

Junior Stem Wetlands Project

Fall Semester 2022

Overview:

Students will study the impact of pollution, climate change, invasive species, and endangered species as it affects our coastal community. In a series of three main projects, students will discover and investigate a coastal community concern.

Project 1

Students will work in groups to research and select an area of concern. Their groups will become a marketing company. They are tasked with creating a logo, slogan and a commercial to increase public awareness of their area of concern.

Project 2

Students will continue their research and select an invasive or endangered species. Working in their groups, they will address how to mitigate or enhance the population of their selected species. They will design a device to achieve the desired goal, providing blueprints and an operation manual. After building their prototype, students will devise a strategy to test their prototype indicating what a positive result would look like. Once testing has been completed, students will create a build proposal.

Project 3

Students will advocate for change. In their groups, they will research current laws and efforts to effect change in their area of concern. Based on their research, they will formulate a plan to increase public awareness and change current practices or laws to affect a positive outcome. Their plan may include letter writing campaigns to their community and state leaders or community service projects or they may take a different avenue of their choosing.

Interdisciplinary Standards

Math Standards Addressed:

Make inferences and justify conclusions from sample surveys, experiments, and observational studies.

MGSE9-12.S.IC.3 Recognize the purposes of and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each.

MGSE9-12.S.IC.4 Use data from a sample survey to estimate a population mean or proportion develop a margin of error using simulation models for random sampling.

MGSE9-12.S.IC.5 Use data from a randomized experiment to compare two treatments; use simulations to decide if differences between parameters are significant.

MGSE9-12.S.IC.6 Evaluate reports based on data. For example, determining quantitative or categorical data; collection methods; biases or flaws in data.

Science Standards:

ESS3.A: Natural Resources Humans depend on Earth's land, ocean, atmosphere, and biosphere for many different resources, including air, water, soil, minerals, metals, energy, plants, and animals.

ESS3.C: Human Impacts on Earth Systems Recorded history, as well as chemical and geological evidence, indicates that human activities in agriculture, industry, and everyday life have had major impacts on the land, rivers, ocean, and air.

ESS3.D: Global Climate Change Humans are now so numerous and resource dependent that their activities

Engineering Standards:

ENGR-EA2 – Students will develop and follow a detailed plan for the solution of a design problem. (a) Produce flow charts, timelines, and other scheduling tools. (b) Apply mathematical models and calculations necessary to complete predictive analysis. (c) Modify a design plan to accommodate unforeseen constraints. (d) Assess the effectiveness of design plans.

ELA Standards:

ELAGSE11-12W7 - Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. ELAGSE11-12W8 - Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation

Project Rubrics

Project 1 Rubric

Commercial Rubric

Length of Commercial 20 points

Score (points)	0-3	4--8	9-12	13-16	17-20
To what extent did the student adhere to the time requirements?	1 to 10 seconds	11-15 seconds	16-20 seconds	21-24 seconds	25-30 seconds

Commercial Interest 10 points

Score (points)	2	2	2	2	2
To what extent did the student engage the viewer in the first 5 seconds of the commercial?	Creates curiosity	Relevant to audience	Presents products (animal, pollution, etc.)	Provides opportunity for viewer	Promotes emotion

Slogan 10 points

Score(points)	3	2	3	2
To what extent did the student create an effective slogan?	Easy to remember	short	Catchy – may rhyme or have similar sounds	Easily recognizable

Logo 10 points

Score (points)	4	2	2	2
To what extent did the student create an effective logo?	Original design	Color scheme	Simple in form	distinctive

Persuasive or Informative 20 points

Score (points)	15	5
To what extent did the student inform or persuade the viewer?	Illuminates a problem in the community	Encourages the viewer to become involved

Commercial has continuity 30 points

Score (points)	10	10	10
To what extent did the student provide an effective production?	Commercial has smooth transitions	Commercial is school appropriate	Commercial is visually stimulating

Project 2 Rubric

Levels of Achievement →	<i>0-25points</i>	<i>0-25 points</i>	<i>0-25 points</i>	<i>0-25 points</i>
↓Criteria				
Research of Invasive or Endangered Species Record all information in Stem Journal 100 points	Student addresses basic needs of plant/animal. What are the perfect environmental conditions for plant/animal?	What conditions negatively affect the plant/animal? Are there multiple environmental conditions that affect the plant/animal?	Is the animal/plant listed on the endangered or invasive species list? How large is the current population?	What are the current efforts in place to encourage population growth for endangered species or discourage population growth for invasive species? Is there legislation regarding this species?
Project Design 100 points	Blueprint of device to enhance or discourage species growth. Include description on how device works. Does the device require routine maintenance, such as cleaning or parts replacement? Create owner's manual for use and maintenance of device.	What is the optimal placement of device? Consider habitat requirements, food resources, predator concerns, and environmental concerns.	Why is device needed? How will elimination of plant or animal affect the food chain and environment?	How would you test your device? What would a positive result look like? How long do you anticipate it would take to see a change in the population?

Build Proposal 100 points	Material list List every item necessary to create prototype. This includes any fasteners, (mechanical or chemical), paint or finishing materials or items discarded in the manufacturing process. Include amount of each item.	Manufacturing timeline Detailed timeline of each step process from beginning to completion	Cost projection List cost of each item in material list and total cost for labor and materials. Include cost of waste materials.	Presentation Presentation is persuasive. Brief summary sheet presented with proposal. May present with PowerPoint or charts.
Prototype 100 points	Prototype is made from materials easily accessible or recyclable materials.	Cost of prototype What is the unit cost? How many labor hours are needed to create device?	What tools are needed to create device?	How durable is the prototype? What is the expected longevity of the device? Must the device be removed once life expectancy has been reached? Are there environmental concerns with the device?
Total of Research, project design, build proposal, and prototype scores divided by four. Test grade!				