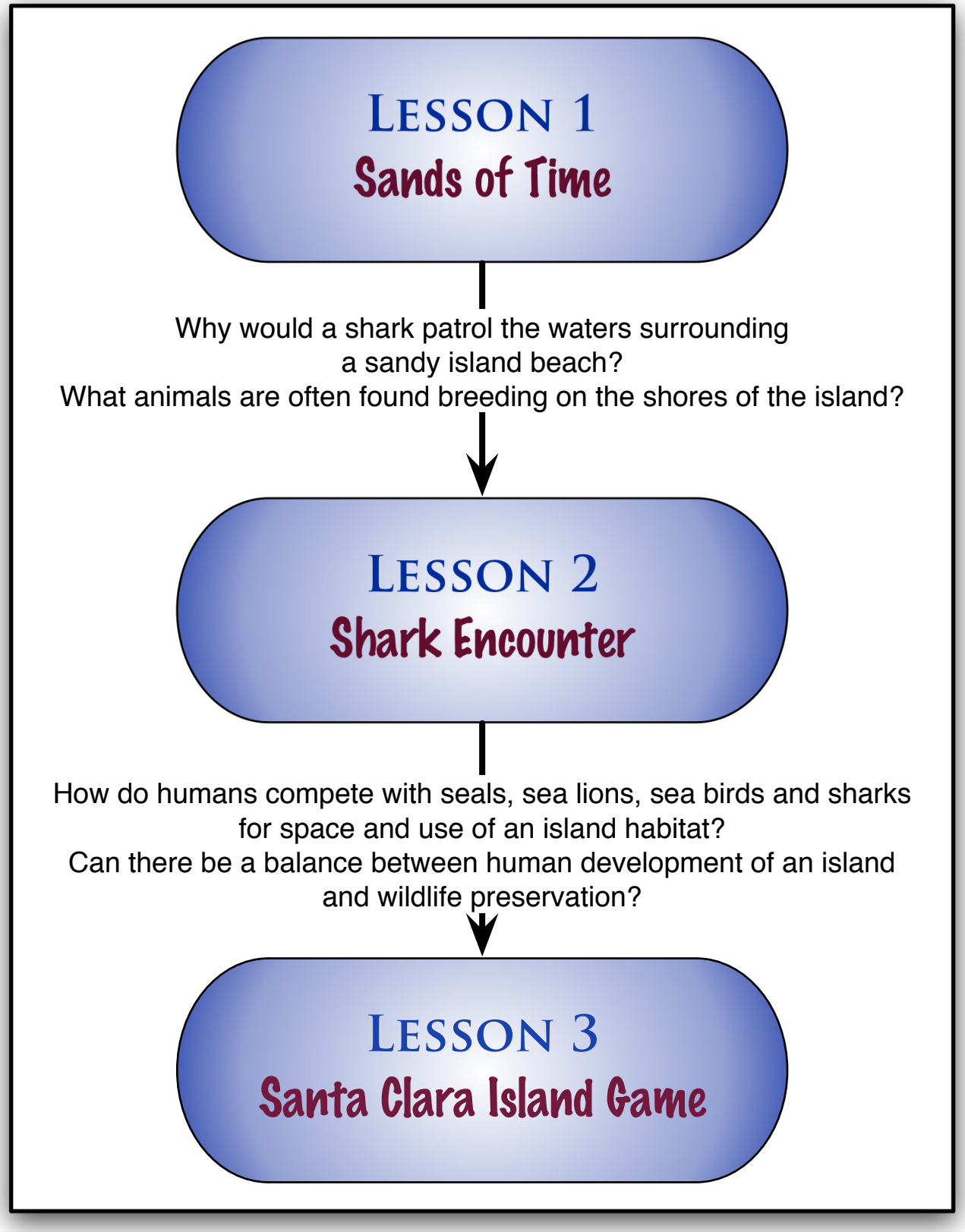
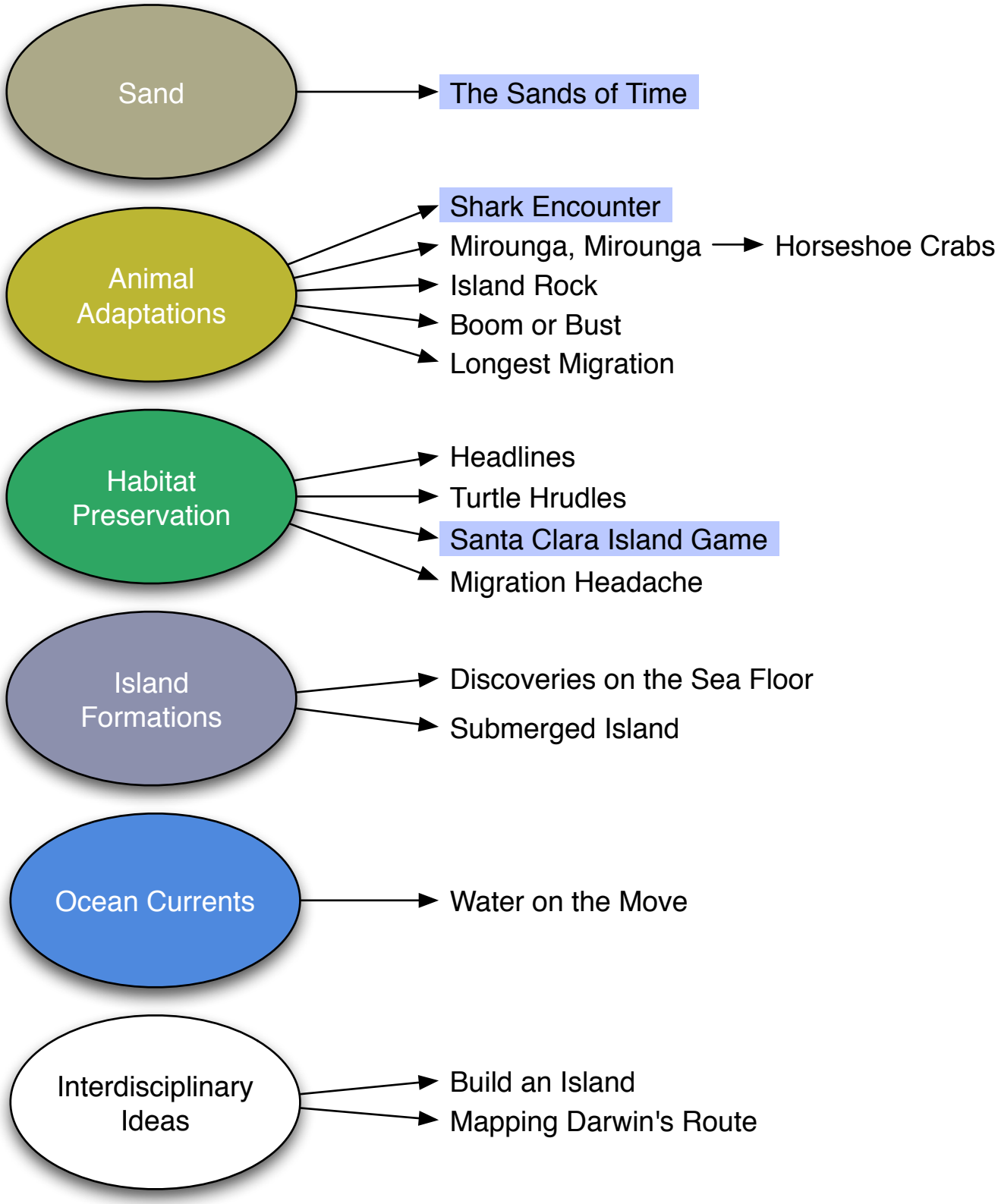

LESSON 1
Sands of Time
Why would a shark patrol the waters surrounding a sandy island beach?
What animals are often found breeding on the shores of the island?
LESSON 2
Shark Encounter
How do humans compete with seals, sea lions, sea birds and sharks for space and use of an island habitat?
Can there be a balance between human development of an island and wildlife preservation?
LESSON 3
Santa Clara Island Game

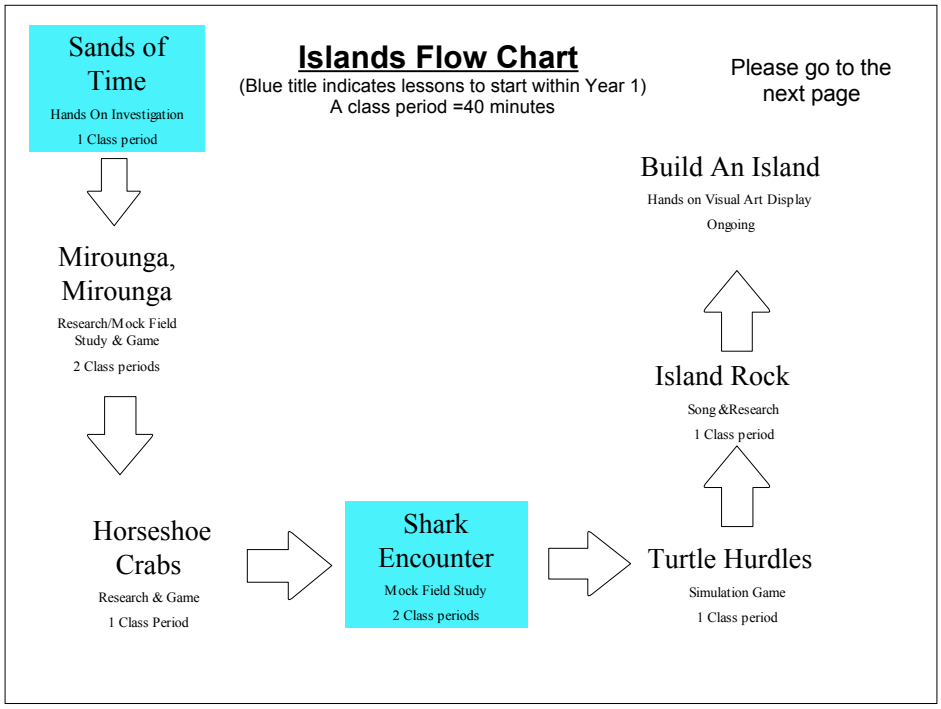
Islands

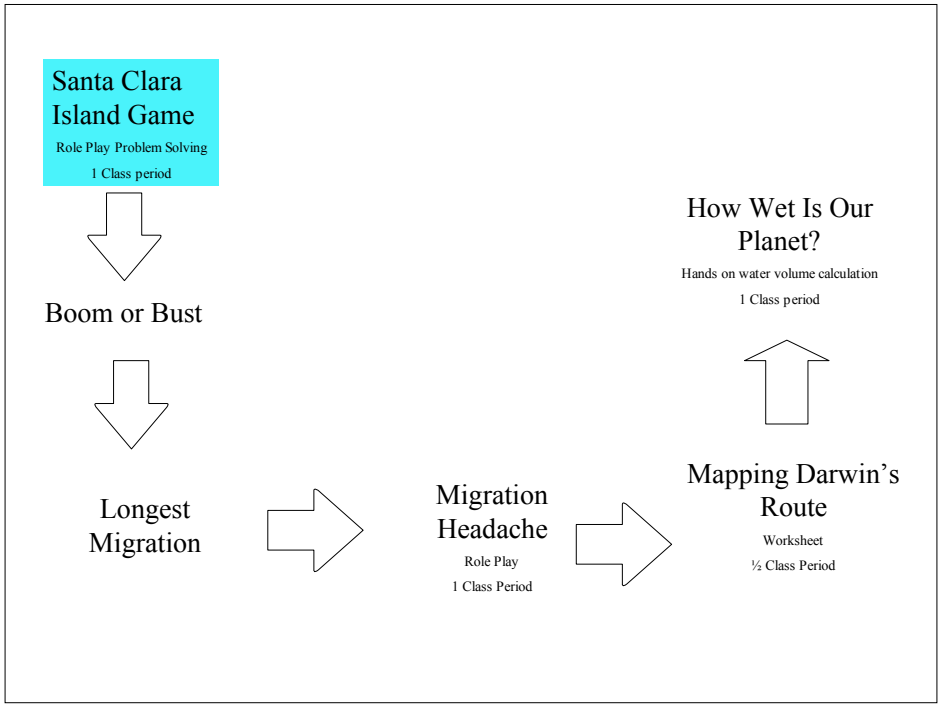
Grade 6

Concept Map



Highlighted text denotes recommended first year lessons


Sands of Time
Hands On Investigation
1 Class period
Islands Flow Chart
(Blue title indicates lessons to start within Year 1)
A class period =40 minutes
Please go to the next page
Build An Island
Hands on Visual Art Display
Ongoing
Mirounga, Mirounga
Research/Mock Field Study & Game
2 Class periods
Island Rock
Song &Research
1 Class period
Horseshoe Crabs
Research & Game
1 Class Period
Shark Encounter
Mock Field Study
2 Class periods
Turtle Hurdles
Simulation Game
1 Class period


Santa Clara Island Game
Role Play Problem Solving
1 Class period
How Wet Is Our Planet?
Hands on water volume calculation
1 Class period
Boom or Bust
Longest Migration
Migration Headache
Role Play
1 Class Period
Mapping Darwin's Route
Worksheet
½ Class Period

The Sands of Time

Islands (Grade 6)

Lesson Overview

Students will use inquiry based learning to discover the origin of their sand sample. Students work in small groups and move through five stations to gather evidence to support their hypothesis for their sand's origin.

Lesson Rationale

Nearly all solid material in the world, both living and non-living will eventually be eroded into sand. The story of a grain of sand can be the story of the evolution of the crust of the earth. This lesson encourages students to "think like a scientist" and supports inquiry and discovery!

Teacher's Notes

- Students work in cooperative groups of 6 students each.
- Adult helpers are required for Station 4. Invite parents or high school students to join you.
- Sand samples are needed prior to this lesson. Request that any families, friends, or staff members, who will be traveling to a sandy beach, bring back a small zip lock bag of sand. Students can also write letters to family members who live near a sandy location and ask for samples to be mailed.

My Notes

Key Concept:

The size, color, shape and makeup of sand grains are clues about their origin and evolution, and the type of beach from which they came.

Time Required:

Three 40 minute class periods

Subject Area	Interdisciplinary Connection	Resources	Going Further	NJCCCS
Science	• Students will seek answers through observation and experimentation • Safety practices during science investigations • Students will identify and investigate properties of sand. • Students will define and understand vocabulary (biogenic, abiogenic). • Students will use evidence to form and support a hypothesis (regarding sand origin).	• Sand samples • Magnifying glass • Index cards • Glue • Sands Of Time worksheets • What's The Story of Your Sand? worksheet • Direction sheets for each station	This key concept will also be taught in the second grade MARE program, on a basic level. If available, encourage the sixth graders to team up with second grade students and share knowledge. Students can prepare a sand display to be shown on Family Night during Ocean Week, with samples, labels, and geographic locations noted on a map.	Standard 5.1 Habits of Mind 5.1A.1, 5.1A 2 Standard 5.1 Safety 5.1C.1, 5.1C 2 Standard 5.1 Inquiry and Problem Solving 5.1B 1, 5.1B 2 Standard 5.6 Structure and Properties of Matter 5.6A 1, 5.6A 2
Language Arts Literacy	Thought Swap: Small group discussions with active listening. KWL Chart on sand. Students will write 5 distinguishing observations about their sand sample. Students will write a post card.	Pictures/photos of a sandy beach Question prompts from the binder. Chart paper 5X8 Index cards	Students can write letters to coastal school districts and exchange or request sand samples. Use the following link to locate school addresses: http://nces.ed.gov/ccd/schooLSearch/ Small zip lock bags are available in most jewelry making supply stores (Michaels, Rag Shop, AC Moore) and work well for mailing sand samples.	Standard 3.3 Speaking 3.3A 1, 3.3A 2, 3.3A 3, 3.3A 4 Standard 3.2 Writing 3.2A 4, 3.2A 5, 3.2D 1, 3.2D 2
Mathematics	Students will compare and sequence sand samples by the size of the grains.	Sand samples	Particles are considered sand when they are between .06-2 mm. Students will identify mm. on a cm. ruler and discuss how a mm. can be further divided into tenths.	Standard 4.2 Geometric Properties 4.2 (2).A1

Subject Area	Interdisciplinary Connection	Resources	Going Further	NJCCCS
Social Studies	Students create a sand exhibit with descriptions of each sample and their location on a world map.	Sand samples World Map Index cards	Students can prepare a sand display to be shown on Family Night during Ocean Week, with samples, labels, and geographic locations noted on a map.	Standard 6.6 The World in Spatial Terms 6.6A 3
Visual Arts			Sand can be mixed with tempera paint to create texture. Students can paint scenes of locations where their sand grain has traveled.	
Technology			Highly magnified pictures and descriptions of sand from around the world. http://www.ed.uri.edu/homepage/projects/ocean/Sampler.htm Sand castle contest pictures. http://www.sandcastlecentral.com/contests/hampton02web/	
World Language			Navajo Native Americans used sand in beautiful art pieces. Medicine men believed in their power of healing. Students can use the Internet or library to research this tradition. Students can use colored sand and glue to get the same effect. See this example: http://www.makingfriends.com/na/sandart_native_american.htm	
Career Education & Consumer, Family & Life Skills	Students must work cooperatively as a team. Students will be required to use social/communication skills to express their ideas and listen actively to a peer.		Students can learn how sand is made into glass. Glass making is an artisan occupation with traditional methods handed down through the generations. Take a field trip to Wheaton Village Glassworks. http://www.wheatonvillage.org/	Standard 9.2 Self Management 9.2 B1, 9.2 C1 Standard 9.2 Interpersonal Communication 9.2 C1, 9.2 C2, 9.2 C4, 9.2 C5
Physical Education				

SHARK ENCOUNTER

Islands (Grade 6)

Lesson Overview
Students simulate field research by working in small teams to collect, analyze and discuss data on local populations of shark species that may be threatened.

Lesson Rationale
Sharks are an example of evolutionary success since they have existed relatively unchanged for the past 400 million years. Shark populations are being severely threatened by unregulated fishing practices by the U.S. and other countries.

Teacher's Notes
Session 2: Station 3 & 4
Session 3: Shark Encounter
Classroom floor tiles often are 1' square and can serve as your lagoon. (10 X 10 = 100 quadrats)
Print the 1-100 tiles needed at this link:
http://www.warrennet.org/oxford/causton/sharkencounter/shark.html

My Notes

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Key Concept:

Sharks are successful predators due to their body shape, keen senses and reproductive and feeding strategies.

Time Required:

Three 40-minute class periods

Subject Area	Interdisciplinary Connection	Resources	Going Further	NJCCCS
Science	• Students will use tables and graphs to represent data. • Communicate experimental findings to others • Develop strategies and skills for information-gathering and problem solving, using appropriate tools and technologies. • Describe the effect of human activities on various ecosystems.	See binder for materials list for each station.	Students can research various shark species and present information in groups or by individuals.	Standard 5.3 Data Analysis 5.3 D1 Standard 5.1 Habits of Mind 5.1A.2, 5.1B.1 Standard 5.10 Natural Systems and Interactions 5.10 B1
Language Arts Literacy	Quick Write: Students will express their ideas for solutions (prompt regarding the potential extinction of Great White Sharks) in writing.	See prompt in "Solutioning" section in Shark Encounters in the binder. Paper Pen/pencil	Use the Baltimore Aquarium Research link and interesting "Which shark are you?" quiz as a prompt for an essay. Students will describe the characteristics that they possess that match a shark species. Students can predict the name of the matching shark species prior to completing the quiz.	Standard 3.2 Writing 3.2A2 3.2A5 3.2B3
Mathematics	• Graphing: Students will create bar graphs using the results of their Shark surveys. • Random sampling: Students will apply random sampling to a scientific investigation. • Collecting data: Students will design a Shark survey and collect data from the school population. • Analyzing data: Students will analyze data from the mock dive activity.	Graph paper or Computer graph program Shark survey	Continue with graphing by comparing shark species by size or weight. Encourage students to choose data and match it to the most appropriate graph (bar, line, pie, etc.).	Standard 4.3 Modeling 4.3 A1 4.3 C1 Standard 4.4 Data Analysis 4.4 A1 4.4 A2 4.4 A3 4.4 B5
Social Studies			Map skills: Students can locate and mark the habitats of various shark species on a world map. Students can learn how scientists define a range for a specific species and how to show this on a map.	

Subject Area	Interdisciplinary Connection	Resources	Going Further	NJCCCS
Visual Arts	Students will draw sharks and label parts. Students will draw tropical scenes for the simulated dive activity.	Paper pencil Markers/crayons (or other drawing tools)	Students can study the shark's streamline shape and use various media to create shark models (clay, mosaics, papier-mâché, etc.) Students can relate the shark's streamline shape to the design of rockets, submarines, missiles, gliders, etc. Study how humans use nature as inspiration for design.	Standard 1.2 Visual Art 1.2 D1
Technology			Monterey Bay Aquarium live Shark camera http://www.mbayaq.org/efc Baltimore Aquarium Research link and interesting "Which shark are you?" quiz http://www.aqua.org/animals_sandtigershark.html	
World Language				
Career Education & Consumer, Family & Life Skills	Students must work cooperatively as a team Students will be dealing with unpredictability when "flags" appear in the shark sampling activity. Students will be required to use "Brainstorming" skills to identify possible solutions to a problem.			Standard 9.2 Self Management 9.2 B1, 9.2 C1 Standard 9.2 Critical Thinking 9.2 A4, 9.2 A1
Physical Education				

Santa Clara Island Game

Islands (Grade 6)

Lesson Overview
Students role-play as land planners to experience the potential conflicts of island development. Students will work in six small groups.

Lesson Rationale
Real estate values on New Jersey's barrier islands are astronomical. Students need to understand the balance between development and preservation that is necessary for the health of these habitats.

Teacher's Notes
This lesson is excellent for New Jersey students who are familiar with Island Beach State Park, Long Beach Island, and Seaside. Santa Clara is a California imaginary island. You can rename the island for your locale. There is a great companion online activity in development on Rutgers Cool Classroom site http://www.coolclassroom.org

My Notes

Key Concept:

Isolation, limited space and unique ecosystems often accentuate the problems and limitations of development on islands.

Time Required:

One 40-minute class period

Subject Area	Interdisciplinary Connection	Resources	Going Further	NJCCCS
Science	• Describe the effect of human activities on various ecosystems. • Students will identify human needs that are supplied by the environment.		There is a great companion online activity in development on Rutgers Cool Classroom site http://www.coolclassroom.org/home.html Connect the information on Islands to New Jersey's own barrier islands. Long Beach Island and Seaside/Island Beach State Park are two local examples. Use this site to get started on barrier island geography and habitat zones: http://science.howstuffworks.com/barrier-island1.htm	Standard 5.10 Natural Systems and Interactions 5.10 B1 5.10 A1
Language Arts Literacy	Small group discussions: Students must communicate their ideas clearly to their group members and compare alternative views.		Students can write a persuasive letter indicating their opinion on the potential development of vs. Preservation of Island Beach State Park in New Jersey. **Related Literature** *Island of the Blue Dolphins* by Scott O'Dell Historical fiction regarding a woman who lived alone on one of the Channel Islands.	Standard 3.3 Speaking 3.3A1 3.3A2 3.3A3 3.3A4
Mathematics			Students can estimate distances between two places on their island map using a scale of miles.	
Social Studies	• Students will identify and discuss factors involved in the development of the island (e.g., transportation, food, marketplace, religion, military protection). • Students will explain and evaluate potential changes in places over time and consequences of those changes.		Many of our islands were once inhabited by Native tribes. Students can learn about the Chumash Indian tribe that inhabited the St. Nicholas Island in the novel Island of the Blue Dolphins. Use this link to get started: http://www.sbnature.org/research/anthro/chumash/index.htm	Standard 6.6 Environment and Society 6.6 E1 6.6 E3 6.6 E4 Standard 6.6 Places and Regions 6.6 B2 6.6 B4

Subject Area	Interdisciplinary Connection	Resources	Going Further	NJCCCS
Visual Arts	Students illustrate the island map with locations of buildings, fresh water supply, sewage treatment, power, transportation, schools, stores, hospitals, etc.	Poster paper Outline of the island	The Chumash Indians painted some of the most colorful cave paintings known. Students can create pigment paints from nature. Most came from minerals. Red was made from an iron oxide called hematite, or red ochre. White came from gypsum or diatomaceous earth. Black was made from charcoal or from manganese oxide. These ground-up pigments were mixed with a binder -- water, animal fat, or plant juices -- to make them into paint. (Soil, seaweed, salmon eggs, cattail pollen, and stinging nettles can also be used to make pigment.)	Standard 1.2 Visual Art 1.2 D1
Technology			Rutgers online Spatial literacy project http://www.coolclassroom.org	
World Language			(See Social Studies above) Students can investigate and learn some vocabulary from the Chumash Indian's language. Use this link for help: http://www.sbnature.org/research/anthro/chumash/speak.htm	
Career Education & Consumer, Family & Life Skills	Students must work cooperatively as a team. Students will be required to use "Brainstorming" skills to identify possible solutions to a problem.		Students can investigate the various careers and trades involved in city planning.	Standard 9.2 Self Management 9.2 B1 9.2 C1 Standard 9.2 Critical Thinking 9.2 A4 9.2 A1
Physical Education				