**Lesson 1**

*It Takes All Kinds*

Why would fish differ in form, color and shape within a similar habitat?
What adaptations can be used to predict a fish’s habitat and lifestyle?

**Lesson 2**

*Red Fish Roundup*

How might the light penetrate differently at the bottom of the kelp forest than towards the surface?
How do other different organisms use light to camouflage themselves in the kelp forest?

**Lesson 3**

*Build a Kelp Forest*
Highlighted text denotes recommended first year lessons
The Kelp Forest

Flow Chart

Grade 4 MARE

The Kelp Forest Flow Chart
(Blue title indicates lessons to start within Year 1)
A class period =40 minutes

Seasons of the Kelp Forest
Earth/Physical Science

Fish Formation
Biological Science Hands on

It Takes All Kinds
Biological Science Hands on 4 class periods

Red Fish Round Up
Earth/Physical Science Hands on 3 class periods

Build a Kelp Forest
Biological Science Hands on 4 class periods

Seaweed Smorgasbord
People & The Sea

Sea Otter Jeopardy
Biological Science
Lesson Overview
Students make close observations of fish adaptations and make predictions about behavior and choice of habitat.

Lesson Rationale
Students are actively engaged in observations of fish and gain an understanding of adaptations and how those adaptations have allowed fish to successfully survive and reproduce in their habitat.

Teacher’s Notes
If session 2 needs more time session 3 can be skipped (refer to binder).

Key Concept:
Fish come in a great variety of forms, colors, and shapes and these adaptations can be used to predict their habitat and lifestyle.

My Notes

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Time Required:
4 class periods of approximately 40 minutes each.
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<tr>
<th>Subject Area</th>
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<th>NJCCCS</th>
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</table>
| Science      | • Use images to show tremendous variety in fish size, shape, color and habitat.  
                 • Observations will be made to apply to the “Anticipatory Guide” (binder).  
                 • Fish observations will be recorded on charts and discussed.  
                 • Presentations of charts will be made to class  
                 • Fresh fish specimens will be observed by physically handling them. | 30 or more colored pictures of a variety of fish  
Video of fish  
Fish posters  
Markers  
Chart paper  
Scissors  
Tweezers  
Anticipatory guide about fish (binder)  
Fish adaptation chart (binder)  
Fresh fish/ Rubber fish | | Standard 5.1  
(Scientific Processes)  
A1, A2, A3, A4, B2  
Standard 5.3  
(Mathematical Applications)  
A1, A2, B2, C1, D1  
Standard 5.5  
(Characteristics of Life)  
A2, B1, B2 |
| Language Arts Literacy | • Students view videos on fish from school or teacher library.  
                 • Documentation directly reflects observations and vocabulary mentioned in videos.  
                 • Drawings are labeled using prior vocabulary learned.  
                 • Mini-books are created to provide opportunities to use written language in meaningful ways and to assess writing skills. | Poster paper  
Worksheets (binder)  
Pencils  
Mini-books | | Standard 3.2  
(Writing)  
B5, B6, C1, C4, C11, D1, D8, D12  
Standard 3.4  
(Listening)  
B2, B4  
Standard 3.5  
(Viewing & Media Literacy)  
A2, A4, A7 |
| Mathematics |  | During observations of fresh fish specimens, rulers may be used to measure and differentiate between specimens. Patterns can be identified within or between the specimens. | |
| Social Studies |  |  | |
| Visual Arts | • Ancient art of fish printing, known as “Gyotaku,” is created from frozen or rubber fish. | Real or rubber fish  
Paint  
Paintbrushes | Shirts or bags may be brought in for printing.  
Create a class paper quilt | Standard 1.1  
(Aesthetics)  
A1, A2, B1 |
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<tr>
<td>Technology</td>
<td>Observations about shape, color and size are made from viewing imagery.</td>
<td>Crayons/ craypas, Newsprint paper (9”x12” or 12”x18”), Rice paper, Cardboard</td>
<td>representing the vast array of fish diversity and adaptations.</td>
<td>Standard 1.2 (Creation &amp; Performance) D1, D2, D3 Standard 1.3 (Elements &amp; Principles) D1, D2 Standard 1.4 (Critique) B3 Standard 1.5 (World Cultures, History &amp; Society) A1, A2, B1, B2</td>
</tr>
<tr>
<td>World Language</td>
<td>Observational drawings are created from viewing fresh fish specimens.</td>
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<tr>
<td>Technology</td>
<td>Fish video</td>
<td></td>
<td>Online charts can be created using template. Use of real time data to make inferences as to habitat and characteristics of varieties of fish.</td>
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<tr>
<td>World Language</td>
<td>There are different varieties of fish found in bodies of water in the world.</td>
<td>Global Maps</td>
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</tr>
<tr>
<td>Career Education &amp; Consumer, Family &amp; Life Skills</td>
<td>Students work in a group setting and are encouraged to be positive and open to ideas.</td>
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<tr>
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Lesson Overview
The ocean is a filter that only allows certain light to penetrate at certain depths allowing fish and other organisms to hide from predators and assist them in hunting prey.

Lesson Rationale
Students learn a fun and unique way about light and how it penetrates water at different depths providing fish with camouflaged.

Teacher’s Notes
If possible, try to have more than one adult facilitate the “Wavelengths” demonstration to check for understanding.

My Notes

Key Concept:
Some fish hide from predators at depth by using camouflage color.

Time Required:
3 class periods of approximately 40 minutes each.
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| Science      | • Prior knowledge is gained by having students question and discuss in pairs.  
               • Participate in hands on activities to refract light through water and experiment with color, light and rainbows.  
               • Goggles with blue cellophane are used to stimulate underwater light conditions showing that some fish use camouflage color to hide from predators.  
               • Light is refracted through a glass-baking dish to project a rainbow. | Rope  
Rainbow drawing  
Glass baking dish  
Mirror  
Water  
Drawing paper  
Colored pencils  
Cardstock  
Scissors  
Ruler  
Seven colors (ROY G. BIV)  
Goggle pattern  
Blue cellophane  
String/ yarn  
Masking tape  
Staples  
Fish posters (optional)  
Wavelength worksheet (binder)  
Red construction paper | Kelp forest slide show  
Repeat “The Dive” experiment using green cellophane.  
“Color filters (binder) | Standard 5.1 (Scientific Processes)  
A1, A2, B1, B2  
Standard 5.3 (Mathematical Applications)  
A1, D1  
Standard 5.5 (Characteristics of Life)  
B1, B2 |
| Language Arts Literacy | Active listening skills are built on by pairing off and holding discussions based on prior knowledge. | | | Standard 3.4 (listening)  
A1, A3, B2 |
| Mathematics | • Estimated measurements are made between the “high” and “low” crest of the “wavelengths” demonstration.  
• Standard units of measurement are used to measure and divide discs into seven equal parts to create color spinners. | Pencil  
Paper | | Standard 4.1 (Number & Numerical Operations)  
A1  
Standard 4.4 (Data Analysis, Probability, & Discrete Mathematics)  
A2, B2, C4 |
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<td>Visual Arts</td>
<td>Sketches made from observing the “Wavelengths” demonstration help students make conclusions about long and short wavelengths.</td>
<td>Drawing paper</td>
<td>Build a diorama</td>
<td>Standard 1.5 (History/Culture) A2</td>
</tr>
<tr>
<td>Technology</td>
<td></td>
<td>Virtual family vacation</td>
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<tr>
<td>World Language</td>
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<tr>
<td>Career Education &amp; Consumer, Family &amp; Life Skills</td>
<td>Consideration is given to others by being actively engaged in listening and discussion.</td>
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<td></td>
<td>Standard 9.2 (Consumer, Family, &amp; Life Skills) A1, A2, A3, A4, C1, C5</td>
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BUILD A KELP FOREST

Kelp Forest (Grade 4)

Lesson Overview
Students research kelp forest organisms and make presentations to the class as a culmination of the following activities:
- Thought Swap Circles
- The “Virtual” field trip
- Researching the Classroom Kelp Forest
- Luck of the Draw

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 kelp forest.

Teacher’s Notes
Group work is to be guided by the teacher or student (depending on the dynamic of the class). Teacher is to guide the use of the “field note” journal to ensure valid notations.

My Notes

Key Concept:
Kelp forests are home to many different kinds of organisms that interact with one another as predators, prey or competitors.

Time Required:
4 class periods of approximately 40 minutes each.
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| Science      | • A “virtual” field trip is taken that allow students to act as “scientists” by observing and documenting the kelp forests.  
• Kelp is influenced by temperature, nutrients, weather conditions, animals and competition from other species of algae  
• Organisms are placed in the correct zone or niche in 3D kelp forest.  
• Exhibit labels depict organism/location studied.  
• Connect organisms in kelp forest to show ecological, relationships.  | Poster paper  
Paper / journals  
Pencils  
Colored pencils/ markers  
Radish  
Index cards/ Presentation cards  
Media/ Literacy (books, websites)  
Yarn  
Kelp forest information cards (binder)  
Computer/ internet | Standard 5.1 (Scientific Processes)  
B1, B2  
Standard 5.3 (Mathematical Applications)  
A1  
Standard 5.5 (Life Science)  
B1, B2 | |
| Language Arts Literacy | • Active listening skills are built on by holding short discussions about kelp forests.  
• Media and Literature are viewed to gain reference and information.  | Paper  
Pencils  
Visual prompts (slides, pictures, music, etc)  
Reference books/ websites  
Computer/ internet | 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 kelp forest.  
• Monitor kelp growth per day as compared to a land plant such as a radish.  | Rulers  
Radish  
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 | Survival of kelp in different bodies of water.  
Effects of different climates in different coastal regions around the world.  | Coastal maps | Standard 6.6 (Geography)  
A5, B1, B2, C1 | |
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<td>Visual Arts</td>
<td>Sounds of the surf/ Ocean/ or classical music are played along with visual prompts. Build a 3D kelp forest. A “gallery” walk is taken to view and discuss other students’ illustrations of the kelp forests.</td>
<td>Picture cut outs from magazines/calendars Markers, colored pencils, paint Music- “Giant Kelp Forest” song (binder)</td>
<td></td>
<td>Standard 1.2 (Creation &amp; Performance) D1, D2, D3 Standard 1.3 (Elements &amp; Principles of Art) B1, B2, B3, D1, D2 Standard 1.4 (Critique) B3</td>
</tr>
<tr>
<td>Technology</td>
<td>Slides shows and media sources used to create virtual field trip. Real time data to observe kelp forests in aquariums.</td>
<td><strong>Websites</strong> Monterey Bay Aquarium live kelp forest exhibit camera <a href="http://www.mbayaq.org/efc/cam_menuasp">http://www.mbayaq.org/efc/cam_menuasp</a> Kelp forest habitat with excellent sea otter information <a href="http://www.mbayaq.org/media/all_about_otters/whatsanottter01.html">http://www.mbayaq.org/media/all_about_otters/whatsanottter01.html</a> <strong>Video</strong> Slide images Audio tape of ocean sounds Tape player</td>
<td></td>
<td>Standard 8.1 (Computer &amp; Information Literacy) A1-9 B1-10</td>
</tr>
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<td>World Language</td>
<td>Kelp forests are presented depicting global location and research found.</td>
<td>Chart paper Markers/ colored pencils</td>
<td></td>
<td>Standard 7.2 (Culture) C2, C3</td>
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