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The Arts in STEM: Advancing Meaningful Integration
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Scavenger Hunt

The lesson that I chose to modify to become more art inclusive is a lesson that I teach called Design Your Dream Tropical Marine Aquarium. While looking at the art standards, I feel that the visual arts standard could really enhance this lesson. Students have many different STEM aspects to tackle in this lesson. However, I feel that the best way to demonstrate what they learn in this project could be done by creating a visual aid. Then they could present their finding and reason behind their design. Peers can applaud and critique one another's designs. Students can find ways to make personal connections to this assignment and adjust this lesson appropriately. Various media can be used to create this visual representation. By using a rubric, I can assess if they learned the rules of tank building and fish care. The lesson is attached below. It also requires several different resources. I believe that this could be represented in a 5 E lesson plan very easily.

Name _____
Marine Biology

Date _____
Period _____

DESIGN YOUR DREAM TROPICAL MARINE AQUARIUM

Through a special grant, you will be given \$5,000 to design a marine aquarium. You need to decide what kind of tank you are going to build, what kind of organisms you will have in the tank, how large a tank you will have, etc. You may be as creative as you want, but you must try to stay within the budget and consider the following issues when you build your tank. Keep in mind that having a marine tank



is a large responsibility and you need to create an environment that will best support the life that you have taken into your care.

POWER POINT- The following are all the categories that you must decide on and consider when you build your tank. Answer the following questions and use these questions to create a powerpoint with prices, descriptions, and photos.

1. **Tank Type** – the first thing that you must decide is what kind of marine tank you want to build. Do you want a fish only tank, a reef tank, a seagrass bed, a seahorse tank, a hard coral tank, a soft coral tank, etc.?

- a. What kind of Marine tank did you decide to build?
- b. Why did you choose this type of tank over the other kinds?
- c. What factors did you consider when you chose the type of tank to build?

2. **Tank Creatures** – You should have a rough idea of what kinds of animals you wish to put into your aquarium. You should make a preliminary list of some of the organisms you want to put into the tank. Be sure the organisms are compatible with each other. It is important that you don't put peaceful animals in with aggressive animals. The website, Drsfoosterandsmith.com, is a good website to find live animals and they have a compatibility chart.

- Make a list of all the animals and/or algae that you want in your tank. (next to each animal on your list be sure to describe it's compatibility or nature and price)

Name of Organism	Temperament	Price

3. **Tank Size and material**– you must decide how large a tank you want to build and what shape. You must also decide what type of tank you want to build (glass or acrylic, etc.).

- a. What size and shape did you decide on?
- b. What are the pros and cons of the size and shape of the tank you chose?
- c. What type of tank did you decide to have?
- d. What are the pros and cons of the type of tank you chose?
- e. How much does the tank cost?

4. **Tank Substrate** – you must decide what type of material (sand, rock,etc.), if any, you want to have on the bottom of the tank. What you decide on will partially depend on what kind of animals you have in the tank. Some animals have certain requirements. For example, jawfish and some gobies need deep sand so that they can burrow.

- a. What type of substrate did you decide on?
- b. What is the advantage of the substrate you chose?
- c. What important role does the substrate play in the survival of the organisms in tank?
- d. What is the cost of the substrate you chose?

5. **Tank Heating** – all tropical tanks will need some kind of heater most of the year.

- a. What kind of heater did you decide on? Why? (remember: keep in mind the size of your tank and how many heaters you may need)
- b. What temperature will you make sure your tank stays at?
- c. If it gets too hot in the summer, what are some options that will help you to maintain the temperature of the tank?
- d. What is the price of the heater you chose?

6. **Tank Filtration** – this is probably the trickiest part of your research. There are many different kinds of filtration systems. Some are better than others depending on what kind of tank you have. You should definitely research protein skimmers too and decide if that would be a good addition to your tank.

- a. What kind of filtration system did you decide on?
- b. Describe how the filtration system you chose works?
- c. What are the pros and cons of the filtration system you chose?
- d. What does a protein skimmer do?
- e. Did you decide to add a protein skimmer to your system? Why or why not?
- f. What is the price of the filtration system and skimmers you decided on?

7. **Tank Lighting** – The type of lighting you use will really depend on what organisms you have in the tank. For example, hard corals will likely need metal halide lamps.

- a. Name 4 different lighting possibilities that you found in your research.
- b. What type of lighting did you decide on for your tank and why?
- c. What is the price of your lighting system?

8. **Tank Décor** – Décor in a marine tank is often more than just decoration! It is often indispensable. Fish and animals need décor to hide in and establish territories in. However, not all materials are suitable for décor. Hint: look for live rock, shells, plastic models, etc...

- a. List at least 3 types of suitable décor that you can put into your tank.
- b. List 2 types of materials that you would not want to use for décor since they may interfere with the water quality of the tank.
- c. What type of décor did you choose and why?
- d. What is the price of your décor?

9. **Tank Maintenance Considerations**: (RESEARCH THIS STUFF)

- a. You will have to make seawater and measure it to be sure it is the correct salinity or density. Describe how you will make seawater and what tools you will need to measure it.

b. You will have to wait at least a month before you can add any fish or large animals to your tank. Explain why.

c. You will have to make water quality measurements at least once a week. What types of tests are you going to have to run? List at least 4 different chemicals that you will have to test for each week.

d. One of the most important ways to maintain your tank is to do a water change at least every month. Describe what a water change is and how much water you actually should change out every month.

e. When it is finally time to introduce your fish, it is important to acclimate them properly. Describe the acclimation process you will use for you animals?

f. What is the cost of all of the maintenance materials: the salt, the tools to measure salinity, the chemical test kit, etc.?

10. **Final Budget:** List each item you purchased (some items can be lumped together – for example, lump together all of the livestock) and the price and then total them up.

a. Did you go over or under budget?

b. Was \$5,000 a reasonable budget for all of those materials? Explain your answer.