



Marine Science
Research Institute
JACKSONVILLE UNIVERSITY



Traveling Trunks: Trunk Program Descriptions and High School (9-12) Standards by Lesson

Darker Skies, Darker Beaches Trunk

Overview

This program teaches students about the impacts lighting can have on sea turtle nesting. Students learn all about sea turtle biology, forms of energy, what makes a circuit, and how to create sea turtle-friendly lighting.

Trunk contents:

- 1 binder with lessons and worksheets
- skull replicas of the 3 sea turtles we see nesting on Florida's beaches
- 3 corresponding food items for each species of turtle replica
- circuit walls
- all the items to engineer a turtle-friendly light fixture
- real light fixtures
- turtle-friendly light testers
- lesson posters
- informational booklets
- videos

Science Bodies of Knowledge: This trunk focuses mainly on the benchmarks under the Physical Science and the Nature of Science Bodies of Knowledge.

Target audience note: Please note that the Traveling Turtle Trunks have been developed at a core for elementary and middle school grades. Although more limited than other grade levels, some high school-level standards can still be addressed through our lessons. Some of our partners have successfully developed extensions for grades 9-12.



Marine Science
Research Institute
JACKSONVILLE UNIVERSITY



Darker Skies, Darker Beaches Trunk (DSDB)

Standards Covered In Each Lesson (Grades 9-12)

Lesson 1: Turtley Awesome!

Activity: Create an Infographic

Description: In this activity, students will rotate through 5 stations in groups, learning about the different aspects of sea turtle biology and behavior. Students in grades 5-8 have more opportunities to incorporate mathematic calculations into the station activities. They will come together in their groups at the end to create an infographic with all they've learned.

High School (Grades 9-12):

SC.912.L.14.50 Describe the structure of vertebrate sensory organs. Relate structure to function in vertebrate sensory systems.

SC.912.L.15.7 Discuss distinguishing characteristics of vertebrate and representative invertebrate phyla, and chordate classes using typical examples.

SC.912.L.17.2 Explain the general distribution of life in aquatic systems as a function of chemistry, geography, light, depth, salinity, and temperature.

All (K-12):

MA.K12.MTR.7.1 Apply mathematics to real-world contexts.

ELA.K12.EE.4.1 Use appropriate collaborative techniques and active listening skills when engaging in discussions in a variety of situations.

ELA.K12.EE.5.1 Use the accepted rules governing a specific format to create quality work.

SP.PK.12.US.1.4a Develop mathematical skills and/or computational fluency for everyday living, such as money skills, estimation skills, time and measurement skills, and comprehension of graphs, tables, schedules, and charts.

Lesson 2: Incredible Energy

Activities: Breakout groups (Name that energy, I Spy, Short circuit)



Marine Science
Research Institute
JACKSONVILLE UNIVERSITY



Description: In this lesson, students will be introduced to different forms of energy, the properties of light, and electrical circuits. During the initial presentation, they will periodically break into activity groups to test their understanding. In the end, each group will build an electrical circuit that can be used in the following lesson.

High School (Grades 9-12):

SC.912.P.10.1 Differentiate among the various forms of energy and recognize that they can be transformed from one form to others.

SC.912.P.10.4 Describe heat as the energy transferred by convection, conduction, and radiation, and explain the connection of heat to change in temperature or states of matter.

SC.912.P.10.14 Differentiate among conductors, semiconductors, and insulators.

All (Grades K-12)

ELA.K12.EE.1.1 Cite evidence to explain and justify reasoning.

ELA.K12.EE.4.1 Use appropriate collaborative techniques and active listening skills when engaging in discussions in a variety of situations.

ELA.K12.EE.6.1 Use appropriate voice and tone when speaking or writing.

Lesson 3: Fix a Fixture

Activity: Engineering process design of fixture and sell pitches

Description: In this lesson, students will take what they've learned about the negative impacts lighting can have on sea turtle nesting and design a solution. They will use the engineering design process to create a light fixture around the light bulb from Lesson 2's circuit wall. In the end, each group will create a commercial that highlights why their fixture is "turtle-friendly" using what they've learned.

High School (Grades 9-12):

SC.912.L.17.16 Discuss the large-scale environmental impacts resulting from human activity, including waste spills, oil spills, runoff, greenhouse gases, ozone depletion, and surface and groundwater pollution.

SC.912.P.10.1 Differentiate among the various forms of energy and recognize that they can be transformed from one form to others.



Marine Science
Research Institute
JACKSONVILLE UNIVERSITY



Grade 9:

ELA.9.C.2.1 Present information orally, with a logical organization and coherent focus, with credible evidence, creating a clear perspective.

Grade 10:

ELA.10.C.2.1 Present information orally, with a logical organization and coherent focus, with credible evidence, creating a clear perspective.

Grade 11:

ELA.11.C.2.1 Present information orally, with a logical organization, coherent focus, and credible evidence, while employing effective rhetorical devices where appropriate.

Grade 12:

ELA.12.C.2.1 Present information orally, with a logical organization, coherent focus, and credible evidence while employing effective rhetorical devices where appropriate.

All (Grades K-12)

ELA.K12.EE.1.1 Cite evidence to explain and justify reasoning.

ELA.K12.EE.2.1 Read and comprehend grade-level complex texts proficiently

ELA.K12.EE.4.1 Use appropriate collaborative techniques and active listening skills when engaging in discussions in a variety of situations.

MA.K12.MTR.4.1 Engage in discussions that reflect on the mathematical thinking of self and others.

Mathematicians who engage in discussions that reflect on the mathematical thinking of self and others:

- Communicate mathematical ideas, vocabulary and methods effectively.
- Analyze the mathematical thinking of others.
- Compare the efficiency of a method to those expressed by others.
- Recognize errors and suggest how to correctly solve the task.
- Justify results by explaining methods and processes.
- Construct possible arguments based on evidence.

MA.K12.MTR.7.1 Mathematicians who apply mathematics to real-world contexts:

- Connect mathematical concepts to everyday experiences.
- Use models and methods to understand, represent and solve problems.



Marine Science
Research Institute
JACKSONVILLE UNIVERSITY



- Perform investigations to gather data or determine if a method is appropriate. Redesign models and methods to improve accuracy or efficiency.

SP.PK12.US.4.4 Demonstrate understanding of information presented orally by using listening skills, including paying attention to cues, linking to prior knowledge, and considering speaker's perspective and nonverbal messages.

WL.K12.AH.3.3 Express personal perspectives and support opinions clearly and precisely in order to persuade others or negotiate a compromise.

Lesson 4: Dig in the Dark

Activity: School Lighting Survey

Description: In this lesson, students will learn about false crawls and how lighting can affect the frequency of false crawls when turtle-unfriendly lighting is used. They will look at real light fixtures and make assessments about each one's turtle-friendliness, ultimately testing their hypotheses out using simulated nesting data. They will then take what they've learned to assess their own school's lighting using a lighting survey. In the end, they will take all the information they've collected from Lessons 1-4 and write a persuasive letter trying to convince their principal to convert to sea turtle-friendly lighting. You can choose to submit these letters or not.

High School (Grades 9-12):

SC.912.N.1.6 Describe how scientific inferences are drawn from scientific observations and provide examples from the content being studied.

SC.912.N.4.1 Explain how scientific knowledge and reasoning provide an empirically-based perspective to inform society's decision making.

Grade 9:

ELA.9.C.1.3 Write to argue a position, supporting claims using logical reasoning and credible evidence from multiple sources, rebutting counterclaims with relevant evidence, using a logical organizational structure, elaboration, purposeful transitions, and a tone appropriate to the task.

Grade 10:

ELA.10.C.1.3 Write to argue a position, supporting claims using logical reasoning and credible evidence from multiple sources, rebutting counterclaims with relevant evidence, using a logical organizational structure, elaboration, purposeful transitions, and maintaining a formal and objective tone.



Marine Science
Research Institute
JACKSONVILLE UNIVERSITY



All (Grades K-12)

ELA.K12.EE.1.1 Cite evidence to explain and justify reasoning.

ELA.K12.EE.6.1 Use appropriate voice and tone when speaking or writing.

MA.K12.MTR.7.1 Apply mathematics to real-world contexts.

MA.K12.MTR.4.1 Engage in discussions that reflect on the mathematical thinking of self and others.

MA.K12.MTR.7.1 Mathematicians who apply mathematics to real-world contexts:

- Connect mathematical concepts to everyday experiences.
 - Use models and methods to understand, represent and solve problems.
 - Perform investigations to gather data or determine if a method is appropriate.
 - Redesign models and methods to improve accuracy or efficiency.
-