Going Beyond the Classroom

• Hands On Education
  – Tecnology development
  – Moving forward with new projects
• Science Acquisition
  – use as science platform
• Classroom integration
  – Inter-disciplinary integration

Next Generation Sea Perch – Beyond the Classroom
Goals

• Continue to provide inexpensive, hands-on projects for the classroom, focusing on science, technology and engineering.
Inter-disciplinary Integration

- **Math**
  - Engineering Calculations
  - Collecting and Plotting data – statistics
- **Physics**
  - Bouyancy, vectors, electricity, circuits
- **Engineering & Technology**
  - Design, construction, tools, management
- **Chemistry**
  - Water chemistry, water quality, pollution (point & non-point), adhesives
- **Earth Sciences**
  - Geology, weather, ocean processes
- **Living Sciences**
  - Biology, ecology, biodiversity
  - Habitats, plankton tows, behavior
- **History**
  - Of Engineering, exploration, trade, Navies, military technology
- **English**
  - Literature/Novels, Journal writing
- **Social sciences & politics**
  - Role of ships & subs in society
  - Marine, environmental and water issues
- **Economics**
  - Trade, naval, project management
Example: Physics Curriculum Connections

Remote Operated Vehicles: Odyssey High School

Apply Scale Drawings (1.4)
Interpret Plans and Diagrams (1.5)
Create and Interpret Graphs (1.4)

Apply Newton's Laws (1.6, 1.7, 1.10)
Use Free Body Force Diagrams (1.8)

Understand Speed, Acceleration and Distance Relationships (1.12)

Identify and explain use of common technology tools (2.2)

Describe how structures are constructed (2.3)
Identify and explain the use of materials (2.4)

Construction Technologies

Technology Standards

Engineering Design

Building of the ROV

Physics Standards

Conservation of Energy and Momentum
Calculate Momentum (2.5)

Interpret Conservation of Momentum (2.1)

Understand Units of Measurement (2.6)

Measurement of Voltage, Current, and Resistance (5.5)
Understand relationship between Voltage, Current, and Resistance (5.4)

Electromagnetism

Understand Circuits (5.2)
Understand Current Flow (5.4)
Describe instruments used to measure current, voltage, resistance (5.1)

Next Generation Sea Perch – Beyond the Classroom
Sensors

- Video (camera)
  - Animal and behavioral observation
  - Structural and mechanical inspection
- Data Loggers (Hobo, etc.)
  - Temperature
  - Light
  - Depth (pressure)
- Compass
- Plankton net
- Water Sampler
- Scoop or soil sampler
- Lifting devices or grabber
Super Sea Perch

- Larger Frame
- Powerful Thrusters
- Longer Tether
- Depth Guage
- Compass
- Lights
- Stereo Hydrophones
Super Sea Perch Capabilities

- Deeper rated
- Improved control
- Can handle some current
- Larger payload
- Better navigation
- More design possibilities
- Easily adapted
LED Lighting Bank

- 42 LEDs
- Potted in Epoxy
- Bright & Dim settings
- Illuminates field of view and gauges
Stereo Hydrophone System

- Combine two hydrophones
- Use stereo headphones
- Adjusted for sound speed in water
- Directional hearing
Surface Craft

- Hull Design
- Hull Construction
- R/C controls integration
- Surface Exploration