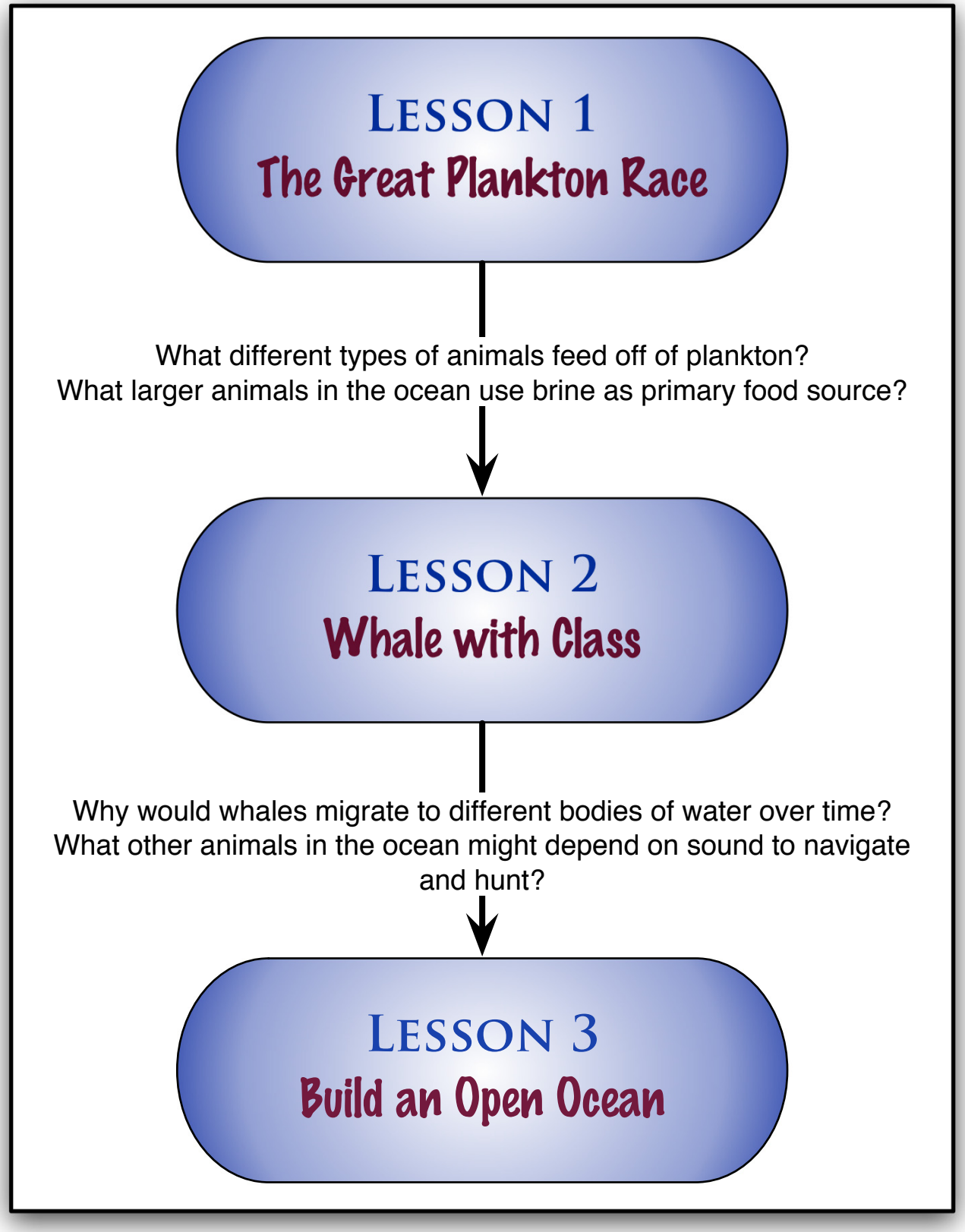
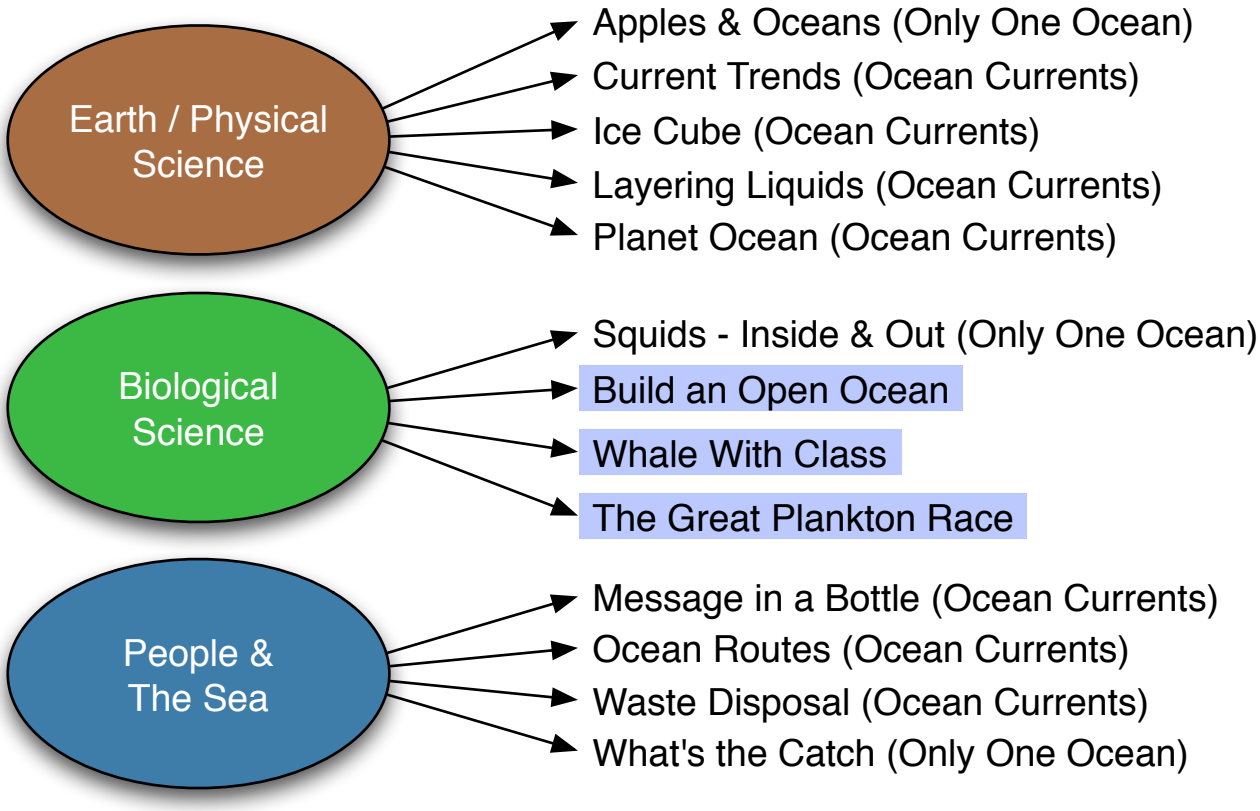

Lesson 1
The Great Plankton Race
What different types of animals feed off of plankton?
What larger animals in the ocean use brine as primary food source?
Lesson 2
Whale with Class
Why would whales migrate to different bodies of water over time?
What other animals in the ocean might depend on sound to navigate and hunt?
Lesson 3
Build an Open Ocean

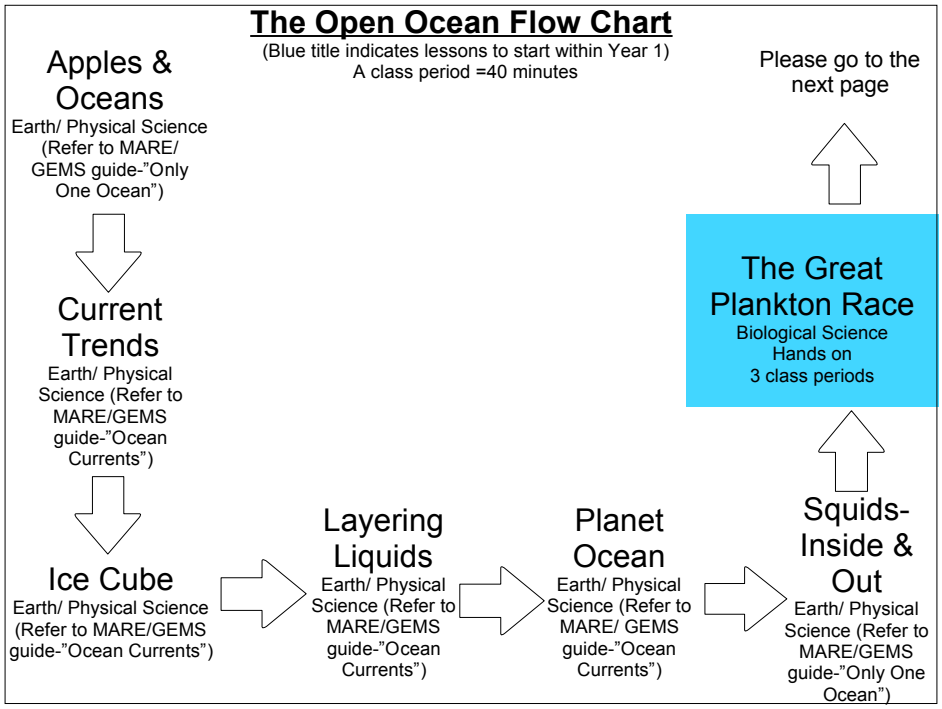
Open Ocean

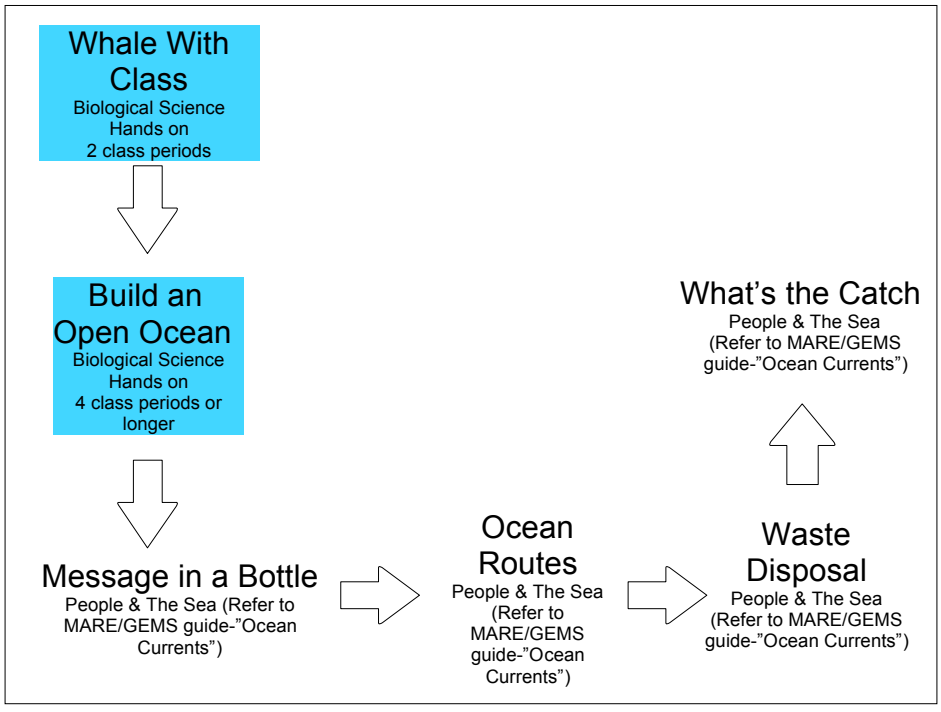
Grade 5

Concept Map



Highlighted text denotes recommended first year lessons


The Open Ocean Flow Chart
(Blue title indicates lessons to start within Year 1)
A class period =40 minutes
Apples & Oceans
Earth/ Physical Science (Refer to MARE/ GEMS guide-"Only One Ocean")
Current Trends
Earth/ Physical Science (Refer to MARE/GEMS guide-"Ocean Currents")
Ice Cube
Earth/ Physical Science (Refer to MARE/GEMS guide-"Ocean Currents")
Layering Liquids
Earth/ Physical Science (Refer to MARE/GEMS guide-"Ocean Currents")
Planet Ocean
Earth/ Physical Science (Refer to MARE/ GEMS guide-"Ocean Currents")
Squids-Inside & Out
Earth/ Physical Science (Refer to MARE/GEMS guide-"Only One Ocean")
The Great Plankton Race
Biological Science
Hands on
3 class periods
Please go to the next page


Whale With Class
Biological Science
Hands on
2 class periods
Build an Open Ocean
Biological Science
Hands on
4 class periods or longer
Message in a Bottle
People & The Sea (Refer to MARE/GEMS guide-"Ocean Currents")
Ocean Routes
People & The Sea (Refer to MARE/GEMS guide-"Ocean Currents")
Waste Disposal
People & The Sea (Refer to MARE/GEMS guide-"Ocean Currents")
What's the Catch
People & The Sea (Refer to MARE/GEMS guide-"Ocean Currents")

The Great Plankton Race

Open Ocean (Grade 5)

Lesson Overview
Students learn that viewing the ocean under a microscope reveals tiny plants and animals called plankton that are critically important to the health of the ocean and create the base of the food chain.

Lesson Rationale
Students are actively engaged in a fun and experimental activity that informs them about the types of plankton and how they adapt to survive in the ocean

Teacher's Notes
Plankton models must be disassembled for proper drying to prevent damage to the kits.

My Notes

_____

_____

_____

_____

_____

_____

Key Concept:

Plankton have adaptations which help them avoid sinking below the sunlit photic zone.

Time Required:

3 class periods of approximately 40 minutes each

Subject Area	Interdisciplinary Connection	Resources	Going Further	NJCCCS
Science	• Using different media, observations are made and recorded about color, shapes, spines, and motions of plankton. • Viewing drawings discussions start on advantages of certain adaptations. • Discuss the importance of plankton floating as opposed to sinking. • Plankton models are created out of various materials with various densities to then race against other students. • Pairs and foursomes develop inquiry questions based on brine shrimp.	• Treasury of Ten Aquarium Videos (Monterey Bay Aquarium) • Paper • Pencils/ markers • Chart paper • "Baby" to "Adult" picture album (binder) • Large clear waterproof container (20 gal) • Stopwatches • Knife (cutting corks) • Award Ribbon (see "getting ready" in binder) • Red, blue and white construction paper • Several gallon jars • Container with objects of several densities; corks, washers, Styrofoam, etc. • Scissors • Sponge • Tape • Turkey baster • Live brine shrimp • "Questions We Have About Plankton" poster (binder) • "What We Know About Plankton" poster (binder)	Collect plankton from ponds or ocean using nylon stocking nets. Field trips to salt ponds.	Standard 5.1 (Scientific Processes) B1, B2, B3 Standard 5.3 (Mathematical Applications) D1, D3, D4 Standard 5.7 (Physics) A2, A3 Standard 5.10 (Environmental Studies) A1, A2, B1, B2
Language Arts Literacy	• Observations of plankton are written and expressed orally with partners/group. • New vocabulary is put in context by using students' own drawings and observations. • Active listening skills are built on by holding short discussions with group members about plankton	Paper Pencil		Standard 3.3 (Speaking) A1, A2, A3, A4, A5, B1, B2, B3, B4, B5, B6 Standard 3.4 (Listening) B3 Standard 3.5

Subject Area	Interdisciplinary Connection	Resources	Going Further	NJCCCS
	adaptations/ observations.			(Viewing and Media Literacy) A4, B7
Mathematics			- Graph sinking times on a frequency histogram on the blackboard (or rates in cm/sec.) - Determine range and average sinking time for the class. Estimate time for the slowest to sink below the photic zone. (binder)	
Social Studies				
Visual Arts	• Detailed drawings are created depicting at least 4 different types of plankton. • Class drawings are created and labeled from observing brine shrimp	Chart paper Pencils Markers		Standard 1.2 (Creation & Performance) D1, D4 Standard 1.4 (Critique) A3
Technology				
World Language				
Career Education & Consumer, Family & Life Skills	Students work in a group setting and are encouraged to be positive and open to ideas.			Standard 9.2 (consumer, Family & Life Skills) A1, A2, A4, B3, C1, C2, C3, C4, C6
Physical Education				

Whale with Class

Open Ocean (Grade 5)

Lesson Overview
Focusing on whales, students learn that adaptation through natural selection has resulted in many changes in marine mammal body plans and behaviors.

Lesson Rationale
Students engage in a fun and scientific activity that allow them to learn about body parts of whales and choreograph different behaviors and adaptations of those body parts.

Teacher's Notes
Group work should be guided by the students and facilitated by the teacher.

My Notes

Key Concept:

Over 50 million years, whales have evolved from land mammals into ocean mammals.

Time Required:

2 class periods of approximately 40 minutes each

Subject Area	Interdisciplinary Connection	Resources	Going Further	NJCCCS
Science	• Students brainstorm and discuss in groups what changes are necessary for an animal to live in the ocean from land. • Estimated recreations of a blue whale are created using student "bodies" to show students size and scale to the vastness of a blue whale.	Chart paper Pencils Markers	Marine Mammal Outreach (Whale artifacts) Scuba diver speaker	Standard 5.5 (Characteristics of Life) B1, B2, C1
Language Arts Literacy	• "Silent Mingle"- students talk and write about prior knowledge of mammals and whales. • "Think Pair Share"-reflections are made through writing or illustration based on the key question "How could you change or adapt the land mammal in your picture to live successfully in the ocean?" • Predictions are made as to how a specific land mammal will evolve over 10 millions years into the future.	Pictures of terrestrial mammals Key concept list (binder) Paper Pencil Land mammal books	Whale books Whale charades (binder) A Day in the Life (binder)	Standard 3.3 (Speaking) A2, A3, B4, B5, B6, C3, C4 Standard 3.4 (Listening) A1, A3, B2, B3
Mathematics	Students estimate size of whale parts by directly engaging students as measuring tools.		Whale Math (binder)	Standard 4.1 (Numbers & Numerical Operations) C2, C3, C4 Standard 4.2 (Geometry & Measurement) D1, D2, D4
Social Studies	Understand that whales migrate to various parts of the world based on climate.	Global map		Standard 6.6 (Geography) A2, A3, A4
Visual Arts	• Illustrations are made based on animal adaptation from land to ocean. • "Evolution My Way"- students select and draw specific land mammals and how they've evolved over 10 million years into the future. • A "gallery" walk is done in class to view all illustrations depicting how each student has adapted their animal over 10 million years.	Pencil Drawing paper Markers/ colored pencils	Biological illustrator	Standard 1.2 (Creation & Performance) D1, D3 Standard 1.5 (History/Culture) A1

Subject Area	Interdisciplinary Connection	Resources	Going Further	NJCCCS
Technology			Internet Research (accuracy) (binder)	
World Language				
Career Education & Consumer, Family & Life Skills	Students work in a group setting and are encouraged to be positive and open to ideas.			Standard 9.2 (consumer, Family & Life Skills) A1, A2, A4, B3, C1, C2, C3, C4, C6
Physical Education				

Build an Open Ocean

Open Ocean (Grade 5)

Lesson Overview
Organisms within the open ocean are researched and presented. In addition, the organisms researched are then constructed and implemented into a 3D open ocean classroom.

Lesson Rationale
Students are actively engaged in a fun, scientific and artistic way to learn about different organisms that make up the habitat of the open ocean.

Teacher's Notes
This activity may be done minimally in 3-4 hours or it has the potential to be stretched over weeks depending on the involvement of the teacher.

My Notes

Key Concept:

The open ocean is home to many different organisms that interact with one another as predators, prey or competitors.

Time Required:

Time may vary from 4 class periods of 40 min or longer

Subject Area	Interdisciplinary Connection	Resources	Going Further	NJCCCS
Science	• A "virtual" field trip is taken that allow students to act as "scientists" by observing and documenting organisms within the open ocean. • Post the "Taking Field Notes" list and review it briefly. (in binder) • Use "Open Ocean Field Guide" worksheet (in binder), to guide thinking.	Poster paper Paper/ journals Pencils Colored pencils/ markers		Standard 5.1 (Scientific Processes) B1, B2 Standard 5.5 (Life Science) B1, B2
Language Arts Literacy	• Active listening skills are built on by holding short discussions about the open ocean. • Media and Literature are viewed to gain reference and information. • Questions from #8 (in binder) are used to guide the conversations in "Thought Swap" circles.	Pictures of ocean/ organisms		Standard 3.3 (Speaking) A2, A3, B4, B5, B6, C3, C4 Standard 3.4 (Listening) A1, A3, B2, B3 Standard 3.5 (Viewing & Media Literacy) A5, A7
Mathematics	Sizes of animals are estimated to fit the scale of the 3D open ocean.	Rulers Pencils Paper Chart paper		Standard 4.1 (Number & Numerical Operations) C3 Standard 4.2 (Geometry & Measurement) A1, D1 Standard 4.5 (Mathematical Processes) A1
Social Studies	• Bodies of water from all over the world have different species of animals. • Effects of different climates in different coastal regions around the world.	Coastal maps		Standard 6.6 (Geography) A5, B1, B2, C1
Visual Arts	• Sounds of the surf/ Ocean/ or classical music are played along with visual prompts. • Build a 3D open ocean • A "gallery" walk is taken to view and discuss other students' illustrations of the open ocean.	Pictures of organisms Markers/ colored pencils/ paint		Standard 1.2 (Creation & Performance) D1, D2, D3 Standard 1.3 (Elements& Principles of Art) B1, B2, B3, D1, D2

Subject Area	Interdisciplinary Connection	Resources	Going Further	NJCCCS
				Standard 1.4 (Critique) B1
Technology	Slide shows and media sources used to create virtual field trip.	Video/ slide images Computers		Standard 8.1 (Computer & Information Literacy) A1-9 B1-10
World Language	The open ocean is presented depicting global location and research found.	Chart paper Markers/ colored pencils.		Standard 7.2 (Culture) C2, C3
Career Education & Consumer, Family & Life Skills	Students work in a group setting and are encouraged to be positive and open to ideas.			Standard 9.1 (Career & Technical Education) B1, B2, B3 Standard 9.2 (consumer, Family & Life Skills) A2, A2, A4, B1, B2, B3, B5, C1, C2, C5
Physical Education				