



Middle School Capstone Science Project

Congratulations!

Look at you! Look how awesome you are! You have completed HandsomeScienceTeacher's Homeschool Science Curriculum. In the process, you have learned a lot! More than you probably realize in fact. Not just facts and formulas, but also how to do real science, and how to think intelligently. You have learned how to collect and interpret data, how to support your opinions using evidence, how to create models, how to write persuasively, and so much more.

It's time to put your knowledge to the test in your Capstone Project.

In This Capstone Project You Will Be Doing Real Scientific Research

It is important that you complete all aspects of this capstone project in order. Take your time, and don't stress. This is a celebration! You are now a real scientist and you are about to do real scientific research.

I. Ask Questions & Define Problems

You will define the problem you are going to research.

II. Design And Carry Out An Investigation

Once you know the area you are going to study, you will design your own experiment and carry it out.

III. Analyze And Interpret Data

As you carry out your research you will collect data. You will then organize your data into a meaningful chart so that you can identify patterns. Finally, you will analyze your data, and draw conclusions.

IV. Construct Explanations & Design Solutions

Once you have collected valid data, you will use that data to construct an explanation about the phenomenon you studied. You will also design a solution to address any issues or problems you noticed.

Key Things We Will Learn In This Mastery Badge

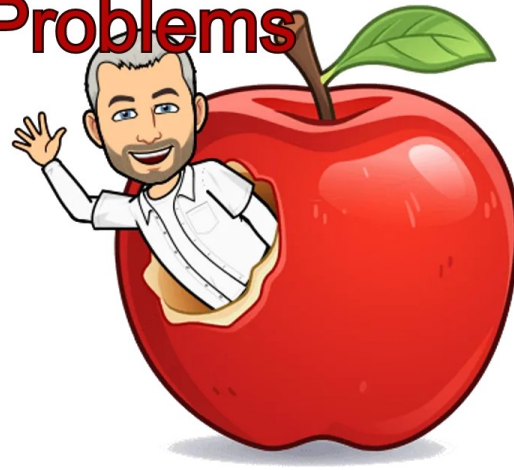
Some of the most important things we will learn in this mastery badge:

- Using The Eight Science And Engineering Practices To Solve Real Problems
- I am capable of doing real science.

Ask Questions & Define Problems



I think about the world around me and am curious.



Activity: Asking Questions & Defining Problems

Directions: Follow the directions below to identify a problem you are curious about.

Goal: To identify an issue that you can explore in greater detail.

Scientists Are Thoughtful & Curious

Throughout your time using HandsomeScienceTeacher's Science Curriculum you have learned that scientists begin their research with questions that they have. These questions come from their own curiosity. Sometimes we believe that all the questions have already been asked and researched and that all we have to do is search online to find these questions. Often this is true. But the reality is that there are many more unanswered questions in the Universe than there are answered questions.

Did you know that science is probably only discovered about 10% of the lifeforms that live on Earth!

Think about how significant that fact is! This means that 90% of living things on Earth have still not been discovered. The same is true of all other branches of science.

You Can Do Good Science

You are capable of doing great scientific research. Being young does not mean that you are somehow disqualified from doing actual science or from making real discoveries.

What Do You Want To Explore?

Take a moment and think about a question that you might enjoy researching. What is something that you are curious about? It is okay if it is a topic that others have already studied. The discoveries you make will be new to you, and perhaps even new to science.

What question will you research for this project? Select a topic that you won't mind studying for the next two weeks.

Design And Carry Out An Investigation

I can design and carry out my own experiments.



Activity: Design And Carry Out And Investigation

Directions: Follow the directions below to design an experiment that will allow you to learn more about your problem.

Goal: To learn about the issue you have identified.

Scientists Design And Carry Out Investigations

Doing science experiments is fun. Often when we do these experiments we follow the procedures that someone else has written for us. Throughout this course you have done many experiments. Some of them were created by us, and you followed our directions. Other times we had you write your own step by step instructions and carry them out.

Think about the problem that you identified for your capstone project.

How can you solve your capstone problem?

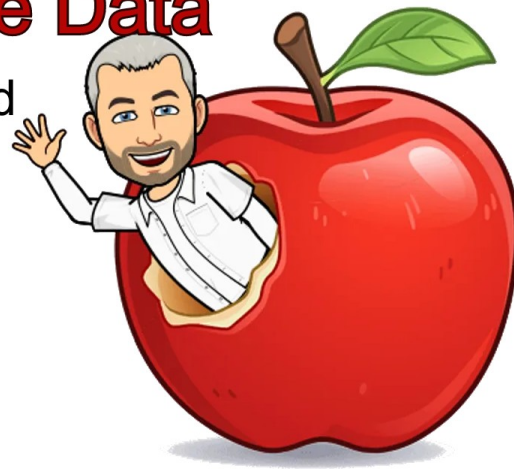
Is your problem something that someone else has already researched? If so, can you learn more about it by studying the work of others? Is the problem you identified something that you can learn about by doing some sort of experiment or observation?

Explain in detail how you will learn about the problem you identified. In the next section, you will be asked to collect data. How will you collect data about your capstone problem? If there is not enough space in this box, it is okay to use a separate sheet of paper.

Analyze And Interpret Data



I can collect, analyze, and interpret meaningful data.



Activity: Analyze And Interpret Data

Directions: Follow the directions below to collect, analyze, and interpret data about your problem.

Goal: To analyze and interpret data about the problem you identified.

Scientists Support Their Opinions Using Data And Evidence

Science is a tool that humans use in order to better understand the world around us. The goal of science is to help people learn how the Universe really functions. In order for this process to be successful it is critical that scientists support their views, opinions, and claims with data and evidence.

How Can You Collect Data About Your Problem?

Think about the problem you defined earlier. What data could you collect about it? This might be data that comes from your research. It could be data that comes from the results of an experiment that you designed. It might be data from observations that you made.

You Will Use This Data In The Final Section of Your Capstone

In the last step of your capstone you will use this data to support your final conclusions. Make sure that you are precise, detailed, and accurate in your data collection. Otherwise, your conclusions will not be as valid.

Collect And Organize Your Data

Collect your data on a separate sheet of paper or in a computer program, such as a spreadsheet. Using a spreadsheet will make graphing your data much easier.

Graph Your Data

Select a type of graph that you think will be best for the data you collected. This might be pie charts, bar graphs, scatter plots, or any other form. It is up to you to decide the best way to organize your data. Graph all of your data as accurately as possible.

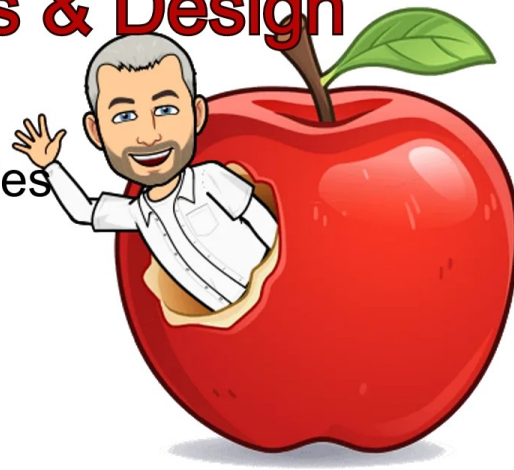
Look For Patterns In Your Data

What patterns do you notice in your data? What conclusions can you draw?

Construct Explanations & Design Solutions



I can share my discoveries with others



Activity: Construct Explanations & Design Solutions

Directions: Follow the directions below to construct explanations and design solutions.

Goal: To communicate my discoveries to others.

Scientists Share Their Discoveries With Others

The purpose of science is to make the world a better place. When scientists make discoveries, they share them with others. For this assignment you will be writing a one-page essay communicating your discoveries with the rest of the world.

Write About Your Process And What You Learned

Start by sharing your question with your readers. Then explain how you went about answering your question or solving your problem. Then share the results of your research, your experiments, and/or your observations. Finally, draw conclusions and support those conclusions with evidence from your data.

Don't Doubt The Validity of Your Science

Just because you are young doesn't mean that your research is any less valid than the research of someone older than you. A scientist with an advanced degree can be wrong and you can be right. If you have done good research, take confidence in that, and don't be afraid to stand up for what you have learned.

Write your essay with the confidence of a true scientist!

Go Forward Being Science-Minded

You have just completed an advanced middle school science curriculum. You have proved your science credentials by doing a capstone project. My parting advice to you is to maintain the abilities that you have gained throughout this course for the rest of your life.

Remember to ask questions, collect data, do research, think intelligently, demand evidence, and have confidence in your own ability to think about and understand the Universe.

Congratulations On Finishing This Course!



Congratulations! You Have Completed All of The Mastery Badges!

You have worked really hard to earn this mastery badge. More importantly, you have worked hard to earn your knowledge!

Time To Evaluate Your Work

Check each of the following to evaluate your work:

1. Did you do every assignment?
2. Did you collect good data?
3. Did you take pride in your work?

My Self-Evaluation:

Based on the criteria listed above, I believe I have passed off this Mastery Badge because...
(Be detailed and specific)

Mastery Badge Counselor Evaluation:

I have reviewed this student's work. Based on the criteria listed above I hereby certify that they have passed off the Mastery Badge because... (Be detailed and specific) Note: Any adult may serve as a Mastery Badge Counselor, so long as they are committed to ensuring the highest standards of excellence.

Student's Signature

Date

**Signature of Mastery
Badge Counselor**

Date

Certificate For Your Homeschool Records

The following certificate which has been awarded through self-evaluation by the student, and also certified by a mastery badge counselor proves that the student listed thereon has completed all the work and has mastered all the concepts for the specified topic.

Keep this on file as evidence of your successful completion of this topic.

If audited by the State, these certificates stand as evidence that you have worked on and successfully completed a rigorous science curriculum.

