Art Integration in the Science Classroom

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In the science classroom, there are many activities that occur to teach a variety of skills laid out by the NGSS. Some students really excel at this but others find it stifling. As we move to a more visual world where things are ordered online, paid online and delivered by drones even, students need to express themselves in other ways. As Liao, et al (2016) points out, project based learning with hands-on digital art components links STEM knowledge and art in a way that allows students to see multi-disciplinary connections between individuals and the world they live in (p. 29).

Art Form

The art form that I chose to focus on was RAFTS writing technique. This acronym stands for (See attached pages):

- Role of the writer: Who are you? A piece of coral? A fish in the deep sea?
- Audience: To whom are you writing? Your class? A friend? The entire deep sea? A mangrove leaf?
- Format: What format will the writing take on? A classified ad? A poem? A snap chat?
- Topic + Strong Verb (T + S): What is the subject or point you are trying to get across? Are you pleading for your life? Are presenting an injustice?

Since these writings ask the student to take on a viewpoint different from the student and write to an audience other than the teacher and in a form that is not ordinary for the science classroom, the student is able to think creatively and engage in the science subject matter with a creative outcome ("Tangi Schools", 2018). I find asking students to think about science topics in everyday ways helps them to internalize and understand it better. When they then connect these writing forms with digital storytelling or movement by acting the poem out or carrying on a debate then they will personalize it and apply critical and creative viewpoints (Liao, et al, 2016).

Lesson Enhancement

This art integration would follow as a summative assignment in project form for my Ecology unit. Science many times can feel cold and hard to connect to. Some students even feel repulsed by certain topics. Ecology is a study that I begin each year with. It sets the stage for what is to come and largely deals with the surrounding world that most students are familiar with and connect to. I find Ecology helps me to learn about my students and their strengths and weaknesses.

Not all parts of Ecology are as familiar, for example the ocean can feel a bit big and not always easy to visualize. The RAFTS project really connects with many students as they begin to create and bring to life the ocean in a form that they connect with. I have provided them with a bunch of different choices of role and audience as well as format. This allows them to be creative in an element of their choosing. For some they will not be able to perform in front of the class and others will want to illustrate their response. In either case, I am beginning to see how they best connect to science.

Integrating Art

Art integration is a great way to get kids of different learning styles to engage in what some think of as hard or not interesting. Art can really personalize science in many ways for students. One of my favorite projects this year was a children's book that my students put together after learning about shorebird migrations. The students first learned about Shearwaters and their migrations from Chile where their nesting grounds are located to California and back. We used real satellite data to map their route and then I assigned them the book project. This project was created in Google Slides and they had to make ten stops on their journey back to Chile. On each stop they had to discuss a relevant activity for that country. Some students spoke

of the history and others spoke about native foods. It was a very open ended project but the students learned a lot about California and Central America. I was impressed that they included some of the topics of pollution and ocean surface conditions that we discussed.

Visual Presentation and Interdisciplinary STEM

As discussed above students are being exposed to more than just science in this type of project. They must use the seven elements as well as the three types of digital storytelling (Robin, 2006). Students are creating personal narratives about ocean topics that they have connected with throughout the Ecology Unit. These connections are brought to life as the student takes on a point of view and personifies a part of the ocean. The historical documentaries can be incorporated as they choose topics of global importance. For example, they may write a letter to the editor about the BP oil spill from the point of view of an albatross for the oil executives to read. The historical and environmental implications will be explored. Stories that inform or instruct are explored as students look at different adaptations that certain animals have and then explain them from that animal's point of view. By incorporating such a varied body of formats students have a voice in communicating with others. Students can then be asked to respond or collaborate by putting their letters, comic strips, poems and songs into a newspaper to tell a much larger story of the ecosystem itself.

Art is a great way to integrate curriculum and bridge the gap between what the teacher has taught them and what they internalize that information to mean. Students will gain different perspectives and insights about science. The use of digital media through storytelling will personalize a student's learning experience by allowing them to choose avenues of expression that best shows their mastery of the subject.

References

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Robin, B. (2006, March). The educational uses of digital storytelling. In *Society for Information Technology & Teacher Education International Conference* (pp. 709-716). Association for the Advancement of Computing in Education (AACE).

Tangi Schools. (2018). Retrieved July 1, 2018, from https://www.tangischools.org/cms/lib3/LA01001731/Centricity/Domain/339/What%20is%20RAFT.pdf.

R.A.F.T.S. Writing Prompts

Grade Level: 7
Content Area: Life Science **Topic: Food Chains Mangrove Forest**

Role	Audience	Format	Topic	Strong Verb
Sun	All Organisms	Speech	Importance of Self in the Food Chain	**Persuade:** I wish you understood me!
Red Mangrove Tree	Public	Comic Strip	How a food chain works	**Explain:** Why the mangrove is so important.
Snails/Crabs (decomposers)	A young animal (an organism)	Thank you Letter	The relationship between Consumers and decomposers	**Instruct:** Why it is good that you're dead…
Snapper	A Carnivore	Children's Book	How a snapper migrates in the mangrove forest to lay its eggs and avoid predators.	**Describe:** How the fish may be afraid to enter the forest.
Oyster/Barnacle	Tides	Email	How the tides affect life for filter feeders.	**Demand:** Better treatment from the tides.
Plankton	Self	Diary Entry	Where do I fit in?	**Reflect:** Why am I important to this ecosystem?

R.A.F.T.S. Writing Prompts

Grade Level: 7

Content Area: Life Science **Topic: Food Chains Coral Reef**

Role	Audience	Format	Topic	Strong Verb
Sun	All Organisms	Lecture	Importance of Self in the Food Chain	Persuade: How the sun provides for all the diversity in the reef!
Coral	Public	Comic Strip	How a reef is a stony formation built from the ground up	Explain: Why the coral is the foundation to life on the reef.
Coral	Parrot Fish	Thank you Letter	The relationship between consuming macro-algae to keep the coral healthy	Instruct: Why it is good that I keep you around…
Zooxanthellae	Coral	Text message	What is the relationship between the zooxanthellae and the coral	Describe: What are you up to? Producers roles in the ecosystem.
Reef Shark	Food Web	Speech	Why I should be your apex predator.	Demand: Re-election to the top spot.
Butterfly Fish	Plankton	Diary Entry	Plan your attack on your next meal!	Reflect: On your catch for the day…were you successful or did you go hungry!

R.A.F.T.S. Writing Prompts

Grade Level: 7
Content Area: Life Science **Topic: Food Chains Deep Sea**

Role	Audience	Format	Topic	Strong Verb
Photosynthesis	**Sun**	**Complaint Letter**	**WHERE are you???**	**Persuade:** The sun to penetrate deeper into the ocean…how would life be different with the sun?
Tube worms	**No green plants**	**Comic Strip**	**Why you have been replaced…**	**Explain:** How the tubeworms provide for the biomass in the deep sea.
Deep sea scavengers	**Jellyfish**	**Thank you Letter**	**Jellyfish lakes are formed by jellyfish blooms that die and provide a huge amount of nutrients to the deep sea.**	**Describe:** Producers roles in the ecosystem.
Angler fish	**Bacteria**	**Text message**	**What is the relationship between the bacteria and Angler fish?**	**Instruct:** What are you up to? Please return as soon as possible, I will leave the light on!

R.A.F.T.S. Writing Prompts

Grade Level: 7
Content Area: Life Science **Topic: Food Chains Open Ocean**

Role	Audience	Format	Topic	Strong Verb
Phytoplankton	**All the organisms**	**Lecture/Power Point**	**I am the base of the food chain…without me you would have no energy.**	**Persuade: Phytoplankton are the base of the food chain and how all life in the open ocean depends on it.**
Landforms	**All organisms or pick one**	**Comic Strip**	**How to navigate at sea…turn right at the third sea mount?**	**Explain: How to navigate as sea using the stars or some other method to get to your location…**
Sharks	**Remora Fish**	**Thank you Letter**	**Remora fish attach to the belly of the shark by a sucker disc in its mouth. It cleans the shark of parasites and also eats any left overs from the shark's dinner**	**Describe: Symbiotic relationships in the open ocean.**
Blue Whale at a deeper depth	**Blue Whale on the surface**	**Text message**	**What is the temperature like up there today?**	**Instruct: Is it warm enough to surface today or will the air temperature be too cold?**

R.A.F.T.S. Writing Prompts

Grade Level: 7

Content Area: Life Science **Topic: Food Chains Kelp Forest**

Role	Audience	Format	Topic	Strong Verb
Sea Otter	Kelp Forest	Speech	What is a keystone species?	**Persuade:** The kelp forest that it would die without the sea otter.
Fish	Kelp	Comic Strip	How the kelp is used as a nursery for the fish offspring.	**Explain:** How the kelp provides for the fish a habitat for their young.
Giant Kelp	Sun	Thank you Letter	I am what I am because of you.	**Describe:** Producers roles in the ecosystem. How do the kelp forests provide food and shelter for variety of animals.
Sea Urchin	Kelp Forest	Text message	I have you in check	**Instruct:** How does the sea urchin affect the survival of kelp forests?

R.A.F.T.S. Writing Prompts

Grade Level: 7

Content Area: Life Science **Topic: Food Chains Polar Sea**

Role	Audience	Format	Topic	Strong Verb
Phytoplankton	**Ocean Current**	**Song**	**Where will you take me next?**	**Persuade:** Take me away from here where it is warmer and I can surface (upwelling) to soak in the sun.
Polar Bears	**Polar Ice**	**Comic Strip**	**Where will we wander to next.**	**Explain:** How is the polar ice is essential to the polar bears?
Krill	**Whales**	**Thank you Letter**	**I am what I am because of you.**	**Describe:** Roles in the ecosystem. How do the krill provide food for a variety of animals.
Penguins	**Fish**	**Text message**	**I have you in check**	**Instruct:** How does the penguin fish for its food?

R.A.F.T.S. Writing Prompts

Grade Level: 7
Content Area: Life Science **Topic: Food Chains Salt Marsh**

Role	Audience	Format	Topic	Strong Verb
Tall Grasses	Humans	Lecture/Power Point	Conservation: How can humans protect the salt marsh?	**Persuade:** The humans that the tall grasses are needed to provide natural filtration.
Fish	Tall grass	Thank you Letter	How the grass is used as a nursery for the fish offspring.	**Explain:** How the grass provides for the fish a habitat for their young.
Crabs/ Lobster/ Shrimp	Tides	Comic Strip	I am at your mercy. You come and go and I must move here and there.	**Describe:** The harsh environment that the tides can bring and the adaptations for wet/dry times.
Sea Horse	Dad Sea Horse	Text message	I will be home soon.	**Instruct:** How does the sea horse take care of its young?

R.A.F.T.S. Writing Prompts

Grade Level: 7
Content Area: Life Science **Topic: Food Rocky Shore**

Role	Audience	Format	Topic	Strong Verb
Rocks	Tides	Lecture/Power Point	Conservation: How can humans protect the Rocky Shore?	**Persuade:** The humans that the rocky shores are diverse habitats.
Sea weed	Sun	Thank you Letter	How does the Seaweed depend on the sun?	**Explain:** How does photosynthesis work? What do these plants do at high tide?
Crabs/ Barnacles/ Muscles	Tides	Comic Strip	I am at your mercy. You come and go and I must move here and there.	**Describe:** The harsh environment that the tides can bring and the adaptations for wet/dry times.
Crabs/ Barnacles/ Muscles	Tides	Text messages between	What is your ETA?	**Instruct:** How do invertebrates depend on the tides?