Team Advisor's User Guide

Competition Year

2018-2019

Table of Contents

Welcome 1

Competition Background Information 1

Team Advisor Background Information 1

Getting Started 2

Overview of Responsibilities 3

Familiarize yourself with eCYBERMISSION 3

Role of an eCYBERMISSION Team Advisor 3

Registering 3

Assigning Students to Teams 3

Mission Folders 7

Mission Folders 8

Mission Folders Overview 8

Mission Challenge Overview 8

Mission Folder Method Overview 8

Choosing a Mission Challenge and Method 9

Sections of the Mission Folder 10

Submitting a Mission Folder 11

How to avoid disqualification 14

Surveys 15

What constitutes a survey? 15

Survey Approval Form 15

Institutional Review Board (IRB) 16

What is an IRB? 16

When is IRB approval required? 16

IRB Approval Form 16

Appendix 18

Mission Folder Scorecards 18

Tips from former TAs 32

Welcome

Welcome to eCYBERMISSION and your Team Advisor's (TA) User Guide. Thank you for serving as a Team Advisor (TA) for this year's eCYBERMISSION Competition. This guide provides you with all the information that you will need to complete your TA duties. Please take some time to become familiar with this guide, as well as the eCYBERMISSION website.

COMPETITION BACKGROUND INFORMATION

eCYBERMISSION is a web-based, Army sponsored, Science, Technology, Engineering and Mathematics (STEM) competition free for students in grades six through nine. Students work in small teams, mentored by an adult supervisor, to identify and solve challenges in their communities. By applying STEM principles to a problem affecting their community, students not only discover the applications and relevance of STEM education, but also realize how they can make a difference in their communities.

The concept of eCYBERMISSION was developed around the U.S. Army's mission to create a forum that engages a broad spectrum of America's youth in STEM. The goals of eCYBERMISSION are to inspire and improve student performance in STEM, and to encourage future careers in these fields.

Since its inception in October 2002, eCYBERMISSION has received praise from educators across the country. From the program's use of technology and team-based approach, to its open-ended challenges and community focus, eCYBERMISSION invites students from all proficiency levels, backgrounds and interests to participate.

TEAM ADVISOR BACKGROUND INFORMATION

A Team Advisor (TA) is anyone over the age of 21 who has interest in working with a team of 3-4 students in grades 6, 7, 8, or 9. A TA must have a relationship with at least one of the students on the team such as teacher, parent, community leader, etc. They are vitally important to the success of eCYBERMISSION.

Team Advisors can advise as many teams as they wish, but each team must be made up of students who are in the same grade and live in the same state. A Team Advisor may work with different teams in different grades.

The primary role of the Team Advisor is to provide student teams with assistance. Specifically, the Team Advisor is expected to:

- Self-register on the site
- Assist teams, if necessary, in choosing a Mission Challenge
- Monitor team activity on the Discussion Forums and team page
- Review the team's Mission Folder submission

GETTING STARTED

In preparation for your role as an eCYBERMISSION Team Advisor, please review the following information in addition to this guide:

- Review the eCYBERMISSION Rules. There are often changes from year to year.
- Review the overall eCYBERMISSION timeline.
- Review the Mission Challenges, judging criteria, and awards which are all available on the eCYBERMISSION website: www.ecybermission.com.
- Review all general competition information, including how teams complete and submit Mission Folders.
- Contact Mission Control if you have any questions or concerns at 1-866-GO-CYBER (462-9237) or via email at missioncontrol@ecybermission.com.

Overview of Responsibilities

FAMILIARIZE YOURSELF WITH eCYBERMISSION

Get to know the program's main components, such as Mission Challenges, previous winning projects, and who can compete by visiting the eCYBERMISSION website at http://www.ecybermission.com.

ROLE OF A TEAM ADVISOR

A Team Advisor (TA) is responsible for the work submitted by their eCYBERMISSION team or teams. It is the responsibility of a team advisor to guide the students in their work and make sure they are:

1. Following all rules set forth for the competition
2. Conducting themselves in a safe, professional manner
3. Completing their work on time
4. Submitting work that is up to the standards of the TA

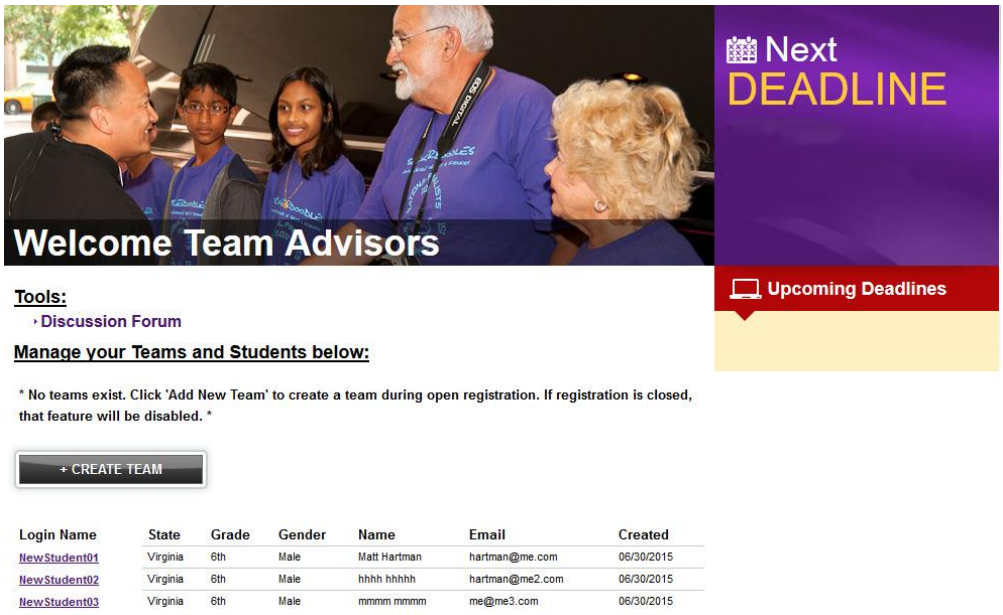
REGISTERING

A TA must register at www.ecybermission.com BEFORE their students register. This is required so that students can link themselves to their Team Advisor.

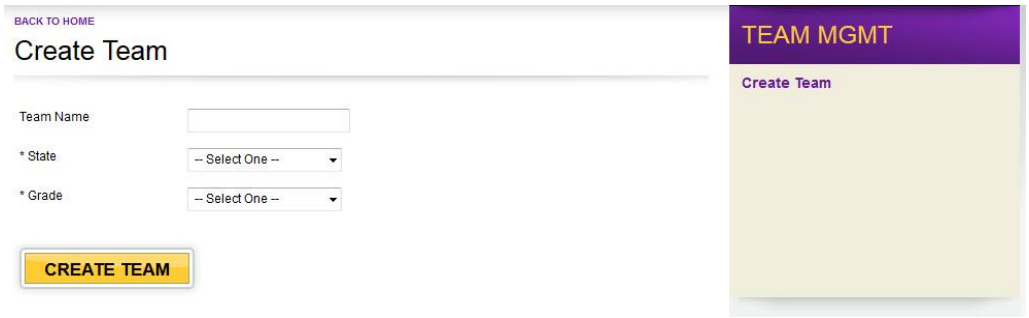
ASSIGNING STUDENTS TO TEAMS

The TA is responsible for assigning students to teams. Upon registration, students select you as their Team Advisor (it is important that you are registered in the system before they do so)). Students who have selected you as their TA will appear on your log-in page and you will receive email notification each time a new student selects you as their Team Advisor. You must create teams and assign students to them BEFORE the registration deadline passes. Students not assigned to teams prior to the registration deadline will be unable to participate.

To assign students to team, first log in to your account. At that point you should see a screen like the one below:

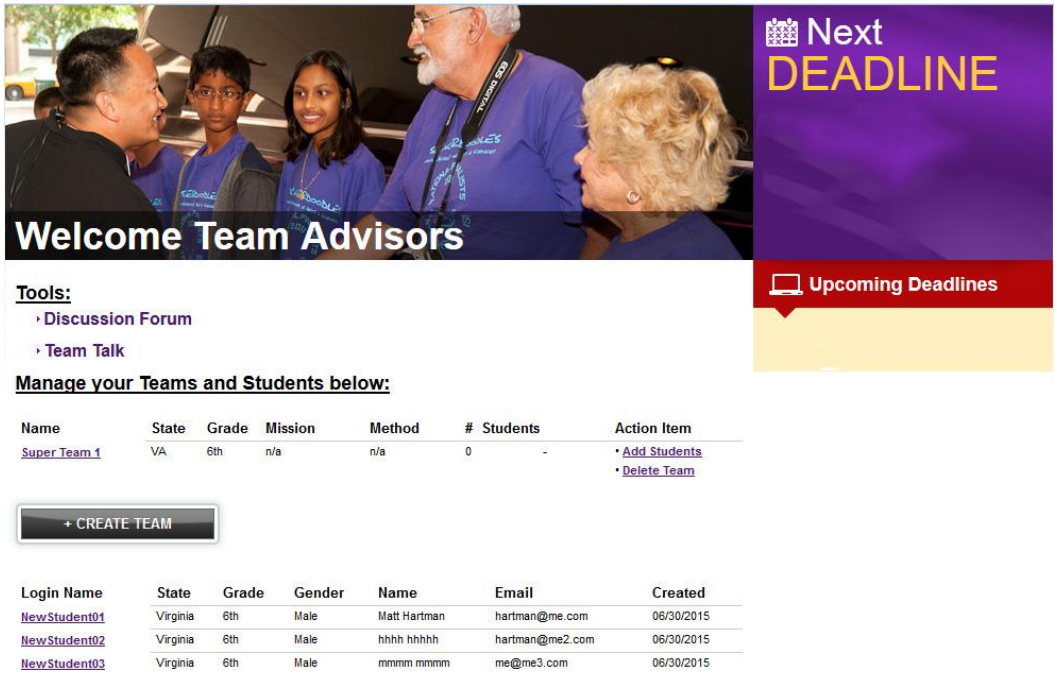


Notice that on the right you will see a bar with deadlines. This will be updated with information such as the registration deadline, submission deadline, etc. On the left you see a link to the discussion forum and a list of your teams. In the account above there are no teams, but note the “Create Team” button and the three students that are linked to this TA. In order to assign those students to teams you must first create a team. You can do this by clicking on the “Create Team” button. You will be taken to this screen:

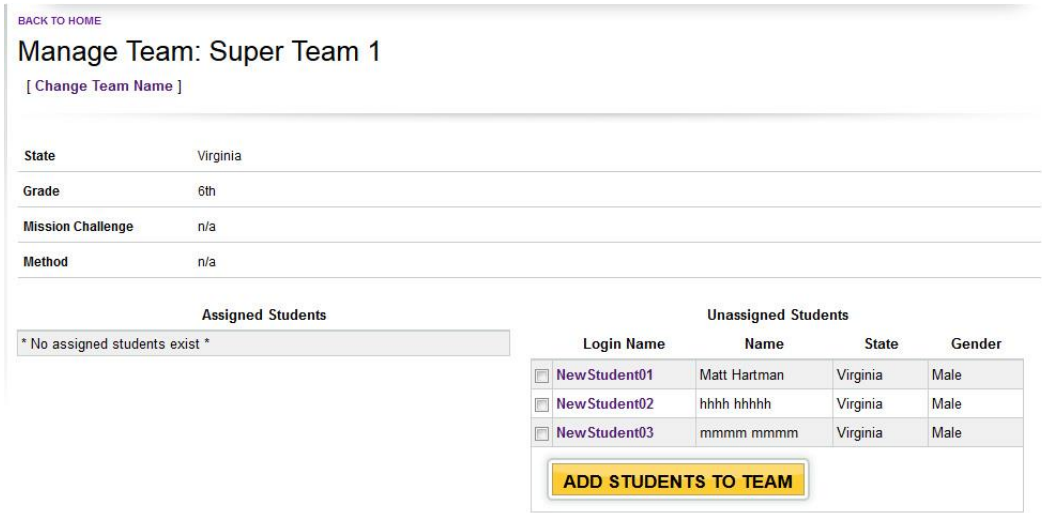


On this screen you can select a Team Name (this can be chosen by you or the students, but we encourage students to come up with their own team names). Enter the state and grade of the given team. Make sure you select the correct grade and state as students who are in a different grade or state form that assigned to the team will not be able to be added to that team (i.e. if the team is assigned as 7th grade you would not be able to add a 6th grade student to the team and if a student is registered in Pennsylvania you could not add them to a team assigned to Virginia).

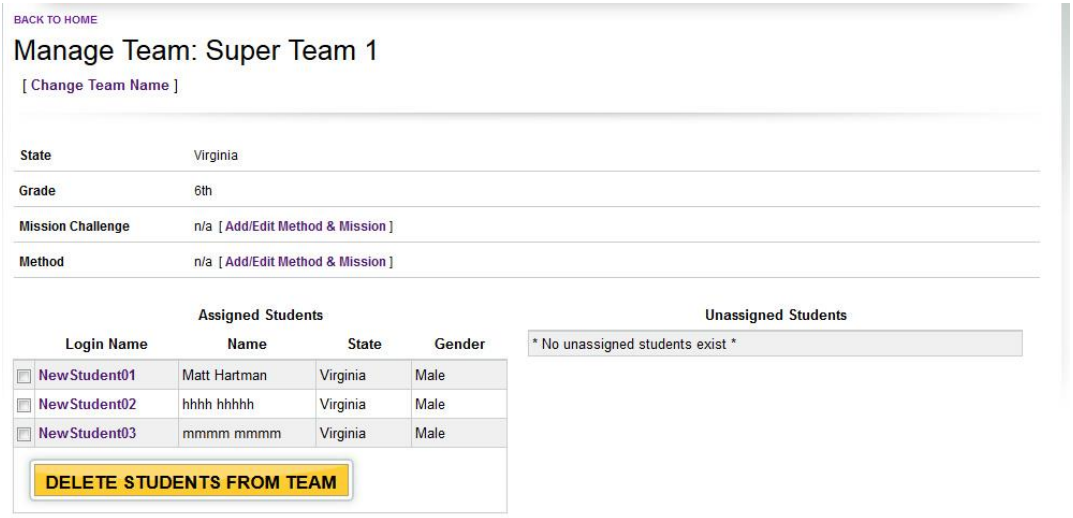
Once you have entered the team name, state, and grade click the “Create Team” button. Your main login screen should now look like this:



Note that there is a link for Team Talk on this page, as well as a team listed. Here you can see the state and grade of the team and you can also see what Mission Challenge has been selected, what Method has been selected and the number of students assigned to the team. Teams need 3-4 students to be complete. You will then see links where you can “Add Students” or “Delete Team.” Let’s try “Add Students.” It will take you to this screen:

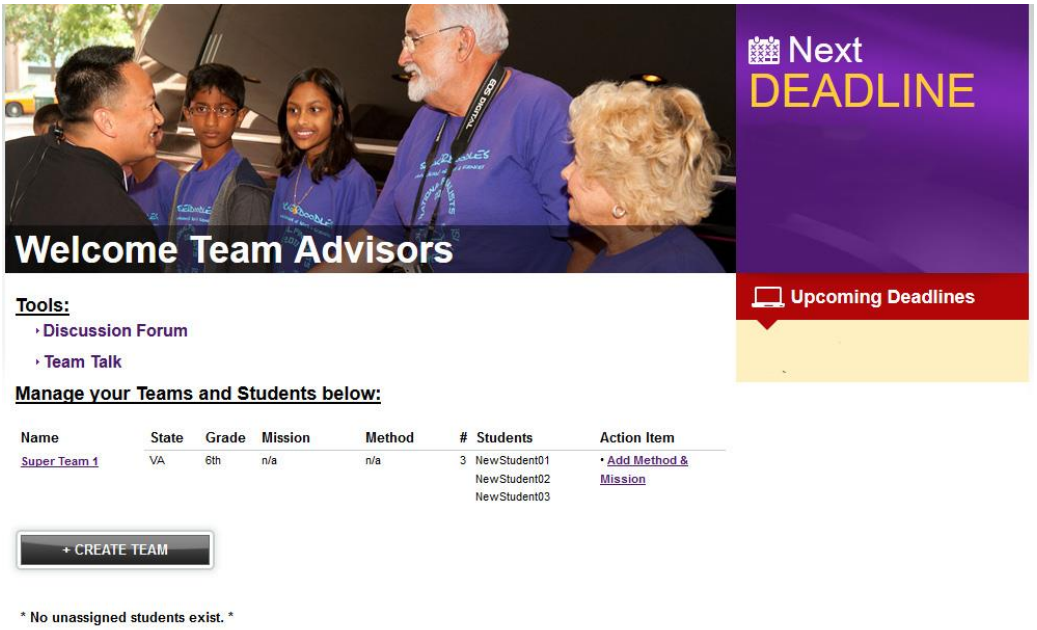


On this page you have ability to change to team name and also add students to you the team. To add students, simply click the check box next to the name of the students you would like to add to this team. Once you have selected the students you wish to add (remember each team must have 3-4 students) click on “Add Students to Team.”



Once you have clicked the button, you will see that the students are now listed under “Assigned Students” on the left. If you have any students linked to you that have not yet been assigned to teams they will remain under “Unassigned Students” on the right.

At this point you can choose the Mission Challenge and Method for the team if you like. Or, if you aren’t ready to do that (the students have not discussed what they would like to do yet) you can wait and do it later. Click the “Back to Home” link at the top left of the page once complete.



Note that the team now shows you which students have been assigned to the team. Team assignments are now complete and ready for a Mission Challenge and Method.

MISSION FOLDERS

Mission Folders are the method used to submit student projects. A Mission Folder is made up of four sections:

- Team Collaboration
- Scientific Inquiry or Engineering Design
- Benefit to the Community
- Mission Verification

While students are responsible for all of the content contributed to their Mission Folder, the TA must review this work periodically throughout the contest year. In addition, the TA must also set the method (Scientific Inquiry or Engineering Design) and the Mission Challenge for each team before the team will be able to access and begin work on their Mission Folder. The TA is also responsible for submitting the Mission Folder once all work is completed. This submission process includes validating when the team began work on the project as well as verifying that all work was completed exclusively by the students.

Mission Folders

MISSION FOLDER OVERVIEW

Teams are required to answer a series of questions when completing their Mission Folders. eCYBERMISSION requires students to follow either the Scientific Inquiry Using Scientific Practices Mission Folder or the Engineering Design Process Mission Folder. There are slightly different questions for each type of Mission Folder. The Mission Folder questions are designed to help students stay focused and structure their work, while also providing them freedom to discover and explore. Mission Folders will be judged by three criteria: Application of Scientific Inquiry Using Scientific Practices or Engineering Design Process, Team Collaboration and Benefit to the Community.

In order for a team to begin work on their Mission Folder they must be on a complete team. This means the team must have at least three and no more than four students who are in the same grade and live in the same state. Once they are all registered and assigned to the same team the Team Advisor must select a method (either Scientific Inquiry or Engineering Design) and a Mission Challenge (explained below). Only after both have been selected will a team be able to begin work on their Mission Folder.

MISSION CHALLENGE OVERVIEW

Teams are provided seven Mission Challenges to choose from. Each is designed to give teams latitude in selecting their particular projects. The information on each Mission Challenge can also be viewed on the website by clicking on the "Mission Challenges" section, located on the Virtual Judge home page.

The seven available Mission Challenges are:

- Alternative Sources of Energy
- Environment
- Food, Health & Fitness
- Technology
- National Security & Safety
- Robotics
- Forces and Motion

The teams' assignment is to pick a Mission Challenge and work to solve an issue in their community based on their selected topic. Teams are instructed to research, hypothesize, experiment; or apply engineering design processes and use STEM to help the community.

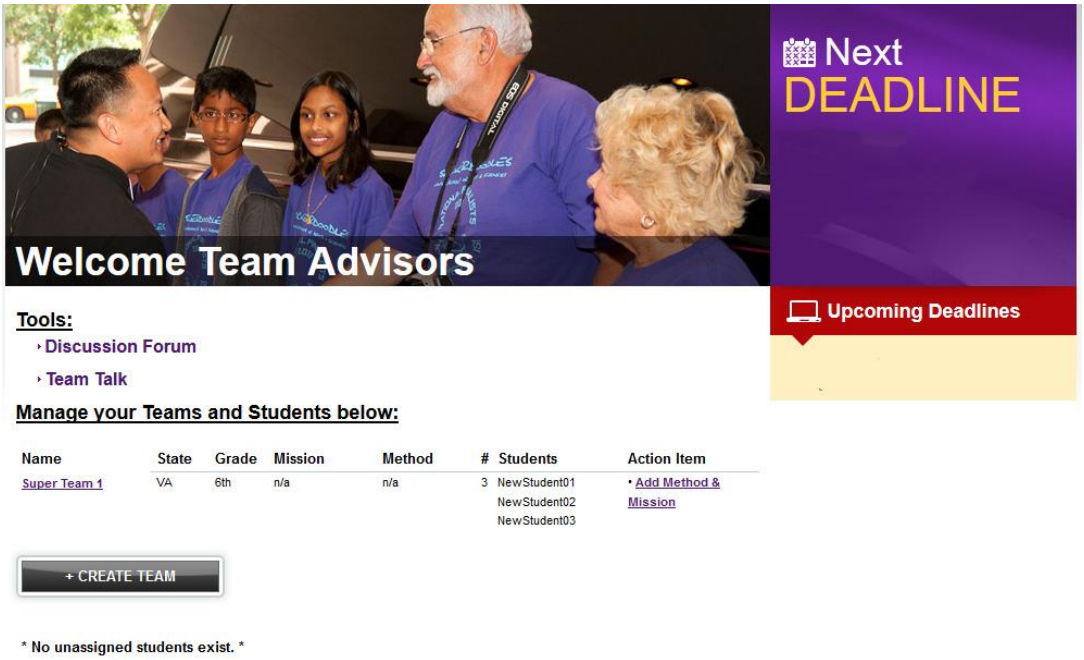
MISSION FOLDER METHOD OVERVIEW

Team must choose between two different methods for completing their Mission Folder: Scientific Inquiry Using Scientific Practices or the Engineering Design Process. For Scientific Inquiry Using Scientific Practices, the students will be conducting a science experiment complete with developing and testing a hypothesis. For the Engineering Design Process, students will be developing a prototype or model and testing that prototype or model. Essentially, if students are attempting to answer a question about a community problem they will choose Scientific Inquiry. If

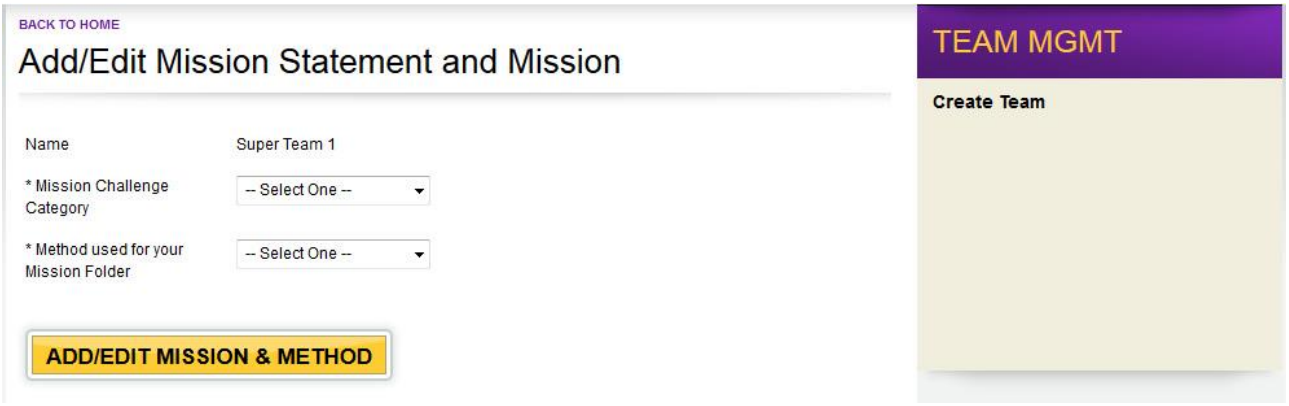
they are going to try to design something to solve the problem they will choose Engineering Design. You can find the questions and judging rubrics for both methods under the Advisor Resources at www.ecybermission.com or in the Appendix of this document.

CHOOSING A MISSION CHALLENGE AND METHOD

To add a Mission Challenge and Method to a Mission Folder for a complete team, simply log in to your account. You will see a screen like this:

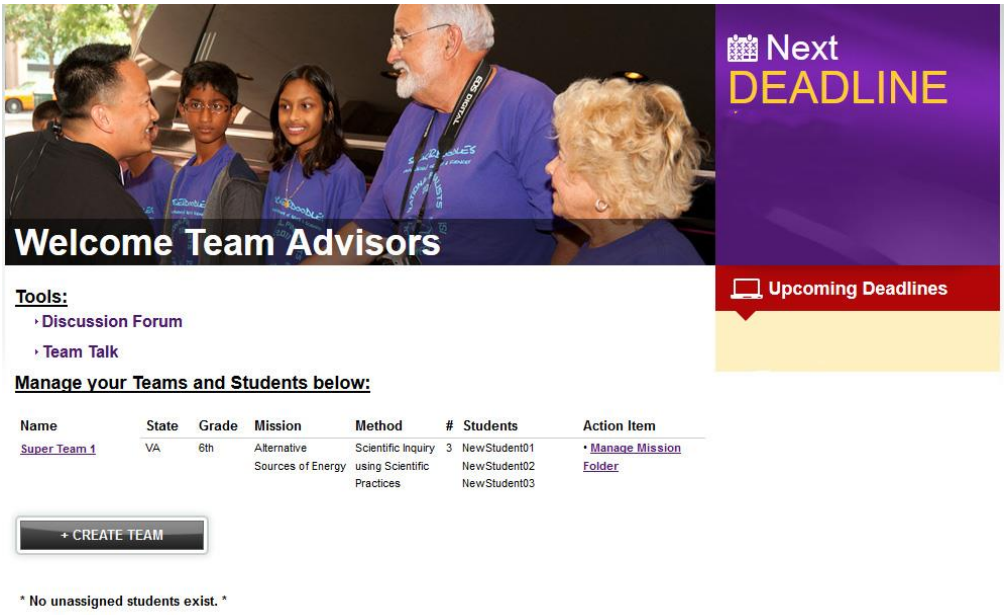


Note that there is a link next to any team that does not have a Mission Challenge and Method assigned to it that says “Add Method & Mission.” Click on that link for the team to which you’d like assign a Mission Challenge and Method.



Here you can select the Mission Challenge and the Method for this team. Once you have selected these, you can click the “Add/Edit Mission & Method” button. The reason is says “Edit” is that you can change these later if the team changes their minds. But note: that while changing the Mission Challenge will not affect any text entered into the Mission Folder, changing the Method will wipe

out any work that has been done so it is important to have students copy and paste any work into an outside document so that the information will not be lost. Questions for Scientific Inquiry and Engineering Design are different, so the entire Mission Folder will reflect that change.



The example above now shows that the team has a state and grade listed; a Mission Challenge and Method assigned, and three students whose usernames are assigned to the team. There is also now a new link next to the team titled “Manage Mission Folder” which allows you to see the team’s progress toward each section.

If you need to make changes to the team (i.e. the team members on the team, the team name, etc.) you can do so up until the registration deadline. This is done by clicking on the team name.

SECTIONS OF THE MISSON FOLDER

Mission Folders are divided into four sections:

- Team Collaboration
- Scientific Inquiry OR Engineering Design
- Benefit to the Community
- Mission Verification

The Team Collaboration, Benefit to the Community, and Mission verification sections are the same for both the Scientific Inquiry Using Scientific Practices and Engineering Design Process Methods. The second section changes because the questions for Scientific Inquiry deal with the experiment that the students are completing and the question for Engineering Design deal with the prototype or model that students are building. For the specific questions in each section you can view the judging rubrics in the Advisor Resources or the “How to Complete a Mission Folder” guide in Team Resources or in the Appendix of this document.

NOTE: Students should not work on their Mission Folder at different computers at the same time

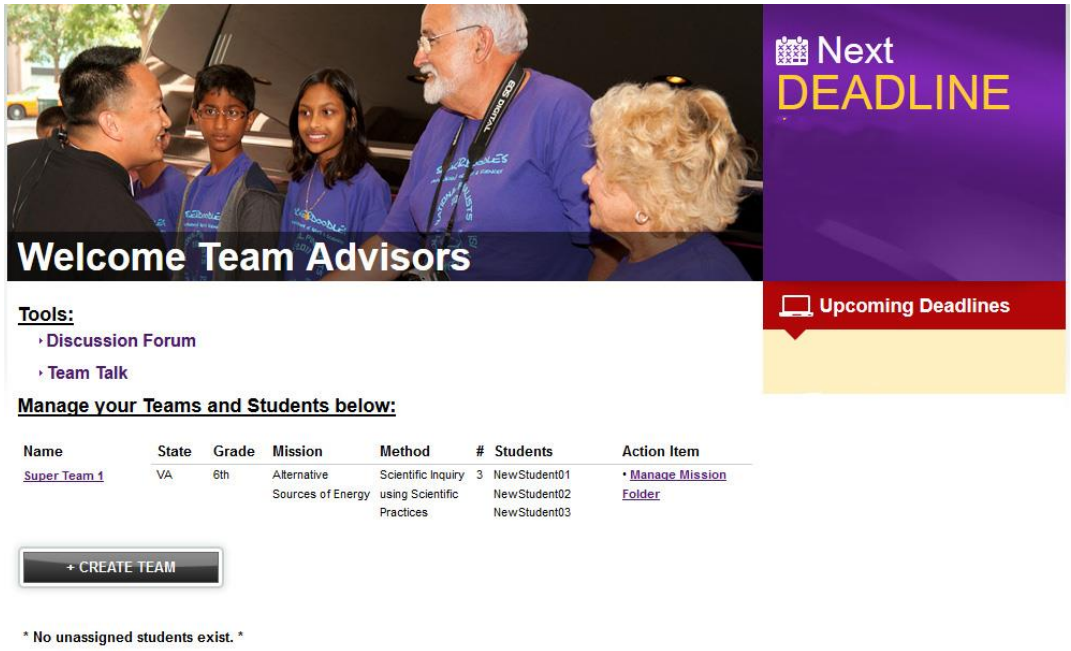
as it can lead to a loss of entered information. Work can be done at different computers but should be done at different times to avoid any problems or loss of work.

SUBMITTING A MISSON FOLDER

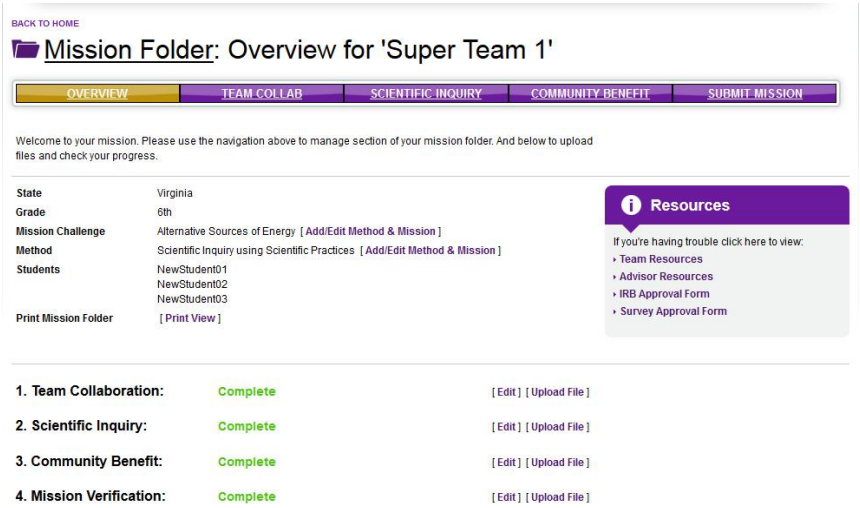
Submitting the Mission Folder is the responsibility of the Team Advisor. Once a team has completed their Mission Folder they will notify you. We recommend that you look over the Mission Folder prior to submission to check for grammar and spelling mistakes, clarity, or anything that you feel the students may want to change before submitting.

To submit a Mission Folder:

1. Log in to your account. You will see a screen like this:



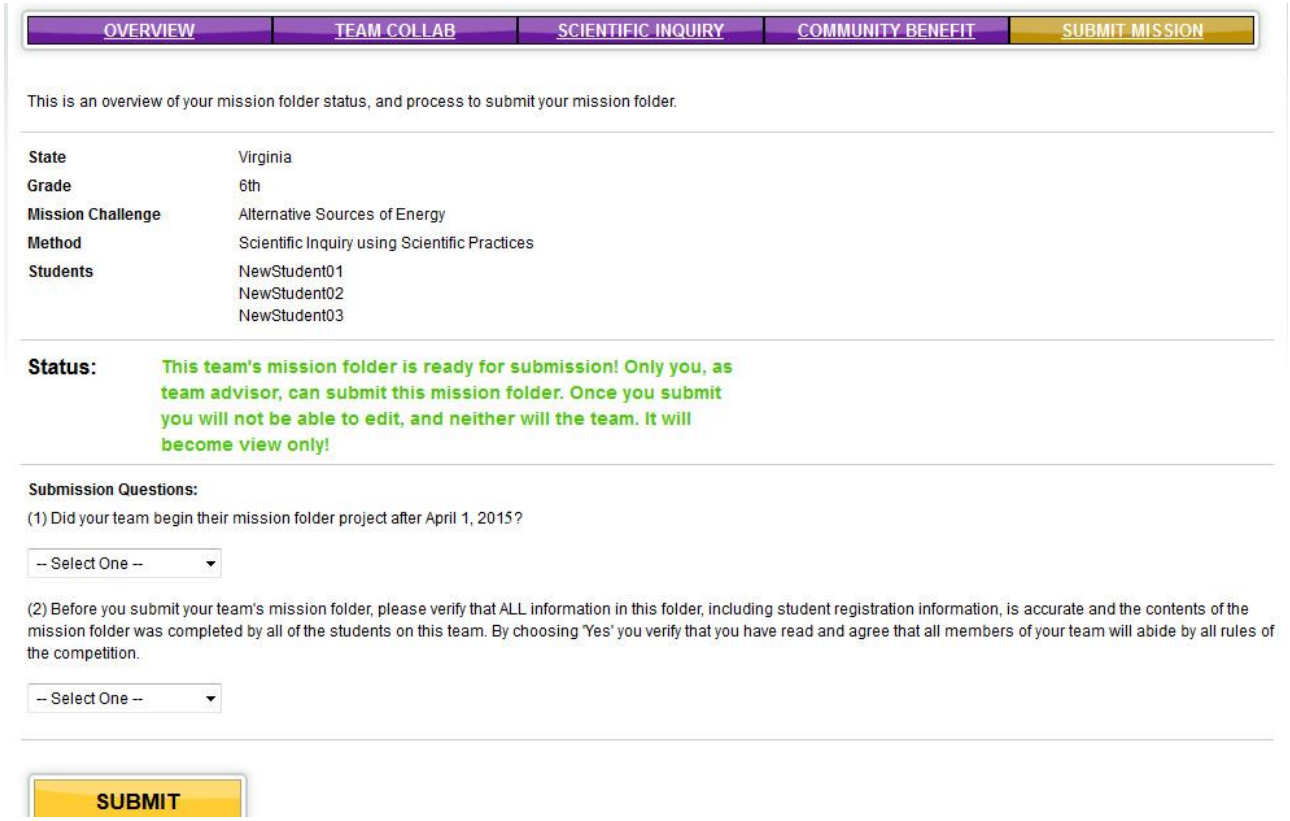
2. Click on the link “Manage Mission Folder” to select the team’s Mission Folder you are submitting. It will take you to this screen:



Note that the green “Complete” simply means that there is text in every text field in that section, it does NOT necessarily mean that every answer is a complete answer. **It is advised that you look through each section by clicking on the “Edit” button.** Also note that any uploaded files appear under the corresponding section to which they belong. This Mission Folder sample has NO files uploaded to it. For the complete process of how to upload a file see the “How to Complete a Mission Folder” document in Team Resources.

If you would prefer to check the Mission Folder as a hard copy, you can print the Mission Folder by selecting the “Print View” link above the section titles seen here.

Once you have reviewed all sections of the Mission Folder you can click the “Submit Mission” button on the far right of the toolbar. However, please be sure to carefully review the Mission Verification section. This section contains student declarations regarding any testing on vertebrates or use of a survey, the abstract for their project, and also where any IRB approval forms or survey approval forms are uploaded. Once you click the ‘Submit Mission” button, It will take you to this screen:



Here you can see that the Mission Folder is ready for submission. Again, this is based simply on text being entered in each text field. Once you are ready to submit, answer the two questions. If both are answered “Yes” you can then click the “Submit” button. You will be asked if you are sure you want to submit the folder. Click “OK” if you are sure.

At this point, you will receive an email confirming that this Mission Folder has been submitted. You will also be taken back to your home page:

At this point, when you log in you will see a screen like this. Note that the Mission Folder is now "View Only" so neither you nor the students can edit it. If any changes DO need to be made after this point, you can unsubmit the folder by clicking "Unsubmit." If you do this, be sure that you submit the folder again after the changes are made but before the registration deadline.

HOW TO AVOID DISQUALIFICATION

Mission Folders can be disqualified for numerous reasons to include:

- Lack of a properly completed IRB approval form and/or proper documentation from medical professionals uploaded prior to student testing
- Lack of a properly completed survey approval form uploaded prior to survey being administered
- Failure to follow the competition rules (including any safety violations and plagiarism)
- Incomplete Mission Folder

In order to avoid disqualification, make sure that Mission Folders have all necessary forms completed and attached, and that they follow all competition rules. The forms will be explained in further detail below.

Surveys

WHAT CONSITUTES A SURVEY

Surveys are anything intended to document the opinions or preferences of a study group. These may be given to fellow students, teachers, parents, community members, etc.

SURVEY APPROVAL FORM

All surveys must be approved by the team's school administration AND an Institutional Review Board (IRB).

Each team conducting a survey must fill out the eCYBERMISSION Survey Form and IRB Approval Form, have them signed by the school administration, and upload the forms as part of the Mission Folder submission in the appropriate section BEFORE students administer the survey.

The survey/IRB approval form can be found in the Competition Rules section on the eCYBERMISSION website or you can get it here.

Any Mission Folder that contains the use of a survey, but does not have properly completed survey approval and IRB forms (including all required signatures) signed and dated BEFORE the students administer the survey, are subject to disqualification.

Institutional Review Board (IRB)

WHAT IS AN IRB?

An IRB is a committee that has been formally designated to approve, monitor, and review research involving vertebrates with the aim to protect the rights and welfare of the research subjects. eCYBERMISSION does not participate in or sponsor the IRB process in any way.

WHEN IS IRB APPROVAL REQUIRED?

An IRB must give approval for any tests conducted on vertebrates. This includes any testing done on humans (i.e. exercise, trying different foods, completing a written test etc.) or any creature that has a backbone. If an IRB is not available locally, the school can create their own using the IRB Approval Form. Please note that the IRB form and all supporting documents must be attached to the Mission Folder in the correct section when it is submitted.

This means that any tests that involve human subjects in any way (tasting, smelling, exercising, changing diets, interacting, etc.) are not permitted as part of the eCYBERMISSION competition without IRB approval. Even if a test does not SEEM dangerous, it is not permitted (without IRB approval) if there is any outside stimulus introduced as a result of the project.

Observations made of subjects in their natural habitat that do not pose a health risk to the subject by introducing a foreign object or stimulant ARE permitted without IRB approval.

IRB APPROVAL FORM

The IRB approval form is available in the Competition Rules or here.

If an IRB is being formed at the school, it requires three members:

- The school science fair coordinator or school science teacher **(May NOT be the students' classroom teacher or team advisor!)**
- The school principal or administrator **and**
- One of the following: a psychologist, psychiatrist, medical doctor, or medical professional (this can be the school or district licensed nurse).

As the IRB approval form makes clear, the IRB needs to address the following questions:

1. Are **humans** involved in the study?

    a. If Yes, and the human(s) *could* be harmed in any way, then the teacher needs to ask the student to have a **medical doctor** or **physician's assistant** provide written certification that he/she has reviewed safe practices with the student researcher **prior** conducting the research and submit the certification to the IRB along with the IRB Approval form. Make sure the student understands that he/she cannot begin work on the project until IRB approval is obtained.

    b. If Yes, and it is obvious that the human(s) *will not* be harmed in any way, the teacher needs to ask the student to submit an IRB Approval form to the IRB.

Make sure the student understands that he/she cannot begin work on the project until IRB approval is obtained and all three signatures have been collected.

2. Are animals involved?

    a. If Yes, and the animal(s) *could* be harmed in any way, then the teacher needs to ask the student to have a **veterinarian** review safe practices with the student researcher and check the condition of the animal(s) **prior** to and **after** conducting the research. Ask the student to submit the certification of both to the IRB along with the IRB Approval form. Make sure the student understands that he/she cannot begin work on the project until IRB approval is obtained.

    b. If Yes, and it is obvious that the animal(s) *will not* be harmed in any way, the teacher needs to ask the student to submit an IRB Approval form to the IRB. Make sure the student understands that he/she cannot begin work on the project until IRB approval is obtained.

Note that IRB Approval, if required, must be gained BEFORE students begin work on the project. In addition, the IRB approval form AND any supporting documents (i.e. certifications from medical professionals) must be attached to the Mission Folder in the "Mission Verification" section BEFORE students begin testing. Any Mission Folder containing testing on vertebrates that does not have a properly completed IRB approval form (containing all required signatures) AND all necessary documentation BEFORE testing begins are subject to disqualification.

Engineering Design Process Mission Folder Rubric

Use of Engineering Design

Suggested file attachments: bibliography, experimental procedure, photos of experiment, data spreadsheets, charts, graphs, PowerPoint presentations if used as part of experiment
Total maximum points in this section: 350

Mission Folder Questions and Answers	*Judging Criteria*	*Max Points*	*Scoring Details*	*Score*
Problem Statement				
What problem in your community will your team attempt to solve using the engineering design process?	Selected problem deals with an interesting or challenging community issue	*15*	*0 Points: Does not state a problem* *3 Points: Statement, but is not a community-based problem* *5 Points: States a community-based problem but not clearly* *7 Points: States a community-based problem, but rather generic in nature* *10 Points: States an interesting or challenging community-based problem* *15 Points: States a very unique community-based problem*	
	Clear question to be answered	*10*	*0 Points: Does not state a question to be answered* *3 Points: Question is stated but not related to problem* *7 Points: Question is stated, related to problem, but not clear* *10 Points: Question is stated, related to problem and clear*	
Research your problem. You must learn more about the problem you are trying to solve and also what possible solutions already exist. Find AT LEAST 10 different resources and list them here. They should include books, periodicals (magazines, journals, etc.), websites, experts, and any other resources you can think of. Be specific when listing them, and do not list your search engine (Google, etc.) as a resource.	Literature search is extensive and scholarly sources are reputable and varied	*20*	*Add 1 Point for EACH generic resource (i.e. name of website but not a specific page, etc.)* *Add 2 Points for EACH specific resource*	
Explain what you learned from your research. What did you find out about your problem that you didn't know before? What kinds of possible solutions already exist? Be sure to put this in your OWN words, do not just copy and paste information. Also, be sure to cite your sources.	Describes relevant information that relates to the selected problem	*25*	*10 Points: Answers only one of the questions* *20 Points: Answers both questions* *25 Points: Answers both questions and all sources cited throughout*	

Design Development				
What MUST be a part of your solution? This is called the criteria. What does your solution need to have in order to solve the problem? (NOTE: Don't discuss a specific solution here, just the characteristics of a good solution).	Clearly explains the criteria for their solution.	*15*	*3 Points: Explains what is required for their solution* *6 Points: Explains what is required for their solution and criteria are measurable* *9 Points: Explains what is required for their solution and criteria are measurable and connected to the stated problem* *12 Points: Explains what is required for their solution and criteria are measurable, connected to the stated problem, and connected to information learned in team research* *15 Points: Explains what is required for their solution and criteria are measurable, connected to the stated problem and connected to information learned in team research, and explanation is very clear and complete*	
What limits are there on your solution? These are called constraints. Does it need to be a certain size? A certain weight? Is the cost a factor? Write down all of the limits your solution has.	Clearly explains the constraints for their solution.	*15*	*3 Points: Explains what is required for their solution* *6 Points: Explains what is required for their solution and constraints are measurable* *9 Points: Explains what is required for their solution and constraints are measurable and connected to the stated problem* *12 Points: Explains what is required for their solution and constraints are measurable, connected to the stated problem, and connected to information learned in team research some constraints may be missing* *15 Points: Explains what is required for their solution and constraints are measurable, connected to the stated problem and connected to information learned in team research, and explanation is very clear and appears to include all required constraints*	
Based on your criteria and constraints, what is your proposed solution to the problem you chose? Explain what it will look like and how it will work. If you can, include a detailed, labeled drawing.	Clearly explains the solution proposed to the problem	*25*	*5 Points: States a proposed solution to the problem* *10 Points: States a proposed solution to the problem that addresses stated criteria* *15 Points: States a proposed solution to the problem that addresses stated criteria and addresses stated constraints* *20 Points: States a proposed solution to the problem that addresses stated criteria and addresses stated constraints and is very clear and fully explained* *25 Points: States a proposed solution to the problem that addresses stated criteria and addresses stated constraints and is very clear and fully explained and a labeled drawing is included*	

How will you test your solution? The BEST way to test your solution is to build a working model or a prototype that you can actually use. OR you can guess how your solution will work BASED ON your research. Which method will you use and why?	Clear selection of method for testing solution is described	*10*	*2 Points: Chooses a method to test proposed solution* *8 Points: Chooses a method to test proposed solution and explains why chosen method was selected* *10 Points: Chooses a method to test proposed solution and explains why chosen method was selected and explanation is clear and makes sense*	

Mission Folder Questions and Answers	Judging Criteria	Max Points	Scoring Details	Score
Build Model or Prototype				
If you built a prototype or model, explain how you built your prototype or model, step-by-step including all safety precautions. If you guessed how your solution would work BASED ON your research, explain important information from your research that you used to prove how your solution would work and be sure to cite your sources.	Explanation of how prototype or model was constructed OR what information was used for an educated guess about how the prototype would work is clear and addresses the problem stated.	*25*	*10 Points: Explains how prototype or model was constructed OR explains what information was used to make a prediction* *15 Points: Explains how prototype or model was constructed OR explains what information was used to make a prediction and relates to proposed solution* *20 Points: Explains how prototype or model was constructed OR explains what information was used to make a prediction and relates to proposed solution and to the stated problem* *25 Points: Explains how prototype or model was constructed OR explains what information was used to make a prediction and relates to proposed solution and to the stated problem and is very clear and detailed*	
Test Model or Prototype				
Explain how you tested your prototype or model. Be sure to include every step of your testing including all safety precautions that were taken. If not stated it will be assumed no safety precautions were taken. If you are using research to guess how your solution will work, explain step-by-step how it will work and why.	Explanation of procedures is clear and complete	*30*	*10 Points: Lists all steps necessary to test prototype OR all steps necessary for a proposed test (if not able to build prototype)* *20 Points: Lists all steps necessary to test prototype OR all steps necessary for a proposed test (if not able to build prototype) and includes all necessary safety precautions* *25 Points: Lists all steps necessary to test prototype OR all steps necessary for a proposed test (if not able to build prototype), includes all necessary safety precautions, and clearly relates to proposed solution* *30 Points: Lists all steps necessary to test prototype OR all steps necessary for a proposed test (if not able to build prototype), includes all necessary safety precautions, clearly relates to proposed solution, and is very clear and correctly uses engineering terminology*	

What problems did you find with your solution? Be specific since you will need to redesign based on these problems.	Describe all problems encountered during testing or predicts problems for proposed testing	*25*	*15 Points: Explains AT LEAST 1 problem encountered during testing OR proposed testing (if not able to build prototype)* *20 Points: Explains AT LEAST 1 problem encountered during testing OR proposed testing (if not able to build prototype)and problem(s) encountered is/are explained in detail* *25 Points: Explains AT LEAST 1 problem encountered during testing OR proposed testing (if not able to build prototype), problem(s) encountered is/are explained in detail, and is very clear and free of spelling and grammar mistakes*	
Describe all of the changes you made to your prototype or model (or proposed prototype) after your first test. Why will these changes improve your solution?	Description of how the team changed (or would change) their prototype	*25*	*5 Points: Describes changes made to prototype or model (or proposed prototype if not able to build one)* *15 Points: Describes changes made to prototype or model (or proposed prototype if not able to build one) and changes are related to problems encountered during testing (or predicted problems)* *20 Points: Describes changes made to prototype or model (or proposed prototype if not able to build one), changes are related to problems encountered during testing (or predicted problems), and appear necessary to achieve proposed solution* *25 Points: Describes changes made to prototype or model (or proposed prototype if not able to build one), changes are related to problems encountered during testing (or predicted problems), appear necessary to achieve proposed solution, and includes an explanation of why the changes will improve their solution.*	
Present the data you collected from your tests or from your research. If you tested a prototype or model then include all of the numbers you gathered during your testing and all observations you made. Use of graphs and charts is HIGHLY encouraged. If you used research to prove how your solution would work, be sure to include all of the numbers, charts, and graphs you used to make your case.	A sufficient amount of data is collected and well-presented	*35*	*0 Points: No data presented* *7 Points: Data presented but not clearly* *14 Points: Data presented but not related to proposed solution* *21 Points: Data presented clearly and related to proposed solution but incomplete* *35 Points: Data presented clearly, related to proposed solution and complete*	

What are your potential sources of error? Remember, this doesn't mean "Did everything work?" since all tests have potential sources of error, so make sure you understand what that means. Explain how these sources of error could have affected your results.	Lists sources of error and explains how these could have affected the results	*25*	*0 Points: Does not list any errors* *5 Points: Incomplete list of sources of error* *10 Points: Lists sources of error only, no explanation* *15 Points: Lists sources of error, explains how affected the results, but vague* *20 Points: Lists sources of error, explains how affected the results, lacks some detail* *25 Points: Lists sources of error, explanation very thorough and free from spelling or grammar errors*	

Mission Folder Questions and Answers	Judging Criteria	Max Points	Scoring Details	Score
Drawing Conclusions				
What conclusions can you draw based on the data you gathered during your tests?	Provides thorough explanation of conclusions drawn based on their testing	*50*	*0 Points: No conclusion provided* *3 Points: Conclusion provided* *10 Points: Conclusion is related to testing conducted* *20 Points: Conclusion is related to the testing and includes data collected* *30 Points: Conclusion is related to the testing, includes data collected, and refers to proposed solution* *40 Points: Conclusion is related to the testing, includes data collected, refers to proposed solution, and refers to original problem stated* *50 Points: Conclusion is related to the testing, includes data collected, refers to proposed solution, refers to original problem stated, and is well written and clear and free from spelling and grammar errors*	
			Use of Engineering Design Subtotal	

Benefit to the Community				
Suggested file attachments: brochures, fliers, posters, website links Total maximum points in this section: 90				
Mission Folder Question and Answer	***Judging Criteria***	***Max Points***	***Scoring Details***	***Score***
Explain how investigating the problem your team chose will help the community. Be sure to include the impacts your research will have on individuals, business, organizations, and the environment in your community (if any). Make it very clear why solving this problem would help your community.	Indicates how this project can help the community	*30*	*0 Points: No explanation as to how investigation could help the community* *10 Points: Explanation is vague* *15 Points: Explanation explains the problem, but not how the investigation could help* *20 Points: Explanation includes the problem and the benefits of the investigation but lacks some detail* *25 Points: Explanation is complete and very detailed with some spelling/grammar errors* *30 Points: Explanation is complete and very detailed with no spelling/grammar errors*	
	Indicates the effects of the project on members of the community	*30*	*0 Points: No impacts are identified* *10 Points: Impacts are identified but some are missing* *20 Points: Impacts are identified but lack some detail* *25 Points: All impacts are identified and very detailed with some spelling grammar errors* *30 Points: All impacts are identified and very detailed with no spelling/grammar errors*	
	Provides clear explanation of benefit to the community	*30*	*0 Points: The benefit to the community is not clear* *15 Points: Benefit to the community is somewhat clear* *20 Points: Benefit to the community is clear with some spelling/grammar errors* *30 Points: Benefit to the community is made very clear with no spelling/grammar errors*	
			Benefit to Community Subtotal	

Team Collaboration				
Suggested file attachments: Breakdown of team responsibilities, team plan, experiment schedule Total maximum points in this section: 60				
Mission Folder Question and Answer	***Judging Criteria***	***Max Points***	***Scoring Details***	***Score***
How was your team formed? Was your team assigned or did you choose to work with each other?	Explains how the team was formed	*5*	*0 Points: Does not explain how team was formed* *3 Points: Explains how team was formed but lacks detail* *5 Points: Fully explains how team was formed*	
Provide a detailed description of each team member's responsibilities and jobs during your work on the Mission Folder.	Clear description of the responsibilities of each team member	*20*	*10 Points: Description of roles is described and assigned* *20 Points: Description of roles is described and assigned and responsibilities assigned for each team member*	
Did your team face any problems working together? If so, how did you solve them? If not, why do you think you were able to work together so well?	Explains the problems (or lack thereof) faced by the team and how they were overcome (or not)	*15*	*0 Points: Does not answer the question* *5 Points: Lists problems but not how they were solved OR says they faced no problems but does not explain why* *10 Points: List problems and how they solved them but lacks detail OR explains why they worked well together but lacks detail* *15 Points: Explains problems and solutions in detail OR provides detailed explanation as to why they worked well together*	
What were some possible advantages to working together as a team on this project? How would working as individuals have made this project more difficult?	Explains how working together was helpful	*20*	*10 Points: Advantages to working as a group provided OR how working as individuals would have been more difficult provided* *20 Points: Both questions are answered*	
			Team Collaboration Subtotal	
			Mission Folder Total Score	

Scientific Inquiry Using Scientific Practices Mission Folder Rubric

Use of Scientific Inquiry

Suggested file attachments: bibliography, experimental procedure, photos of experiment, data spreadsheets, charts, graphs, PowerPoint presentations if used as part of experiment
Total maximum points in this section: 350

Mission Folder Questions and Answers	*Judging Criteria*	*Max Points*	*Scoring Details*	*Score*
Problem Statement				
What problem in your community will your team be investigating through scientific inquiry using scientific practices? Specifically, based on this problem, what question will you be trying to answer?	Selected problem deals with an interesting or challenging community issue	*15*	*0 Points: Does not state a problem* *3 Points: Statement, but is not a community-based problem* *5 Points: States a community-based problem but not clearly* *7 Points: States a community-based problem, but rather generic in nature* *10 Points: States an interesting or challenging community-based problem* *15 Points: States a very unique community-based problem*	
	Clear question to be answered	*10*	*0 Points: Does not state a question to be answered* *3 Points: Question is stated but not related to problem* *7 Points: Question is stated, related to problem but not clear* *10 Points: Question is stated, related to problem and clear*	
Research your problem. You must learn more about the problem you are trying to solve and also what testing has already been done. Find AT LEAST 10 different resources and list them here. They should include books, periodicals (magazines, journals, etc.), websites, experts, and any other resources you can think of. Be specific when listing them, and do not list your search engine (Google, etc.) as a resource.	Literature search is extensive and scholarly sources are reputable and varied	*20*	*Add 1 Point for EACH generic resource (i.e. name of website but not a specific page, etc.)* *Add 2 Points for EACH specific resource*	
Explain what you learned from your research. What did you find out about your problem that you didn't know before? What kinds of experiments have been done by other people before you? Be sure to put this in your OWN words, do not just copy and paste information. Also, be sure to cite your sources.	Describes relevant information that relates to the selected problem	*25*	*0 Point: Does not answer either question* *10 Points: Answers only one of the questions* *20 Points: Answers both questions* *25 Points: Answers both questions and all sources cited throughout*	

Mission Folder Questions and Answers	Judging Criteria	Max Points	Scoring Details	Score
Experimental Design				
Based on the question you are trying to answer, and your research, what is your team's hypothesis for this investigation?	Develops a logical hypothesis based on an analysis of all research	*30*	*0 Points: Does not provide a hypothesis* *5 Points: An independent variable is stated* *10 Points: An independent and dependent variable are stated* *15 Points: The independent and dependent variables are stated and related* *20 Points: Both variables are stated and related and evidence of research is present* *25 Points: Both variables are stated and related, research is evident, and hypothesis is written in a proper format* *30 Points: Both variables are stated and related, research is evident, hypothesis is properly formatted, and is able to be tested*	
What are the independent and dependent variables in your investigation?	Correctly identifies the independent and dependent variables	*25*	*0 Points: Does not correctly identify either variable* *10 Points: Correctly identifies either the independent or dependent variable, but not both.* *25 Points: Both variables are correctly identified*	
What are the constants in your investigation?	Correctly identifies the constants	*15*	*0 Points: Does not identify any constants* *5 Points: Identifies only incorrect constants* *10 Points: Identifies some correct and some incorrect constants* *13 Points: Identifies correct constants but leaves some out* *15 Points: Appears to correctly identify all constants*	
Will your investigation have a control group? If so, describe the control group. If not, why not?	Indicates whether a control group is necessary and correctly identifies any required controls	*15*	*5 Points: Incorrectly indicates whether a control group is necessary or not* *10 Points: Correctly indicates whether a control group is necessary or not, but does not correct identify the control OR does not correctly explain why one is not required.* *15 Points: Correctly indicates whether a control group is necessary or not AND correctly identifies the control group OR correctly explains why one is not required.*	

Mission Folder Questions and Answers	Judging Criteria	Max Points	Scoring Details	Score
Experimental Process				
List all of the materials you used in your experiment. Be sure to include all physical materials as well as any technology or websites used to collect data (not websites you used in your research).	Accurately identifies all materials necessary for the experiment	*25*	*0 Points: Lists no materials necessary for the experiment* *5 Points: List some materials, but some are clearly missing* *10 Points: Includes most materials necessary for the experiment* *25 Points: Appears to have a complete list of all materials necessary for the experiment*	
Explain your experimental process. Be sure to list all of the steps and safety precautions for your experiment. If no safety precautions are listed it will be assumed none were taken. Remember to write it so someone else could follow the steps and recreate your experiment.	The proposed experiment is conducted sufficiently (qualitatively and quantitatively) and is a valid test of the hypothesis	*60*	*0 Points: Does not list an experimental process* *5 Points: Lists an experimental process that does not relate to the problem stated.* *10 Points: An experimental process that is related to the problem stated is listed, but is largely incomplete.* *20 Points: An experimental process that is related to the problem stated is listed, but is not able to be followed step-by step* *30 Points: An experimental process that is related to the problem stated is listed step-by-step but is missing safety requirements* *40 Points: An experimental process that is related to the problem stated is listed step-by-step including safety requirements but does not adequately test the hypothesis stated previously* *50 Points: An experimental process that is related to the problem stated is listed step-by-step including safety requirements and adequately tests the hypothesis previously stated but is missing some steps* *60 Points: An experimental process that is related to the problem stated is listed step-by-step including safety requirements and adequately tests the hypothesis stated*	

Mission Folder Questions and Answers	Judging Criteria	Max Points	Scoring Details	Score
Data Collection and Analysis				
Present the data you collected form your experiment. Be sure to include all of the numbers you collected form your observations and measurements. Use of graphs and charts is HIGHLY encouraged.	A sufficient amount of data is collected and well-presented	*35*	*0 Points: No data presented* *7 Points: Data presented but not clearly* *14 Points: Data presented but not related to supporting hypothesis* *21 Points: Data presented clearly and related to supporting hypothesis but incomplete* *35 Points: Data presented clearly, related to supporting hypothesis and complete*	
What are your potential sources of error? Remember, this doesn't mean "Did everything work?" All tests have potential sources of error, so make sure you understand what that means. Explain how these sources of error could have affected your results.	Lists sources of error and explains how these could have affected the results	*25*	*0 Points: Does not list any errors* *5 Points: Incomplete list of sources of error* *10 Points: Lists sources of error only, no explanation* *15 Points: Lists sources of error, explains how affected the results, but vague* *20 Points: Lists sources of error, explains how affected the results, lacks some detail* *25 Points: Lists sources of error, explanation very thorough and free from spelling and grammar errors*	

Mission Folder Questions and Answers	Judging Criteria	Max Points	Scoring Details	Score
Drawing Conclusions				
What conclusions can you draw based on the data you gathered during your experiment(s)?	Provides thorough explanation of conclusions drawn based on their experiment	*50*	*0 Points: No conclusion provided* *5 Points: General conclusion provided* *10 Points: Conclusion is related to experiment conducted* *20 Points: Conclusion is related to the experiment and includes data collected* *30 Points: Conclusion is related to the experiment, includes data collected and refers to hypothesis stated* *40 Points: Conclusion is related to the experiment, includes data collected, refers to hypothesis stated and refers to original problem/question stated* *50 Points: Conclusion is related to the experiment, includes data collected, refers to hypothesis stated, refers to original problem/question stated and is well written and clear and free from spelling and grammar errors*	
			Use of Scientific Inquiry using Scientific Practices Subtotal	

Benefit to the Community				
Suggested file attachments: brochures, fliers, posters, website links Total maximum points in this section: 90				
Mission Folder Question and Answer	***Judging Criteria***	***Max Points***	***Scoring Details***	***Score***
Explain how investigating the problem your team chose will help the community. Be sure to include the impacts your research will have on individuals, businesses, organizations, and the environment in your community (if any). Make it very clear why solving this problem would help your community.	Indicates how this project can help the community	*30*	*0 Points: No explanation as to how investigation could help the community* *10 Points: Explanation is vague* *15 Points: Explanation explains the problem, but not how the investigation could help* *20 Points: Explanation includes the problem and the benefits of the investigation but lacks some detail* *25 Points: Explanation is complete and very detailed with some spelling/grammar errors* *30 Points: Explanation is complete and very detailed with no spelling/grammar errors*	
	Indicates the effects of the project on members of the community	*30*	*0 Points: No impacts are identified* *10 Points: Impacts are identified but some are missing* *20 Points: Impacts are identified but lack some detail* *25 Points: All impacts are identified and very detailed with some spelling grammar errors* *30 Points: All impacts are identified and very detailed with no spelling/grammar errors*	
	Provides clear explanation of benefit to the community	*30*	*0 Points: The benefit to the community is not clear* *15 Points: Benefit to the community is somewhat clear* *20 Points: Benefit to the community is clear with some spelling/grammar errors* *30 Points: Benefit to the community is made very clear with no spelling/grammar errors*	
			Benefit to Community Subtotal	

Team Collaboration				
Suggested file attachments: Breakdown of team responsibilities, team plan, experiment schedule Total maximum points in this section: 60				
Mission Folder Question and Answer	***Judging Criteria***	***Max Points***	***Scoring Details***	***Score***
How was your team formed? Was your team assigned or did you choose to work with each other?	Explains how the team was formed	*5*	*0 Points: Does not explain how team was formed* *3 Points: Explains how team was formed but lacks detail* *5 Points: Fully explains how team was formed*	
Provide a detailed description of each team member's responsibilities and jobs during your work on the Mission Folder.	Clear description of the responsibilities of each team member	*20*	*10 Points: Description of roles is described and assigned* *20 Points: Description of roles is described and assigned and responsibilities assigned for each team member*	
Did your team face any problems working together? If so, how did you solve them? If not, why do you think you were able to work together so well?	Explains the problems (or lack thereof) faced by the team and how they were overcome (or not)	*15*	*0 Points: Does not answer the question* *5 Points: Lists problems but not how they were solved OR says they faced no problems but does not explain why* *10 Points: List problems and how they solved them but lacks detail OR explains why they worked well together but lacks detail* *15 Points: Explains problems and solutions in detail OR provides detailed explanation as to why they worked well together*	
What were some possible advantages to working together as a team on this project? How would working as individuals have made this project more difficult?	Explains how working together was helpful	*20*	*10 Points: Advantages to working as a group provided OR how working as individuals would have been more difficult provided* *20 Points: Both questions are answered*	
			Team Collaboration Subtotal	
			Mission Folder Total Score	

TIPS FROM FORMER TAs

One of the best resources for success is someone with prior experience. Here are some tips from former Team Advisors:

- We have been doing this for 3 years now. When we first started we followed the TA resource guide and used the tips to set up the group expectations, facilitate discussion, and create roles. I found them very useful.
- We met weekly for at least two hours. Sometimes, we had a brief conference call mid-week as we got closer to the project completion. There were a few meetings that ran all day, with adequate breaks for play and fun.
- I estimate that students spent about 5 hours per week or more, for the 5 months that they were involved in the project. It may have been more towards the end.

- My process is the process described in the Team Advisor Resource Guide
- The students form teams largely based on who they want to work with.
- Students write their team name on a calendar posted in my classroom to sign up for what one day afterschool they want to meet and work. They work from 4:00 - 6:00 consistently on Monday's or Wednesday's, etc.. from September through April. We don't stop in February because their projects are not being done simply for the eCM submission - they have long lasting effects on the community and they commit to that.
- If students find an 'expert' at a university or in the community and need that person's advice, I drive them there during school hours with permission of their principal on the assigned day. If the students have on-going connections with those people, they email from my school computer so all replies come to the same place.
- Most of my teams begin working after April 1 of their 5th grade year and meet several long days in the summer and on weekends as well - not every weekend, but one weekend a month.
- I would say for my teams who make it to NJ&EE, I've averaged 200 hours per project, as have the students.
- Basically, if the team is meeting, I'm with them. It is very rare for my students to meet on their own at one of their homes to work once the research phase is basically over. During the beginning, they do some research at home, but many do not have computers and need the school facilities.
- I do not allow my students to choose a topic that I can't imagine seeing at NJEE. If it doesn't apply to other communities, it they can't find experts to help, if they can't come up with multiple solutions/experiments, then I tell them to find a different topic. I don't waste my time on silly and simple projects.

- My students created their own templates to describe their personal strengths/weaknesses and how they benefit the team for the teamwork questions/attachments. They also created a graphic organizer that helped lead them from the problem to the hypothesis to the experiment to the results to the solution to the community action.
- We use the webinars and we refer extensively to the scoring rubric. If the judges have the opportunity to give points for something in particular, then my students are encouraged to be sure that's in their mission folder. If the recommended number of resources used in research is "at least 10", then my students will have 30 or 40.