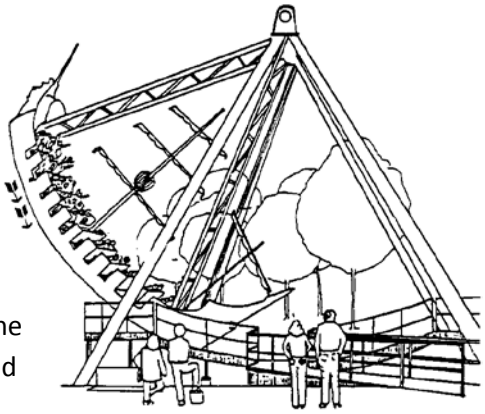
The Pirate



The Pirate is very much like a large pendulum. Using that idea, conservation of energy and conservation of momentum, answer the following questions.

1. In an ideal situation, what is the relationship between the potential energy PE of the ship at the top of its swing and the kinetic energy KE at the bottom of the swing?

2. What are some things that keep this from being an ideal situation?

3. The maximum height of the boat is 13.6 m and the mass of the boat (when full) is 9548 kg.

    a. Calculate what the speed of the boat should be at the bottom of its swing if energy is conserved.

    b. Find the speed of the boat at the bottom of its swing using the directions on Appendix B.

4. How much energy did the boat lose and why?

5. Draw a rough sketch of kinetic energy vs. time for three periods, with t=0 at the base of the swing. You sketch should have a vertical axis for kinetic energy, a horizontal axis, and labels for when the boat is at the top of the swing and at the bottom of the swing. Values need not be exact.

6. Draw a rough sketch of potential energy vs. time for three periods, with t=0 at the base of the swing. Label this graph as you did for the previous problem.

7. Draw a rough sketch of total energy vs. time for three periods, with t=0 at the base of the swing.