Survivor!

Loggerhead Hatchling Activity
Creators: Susanna Musick, John A. Musick, Lisa Ayers Lawrence
Edited by: Vicki Clark, Kate Musick

OBJECTIVES: Students will (1) identify threats to sea turtle nests, hatchlings and adults (2) define factors limiting the development and survival of eggs, hatchlings and adults (3) discover characteristics of the nest environment (4) investigate the life history stages and habitats of threatened and endangered species (5) learn about conservation and protection of threatened and endangered marine species (6) discuss percent mortality, survival of the fittest, and management concepts.

MATERIALS: 100 ping-pong balls, five small containers labeled Stage 1, 2, 3, 4, and 5, "dead" and "alive" square sheets, printout of Kate Mansfield's excerpt on Sea Turtle Nesting Behavior (www.fisheries.vims.edu/turtletracking/nestingbehavior.html).

AGE LEVEL: 11-15

DURATION: 60 minutes

KEY TERMS: Benthic, desiccation, entangle, hypothermic stunning, incidental capture, predator, pelagic, poaching, sargassum, surf zone.

PREPARATION:

1. Label each of the five containers STAGE 1 to STAGE 5.

2. The first container represents hatching success. Cut out STAGE 1 squares (80 alive and 20 dead). In the first container place the STAGE 1 squares of paper. There is 20% mortality at this stage. See the attached list for the reasons of death, and print those on the squares as well.

3. The second container represents the journey of the hatchlings from the nest to the water. In this stage there is an additional 5% (of the original 100) mortality. Cut out the STAGE 2 squares and place them in the container.

4. The third container represents the survival of hatchlings in the surf zone with an additional 10% mortality. Cut out the STAGE 3 squares and place them in the container.

5. The fourth stage takes place in the pelagic zone, about one year after hatching. There is a mortality of 15% at this stage. Cut out the STAGE 4 squares and place them in the container.

6. Cut out the STAGE 5 squares and place in the container. This stage takes place in the coastal zone. This lasts approximately 17 years and has the highest mortality, 49%. Only 1% of the turtles from the nest will survive to maturity.

PROCEDURE:

1. Students should read Kate Mansfield's excerpt from the web on sea turtle nesting behavior

2. Discuss the nest environment and the factors such as temperature, moisture, position of the egg, predators, etc. that determine the outcome of the eggs and hatchlings.

3. Have the students take turns removing the eggs from their container (or egg chamber). Each student should extract the same number.

4. Have the students draw a square of paper from the STAGE 1 container. Each student should draw one square of paper for each egg they are holding. For each dead square, they should return one egg to you.

5. Ask students the reasons for the deaths. The majority should be natural causes.

6. Repeat steps 4 and 5 for the remaining stages. As the turtles get older, the students should notice that more and more deaths occur due to human actions. In the last stage, human actions are the overwhelming reason for turtle mortality.

7. Wrap up the activity with a review of all the contributing factors that determine whether or not a sea turtle will survive to maturity, placing the emphasis on human sources. Discuss why it is important to protect and conserve threatened and endangered marine species and how poaching, fishing, pollution, and other human sources contribute to the decline of sea turtles.

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STAGE ONE - Hatching Success (*incubation-60 days*)

Stage	Alive or Dead	Contributing Factors
Hatchling	Dead	Inundation with water
Hatchling	Dead	Inundation with water
Hatchling	Dead	Inundation with water
Hatchling	Dead	Desiccation
Hatchling	Dead	Not enough gas exchange
Hatchling	Dead	Eaten by ants
Hatchling	Dead	Eaten by ants
Hatchling	Dead	Eaten by ants
Hatchling	Dead	Trapped by plant roots
Hatchling	Dead	Trapped by plant roots
Hatchling	Dead	Erosion
Hatchling	Dead	Erosion
Hatchling	Dead	Erosion
Hatchling	Dead	Eaten by dogs
Hatchling	Dead	Eaten by raccoons
Hatchling	Dead	Nest temperature too cold
Hatchling	Dead	Bacteria
Hatchling	Dead	Eaten by raccoons
Hatchling	Dead	Eaten by raccoons
Hatchling	Dead	Desiccation
Hatchling	Alive	
Hatchling	Alive	
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STAGE 2 – Journey from nest to shoreline (*1 hour*)

Stage	Alive or Dead	Contributing Factors
Beach	Dead	Eaten by ghost crabs
Beach	Dead	Eaten by a raccoon
Beach	Dead	Trapped in a tire rut from an off-road vehicle and was subsequently eaten by a seagull in the morning
Beach	Dead	Went the wrong way because of beach lighting; got run over by a car
Beach	Dead	Went the wrong way because of beach lighting; was eaten by a raccoon
Beach	Alive	
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STAGE 3 – Surf zone (*~2 hours*)

Stage	Alive or Dead	Contributing Factors
Surf zone	Dead	Eaten by a seagull
Surf zone	Dead	Eaten by a bluefish
Surf zone	Dead	Eaten by a snapper
Surf zone	Dead	Eaten by a jack
Surf zone	Dead	Eaten by a bluefish
Surf zone	Dead	Eaten by a sharpnose shark
Surf zone	Dead	Eaten by a young sandbar shark
Surf zone	Dead	Eaten by a pelican
Surf zone	Dead	Exhaustion
Surf zone	Dead	Eaten by a cormorant

Surf zone	Alive	
Surf zone	Alive	
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STAGE 4 – Pelagic (Sargassum) zone (*1 year*)

Stage	Alive or Dead	Contributing Factors
Pelagic	Dead	Eaten by a tuna
Pelagic	Dead	Entangled in fishing gear
Pelagic	Dead	Eaten by a whitetip shark
Pelagic	Dead	Eaten by a blue shark
Pelagic	Dead	Eaten by a wahoo
Pelagic	Dead	Eaten by a silky shark
Pelagic	Dead	Eaten by a wahoo
Pelagic	Dead	Eaten by a dolphin fish
Pelagic	Dead	Starved
Pelagic	Dead	Eaten by a wahoo
Pelagic	Dead	Eaten by a dolphin fish
Pelagic	Dead	Consumed plastic debris
Pelagic	Dead	Starved
Pelagic	Dead	Entangled in debris and drowned
Pelagic	Dead	Eaten by a dolphin fish
Pelagic	Alive	
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STAGE 5 – Benthic juvenile to adult stage (*17 years only, 1% one nest will make it to maturity*)

Stage	**Alive or Dead**	**Contributing Factors**
Juvenile	Dead	Disease
Juvenile	Dead	Disease
Juvenile	Dead	Disease
Juvenile	Dead	Ingestion of debris
Juvenile	Dead	Incidental capture in fishing gear
Juvenile	Dead	Boat strike
Juvenile	Dead	Drowned in trawl net
Juvenile	Dead	Starved
Juvenile	Dead	Eaten by tiger shark
Juvenile	Dead	Eaten by bull shark
Juvenile	Dead	Eaten by bull shark
Juvenile	Dead	Eaten by bull shark
Juvenile	Dead	Eaten by tiger shark
Juvenile	Dead	Entangled in debris
Juvenile	Dead	Entangled in debris
Juvenile	Dead	Entangled in debris

Juvenile	Dead	Disease
Juvenile	Dead	Disease
Juvenile	Dead	Drowned in trawl net
Juvenile	Dead	Drowned in trawl net
Juvenile	Dead	Drowned in mesh pound net
Juvenile	Dead	Drowned in gill net
Juvenile	Dead	Drowned in gill net
Juvenile	Dead	Entangled in fishing gear
Juvenile	Dead	Drowned in trawl net
Juvenile	Dead	Entangled in fishing gear
Juvenile	Dead	Drowned in mesh pound net
Juvenile	Dead	Disease
Juvenile	Dead	Disease
Juvenile	Dead	Entangled in fishing debris
Juvenile	Dead	Exposed to chemical pollutants
Juvenile	Dead	Boat strike
Juvenile	Dead	Droned in fishing gear
Juvenile	Dead	Drowned in fishing gear
Juvenile	Dead	Drowned in fishing gear
Juvenile	Dead	Eaten by tiger shark
Juvenile	Dead	Eaten by bull shark
Juvenile	Dead	Hypothermic stunning
Juvenile	Dead	Hypothermic stunning
Juvenile	Dead	Dredging
Juvenile	Dead	Oil pollution
Juvenile	Dead	Eaten by sandbar shark
Juvenile	Dead	Eaten by sandbar shark
Juvenile	Dead	Exposed to chemical pollution
Juvenile	Dead	Poached
Juvenile	Dead	Boat strike
Juvenile	Dead	Disease
Juvenile	Dead	Hypothermic stunning
Juvenile	Dead	Ingested plastic debris
Juvenile	**ALIVE**	***CONGRATULATIONS!*** ***YOU SURVIVED!***

Tips:

- ❑ Instead of using paper squares, use poker chips. Label them *alive* or *dead*, and include the reason for the death.

- ❑ Number the poker chips and announce to the students which numbers died and why.