Seacoast Science Center Marine Science Fellowship Program for High School Students:

Course Description:
A full semester hands-on marine science course for high school sophomores, juniors and seniors to learn about the field of marine science, both in the field and in the classroom. Students learn first-hand about various marine science topics and areas of study. They will discuss marine science career paths and meet different scientists within the field. Students will have the opportunity to create their own research project during the semester. Students may apply for the fall, spring, or both semesters. A second semester allows students to deepen their engagement in marine science topics and research.
*Students may apply for Extended Learning Opportunity or NH Learn Everywhere credit through their schools.

Objectives:
- To give students a greater understanding of the field of Marine Biology through inquiry, investigation, and hands-on experiences at Seacoast Science Center
- To expose students to a range of careers in marine biology and provide opportunities for them to engage with visiting professionals
- To engage the students in research, improve scientific skills and practices, foster individuals’ special interests, and practice presentation skills and techniques
- To educate students about the impact they have on the ocean, the challenges facing our climate, and how they can contribute to a sustainable and healthy ocean.

Time Commitment:
3-6 hours per week. The class meets Saturday mornings from 10 AM to 1 PM, with an option for a second day each week for volunteering. Wednesdays from 3:30-6:00 PM are makeup sessions for those who are unable to make the Saturday class. Wednesday's class time can be changed depending on the availability of the students

Contact Information:
A full contact list can be found in our Fellows 2023 S2 Class folder on Google Drive. Registered students have access to the entire course folder.
- Sean McKenna Aquarist II & Marine Fellowship Coordinator s.mckenna@sscnh.org ext. 31
- Kate Leavitt Chief Program Officer k.leavitt@sscnh.org ext. 27
- Amanda Komarek Program Manager a.komarek@sscnh.org ext. 17

Google Folder:
A Google Folder on the Google Drive, Labeled Fellows 2023 S2, is where you upload assignments. This folder will also have resources such as: contact list, assignment list, PowerPoints and discussion topics, notes, project material, and course material.

<table>
<thead>
<tr>
<th>DATE</th>
<th>DETAILS</th>
<th>IMPORTANT DATES</th>
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<tbody>
<tr>
<td>February 4th</td>
<td>Introduction: Overview of habitats and animals</td>
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<tr>
<td>February 11th</td>
<td>Marine Bioacoustic</td>
<td>Introduce project topics</td>
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<td>February 18th</td>
<td>Research Day (SAG: Kate &amp; Amanda)</td>
<td>Introduce Research/Inquiry projects</td>
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<td>Research question idea</td>
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<tr>
<td>March 11th</td>
<td>Marine Mammal Rescue Talk (Guest Speaker: MMR Rescue Team Member)</td>
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<tr>
<td>March 18th</td>
<td>Animal Handling</td>
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<td>March 25</td>
<td>Project Class - Open House for Research (SAG: Kate &amp; Amanda)</td>
<td>Deadline for comparative questions &amp; methods.</td>
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<td>April 1st</td>
<td>Diving and involvement</td>
<td>start compiling rough draft of methodology (Results, Discussion, References)</td>
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<td>April 15th</td>
<td>Marine Geology</td>
<td>Peer review projects</td>
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<td>May 6th</td>
<td>Archeology and Fossils</td>
<td>Share and start compiling Rough Draft (Results, Discussion, References)</td>
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<tr>
<td>May 20th</td>
<td>What’s Next? How do we get involved &amp; college programs</td>
<td>Posters need to be submitted in the poster template in the Google Docs electronic format</td>
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**Project Outline:**
Students will learn the necessary skills required to perform a scientific research project. They will choose a topic of their choice. Students will learn the different sections of a research poster and be able to include each section in their research posters. Each student will conduct their own research and present their findings in a research symposium at the end of the semester.

**Check-ins:** Each student will meet with the leaders of the class several times. This check-in is to review progress and answer any questions the student may have.

**In-class Project Time:** One hour of each class is dedicated to the project, with some additional classes dedicated solely to individual and group project planning and research. This is time for students to work with peers and instructors on experimental design, methods, research, collaboration, and to receive support. These time blocks sometimes focus on a specific research skill or poster topic, and other times are loosely structured to support students in completing the necessary research.

**Assignments** - Research project elements are broken down into achievable pieces with different deadlines throughout the semester. This is to ensure that we are all staying on track. This also provides the opportunity for peer review and time for us to sit down with you and review each section of the project. This way we come out with the best results and students maximize their learning of the research process. Assignment dates are listed below and in the chart above.

**Poster and PowerPoint** - Each poster and PowerPoint will consist of the following sections, listed below. For more information on how to write these sections, refer back to the Project PowerPoint located in the Google Drive project resource folder.

**Title** - Something catchy and to the point about your topic

**Question** - Use one of the three types of questions you learned
- Descriptive, Comparative, Correlative

**Hypothesis** - Take a position on your question

**Introduction** - Briefly and clearly describe why you are conducting this research project. The introduction supplies sufficient background information for the reader to understand and evaluate your experiment and supplies a rationale for the study.

**Methodology** - Explain what you did and how you did it so that anyone could replicate the process.

**Comparison/results** - Present your results using graphs, tables and text to summarize your main findings.

**Discussion** - Usually the hardest section to write. You are trying to bring out the true meaning of your data without being too wordy. Talk about what you found out and include recommendations for future inquiries/research.

**References** - This is the last section of the poster. Here, you should provide an alphabetical listing of all the published work you cited in the text of the paper. This does not mean every article you found in your research; only include the works you actually cited in the text of your paper.

**Some Past topics:**
- Do Gulf of Maine fish show self awareness?
Do seahorses prefer smooth and flat grass to cling onto over round and wavy grass?
How daily temperature changes effect the animals
How tides affect the temperature of tide pools
What kind of pollution is found on the beach and where is it located?
Do cephalopods react differently to different colors?
Does the skate’s feeding behavior change when in solitude versus a social setting?
Where along the NH state parks are invasive species found?
Can phytoplankton grow in tubing for the implantation of reducing carbon emissions in urban areas by lining buildings with said tubing? Additionally, how effective would this be?
Can coral growth be stimulated by microfracturing?
What marine scavengers are most effective in breaking down environmental waste?
Does Mushroom coral, Chalice coral, or Birds Nest coral grow the fastest at 80 degrees Fahrenheit?
How are sea turtle strandings different in the Gulf of Maine vs the Gulf of Mexico?
How are rising acidity levels affecting coral reefs?
What are we learning from tracking seals?
How is climate change affecting the lifespan of sea stars?
What was the most frequently found article of trash on New England beaches? What are some possible alternatives?
How are sharks affected by different types of food and enrichment?
How is climate change negatively impacting endangered species?
How do methods of coral fragmentation affect their rate of growth?
How do lobsters react when presented with food when another lobster is near?

**Important Project dates:**
February 11th - Introduce project topics
February 18th - Introduce Research/Inquiry project, timeline and assign comparative question and Methods
March 25th - First draft of question, hypothesis and intro due
April 1st - start compiling rough draft of methodology (Results, Discussion, References
April 15th - Draft of methodology due for peer review
May 20th - Project due in PowerPoint form on Google Drive