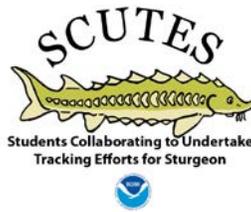


<b>Topic/Lesson:</b>	<b>Atlantic Sturgeon in Hot Water: Climate Change</b>
<b>Objectives:</b>	<p>Students will be able to:</p> <ul style="list-style-type: none"> <li>• Understand that the climate is changing.</li> <li>• Explain how the changing weather and increase in temperature could cause drastic changes within the ocean ecosystem.</li> <li>• Create a “rap” or song describing how climate change is negatively affecting Atlantic sturgeon.</li> <li>• Understand the outcomes of climate change.</li> <li>• Discuss tips for humans to help stop rapid climate change.</li> </ul>
<b>Materials:</b>	<ul style="list-style-type: none"> <li>• “Atlantic Sturgeon in Hot Water” paper</li> <li>• Paper or writing notebook</li> <li>• Pencils and erasers</li> <li>• Computers or projector to view video clip online – <a href="http://passporttoknowledge.com/polar-palooza/whatyoucando/taacc/">http://passporttoknowledge.com/polar-palooza/whatyoucando/taacc/</a></li> </ul>
<b>Vocabulary:</b>	<ul style="list-style-type: none"> <li>• Climate change</li> <li>• Atlantic sturgeon</li> <li>• Global warming</li> <li>• Temperature</li> <li>• Spawning</li> <li>• Ecosystem</li> </ul>
<b>Procedures:</b>	<ol style="list-style-type: none"> <li>1) Begin class by asking “Is our climate pretty predictable?”</li> <li>2) Allow partners or small groups a few minutes to discuss.</li> <li>3) Have volunteers share their responses and have class discussion.</li> <li>4) Next ask, “Does being able to predict our climate and weather make our lives easier or harder and why? What would happen if all of a sudden our climate and weather was not predictable and changed rapidly?”</li> <li>5) Again students discuss their thoughts in their groups, before sharing as a class.</li> <li>6) On a small piece of paper have students write down three or four sentences describing what global warming is and how it is changing the Earth.</li> </ol>

	<p>7) Allow volunteers to share their answers (most students will not include anything about our oceans, rivers, and aquatic life).</p> <p>8) Distribute “Atlantic Sturgeon are in Hot Water” paper and read it out loud, stopping to discuss wherever teachers see fit.</p> <p>9) Next, students will watch the rap video clip about climate change. Teachers may allow students to watch individually on their own computers, or use a projector to watch the video as an entire class.</p> <p>10) After watching the video, explain that their task will be to create a “rap” or song to explain climate change, global warming, how it is affecting Atlantic sturgeon, and what people can do to help. Pass out written directions to each pair or group.</p> <p>11) Pair students up or put them into small groups to complete their assignment. It is up to the teacher how long students have to work on their raps. For students with accommodations, you can have them make a story or comic book instead.</p> <p>12) Partners or small groups present/perform their raps for the class, as well as turning in written lyrics to the teacher.</p>
<p><b>Accommodations/ Modifications:</b></p>	<ul style="list-style-type: none"> <li>• Peer partnering</li> <li>• Multi – sensory assignment</li> <li>• Written instructions</li> <li>• Fact sheet</li> <li>• Modeling (watch video as example)</li> </ul>





## **Atlantic Sturgeon are in Hot Water**

Atlantic sturgeon are a large fish that is found along the entire eastern Atlantic coast in North America. They can live up to 60 years, reach up to 14 feet in length, and weigh over 800 pounds. Atlantic sturgeon spend most of their lives in the ocean, but are anadromous, meaning they migrate back to the rivers they were born in to spawn. Although Atlantic sturgeon populations were once abundant, they have drastically declined since the late 1800s. Some of the reasons their populations are in danger are impacts from overfishing, loss of habitat from dams and dredging, and water pollution.

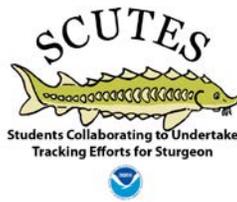
Now, the Atlantic sturgeon may be facing another potential threat. This newly recognized threat is not overfishing, dams or dredging, or water pollution; it's rising temperatures from climate change. Along with all fish, the Atlantic sturgeon may be becoming increasingly at risk due to the damaging effects of climate change and rising temperatures in rivers and oceans. When the water gets hotter, it may affect fish by impacting the amount of food available, decreasing the suitability of spawning habitat (e.g., causing the spawning habitat to not be as good for sturgeon), and lower oxygen concentrations in the water. Global warming is causing the waters to become warmer. Rainfall patterns, sea levels, and water currents are also changing.

Some fish are unable to spawn if the water temperature is too hot. If the Atlantic sturgeon are unable to spawn due to high water temperatures, their populations face another hurdle to overcome. If sturgeon are unable to reproduce due to the warmer water, it is only a matter of time until there are no Atlantic sturgeon left.

Atlantic sturgeon spawning areas also need to contain oxygen levels that are able to support young life stages of sturgeon, which are more sensitive than the larger fish. As the water temperature rises, the oxygen levels can decrease. Just as oxygen in the air is necessary for humans to survive, the oxygen in the water is necessary for Atlantic sturgeon to survive and grow.

Atlantic sturgeon could try to adapt to the hotter water temperatures by migrating or moving to cooler waters; however, this move could have negative outcomes as well. First, Atlantic sturgeon are programmed to home to their natal river (e.g., they return to where they were born to spawn). If they attempt to spawn in an unfamiliar area, reproducing could be unsuccessful. This new habitat could be unsuitable and unfit for laying eggs, providing them with cover until they hatch, and allowing juvenile sturgeon to grow safely. Another problem with Atlantic sturgeon migrating to cooler waters permanently is that it would impact the food chain. Other animals and aquatic life will be affected by the lack of Atlantic sturgeon. Remember, every part of the food chain plays a valuable role. One missing link could drastically change the ecosystem.

Changes in the Earth's climate have always happened, but usually the change is much slower, leaving time for life on earth to adjust and adapt gradually. Currently, global warming is causing much more drastic and rapid changes in our climate, which will continue to happen if we do not figure out a way to stop it.



## Climate Change Rap/Song

Your group or pair is responsible for creating an original rap or song to demonstrate your knowledge of climate change, global warming, how it is affecting Atlantic sturgeon, and what people can do to help. It will be helpful to do some extra online research on global warming and its effects on the ocean.

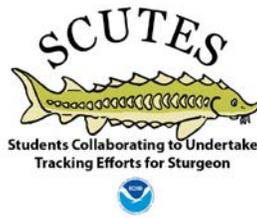
When you are done creating your rap or song, you should practice it. Your group **MUST** present your rap or song to the class, as it will be used for part of your grade. As well as creating the rap, and presenting it, a neat, organized, edited, written set of lyrics must be turned in.

You may rap or sing your climate change song to other familiar songs or raps. For example, one group could create lyrics to go along with “The Star Spangled Banner” or “Frosty the Snowman.”

Use the rubric below to help you focus while creating and practicing your original rap. Good luck, have fun, and follow directions!

### Climate Change Rap Rubric

Area	Objectives	Possible Points
Cooperative Learning	Students work together cooperatively. All students participate while working on all aspects of the “rap” assignment.	25 pts
Written Lyrics	Written lyrics are organized, and written neatly. Final copy has been edited and revised, with no grammatical or spelling mistakes.	25 pts
Presentation	Entire group participates in some way during the rap presentation. The rap is performed musically, not simply read out loud. Volume is good and rate sung or “rapped” is appropriate.	20 pts
Accuracy	Rap includes accurate information that demonstrates knowledge of climate change, global warming, how it is affecting Atlantic sturgeon, and what people can do to help.	30 pts



## Climate Change Song Example

### Atlantic Sturgeon Feeling Hot, Hot, Hot (A parody of "Hot, Hot, Hot" by Buster Poindexter)

By Edith Carson

Ole ole - ole ole / Ole ole - ole ole

EE-Yessa Ha-ha  
Ee-yes sturgeon

The temp is rising – It's not surprising-- Feeling hot hot hot  
It's climate change -- All around me feeling hot hot hot  
What to do – for creatures like fish  
Where's their food – O<sub>2</sub> their wish  
We need a greener plan – Reduce carbon footprint

So we go rum-bum-bum-bum  
Yeah we rum-bum-bum-bum  
Feeling hot hot hot -- Feeling hot hot hot - oh scutes

(me la la la lum bum bum)

Our fish companion – Atlantic sturgeon -- Feeling hot hot hot  
With global warming – They are not spawning -- Feeling hot hot hot  
It's in the air – River spawning time  
With this heat – sturgeon hard to find  
We can help them along- Lessen greenhouse gases

So we go rum-bum-bum-bum  
Yeah we rum-bum-bum-bum  
Feeling hot hot hot -- Feeling hot hot hot - Oh scutes

Ha-ha

Ole ole - ole ole / Ole ole - ole ole  
Ole ole - ole ole / Ole ole - ole ole

EE-yes sturgeon

Sturgeon in the river - hot hot hot

Sturgeon in the river - hot hot hot  
They come to the river know what they got  
They come to the river know what they got  
Air hot – Sea hot -- He's hot -- She's hot  
Fish hot -- Spawn hot -- Eggs hot -- Eggs not  
(Real hot) -- (Real hot) -- (Real hot) -- (Real hot)  
Ha-ha-ha - Oh scutes

How are sturgeon? (Hot hot hot)  
How are sturgeon? (Hot hot hot)  
How are sturgeon? (Hot hot hot)  
How are sturgeon? (Hot hot hot)

(Hot hot hot)(Hot hot hot)  
(Hot hot hot)(Hot hot hot)

## **Sturgeon Rap Example**

by Richard Laughton

Yo, I'm chillin' at the dock and I'm tempted to say,  
Why all y'all fishermen by bycatching all day  
Installation of tidal turbines threatening potential damage,  
And got mad fishing vessels threatening potential ramage,

Dams in eastern rivers with no fitting fishways  
And dumping mad contaminates, making their future look grey,  
Exposure to pollutants reducing egg viability, lowering survival rates and delaying fish maturity

Dredging prey's habitats, wherever they may lay,  
And be trashing all the oceans, making their water look dirtay.  
All these things be effecting any habitat they see, anadromous fish be living in estuaries, rivers  
and coastal seas.

And the floating nets in the marine, all the trash looking quite obscene,  
All of these fish see chemical runoff, and any layers of oil won't come off,  
But I cannot find the reason why regardless of the season, y'all be hurting fish like treason,  
vessels leaving em with lesions.

Threats to marine species are constantly emerging but you know through it all I'm protecting  
sturgeon