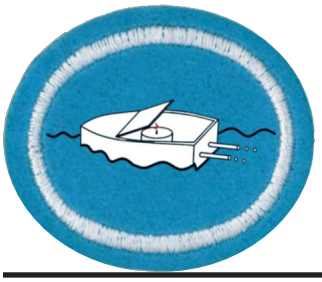

Pathfinder's Name

Toy Boat Regatta

❑ **1.** Draw a schematic of a wind powered (sail) boat showing pertinent features and how they function. Features should include, but not be limited to a boom, hull, jib, keel, mainsail, mast, and rudder.

How do features commonly removed from toy boats affect functionality?

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❑ **2.** Draw a plan for a rubber band-powered toy boat of a design of your choosing showing pertinent features that differ from a wind powered boat.

❑ **3.** Be able to describe Archimedes' Principle of Buoyancy and how this principle applies to all boats.

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❑ **4.** Be able to describe Newton's First Law of Motion and how this principle applies to all boats.

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❑ **5.** Be able to describe Newton's Third Law of Motion and how this principle applies to a wind-powered (sail) boat.

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❑ **6.** Be able to describe the difference between Potential Energy and Kinetic Energy. Discuss how and when a toy rubber band powered boat uses both types of energy.

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❑ **7.** Use recycled materials to make at least one toy wind powered (sail) boat and at least one toy rubber band powered boat. Each toy boat will be no wider than 4 inches (10 cm) and suitable for travel in a 6-inch (15 cm) wide lane of water.

Date completed _____

❑ **8.** Participate in an organized wind-powered (sail) boat race using a boat you have made to complete this honor.

Date completed _____

❑ **9.** Participate in an organized rubber band boat race using a boat you have made to complete this honor.

Date completed _____

❑ **10.** Identify and tell a short story of at least two instances in the Bible that describe floating boats/objects and two that defy Archimedes' Principle of Buoyancy.

Date completed _____

Date completed _____ Instructor's Signature _____

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Pathfinder's Name

Toy Boat Regatta, Advanced

❑ **1.** Have the Toy Boat Regatta Honor.

❑ **2.** Draw a schematic of a pop pop boat (sometimes known as putt-putt boat) showing pertinent features and how they function. Show options of a looped tubing engine (copper coil engine) and a diaphragm engine.

❑ **3.** Describe what happens to liquid water when it turns to steam and demonstrate this phenomenon using any experiment of your choosing.

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❑ **4.** Describe what happens when water steam cools and demonstrate this phenomenon using any experiment of your choosing.

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❑ **5.** Describe how a pop pop boat engine utilizes Newton's first law of motion.

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❑ **6.** Make at least one pop pop engine boat utilizing recycled materials powered by one tea-candle for a heat source.

Date completed _____

❑ **7.** Modify the pop-pop boat in the previous requirement or make multiple pop pop boats to determine how changes to capacity of reservoir and/or diameter of tubes affect the boat's operation. Hypothesize the outcomes before experimenting on the modified boat(s), evaluate the performances, and document the results.

Date completed _____

❑ **8.** Participate in an organized pop pop boat race using a pop-pop boat you have made to complete this honor.

Date completed _____

❑ **9.** Use the Biblical dimensions of Noah's Ark, independently theorize how much the animals and other cargo could have weighed. Remember to consider the weight of the wood used in ship building. If possible, compare your assumptions and answers with others working on this honor. Based on that available weight for cargo, how many animals could have fit on the Ark using your assumptions?

Date completed _____

Date completed _____ Instructor's Signature _____