



EnvironMentors[®] Project Topic Planning

Teacher and Mentor Summary

The purpose of this project is to provide students experience in constructing a project topic, developing a project rationale, research question, and defensible hypothesis.

Objectives Students will:

- Identify a project topic
- Develop a project rationale
- Determine a research question
- Develop a defensible hypothesis.

Activities

- Students will use a **mind mapping technique** to help them freely associate interests related to environmental issues and topics and to hone in on topics that are of greatest interest to them.
- Once they have determined their general topic, students will be well positioned to think critically about **what they currently know** about the topic, **what they don't know**, and **what they would like to know**. This inquiry will help students come up with innovative research questions related to their topic.
- They will develop a **project need statement** (explanation of what is to be gained from studying this subject).
- They will write a **project purpose**.
- Finally, students will **construct a defensible hypothesis** which they will seek to prove or disprove through research for their project.

Suggested Rubric

Total Value = 10 points

To what extent does the student:

- Engage fully in the mind-mapping creative process in order to develop a project topic of his or her interest.
- Describe a compelling need for the project in his or her own words in approximately 100 words.
- Clearly articulate the overall purpose and goals of the project in 50 words
- Identify the essential roots of the environmental problem or issue he or she will address in the project.
- Pose an innovative and unique research question which to the best of his or her knowledge of what is currently known and unknown, has never been addressed before.
- Present a "defensible" hypothesis.



Why Should I Care?

Complete the following statements with three responses of your own:

1) If there was absolutely no clean water in our rivers, streams, oceans, and homes _____ i.e.) I would get sick very quickly. I would die of thirst. There would be no fish.

A)

B)

C)

2) If there were no clean air to breathe outdoors or indoors, _____ i.e.) I would get sick very quickly, etc.

A)

B)

C)

3) If there were no wildlife and animals left on earth, _____ i.e.) I would be very sad, be forced to become a vegetarian.

A)

B)

C)

4) If there were no plants, trees, gardens, or forests left anywhere on earth,

i.e.) There would be no photosynthesis or oxygen produced and I would suffocate, there would be no place for insects.

A)

B)

C)

5) If you absolutely had to choose, and you had to choose just one, what type of world would you most want to live in, and why (check only one).

*PS. This is **NOT** a test, and there is **NO** right or wrong answer. It is simply a hypothetical exercise to help you get closer to what aspects of the environment are interesting or important to you.*

A) _____ A world with nothing but the purest crystal clear water in all the rivers, lakes, streams, oceans, and homes.

B) _____ A world with nothing but absolutely the purest, non-polluted air to breathe outdoors and indoors.

C) _____ A world with an extraordinary abundance and diversity of wildlife and animals.

D) _____ A world rich with a huge abundance of plant species including trees, shrubs, and flowers that make up beautifully diverse forest, meadow, dessert, and other plant ecosystems.

6) Can you explain why you chose the “world” you did?



Mind Mapping Made Easy

The purpose of this exercise is to help you refine your general area of interest to a more specific topic.

Instructions:

1. Gather your supplies--a large white sheet of paper, and a selection of colored pens, pencils, and crayons of all sizes.
2. Think about one or two things you experienced on the field trip that interested you. This could be the fact that there are so many different fish species living in the Chesapeake Bay, Potomac, and Anacostia Rivers, that oyster catch is currently at an all time low, or that people still eat so many oysters. Start with whatever sparks your interest.
3. Start in the center with an image/picture that comes to mind related to your idea. Make it about 2 inches by 2 inches large in size.
4. Extend branches or lines out from the central image. Make the branches closest to the center thicker. At the end of the branch, draw an image or write words related to the original image/topic. Feel free to make the lines straight or wavy. Think of these branches as “sub-topics.”
5. Feel free to be creative with dimension, expression, and color.
6. Make thinner lines off of the bigger branches to hold supporting ideas and information (place the most important ideas closest to the central image).
7. Draw pictures wherever possible.
8. Use colors as your own special code to show people, topics, themes or dates and to make the Mind Map more beautiful and memorable for you.
9. Expand and capture all ideas, then edit, re-organize, make more beautiful, elaborate or clarify as a second stage of thinking.

SUGGESTIONS:

- **Your Mind Map is for YOU.** Develop your own personal style of Mind Mapping.
- Use images, symbols, codes and dimensions rather than just words wherever possible throughout your Mind Map.
- Select key words that relate to your images.
- All lines must be connected, starting from the central image. The central lines are thicker, organic and flowing, becoming thinner as they radiate out from the center.
- Use emphasis and show associations in your Mind Map.



What Do You Know

Teacher and Mentor Preparation

While Mind Mapping helps students' begin to hone in on a general project topic, *What Do You Know* supports students in generating a Research Question. Prepare for this activity by writing **General Topic** at the top of a blackboard. Draw three columns beneath the general topic line and label the first: "**Know/Assume,**" the second: "**Don't Know,**" the third: "**Want to Know.**"

Discuss the attributes that constitute a good research question in advance. Make sure to touch on the following attributes of a good research question:

- A question that, to the best of the student's knowledge, has never before been asked or answered
- A question that pushes the envelope of existing knowledge
- A question that will require conducting **original research** in which the student can collect and analyze observable data.

Write these and other attribute on the board.

Pre-Activity Discussion

Conduct a sample *What Do You Know* exercise to help get the group started. You may want to ask students to offer an environmental issue they are familiar with to serve as the example. Conduct the sample *What Do You Know* exercise on an environmental issue with which your students have some familiarity and that is reasonably current in the news.

- As a group, ask students to brainstorm everything they THINK they know, or ASSUME they know about the sample topic. If anyone has a question about some of the information, have them indicate this with a star. Move on to the next column.
- Have the group brainstorm about, what they are sure of, and what they don't know about the topic. List the *Don't Know's* in Column II.
- Moving onto Column III, ask students to toss out their questions about what they want to find out and what intrigues them most about the topic.
- Based on this information, have each student independently right up a brief draft research question related to the example project topic. Finally, ask them apply the criteria for a good research question and have them rewrite their question with the criteria in mind.

Activity

Now, ask students to write their own General Topic on their own *What Do You Know* sheet. Remind them that the *What Do You Know* exercise will help them develop a strong research question about their general project topic, which will, in turn help to focus the project into something more specific and manageable. You may want to have your students work in small learning groups, in pairs, or independently.

Once they have completed their charts, have each student independently draft a research question for their project topic using the information they developed in the *What Do You Know* charts and the criteria of a good research question.

What Do You Know

Based on your mind map, select one area or topic that you find particularly interesting or compelling. With this topic in mind, you will explore what you know about the topic to find a clear research question.

Your *General* Project Topic

Know/Assume	Don't Know	Want to Know

Write your Draft Research Question above.



Student Project Topic Form

Now that you have identified your general research questions, you can further develop your project topic.

A) Project Topic _____

***Note: What Makes a GREAT Project Topic?**

- The most important key to a great topic is whether **YOU LIKE IT. Not your friend, your teacher, or your mentor, but YOU.** Does it inspire you?
→ If you don't like your topic, think back on what part of the topic **DOES** inspire you and work through the brainstorming activity again.
- **Is your topic unique?** What makes your topic unique? If you cannot think of anything, it may need more tweaking.

B) Project Rationale

Need for the Project (Develop a one paragraph summary stating the overall **Need** for your project using approximately 100 words. Think in the context of importance of the topic to your community and worldwide.).

Project Purpose (Develop a one paragraph statement stating the over **Purpose** for your project using approximately 50 words).

C) Problem Statement (Write a one or two sentence description stating the environmental problem you are addressing through your project.)

D) Research Question

What is a Hypothesis? There are many definitions, but here are a few that are particularly helpful:

- A specific statement or proposition, stated in a testable form.
- A trial answer that can be tested with an experiment.
- A statement of what the experiment should prove.

Examples Hypotheses:

- Aspirin does help to relieve headaches.
- Limiting a plant's exposure to sun to one hour a day will kill it.
- The smoke from diesel vehicles can cause asthma.

E) Hypothesis

Congratulations! You have to put together the pieces of the introduction with which you will begin your final paper! Write them up in paragraph form and SAVE them to a disk. Print a copy and turn it in to your teacher or coordinator.

Due _____