Leapfrog Program

Course Title: Designing Sailing Ships

Course Description

Following in the footsteps of naval architects, novice designers examine the different methods of assembling ships. Students implement their discoveries as they design ships complete with keels, hulls, and masts.

Essential Questions

- What is a sailing ship and why is it useful?
- What makes a sailing ship go?
- What are the important design features on a sailing ship and why?

Outcomes

Upon successful completion of this course, students will have:

a. discussed the form and function of sailing ships
b. defined *buoyancy* and *density* and described their roles in ship design
c. researched the history of boat design
d. collaborated with others in the creation of a ship design
e. constructed model ships using a variety of materials
f. evaluated and tested the ships for strength and durability

Instructional Strategies

Students will have the opportunity to develop inquiry questions about sailing ships through read alouds and experiments. Throughout the course, students will be able to test and explore their inquiries. Students will participate in science labs to test objects for buoyancy and density and apply the results by designing and creating their own sailing ships. Daily journaling will enable students to monitor their own growth and learning. Students will have the opportunity to work in whole group, small groups, pairs, and independently. The final project will create an opportunity for students to share their knowledge of sailing boats in a way that expresses their individuality and skill level.

Resources and Materials

- **Books**
  a. Humble, Richard. *Timelines, Ships, Sailors and the Sea.* 1991. ISBN:053110923
  b. O'Brien, Patrick. *The Great Ships.* 2001. ISBN: 0606337857
  c. Relf, Patricia. *The Big Golden Book of Boats and Ships.* 1991. ISBN: 0307678733
  d. Shackle, Swivels and Link. *The Visual Dictionary of Ships and Sailing.* 1991. ISBN: 187943120351495

Student Assessment

- **Pre-Assessment**
  Students will discuss topic related to the form and function of ships and what makes a ship float. Ideas will be charted (KWL) to demonstrate prior knowledge.

- **Documentation of Learning**
  Students will participate in lab activities involving buoyancy and density. The results will be recorded in their journals and discussed with the class. Students will also sketch a sailing boat and label with key terms. The students will also build a model boat using a variety of materials testing its buoyancy and recording results in their Discovery Journal.

- **Post-Assessment**
  Students will refer back to the original KWL chart and we will fill in what the students learned. The Students will demonstrate what they have learned by presenting their ship models at the parent *Expo!* Students will receive a written evaluation at the end of the session based on general class performance, discussion, participation (small group and whole group) and written work.

Schedule

Date	Topic(s)	In-class Activities	How will you document learning for assessment?
07/05/2011	Why do boats float? What is buoyancy and density? What are the main parts of a sailboat? What is the purpose of the keel, hull and mast?	Begin the KWL. Read books about floating. Participate in lab activity to test buoyancy and density. Record findings in Discovery Journal. Sketch a sailboat and label its parts.	KWL Discovery Journals Anecdotal notes on performance and discussions. Sailboat drawing.
07/06/2011	What is the history of the sailboat? Who built the first sailboat? How do ships differ in their design and their use?	Explore books about the history of the sailboat. Compare and contrast two ships in your Discovery Journal. Sketch and list materials needed for individual ships. Begin to build sailboats.	Discovery Journal Anecdotal notes on task performance and discussions.
07/07/2011	What is the terminology used to describe onboard positions on a boat? How were charts used? What tools are used for navigation?	Read several books about charts and tools. Participate in an outdoor navigation activity using a compass. Participate in a group activity using onboard positions. Continue to build ships and test their ability to float. Document findings in your Discovery Journal.	Discovery Journal Anecdotal notes on task performance and discussions.
07/08/2011	Review and prepare for Expo!	Review of concepts. Students will share their favorite parts of the class and what they found most interesting. Students will explain why they chose materials for their ships and if they would try things differently.	Presentations and final project.

CTD Statement on Third-Party Web Sites

Instructors are required to thoroughly review any third-party web sites they intend to use in their courses for inappropriate content. However, because web content continuously changes, CTD disclaims any responsibility for any of the content contained on third-party web sites used in course materials. If you become aware of anything that may be inappropriate, please notify CTD staff immediately.