Broadcom MASTERS 2022 Application Questions

This document previews the application questions for the Broadcom MASTERS online application. ALL entries must be submitted through the online application system; hard copies will not be accepted. The application deadline is **Wednesday, June 15, 2022 at 8pm Eastern Time**. The online application can be accessed at https://broadcommasters.smapply.org.

Applicants may email masters@societyforscience.org with any questions they may have. Please be aware this document contains many branching questions that are hidden within the application. Some of these questions will only appear based on the entrant's response to a previous question. The application appears here in its longest state.

Application Instructions

Congratulations, you are now registered in the Broadcom MASTERS competition, a program of Society for Science (The Society)! Tell us about yourself and your awesome project through this application form. We are here to help you along the way – check out the Resources tab in the upper right hand corner for helpful hints, and feel free to email us at any time with your questions. Please add **masters@societyforscience.org** as a contact in your email account to make sure you receive important notifications.

Take these next steps to complete your application:

1. Review the complete Official Rules 2022.
2. Complete the four Parts of this application. You may save your work and return to the site as often as you'd like before the deadline, even after you hit submit!
3. Upload your visual aid PDF (data, charts, graphs, etc.).
4. Upload your signed Parent/Guardian Permission Form 2022.
5. Upload your science fair approval forms (if applicable).
6. Download your application to review your responses, using the button in the upper right hand corner (button will appear after you have completed Part 1).
7. Submit all information by **Wednesday, June 15, 2022, at 8:00pm Eastern Time**. Be sure to hit the "Submit" button!

Part 1: Registration

Please complete this form to register as an official nominee of the 2022 Broadcom MASTERS competition. The content in Part 1 is not used in evaluation. Please note that this section contains a second page.
*Required Field

STUDENT INFORMATION

- Student First Name, Middle Name, Last Name*
- Student Nickname (optional)
- Student Email Address* (we will use this email address for communications about this year's competition)
- Student Long Term Email Address (please provide an email address that we will be able to reach you at in the future for alumni requests)
- Student Phone Number
- Date of Birth (mm/dd/yyyy)*
- Gender (optional)
- Gender Pronouns (optional)
- Ethnicity (optional)
- Race (optional)
- T-Shirt Size (adult sizes)*
- Mailing Address

If you are selected as one of the Top 300 MASTERS or 30 finalists, do we have permission to share your contact information with your members of Congress?*
- Yes/No

Your Name for Public Materials
- Please tell us how you would like your name to appear in public materials relating to Broadcom MASTERS (press releases, print materials, etc.)*
    o First Name, Middle Name (optional), Last Name, Nick Name for Public Materials*

Languages
- Do you speak another language besides English*? Yes/no
- What languages do you speak?* (select all that apply).
- Fluency* Explain your level of fluency in speaking the language(s) selected above.

Are you an alumnus of the Broadcom MASTERS program?*
- Yes, I am a former entrant, former semifinalist or former finalist. (Welcome back!)
- I have received a nomination in the past, but this is my first time applying. (Congrats!)
- This is my first year receiving a nomination! (Awesome!)

PARENT/GUARDIAN INFORMATION
This information will be used for communication purposes after the application has closed.
Parent/Guardian First Name, Last Name*, Relationship to Entrant*, cell phone number (xxx-xxx-xxxx)*, home phone number (xxx-xxx-xxxx), Parent/Guardian Email Address*

SCHOOL INFORMATION

School Name
Type of School*
- Public
- Private
- Charter
- Home
- Online
- Magnet

School Address*

Please list your middle school science teacher, research teacher, informal science program educator, or homeschooling instructor. The person you list here must work at your middle school and will receive application reminders and notifications from the Society. This teacher will receive awards if you advance to the Top 300 MASTERS or finalist level. You will not be permitted to change the teacher listed here after the application deadline.

Middle School Teacher Information*
Teacher Prefix, First Name, Last Name, Email Address
Are you related to this teacher?* (This information is not used in the evaluation of your application.)
- Yes
- No
Would you identify this teacher as your research mentor, or the person who has most supported your science or engineering project?*
- Yes
- No

Project Mentor Information
Please identify the person who has most supported you with your research project, other than a parent or guardian. This person will be notified if you advance in the Broadcom MASTERS competition.
Mentor Prefix, First Name, Last Name, Email Address

Middle School Principal Information*
Principal Title, First Name, Last Name, Email Address

SCIENCE FAIR & PROJECT INFORMATION
You were nominated for the Broadcom MASTERS by _____. Did you receive a second nomination from another science fair?*
- Yes/No

Is this a team project?*
Just a friendly reminder: each member of a team project needs to submit their own independent application in their own words.

- Yes/No

If you worked on a team, please list the name(s) of your team member(s). If you did not work on a team, please leave this question blank.

- Team Member #1 First Name, Last Name
- Team Member #2 First Name, Last Name

Why did you decide to conduct a research project this year? (select all that apply)*

- It was required by my science teacher/for my science class
- I was interested in a topic and wanted to investigate it
- I completed a project last year and wanted to continue my research
- My teacher encouraged me to complete a project
- My parents encouraged me to complete a project
- A friend wanted to do a team project and I decided to join
- Other (please describe)

Please select all that apply to your research experience this year*

- Conducted research at home or on my own time, apart from school
- Conducted research as part of my science class
- Enrolled in a research class at school
- Participated in a research program at my school after school or on weekends
- Relative, friend, or acquaintance made or helped me make an initial connection that led to my acceptance into a research setting (not at school)
- Teacher or school provided contacts or connections to scientists/engineers
- Identified and contacted a scientist/engineer independent of any support

Would you describe your project as an invention?*
Use the following definition to help you decide: An invention is a novel or unique device, process, or method. It could be an improvement on an existing product or a new process for creating a tangible product.

- Yes (please briefly explain why)/ No

Patents
Do you have any patents related to your research? Responses to this question are shared with our communications team for PR purposes (select all that apply):

- I have at least one patent.
- I have a patent pending.
- I am in the process of applying for a patent.
- I plan to apply for a patent in the future.
- I do not have, nor do I plan to apply for any patents related to my research.

- I do not have a patent for my Broadcom MASTERS research, but I do have a patent or patent pending for a different project.

Part 2: Project Information

This is your chance to tell us about your awesome science or engineering project in your own words. If you are feeling stumped, take a look at your science fair poster/board for inspiration. This section is designed to feel like a judging interview at your science fair. You will have an opportunity to share charts, tables, graphs, photos, etc. containing your data in a PDF visual aid later in this application. Note: there are two pages in this section. Reminder: Each member of a team project needs to submit an independent application in your own words.
*Required field

Select a category that best describes your project*:
These categories might differ from the categories at your local science fair. Here's a helpful hint to help you choose: think about what type of scientist or educator would best understand your project. You can read project category descriptions here.

- Animal Science
- Behavioral & Social Sciences
- Biochemistry
- Chemistry
- Computer Science & Software Engineering
- Energy & Sustainability
- Engineering

- Environmental & Earth Sciences
- Mathematics
- Materials Science
- Medicine & Health Sciences
- Microbiology
- Physics (includes Air/Space Science)
- Plant Science
- Robotics & Intelligent Machines

Project Title*
This is how your project title will appear in our materials if you are selected to the Top 300 MASTERS or top 30 finalists. For any symbols, please write the name of the symbol in all capital letters (ALPHA, GAMMA, etc.) Otherwise, please use normal Title Case.

- Full Project Title*
- If the title of your project requires any special symbols or formatting (such as italics) please explain here:

What is your current grade (2021/2022 academic year)*?
- 6th
- 7th
- 8th

Remind us, is this a team project*? Yes/no

Project Overview
What was the inspiration for your science or engineering project?* (max 200 words)

- How did you come up with your topic? Please describe if there was a personal experience, challenge or individual(s) that inspired your choice of this project. What did you learn about

your topic before you started your project? If your topic was assigned or you got your project idea from an external source, what was the source? How did you make it original?

Project Summary (max. 250 words)
Please Select ONE question, then answer in the text box below*

- Submit an abstract for your project (max. 250 words)
- You are on an elevator and have only until the 10th floor to describe your project to a potential investor. Create an elevator pitch for your project. (max. 250 words)

If selected as one of the Top 300 MASTERS or 30 finalists, do we have permission to share this summary with media?*

- Yes/No

Why is your project topic important to research? Who or what does your project impact and/or benefit?* (max. 100 words).

Project Details
What was your research question? For engineering projects: what was the human need or problem you wanted to solve?* (max. 50 words)

What was your scientific hypothesis or engineering design criteria?* (max. 125 words)

Explain your methodology and procedures for carrying out your project or building your design in detail, addressing the questions below. * (max. 400 words).

- What data did you collect and how did you collect that data? For engineering projects, how did you build your design?
- What were your testing procedures? For engineering projects, what was the device/prototype you designed, and how did you test your design?
- Discuss your control group and variables tested, including your independent, dependent, and controlled variables. For engineering projects, discuss the controls and variables tested in your design. You can reference figures, tables, and/or images from your visual aid in this section (See the Video Resources tab if you need an example of how to do this).

How did you analyze and interpret your data?* (max. 300 words)
Use this section to write about the process of analyzing and interpreting your data.

- What were the results of your data collection?
- Did you notice any patterns in the data?
- Did you use any statistical methods or special analysis? How did you determine the appropriate tests to use?
- For engineering projects, this question still applies. You can reference figures, tables, and/or images from your visual aid in this section (See the Video Resources tab if you need an example of how to do this).

What conclusions did you reach*? (max. 250 words)

- Revisit your hypothesis or engineering design criteria. Does your data support your hypothesis - why or why not? Describe any limitations you had in your study and how that might have affected your results.

What questions or problems arose that you were not expecting? How did you, or would you in the future, adjust your experimental design or your engineering design process to address these problems?* (max. 150 words)
If you chose to continue exploring this topic, what would be the next step?* (max. 100 words)

What was your favorite part of working on your research project? What did you learn about yourself from this experience?* (max. 100 words)

Where did you conduct your experimentation?* Please select all that apply.
- Home
- School
- Field
- Lab (Please Specify)
- Workplace (Please Specify)
- Other (Please Specify)

A science or engineering project is never a solitary activity. Tell us who contributed to your research and what resources did they bring to your project:* (max. 250 words)
- Where and how did you conduct your research? What special equipment did you use? Who supervised and/or collaborated with you on your research (i.e. parents, teachers, mentors, peers)? What were their contributions? Were there others who helped you perform your research who you wish to tell the evaluators about?

If you were a member of a team, please list each team member and explain each person's role in researching, developing and presenting your project. Describe how work was divided among your team. (max. 150 words)

COVID-19 has impacted students across the country in different ways. Describe how you were/are impacted by COVID-19, related to your learning and/or your ability to work on your research project if applicable.* (max 200 words). Examples include:
- Illness or loss within your family or support network
- Employment or housing disruptions within your family
- Food insecurity
- Toll on mental and emotional health
- Availability of computer or internet access required to continue your studies
- Access to a safe and quiet study space

Upload a Visual Aid

Each nominee is required to submit a Visual Aid as a part of the application. The Visual Aid is for nominees to show any visuals related to their materials/methods, research data, and/or analysis used to support the findings of the project. Visual Aids must follow the guidelines below as per the Official Rules 2022:

1. The Visual Aid must be no more than 2 pages, sized 8.5x11 inches each.
2. Each page should have no more than 3 visuals. Visuals can include figures, charts, tables, photos, and/or other graphics you may want to reference that represent your methods, data, analysis, and/or findings.
3. You do NOT need to include your name and project title in your Visual Aid
4. The following are the format requirements for your visual aid:
   1. The Visual Aid must be uploaded in the online application as a PDF.
   2. All text should be easily readable when viewing the entire page at once. Use a font size that is readable at 100% zoom. The smallest allowable font size is 16 pt.
   3. Text should only be used for captions/descriptions of figures and titles. Keep titles and captions short.
   4. Portrait or Landscape orientation are both acceptable.
5. The following are **not allowed** within your visual aid:
   1. Active hyperlinks to websites with additional information about your project.
   2. Any videos or audio embedded within the Visual Aid PDF.
   3. Any identifiable photographs of yourself and/or any human subjects. Photographs where faces are blurred or digitally covered in some way are acceptable.
   4. Additional text for any questions within the application or other essays about your project.
   5. Photograph of your physical project board or digital poster file

If you have uploaded a file and would like to replace it, click the three dots in the upper right corner of this task and select "Reset". This will remove your previous file and will allow you to upload a new one.

PDF is the only acceptable file format for these documents. If you do not have access to PDF creation/writer software, please get a parent/guardian's permission to use a free online program that creates PDFs, such as PDF Converter.

Part 3: Essay Questions

This section provides you with an opportunity to tell us more about yourself and your thoughts about science, technology, engineering and math (STEM) as they relate to your project and in general.

Select one (1) question in each of the sections: About Me, and Solve a Problem, then compose your answers in the resulting text boxes.

About Me* (please select ONE question, then answer in the text box below):

- What is the one characteristic you admire most about yourself? Tell us about a time when this characteristic was helpful in a specific situation and what do you think this characteristic will help you to achieve in the future? (max. 250 words)
- As part of a project for school, you are instructed to fill a time capsule with three objects that best represent you, to be opened by students at your school 100 years in the future. What three objects would you choose, and why? (max. 250 words)

Solve a Problem* (please select ONE question, then answer in the text box below):

- You have been selected as the Commander for the first human mission to Mars and you need to recruit the rest of the team members. The trip will take 3 years in total: one year to travel to Mars, one year to spend in orbit and on the surface, and one year to return to Earth. There is no opportunity for additional crew to join the mission once it has left Earth. The team of astronauts on this first mission will consist of you and three other people. They all must have different careers, and one has to be from a non-STEM
- You are a government official in a city that has recently implemented a tax on sugary drinks (such as soda). How would you design a study to determine whether or not this tax is effective at impacting the negative effect of sugary drinks on the population's health? (max. 300 words)

Part 4: Personal Interests

Tell us a bit about yourself as an individual, apart from your science fair project and your thoughts on science or engineering. Share information that will help us get to know you better.

*Required field

Check activities in which you are currently or have been involved (check all that apply):

- Science Club
- Science/Math Olympiad
- Boy Scouts/Girl Scouts (provide rank)
- 4-H
- Future Farmers of America
- Boys & Girls Club
- School Publications
- Music (instrument or choir)
- Athletics
- Art Club

- Computer Club
- Community Service (where?)
- Robotics
- Odyssey of the Mind
- Science Bowl
- Science or Engineering Summer Camp
- Yearbook
- Student Council
- Foreign Language studies (list language)
- Other

Which instrument? (select all that apply)

- Piano
- Cello
- Violin
- Trumpet
- Guitar
- French Horn
- Saxophone

- Flute
- Clarinet
- Choir/Singing
- Drums/Percussion
- Oboe
- Other, please specify

Which sport? (select all that apply)

- Lacrosse
- Soccer
- Baseball
- Basketball
- Tennis
- Swimming
- Golf
- Volleyball

- Track/Cross Country
- Gymnastics
- Softball
- Dance (you may specify type)
- Martial Arts (you may specify type)
- Fencing
- Other, please specify...

What hobbies or extra-curricular activities do you most enjoy and why? (max. 100 words)

Science Training Institutes, Research Programs, Summer Programs

Please list the names of programs where you have conducted research projects, science summer camps you have attended, etc.

We know COVID-19 may have impacted your ability to participate in extracurricular activities, sports, and summer programs this year. If you would like to elaborate on your participation in any of the above, please use the space below. (max. 100 words)

Tell us about a single accomplishment you are most proud of and why, OR tell us about a challenge you have overcome*. (max 100 words)

Is there additional information that you wish to share with the judges to help them better know you as an individual and what is personally important to you? Future goals, favorite topics, role models, etc.– this is your chance to share anything (max. 100 words)

Which one of the following STEM careers are you most interested in pursuing*?
Please note-- careers will display below in random order.

- Electrical Engineer
- Climatologist
- Medical Doctor
- NanoSystems Engineer
- Cartographer
- Biologist
- Biomedical Engineer
- Neurologist
- Chemist
- Mechanical Engineer
- Cardiovascular Technician
- Industrial Engineer
- Astrophysicist
- Scientist
- Physicist
- Science Teacher
- Animal Trainer
- Sound/Light Engineer
- Pharmacist
- Epidemiologist
- Aeronautical Engineer
- Surgeon
- Surveyor
- Meteorologist
- Civil Engineer
- Materials Scientist
- Computer Engineer
- Nutritionist
- Optometrist
- Nuclear Engineer
- Dentist
- Orthodontist
- Physical Therapist
- Nurse
- Hydrologist
- Anthropologist
- Forensic Scientist
- Forest Ranger
- CAD Technician
- Imagineer
- Astronomer
- Audiologist
- Laboratory Technician
- Respiratory Therapist
- Health Care Professional
- Geologist
- Speech/Language Pathologist
- Veterinarian
- Statistician
- Mathematician
- Emergency Medical Technician
- Seismologist
- Zoologist
- Semiconductor Processor
- Satellite Imaging Engineer
- Biochemist
- Environmental Engineer
- Web Developer
- Psychologist
- Software Developer
- Botanist
- Dietician/Nutritionist
- Other

Why does this career interest you*? (max. 100 words)

Science Fair Paperwork Wizard

In this section you will be asked about what paperwork you completed, what safety measures you followed, and/or what approval process you completed for your research project. Note: You may be required to upload paperwork from your local fair. Please upload files in PDF format only. Other file formats will NOT be accepted. If you do not have access to PDF creation/writer software, please get a parent/guardian's permission to use a free online program that creates PDFs, such as PDF Converter. Hint: If you need to remove and replace a file after you have completed the section, click the three dots in the upper right corner of this section and select "Edit". You can then scroll down to your saved pdf, click the three dots next to it and select "delete". You will then have the ability to upload a new document. To view the paperwork you have submitted, click the three dots next to the document and select "View."

This is what you entered for where you conducted your experimentation in Part 2 of the application: _____. Is there anywhere else that you conducted your research?*

List your Research/ Experimentation Location*

Please provide a brief summary of the approval and permission process at your school or science fair, including answers to the following questions*:
- Who approved your project idea?
- Who supervised your project?
- What type of permissions did you receive throughout the process?
- What type of paperwork did you complete, if any?

Please list the start and end dates of your research (MM/DD/YYYY).*

Is this project a continuation of a research project from a previous year?*
- Yes (if yes, upload continuation form)
- No

Did you complete any general required paperwork for your fair, such as Regeneron ISEF Form 1, Form 1A, Form 1B, Form 1C, or a Form 2, or equivalent forms?
- Yes
- Yes, but I submitted it to my local fair and no longer have a copy
- No

Check all aspects among the following that were used in your research* (must select at least one):
- Human Participants - Used Survey
- Human Participants - Did not use survey
- Vertebrate Animals
- Hazardous Chemicals, Activities and Devices
- Recombinant DNA
- Microorganisms

- Human/Animal Tissue ((fresh/frozen tissue, including primary cell lines, human and other primate established cell lines and tissue cultures)
- Blood, blood products and body fluids
- None of the above

Because you selected an option other than "None of the above," your project may have required pre-approval by a Scientific Review Committee (SRC) or Institutional Review Board (IRB). You MUST upload copies of your science fair paperwork if your science fair or school required these to approve your research. Many fairs use the Regeneron ISEF approval forms; however, some fairs have their own local equivalent. Please see the Regeneron ISEF Rules for clarification: https://www.societyforscience.org/isef/international-rules/.

If you no longer have your science fair paperwork and you cannot get copies, you can upload a letter signed by the adult that approved your project (i.e. SRC or IRB team member, teacher, fair director). This letter should include what you worked with (human subjects, animals, microorganisms, hazardous chemicals/devices, etc.), what approvals you obtained, and/or what safety measures you took while conducting your research. Please email masters@societyforscience.org with any questions about what science fair paperwork you should provide. Please do not upload supplemental essays, abstracts, links, or documents about your project, as only the written information in your application will be reviewed.