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Spring 2023

## “Emotions and the Ocean”: Integrating Social-Emotional Learning into a Fifth-Grade Science Curriculum

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### Recommended Citation

Rossen, Madison, "“Emotions and the Ocean”: Integrating Social-Emotional Learning into a Fifth-Grade Science Curriculum" (2023). *WWU Honors College Senior Projects*. 681.

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Honors Capstone Paper-Emotions and the Ocean

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## **Background**

Emotions are tightly intertwined with memory and learning processes, and teaching emotional skills and academics in the classrooms is beneficial (Tyng, Chai M et al. 2017). Emotions and how we respond to them are a daily part of our lives and are something everyone experiences. Emotions are defined by the American Psychological Association as "conscious mental reactions (such as anger or fear) subjectively experienced as strong feelings usually directed toward a specific object and typically accompanied by physiological and behavioral changes in the body." How we react to our emotions dictates how we feel about ourselves and others (Gillette, 2022). Navigating emotions is something humans do and can be challenging or lead to negative impacts if they are not addressed in a healthy way (Rolston and Richardson). Emotions impact many aspects of our lives, from how we act and form relationships to our learning ability. Studies on the impacts of emotions have determined emotions have a "substantial influence on the cognitive processes in humans, including perception, attention, learning, memory, reasoning, and problem-solving" (Tyng, Chai M et al., 2017.). Schools have recently recognized the importance of emotional skills, and programs called Social Emotional Learning have recently been implemented in schools to teach the skills needed to regulate emotions and form healthy relationships.

Social Emotional Learning (SEL) is defined by the Washington Office of Superintendent of Public Instruction as "a process through which individuals build awareness and skills in managing emotions, setting goals, establishing relationships, and making responsible decisions that support success in school and life." The six primary standards of SEL include self-awareness, self-management, self-efficacy, social awareness, social management, and social

engagement. More specific examples of what students learn include identifying and regulating emotions, forming goals, improving communication skills, and forming positive relationships (Washington Office of Superintendent of Public Instruction). Throughout K-12 education, aspects of the SEL curriculum build on each other as students progress through their education. The Washington State SEL curriculum has standards based on age and grade, like other subjects such as science, math, and social studies. The idea of SEL dates back to ancient Greece; however, the movement became popular in the 1970s in the United States. During this time, James Comer, a child psychologist, implemented a program called Comer School Development Program, that included many aspects of current SEL standards, in low-performing schools and saw positive impacts. Other educators and psychologists built off his research, and the benefits of SEL began to be recognized throughout the United States. However, integrating SEL with specific standards is a relatively new idea, and Illinois was the first state to create an SEL framework in 2004 (Edutopia, 2011). Washington State adopted the current standards for SEL in January 2020, and they are now a required part of the curriculum in Washington State in grades K-12 (Washington Office of Superintendent of Public Instruction).

Research on the impacts of SEL has shown that SEL improves students' behavior and academics both inside and outside of the classroom (Durlak et al. 2011). A meta-analysis study by Durlak et al. in 2011 looking at 213 SEL-based programs in schools found that SEL in the classrooms "enhanced students' behavioral adjustment in the form of increased prosocial behaviors and reduced conduct and internalizing problems." The study also noted an increase in academic ability with the implementation of SEL. A follow-up study by Taylor et al. in 2018 concluded, "Students in school-based SEL interventions continued to demonstrate significant, positive benefits in seven outcomes collected, on average, from 56 weeks and up to 195 weeks".

These studies concluded that implementing SEL in schools could increase skills such as emotional and social skills, positive views of oneself, problem-solving abilities, and academic abilities for many years to come. These studies, as well as other research, show how tightly intertwined emotions and student well-being are with the ability to learn. Learning involves much more than academics, and students' families, feelings, and fellow students' relationship with the teacher can all impact how well students learn (Durlak et al. 2011). Psychological research has determined that, “Emotional experiences are ubiquitous in nature and important and perhaps even critical in academic settings, emotion modulates virtually every aspect of cognition” (Tyng, Chai M et al., 2017). Therefore, navigating emotions, self-regulating oneself, and forming positive relationships at home and in the classroom are both crucial and challenging for students. Implementing SEL programs can help students learn these crucial skills. SEL curriculums encourage positive relationships in the classroom as well as social-emotional skills that not only improve behavior but also increase students’ ability to learn.

In some classrooms, SEL is taught independently; however, integrating SEL into the science curriculum is an effective way to teach SEL while teaching skills critical to working in the science field. There is limited research on the benefits of combining SEL with science however, one meta-analysis determined, “SEL skills and attitudes such as resilience, emotional intelligence, and self-efficacy are important to STEAM engagement and success” (Rikoon et al., 2018). From personal experience, I have found many skills that the SEL curriculum teaches to be important in the scientific field. To work in the scientific field, scientists must know how to work with others of various backgrounds (SEL benchmark 4) and learn when to speak up for themselves (SEL benchmark 5). They need goal and problem-solving skills (SEL benchmark 3) and often want to contribute to the well-being of society (SEL benchmark 6). Many of the skills

taught in the SEL curriculum are skills needed to be successful in the science field, and therefore teaching aspects of SEL should be taught and practiced in science classrooms. In particular, science lessons are a good place to teach SEL skills such as empathy and working in groups. Science classrooms encourage students to think critically about other organisms, which models empathy. Within science classrooms, students work in groups, and sometimes other group members have different opinions. Working with people with different opinions is important in science classrooms and a good place to practice these skills.

**Lesson Plan**

I created a lesson plan to help grade five teachers integrate SEL skills into their science curriculum. The lesson plan below includes a brief introduction to food webs as well as two games: a string food web game, and an emotions/food web game.

Fifth Grade lesson plan 5/26/2023

<p><b>Standards:</b>  <b>Science</b>- 5-LS2-1: Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.  <b>SEL</b>- Standard 1 (Benchmark 1A): Demonstrates awareness and understanding of one’s own emotions and emotions’ influence on behavior.                  Standard 6 (Benchmark 6C): Contributes productively to one’s school, workplace, and community.</p>
<p><b>Objectives:</b>  <b>Science</b>- Students can organize a food web for organisms living within the Salish Sea. Students recognize that matter flows from organism to organism and food is made from the sun through photosynthesis.  <b>SEL</b>- Students are able to identify different emotions and correlate different emotions with different actions/activities. (1A). Students are able to associate emotions with different organisms in the Salish Sea and understand how human impacts can affect organisms. (6C)</p>
<p><b>Previous knowledge students should have:</b>  <b>Science</b>- General layout of food webs.  <b>SEL</b>- General understanding of primary emotions.</p>
<p><b>Modified 5E’s lesson plan:</b></p>
<p><b>Engage (science):</b></p>

<ul style="list-style-type: none"> <li>● Ask students the question: “What marine animals have you seen at the beach or in books in Washington?” and put answers on board.</li> <li>● Ask students the question: “how these animals get energy/food” and put answers on the board</li> <li>● Quick example of arrows in food webs on the board (arrow from fish to seal)</li> </ul> <p>Materials: Whiteboard and markers</p>
<p><b>Explore (science):</b></p> <ul style="list-style-type: none"> <li>● Split students into groups and pass out various organisms on cards to students and have them make a food web with the cards on the table (10 min)</li> </ul> <p>Materials: Salish sea animal cards and arrows.</p>
<p><b>Explain (science):</b></p> <ul style="list-style-type: none"> <li>● Show completed food web on ppt and have students compare and contrast the food web they made. If needed, further explain Salish Sea food web.</li> <li>● Answer any further questions</li> </ul> <p>Materials: Salish Sea food web completed ppt</p>
<p><b>Elaborate (science and SEL):</b></p> <ul style="list-style-type: none"> <li>● Students split into two groups and rotate after 15 min</li> <li>● Half the group plays the emotions/food web game<sup>1</sup></li> <li>● Half the group plays yarn food web game<sup>2</sup></li> </ul> <p>Materials: Emotion game and ball of yarn.</p>
<p><b>Evaluate:</b></p> <ul style="list-style-type: none"> <li>● Worksheet included below<sup>3</sup> (15 min)</li> </ul>

1) Emotions/food web game:

Materials: Variety of salish sea organisms on cards, primary emotions on cards, various human activities on cards, and ocean background on butcher paper.

- Explain that animals do not feel emotions the same way humans do and this game is a story-telling game
- Students are given 4 human activities/organism cards and a pile of emotions cards is placed in the middle of the table
- Play goes clockwise and starts with the student who has most recently had a birthday
- On each turn students create a story by playing 2 activities/organism cards and picking an emotion to go along with it (ie. the seal is chasing the salmon and the salmon is scared)
- The cards are placed on the ocean background from left to right (to create a story)
- Students are encouraged to build off of each others previous play creating a story

- Once game is completed, teacher passes out new emotion cards to each student and one by one students place new emotion card on top of old showing that different organisms have different emotions in the same situation (ie. seal is chasing salmon and salmon is scared -> seal is chasing salmon and seal is excited)

2) Yarn food web game:

Materials: Ball of yarn

- Students stand in circle
- Each student is given organism card and placed at their feet
- Ball of yarn is passed back and forth across circle creating a web
- Teacher asks different organism to tug on the food web (tug=one organism eating the other)
- Teacher asks students to raise their hand if they felt a tug on their yarn
- Teacher tells all students who are zooplankton/plankton to drop their yarn
- Teacher then asks one organism to pull on the rope
- Teacher asks students if food web felt different without plankton

3)

Worksheet: Salish Sea Food Feb + SEL	Name:
<p>1) Draw a food web including the following elements: phytoplankton zooplankton, a small fish, a salmon, a seal, an orca whale.</p>	



Although animals do not feel emotions the same way humans do, use your imagination to answer these questions:

- 2) What is an example of an emotion a salmon may feel while being chased by a seal?  
What is an example of an emotion a seal may feel while chasing a salmon?

Salmon emotion:

Seal emotion:

3)

After playing the food web/emotion game do you think that something can feel multiple emotions at once? (circle your answer)

Yes / no

What are two emotions you feel right now?

- 4) What did you learn from the food web/emotion game about how humans can make organisms feel?

Humans can make organisms in the ocean feel....

What are two positive actions humans can have on the natural environment (like the beach or the forest)?

1)

<p>2)</p>
<p>5) What happened when one person pulled on the string in the food web string game?</p>
<p>6) What do you think would happen to the rest of the food web if a small organism like zooplankton was taken out of the ecosystem?</p>
<p>7) Did you like the food web game with emotions or the game with string better?</p>

This lesson plan aimed to integrate SEL benchmark standards with a science lesson. I plan to start the lesson by eliciting prior student knowledge and asking them what marine organisms they have seen at the beach or in books before. Eliciting prior knowledge allows students to activate relevant prior knowledge and inform teachers where the students are academically (Borasi). I will have students break into small groups and work together to form a food web. This ties in with both the science standard 5-LS2-1: Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment, as well as SEL benchmark 4, which is working with people from various backgrounds. Students in the

classroom come from various backgrounds, and by splitting up into random groups, students can expand their knowledge of working with people from various backgrounds. To further their understanding of the food web, I plan to have the class come back together, and I showed the class what the correct food web looked like. I then plan to ask the students to compare and contrast their food web and discuss what they would change next time within their groups. This allows students to reflect on the food web they created a process that has been found to be beneficial as well as crucial to learning processes (Di Stefano et al., 2014)

After students have a general idea of food webs in the Salish Sea, students will split into groups to play two different games. The first game consists of a ball of yarn and various animal cards. Students will work cooperatively to form a food web and pull on the yarn to show how one organism can impact the whole web. This activity will solidify the food web for students and accommodate kinesthetic learners. The other game students will play incorporates SEL standard Standard 1 (Benchmark 1A): Demonstrates awareness and understanding of one's emotions and influence on behavior. As well as Standard 6 (Benchmark 6C): Contributes productively to one's school, workplace, and community. Students will participate in a storytelling activity where they create a story with various animal cards for marine organisms living in the Salish Sea and human factors. Students will also play an emotion card with the animal card they played. I chose to include the primary emotions, which are anger, fear, sadness, happiness, disgust, surprise, and trust (American Psychological Association), as well as grateful to include another "positive emotion." An example of a story could be "the seal is swimming, sees a surfer in the water and is excited" or "the salmon sees a shark swimming towards it and is scared." This game allows the students to further their understanding of the food web as well as to learn empathy for the organisms that live around them by placing themselves in the organism's shoes through

storytelling. Since there are aspects of the game that include human elements, such as fishing, surfing, littering, picking up trash etc., students can also understand how humans can both positively and negatively impact the surrounding ecosystem. Understanding how humans interact with nature could lead students to care more about their community (Benchmark 6). Finally, to wrap up the lesson, I will give students a worksheet so I could better understand what students got out of the lesson and students could solidify topics learned during the lesson.

## **Results**

Students were initially excited about learning about marine food webs, and many students spoke up about marine animals they had seen before. The students also responded well to creating their own food web and worked well with other students in the group. After looking at the students' completed worksheets, I found that most students were proficient in Salish Sea food webs and could successfully draw the food web after the lesson. After playing the food web/emotion game students demonstrated that they were able to recognize what emotions are appropriate for different situations and what impacts humans can have on organisms. Students also had a good idea of what positive actions humans can have on the natural environment. Some answers students put for the question "What are two positive actions humans can have on the natural environment?" include, "beach clean the trash out of the sand and ocean", "getting rid of invasive species", and "buy less things". After playing the string game most students showed they understood that if one organism is taken out of the ecosystem, it can negatively impact the rest of the ecosystem. Many students' answers for the question "What do you think would happen to the rest of the food web if a small organism like zooplankton was taken out of the ecosystem" included something related to other organisms in the ecosystem dying. Finally,

question seven asked students which game they liked better and most students stated that they liked the string game better.

### **Discussion**

The original lesson plan included bringing the class together after they finished creating their food web so I could show them the correct food web I created. Then, I planned to have the students return to their groups and discuss how their food webs differed from mine. However, explaining each element of the food web was complicated in a large group setting and so I walked around and helped each group individually instead. This individualized time with each group was beneficial, and within ten minutes, all the students had a correct understanding of the food web. Students then split into two groups and I worked with half the students at a time, playing the emotion/food web game. Their teacher played the string game with the other group and then students rotated.

Students had a stronger preference for the string game because they learned more from the game and were more focused during the game. Students wrote on their worksheet that they enjoyed the string game more because they “learned a lot” and “it was cool to learn about ecosystems”. During the lesson it was difficult to analyze how students interacted with the emotion/food web game as I had trouble managing two separate groups of students without the assistance of their teacher. Within twenty minutes of being introduced to the students I began working with them and this was not enough time to form a relationship with them, which I think is part of the reason the students were hard to manage. Building relationships is a key component of classroom management and without a relationship I struggled to keep the students in control (Indiana University, 2021). Students recognized the chaos as well and on the worksheet that asked which game the students liked better one student said, “I liked the string game better

because I think people were listening better it was more focused". Even with the chaos, some students interacted well with the game, and many did a good job of building upon the story line that students before them had created. Students also did a good job recognizing appropriate emotions, and some students put down multiple emotions at once.

Based on the responses I received from students' worksheets about the emotions/food web game, I think the game would be more appropriate for younger students. Students in fifth grade appeared to have a good idea of how to match each emotion with a certain situation and at times seemed bored with the game. They also already understood that people can feel two or more emotions at once and often played multiple emotion cards at once. Next time I play this game with students, I will also slow the game down and pause it every so often to ask someone else to place a new emotion on top of the emotion a student had previously played. This will allow students to observe that their peers may have different emotions than they do and this would improve reinforcing this idea. Overall, the students seemed to enjoy and benefited from learning personal skills and scientific facts at the same time and I believe teaching SEL and science standards together is an effective technique.

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