it?

Improve: Modify your invention based on the results of your first testing.

Retest: Try out your improved invention. Record the results of your testing.

APPLICATION:

Explain how your invention worked and whether or not it adequately addresses your starting problem. How might your invention be used? If your invention didn't work as you intended,

even with improvement and retesting, what did you learn? (It's okay if it does not work, as inventors sometimes try many times before achieving success!)

SOURCES:

List any sources you used in your research or to make your display board.

BIBLE VERSE:

Select a Bible verse that relates in some way to your experiment. Look for ways to see God in science.

PROJECT NOTEBOOK for 6th grade only:

Share about your project in a project notebook or folder. Your folder should be neat and orderly and include the following:

- Title Page
- Table of Contents
- Problem: Describe the problem you wanted to solve with your invention and why you chose this problem.
- Research: List other solutions that are available or that have been tried to address this problem. Describe the qualities possible users want in a new product.
- Solution: Explain the solution you decided to try after your brainstorming. Include the labeled drawings or diagrams of your planned invention. Briefly describe alternate ideas that you rejected.
- Materials: Give a detailed list of all the materials used in your invention. Include with the list any sizes or measurements of the materials used; for example, 3 cups of oil or 5 inches of string.
- Development: Describe the process you used in building your invention. Include obstacles you faced and how you addressed those. Include photos or drawings as appropriate. The steps should be detailed so that an outside reader can understand exactly what you did.
- Testing & Improvement: Describe the testing of your invention and the results. Explain how you modified your invention based on the initial testing. Describe your testing of your improved invention.
- Application: Discuss whether or not you were finally successful in solving your problem with your invention. Explain how your invention can be used, or what future steps could be taken to get to a successful invention.
- Bible Verse: Include the Bible verse you chose. State in 1-2 sentences how this verse relates to your study.
- Resources: Make a detailed list of all the books, websites, magazines, interviews, etc. used in

developing your project. Include the sources for any images you have used in your report as well.

This project notebook will be placed in front of your display board.

DISPLAY BOARD:

See the sample on a previous page in this packet for general information. The information for the board will be excerpts or summaries from your Project Notebook. Items to include:

- The project title
- Your name and type of project (An Invention by...)
- Your problem
- Your idea
- The procedure you followed in creating your invention
- Any pictures taken or drawn of the invention
- Your testing results
- How you improved your invention
- Your retesting results
- Your conclusion about your invention
- The Bible verse you selected
- The list of references used
- Who helped you on your project
- Put your completed nameplate on back of the board (the nameplate is at the end of this packet)

Along with your display board, you may include some of the items used in your experiment. **Please check the “Do Not Bring” list in the Guidebook on what objects cannot be brought to the Science Expo.**

If you want to make a **COLLECTION: 5th-6th Grade**

METHODOLOGY:

PURPOSE:

Determine what natural items (specimens) you are going to collect.

QUESTION:

What do you hope to learn from making this collection?

RESEARCH:

Read about your topic to find out more about the idea you are investigating. Check out 2 or more sources.

COLLECTION:

Materials: Determine and gather any supplies you need to make and categorize your collection. Collect the specimens that will be in your collection. (Photographs are acceptable, if collecting actual items isn't possible.)

Sort/Categorize: Organize your specimens according to one or more characteristics: size, color, weight, location, hardness, or other quality.

Data Recording: Make notes on your collection—how many items, how did you categorize them? Can they be organized in more than one way? Use charts, tables, or graphs if useful for your data.

ANALYSIS:

Explain what you learned from making your collection. How are the items similar or different? What factors cause the differences? Answer your starting question.

SOURCES:

List any sources you used in your research or to make your display board.

BIBLE VERSE:

Select a Bible verse that relates in some way to your collection. Look for ways to see God in science.

PROJECT NOTEBOOK for 6th grade only:

Share about your project in a project notebook or folder. Your folder should be neat and orderly and include the following:

- Title Page
- Table of Contents
- Purpose & Question: State what you chose to collect, what question you wanted to answer, and why you chose this topic.
- Facts: Make sure to include all information that you gathered to use in your project. For example: “Douglas fir cones contain 25-50 seeds.”
- Materials: Give a detailed list of all the materials used in your project. (Photographs are acceptable, if collecting actual items isn’t possible.)
- Collection: Describe the specimens you collected. Explain how you categorized your collection and why you chose to organize it that way. Include photos, tables, or drawings. The descriptions should be detailed so that an outside reader can understand exactly what you did.
- Conclusion: Explain what you learned from this study.
- Bible Verse: Include the Bible verse you chose. State in 1-2 sentences how this verse relates to your study.
- Resources: Make a detailed list of all the books, websites, magazines, interviews, etc. used in developing your project. Include the sources for any images you have used in your report as well.

This project notebook will be placed in front of your display board.

DISPLAY BOARD:

See the general information earlier in this packet. The information for the board will be excerpts or summaries from your Project Notebook. Specific items to include:

- The project title
- Your name and type of project (A Collection by...)
- Your question
- Any interesting facts you learned in your research about the items in your collection
- Any pictures taken or drawn of the collection
- Your results (use charts, tables, or graphs as appropriate)
- The summary of what you learned from your collection
- The Bible verse you selected
- The list of references used
- Who helped you on your project
- Put your completed nameplate on back of the board (the nameplate is at the end of this packet).

Along with your display board, you may include the collection you made. If the collection is too large or for some other reason not displayable at the Science Expo, you should include clear photographs of your collection items. **Please check the “Do Not Bring” list in the Guidebook on what objects cannot be brought to the Science Expo.**

If you want to do a **STUDY**: 5th-6th Grade

METHODOLOGY:

PURPOSE/TOPIC:

Select a subject you want to learn more about.

QUESTION:

Decide on a question about your subject that you want to answer as you do this study.

RESEARCH:

Read about your topic to find out more about the idea you are investigating. Check out at least 2-3 sources.

FINDINGS:

What information did you learn? Your subject will determine what type of facts you will want to include. If you studied a disease, you would include facts about what the disease is, how common it is, who gets it, how you know you have it, and how it is treated. If you explored a physical phenomenon like weather systems or friction, you would describe the phenomenon, explain what other things can influence it, and explore how it is used or seen in everyday life. If you are doing a population study, give some facts about the creatures, like birds or insects or trees, which you expect to find in a certain environment and describe how they fit into their ecosystem. If you studied a math concept, you should explain the concept, and describe how it is used or seen in everyday life. If you studied a scientist, you would include some personal background information about them, and then explain the discoveries they made and why those are important. Use pictures, diagrams, statistics, and examples as appropriate.

EXPERIENCE:

Consider what you learned through your research and look for a hands-on experience that allows you to see your topic in action. Possible options: go somewhere that you can observe or use the item you are studying; interview someone who works with the topic you are studying; do an activity that you find online or in a book that demonstrates the concept you are studying. For example, can you try the vision tests used to diagnose astigmatism, can you make a cloud in a jar, or can you create a fractal design? If you are doing a population study, go observe what creatures you find in a given space, count and identify the different birds, insects, or plants that you see, and then read more about the specific species you observed. Document what happened as you tried out what you learned from your research; use photographs,

drawings, or samples as appropriate.

CONCLUSION:

Summarize how you can answer your starting question, based on what you learned in this study.

SOURCES:

List any sources you used in your research or to make your display board.

BIBLE VERSE:

Select a Bible verse that relates in some way to your study. Look for ways to see God in science.

PROJECT NOTEBOOK for 6th grade only:

Share about your project in a project notebook or folder. Your folder should be neat and orderly and include the following:

- Title Page
- Table of Contents
- Topic & Question: State the topic you chose to study, the specific question you wanted to answer, and why you chose to study this.
- Facts: Explain the information you learned from your research—the facts you found, how those relate to each other and your question, and why those facts would be important.
- Experience: Include diagrams, drawings, photographs along with a summary of the activity you did to experience first-hand what you studied.
- Materials: Give a detailed list of all the materials used in your project (if any). Include with the list any sizes or measurements of the materials used; for example, 3 cups of oil or 5 inches of string.
- Conclusion: Answer your beginning question; explain what you learned from this study.
- Bible Verse: Include the Bible verse you chose. State in 1-2 sentences how this verse relates to your study.
- Resources: Make a detailed list of all the books, websites, magazines, interviews, etc. used in developing your project. Include the sources for any images you have used in your report as well.

This project notebook will be placed in front of your display board.

DISPLAY BOARD:

See the general information earlier in this packet. The information for the board will be excerpts or summaries from your Project Notebook. Specific items to include:

- The project title
- Your name and type of project (A Study by...)
- Your question
- Facts you learned from your study
- Visual aids to demonstrate or illustrate something you learned (be creative)
- Your conclusion
- The Bible verse you selected
- The list of references used
- Who helped you on your project
- Put your completed nameplate on back of the board (the nameplate is at the end of this packet)

Along with your display board, you may include any materials that demonstrate something you learned from this study. **Please check the “Do Not Bring” list in the Guidebook on what objects cannot be brought to the Science Expo.**

ADDITIONAL INFORMATION

DOCUMENTING YOUR SOURCES

Sample for book:

Harbo, Christopher L. The Ultimate Guide to Paper Airplanes. 2011.

Sample for chapter in book (multiple authors):

Hartel, Richard W. & Hartel, Anna Kate. “The Magic of Gelatin” in Food Bites: The Science of Food We Eat. 2008.

Sample for website:

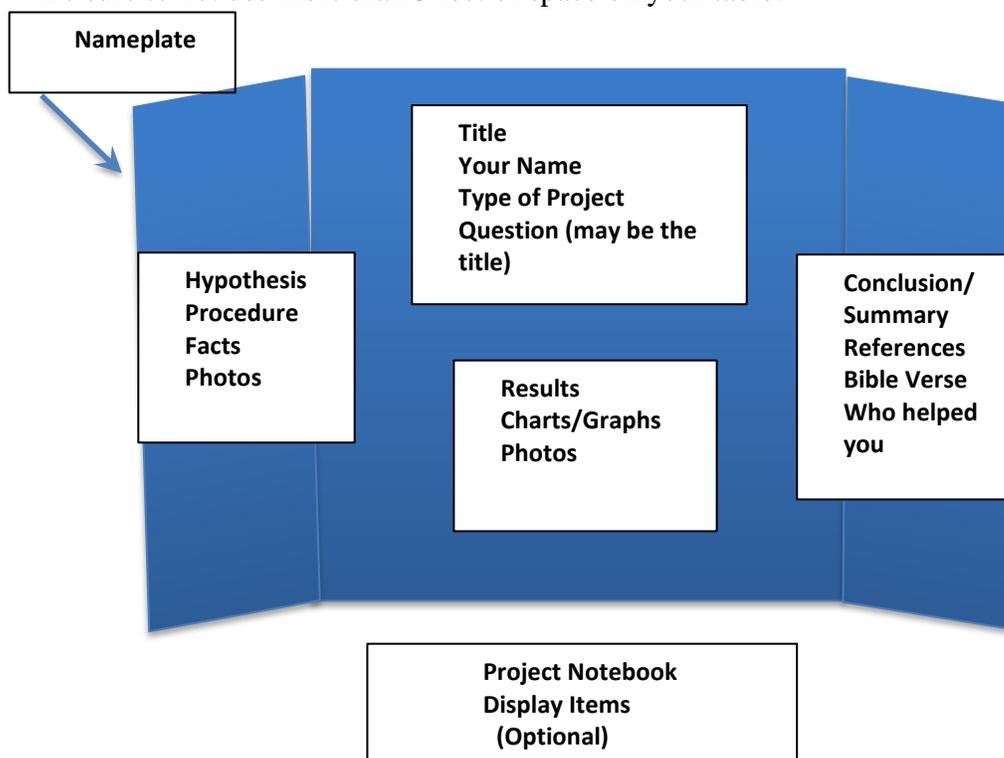
“What Is Protein?” Straight Health. 26 Apr. 2014.

<http://straighthealth.com/pages/qna/what-is-protein.html>

Images used from the Internet may be cited in a separate list, with either the name of the website or the URL.

MAKING THE DISPLAY BOARD

- Fill out and put the nameplate on the right upper corner of the back of your display board (the nameplate is at the end of this packet).
- Your board should be clear, neat, and readable from at least 2 feet away.
- The arrangement of information should be logical; below is an example, but you are free to order the parts in whatever way makes sense for your project.
- Include titles for the sections of your display board. Label all pictures, charts or graphs, and any other materials you include.
- Consider what you can do to make the display visually appealing, like use of color, diagrams, pictures, etc.
- Make sure anything you put on the board is securely attached. You may cut the board down in size, if you need to avoid extra blank space.
- For your display you may include some of the materials from your project, such as a plant you used, examples of your paper airplanes, or the collection you made. **Please note all the rules on what objects cannot be brought to the Science Expo.**
- Be sure to not use more than 3 feet of space on your table.



Thank you to the Science Expo Committee!

Kristen DeBoard

Katrina Wingertsahn

Heather Cooke

Hilary Baylor

Amanda Hearn

These parent volunteers have made this event possible!

2018 CCA Science Expo Nameplate



Science Expo Project Nameplate

Detach and place on the upper right corner on the back of the display board.

TEACHER: _____ GRADE: _____

STUDENT NAME: _____

PROJECT TITLE: _____

PROJECT TYPE: ___ EXPERIMENT ___ INVENTION ___ COLLECTION ___ STUDY

PROJECT CHECKLIST:

- Nameplate is on the back, your name is on the front
- Display board are present (plus any optional display items)
- The question you studied is clearly on the display board
- Your research is included—a few items on the board
- Your **experiment** materials, procedure, & results are shown on the board

OR

Your **invention** problem, solution, materials, process, & testing are shown on the board

OR

Your **collection** materials, descriptions, & categorizing are shown on the board

OR

Your **study** demonstration/experience is shown on the board

- Your conclusion(s) are clearly listed on the display board
- You included a relevant Bible verse on your board
- You listed references on the display board & in your notebook
- You included who helped you on your display board
- For 6th Graders ONLY:** All of the requirements above are required to be placed in a notebook or folder and placed with your project

