

Crossing the Continents

"Turtle Travel – From Egg to Adulthood;

Against All Odds"



Objective:

Students will learn about the conservation efforts of many to save Sea Turtles. Students will use latitude and longitude to partially map turtle migration routes as they learn about several different species of sea turtles. Students will focus on current threats to sea turtles and what can keep them from reproducing to ensure the survival of their species. Students will further learn that sea turtles can take up to 30 years to reach reproductive age and always return to the same beach they were born on to lay their eggs. Finally students will debate in a Socratic Seminar on what they can do every day to help a sea turtle survive from egg to adulthood.

PURPOSE: To educate students on current plights of several different sea turtle species, and what threatens their existence, as well as the many different conservation methods being done to ensure their survival. Students will then plot the partial migration paths of three different species of sea turtles using latitude and longitude coordinates and debate on best practices to ensure the survival of these species.

VOCABULARY: Global Warming, Sea-Level Rise, Migration, Latitude, Longitude, Equator, Prime Meridian, Endangered Species Act, Critically Endangered, Endangered, Threatened, Vulnerable, Data Deficient, Entanglement, Bycatch, Trawls, Gill Nets, Turtle Excluder Devices, Poaching, Sea Turtle Harvesting, Water-craft and Water Vehicles, Coastal Development, Critical Nesting Beach, Artificial Lighting, Beach Armoring, Erosion, Nesting Season, Pollution and Marine Debris, Floating Trash Gyres (Pacific Gyre), Biodegradable, Reusable vs. Disposable, Fibropapilomas, Invasive Algae, Agricultural Run-off, Nearshore Waters, Refuge, Steward of the Environment

Time needed:

1-1.5 hours (30-45 minute Class Prep, Background Research and Socratic Seminar; 30 -45 minute Lab Activity)

TEACHER PREP and BACKGROUND RESEARCH:

1. Watch the following video prior to showing the class.

<https://www.youtube.com/watch?v=l-R0XJokeJU>

Plotting Latitude and Longitude Lines (8 min)

2. Download and print class copies of the following maps for plotting turtle migrations:

<http://conserveturtles.org/pdf/education/AtlanticCaribbeanTrackingMap-NOAA.pdf>

Class Prep and Background Research:

- 1) In a class setting or in small groups, have students view the video, "Sea Turtle Migrations" (4 min) at the following YouTube link (allow time for student's reactions as well as questions afterwards.)

<https://www.youtube.com/watch?v=ZS0kXtmXuj8>

-AND-

<https://www.youtube.com/watch?v=ssIY1HDkH0o>

Satellite tracking turtles reveals migration secrets (about 2 min)

-AND-

<https://www.youtube.com/watch?v=S5DWctDqExY>

Turtle satellite tracking summer 2010 (3 and ½ min)

-AND-

<https://www.youtube.com/watch?v=T8eGw1oyYoQ>

New Born, Baby Sea Turtles Race to the Ocean! (3 min)

- 2) Ask students what they think about the life of a sea turtle, especially of a baby sea turtle? Have students discuss their answer first with a classmate, limiting the discussion to one minute per student, and switching to allow the other a chance to speak as well for one minute.
- 3) Have students then write a comment about the video on a sticky note and post in a central spot within the classroom where the Teacher can read off to the class and discuss comments. (Allow time for students to ask questions, and to discuss possible misconceptions regarding sea turtles without correcting.)
- 4) Read the Introduction section below together as a class and pay particular attention to the vocab terms "Stewards of the Environment", "Critically Endangered", "Endangered", "Vulnerable", "Data Deficient", and "Endangered Species Act". Ask students what does it mean to be a Steward of the Environment? How does that make them feel? Discuss how important it makes humans in the survival of Sea Turtles.
- 5) Next, have students look up pictures on their IPADS or on a computer for each type of Sea Turtle to see if they can tell the differences between the seven species. If allowed, print photos of each to post in a central spot in the classroom for all to see. Place sticky notes under each photograph showing their status: Critically Endangered, Endangered, Vulnerable, or Data Deficient.

Introduction:

Why are Sea Turtles important, you ask? Well, to help balance ocean ecosystems for one. Sea Turtles are part of the food web and help cycle nutrients within their marine habitats. That means they eat and create waste that is necessary for proper health, both for themselves and within our world's oceans. It has been left to us, humans, to help stabilize their populations, and the conservation of our marine waters as *stewards of the environment*. This will create a more balanced ecosystem beneficial to both humans and animals. Let's get to know the seven known species on our planet by reading the status for

each below, according to the *IUCN* (International Union for Conservation of Nature) **Red List** of Threatened Species:

GLOBAL STATUS - The world's seven sea turtle species are classified as follows:

Leatherbacks	Vulnerable
Greens	Endangered
Loggerheads	Endangered
Hawksbills	Critically Endangered
Olive Ridleys	Vulnerable
Kemp's Ridleys	Critically Endangered
Flatbacks	Data Deficient

*Critically Endangered: Species is considered to be facing an extremely high risk of extinction in the wild.

*Endangered: Species is considered to be facing a very high risk of extinction in the wild.

*Vulnerable: Species is considered to be facing a high risk of extinction in the wild.

*Data Deficient: Species that cannot be evaluated because of insufficient information.

Now let's look at some National Laws...

Sea turtles are given legal protection in the United States and its waters under the *Endangered Species Act* (ESA), which lists the Hawksbill, Leatherback, Kemp's Ridley and Green Sea Turtle as endangered; the Loggerhead is listed as threatened. This designation makes it illegal to harm, harass or kill any sea turtles, hatchlings or their eggs. It is also illegal to import, sell, or transport turtles or their products. In the United States, the *National Marine Fisheries Service* has jurisdiction over sea turtles in the water, while the *U.S. Fish and Wildlife Service* is responsible for them on land. Other countries have their own conservation laws and regulations that apply to sea turtles.

So what exactly threatens Sea Turtle Populations and why are they so vulnerable as a species? Well, some sea turtles take up to 30 years to reach reproductive age, and a lot can happen from egg to adulthood between then.

The biggest threats include:

- Entanglement in fishing gear
- Poaching and illegal trade of eggs, meat, and shells
- Coastal development
- Plastic and other marine debris
- Global warming
- Ocean pollution

Part II:

Socratic Seminar Activity:

- 1) Break students into 6 groups and hand each a Turtle Card (#1-6; See Attached). Each card describes a current threat to Sea Turtle survival. Instruct students to silently read about the facts on the front side of their card and to analyze the picture together afterwards as a group. Next, have students read through the conservation suggestions on the back side and decide which ones would be the best to enact or follow to fix the threat described on the front side of their card.
- 2) Next, have students face off with another group and give each one – two minutes to describe their card's threat to sea turtle survival to the other group. It is important that each group decide on ONE person who will speak for the group to the other group. The other group must take notes and not interrupt. If interruptions do occur, add 5 seconds to the group speaking to make up for lost time. Then, after each group has gone, give each group one minute to organize a summary of what they heard while taking notes. Then have the group assign one new person in each group be the spokesperson who will then read back their summary to the other group. Again, no interruptions should occur, only listening.
- 3) Rotate each group so that each gets a chance to listen to the other 5 groups, while presenting their sea turtle threat from their card and then summarizing the other group's threat. Each summary should be no longer than one-minute max.
- 4) Finally, announce to the class that each group will now argue which conservation method on the back side of their card would be the most important to enact or to follow for ALL the threats combined that they learned about today from each other. Each group is to choose one new person to be their first speaker. Let the students know that each group will get a turn, decided by randomly chosen numbers (1-6). The groups that are not speaking must take notes as to why they agree or disagree with the speaking group's points.
- 5) If time, after each group has spoken, ask if there are any groups that would like to change their minds on which conservation method they support as the best for handling all sea turtle threats. Give the class one minute to discuss within their groups, and allow any groups that have changed their minds to allow a speaker to stand up and explain why they have changed and to what conservation method they changed. This could go on for quite a while, yet can end here. Eventually, have each group write on a sticky note their final choice for best conservation method and post this in a central spot in the classroom for others to view. Congratulations, you have successfully completed a Socratic Seminar!

NAME: _____ Date: _____ Period: _____

"Turtle Tourny"

Lab Activity:



Materials:

(Per pair): 1 NOAA Atlantic Caribbean Tracking Map, Pencil and Data Sheet

Hypothesis:

If we map the partial migration routes of three different Sea Turtles, then we predict that the _____ (Loggerhead, Leatherback or Hawksbill) will be the fastest to map (circle one answer per blank above). The longest route will belong to the _____ (Loggerhead, Leatherback or Hawksbill) (circle one answer per blank above).

Procedure:

1. Have students' pair up into groups of two. Hand each student a copy of the NOAA Atlantic Caribbean Map. Watch the following video with the class on mapping Sea Turtle Coordinates. Your finished product will look much like this.
<https://www.youtube.com/watch?v=0M8xIgg6A3w>
2. Have each group choose one turtle to map. Record on the board so that each turtle gets mapped by at least two different groups.
3. Review how to map coordinates on a map using Latitude and Longitude. Remember that "Flat Lats" run parallel up and down the globe, and North or South of the Equator. Longitude is the "Long Lines" perpendicular to the Equator and run West or East of the Prime Meridian.
4. Announce that this is a contest to see which group will be the fastest (and the most correct) at mapping the coordinates of their Sea Turtle. The Teacher may use a timer here to mark time if necessary between multiple classes. The coordinates for each Sea Turtle are laid out in Data Table 1 below and include very important notes about the activity of each sea turtle as it was traveling. These notes and your completed maps will help you answer the questions that follow. READY? SET? GO!

Data Table 1:

TURTLE MIGRATIONS	<u>Date #1 and Coordinates, and observations</u>	<u>Date #2 and Coordinates And observations</u>	<u>Date #3 and Coordinates and observations</u>	<u>Date #4 and Coordinates and observations</u>	<u>Date #5 and Coordinates and observations</u>

TURTLE #1 –	<u>May 19, 2010</u>	<u>July 31, 2010</u>	<u>September 22,</u>	<u>October 26,</u>	<u>November 11,</u>
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Name – <i>My Carolina</i> , Loggerhead Sea Turtle	Satellite Tagged, Release Site – <i>Florida Refuge</i> Latitude 27 N Longitude 80 E, WENT TO VERY DEEP DEPTHS	Latitude 37 N Longitude 75 E, FOUND GOOD FOOD SOURCE	<u>2010</u> Latitude 37 N Longitude 74 E Was caught in a Gill Net and released immediately	<u>2010</u> Latitude 36 N Longitude 75 E Cooler Water Temperatures	<u>2010</u> Latitude 34 N Longitude 76 E Escaped a trawl through a Turtle Excluder Device (TED)
Turtle #2 – Name – <i>Angel's Journey</i> , Hawksbill Sea Turtle	<u>June 5, 2010</u> Satellite Tagged, Release Site – <i>Panama</i> Latitude 9 N Longitude 81 E, WENT TO VERY DEEP DEPTHS	<u>July 3, 2010</u> Latitude 26 N Longitude 83 E, FOUND SOME FOOD SOURCES	<u>August 2, 2010</u> Latitude 29 N Longitude 88 E Barely escaped impact with a water-craft vehicle	<u>September 10, 2010</u> Latitude 29 N Longitude 85 E Lots of Sediment in Water; difficult to see	<u>October 18, 2010</u> Latitude 28 N Longitude 83 E Still swimming through lots of floating trash, oil
TURTLE #3 – Name - <i>Bahama Mama</i> , Leatherback Sea Turtle	<u>June 12, 2010</u> Satellite Tagged, Release Site - <i>Puerto Rico</i> Latitude 18 N Longitude 65 E, WENT TO VERY DEEP DEPTHS	<u>July 11, 2010</u> Latitude 23 N Longitude 66 E, NOT FINDING GOOD FOOD SOURCES	<u>July 25, 2010</u> Latitude 29 N Longitude 72 E Very Warm Waters	<u>August 13, 2010</u> Latitude 33 N Longitude 78 E Cooler Water Temperatures	<u>September 29, 2010</u> Latitude 32 N Longitude 79 E More Food Sources Found

Interpreting Data:

Migration Routes:

- 1) Which group finished mapping their Turtle's route first? Why do you think they finished first?
- 2) Which turtle had the longest migration route so far? Why do you think this is so? Look at that turtle's coordinates and observe any important notes about that turtle.

Analysis:

- 3) What importance does a food source play in the migration route a turtle chooses to follow?
- 4) What role does location play in the migration route a turtle chooses to follow? Think about the safety of the turtle and if there are any threats it may encounter.
- 5) What do you think would happen if most of the countries in the Atlantic Caribbean area worked together to help protect Sea Turtles?

Vocabulary Review:

- 6) What do the words "Steward of the Environment" mean to you? What do these words have to do with today's Lab activity in terms of Sea Turtles and their migration routes?
- 7) After performing this lab, is there a pattern that Sea Turtles follow or does it appear to be random? What influences or threats affect Sea Turtle survival when swimming?

*BONUS QUESTIONS:

- 8) What countries released each Sea Turtle mapped in this lab?
- 9) What solutions or other conservation methods could humans come up with between countries that would help ensure Sea Turtle survival?

Summary Conclusion:

Please write a 3-5-sentence paragraph using at least 5 of the words from the word bank below. Try to describe what happened during this lab according to your data and what you learned from your data.

Word Bank:

Global Warming, Sea-Level Rise, Migration, Latitude, Longitude, Equator, Prime Meridian, Endangered Species Act, Critically Endangered, Endangered, Threatened, Vulnerable, Data Deficient, Entanglement, Bycatch, Trawls, Gill Nets, Turtle Excluder Devices, Poaching, Sea Turtle Harvesting, Water-craft and Water Vehicles, Coastal Development, Critical Nesting Beach, Artificial Lighting, Beach Armoring, Erosion, Nesting Season, Pollution and Marine Debris, Floating Trash Gyres (Pacific Gyre), Biodegradable, Reusable vs. Disposable, Fibropapillomas, Invasive Algae, Agricultural Run-off, Nearshore Waters, Refuge, Steward of the Environment

Turtle Cards:

TURTLE CARD #1

- We all love seafood! Unfortunately, fishing gear accidentally captures thousands of sea turtles every year. This capture is called "by catch" and it occurs when fishing equipment (nets, trawls, hooks) catch animals that they were not meant to catch. Historically, shrimp trawls and long-line fishing have been two of the biggest culprits for injuring and killing sea turtles. In 2010, a study conducted by Duke University reported data on marine turtle by catch for the past 18 years. It showed approximately 85,000 turtles were reported as captured. The study however, only took data from 1% of the total fishing fleets in the ocean. This means that most likely the numbers from those 18 years were in the millions.
- Today, shrimp trawls are required by U.S. law to use Turtle Excluder Devices (TEDs) on their boats. TEDs are small gates that allow large animals (turtles, sharks, etc.) to escape the back of the trawl, while still capturing small animals like shrimp. However, not all countries or fisherman

use these nets and until they do, many more sea turtles will continue to be captured. It is important for humans to make ecologically responsible decisions when choosing where and from whom we buy our seafood.



Entanglement in Fishing Gear

Some immediate goals for protecting sea turtles include:

- Crack down on illegal international trade in sea turtles and their products by enforcing laws and agreements.
- Decrease the turtle deaths caused by commercial fishing through enforcement of Turtle Excluder Device (TED) and gill net regulations.
- Protect nesting beaches by establishing parks and refuges or through regulations combined with public education initiatives.
- Eliminate disturbances at nesting beaches by decreasing artificial lighting, halting beach armoring, regulating beach nourishment and limiting the impacts of people on the beach.
- Enforce national and international laws to minimize the dumping of pollutants and solid waste into the ocean and near shore waters.
- Continue research and monitoring activities so that the population can be monitored and conservation efforts can be focused where they are most needed.
- Increase public awareness and community participation in sea turtle conservation through educational programs such as this.

TURLE CARD #2

- Marine debris is defined by NOAA (National Oceanic and Atmospheric Administration) as “any persistent solid material that is manufactured or processed and directly or indirectly, intentionally or unintentionally, disposed of or abandoned into the marine environment.” Plastic and trash in our oceans are a growing problem. While there is no exact number of how much trash is in our ocean, alarming satellite images show great garbage patches (Pacific Gyre) of floating trash forming in our water and growing larger every day. These patches are larger than the state of Texas. Not only does this trash get eaten by marine life, but also plastics leech (release over

time) harmful chemicals into our ocean and poison the water for everyone.

- All too often, sea turtles mistake trash for the creatures that they prey upon. Many times these items are not thrown directly into the water, but are discarded on the land and get blown into the ocean by the wind or brought in by high tides. They are things we use in our everyday lives such as; bottles, balloons, plastic bags, and food wrappers. When sea turtles ingest trash it can make them very sick and even block their intestines, which can cause death! The photo below shows a stranded sea turtle on South Padre Island excreting a plastic bag. It is important to pick up trash, no matter where you are. Take your trash with you when you leave the beach and if you see something left by someone else, do the right thing and pick that up too. Try to reduce the amount of waste you produce. Use biodegradable plates, reuse your plastic beach toys every year, and bring reusable bags and water bottles to your beach days instead of plastic, disposable ones. These small changes in lifestyle will make a big difference in the health of our planet!!



Plastic - Marine debris, Ocean Pollution

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- Enforce national and international laws to minimize the dumping of pollutants and solid waste into the ocean and near shore waters.
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TURTLE CARD #3

- Sea turtles are reptiles, and breathe air. Although they can hold their breath for long periods of time, they do have to come up to the surface to breathe. When people drive their water-crafts

(boats, jet skis, etc.) carelessly, they can accidentally hit a sea turtle. Shell injuries are very life threatening, and many do not make it. It is important to always follow speed limits and water safety laws when operating any water vehicle.



Boat Strike Injury

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TURTLE CARD #4

- Humans are constantly building new condos, houses, and roadways on the coast. Critical nesting beaches for sea turtles are quickly disappearing due to erosion caused by these developments. Additionally, lights on building and roads can confuse night-time nesters and make them unable to find their way to the ocean. Even a fun day at the beach for humans can turn deadly for sea turtles. Humans often leave beach chairs, umbrellas, and toys on the beach for turtles to get entangled in as they are coming up to nest. Driving on the beach can also pose a threat to nesting sea turtles as they can get hit by cars. We can help sea turtles by cleaning up the

beaches and removing trash, toys, umbrellas, or chairs brought to the beach. If you must drive on the beach, please drive slowly and look out for sea turtles, especially during nesting season. Also, during nesting season, please turn off lights on your beach house or dim them. Some beaches even have ordinances against bright lights so check your city and state legislation on those rules before visiting the beach!



Coastal Development, Global Warming and Sea-Level Rising

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- Increase public awareness and community participation in sea turtle conservation through educational programs such as this.

- Historically, sea turtles and their eggs were of cultural significance and have been a source of food for coastal communities. Today, sea turtle harvesting continues even though populations have declined significantly. Many countries have outlawed sea turtle hunting, but unfortunately the laws are not enforced and communities still continue to poach these animals. Additionally, sea turtles are killed for their shell and skin to make different products. Bright patterned shells (specifically from the Hawksbill sea turtle) are used to make jewellery, guitar picks, and other accessories. Leather made from sea turtle skin is often turned into boots, belts, and wallets. These products are illegal to buy, sell, or possess in the United States. If you are traveling to other countries, beware of these products and do not purchase them. Please do not support the harvesting of sea turtles or products under any circumstances!



Poaching and Illegal Trade of Eggs, Meat, and Shells

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TURTLE CARD #6

- Fibropapillomas are a type of tumor caused by a contagious, herpes-like virus found in sea turtles. Although the virus has been around for decades in other parts of the world, the first documented cases were noted in Texas in 2010. It mostly affects green sea turtles, but is sometimes found in other species. This virus causes large fibropapilloma tumors to grow on the soft tissues of sea turtles. They can grow internally & externally, which can interfere with basic functions of their daily life and ultimately cause death. It is still unknown what causes the spread of this virus, but theories of its spread include marine leeches, invasive algae, agriculture run-off, and global warming.



Global Warming; Ocean Pollution

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