



Recycle Regatta 2022

RULES AND GUIDELINES

February 15-March 31

The Recycle Regatta is a fun, hands-on competition that students can participate in from the safety of their own home! Students will build small-scale, uncrewed, model sailboats, test them, and calculate their speed. Challenge other students from around the world as you do your part for the environment by repurposing and recycling. Prizes will be awarded to winners in each fleet for fastest and most creative!

Fleets for 2022 are: MINIBOAT (GR K-2), OPTI (GR 3-5), HARTLEY (GR 6-8), LASER (GR 9-12)

Educators are encouraged to use our [Teacher Toolkit](#) to assist with running a regatta.

Competition Guidelines for all Fleets:

1. **Start by making a blueprint** on a scrap piece of paper, or on the Data Form (see last page of this document). Engineers always plan before starting to build! This can be a drawing, list of materials, or a write-up of what you plan to do. Your sailboat submission should be small-scale (less than 40 cm long) and uncrewed.
2. **Gather materials** (safely!) that are recycled or discarded. We do not want you to buy materials.
3. **Set up your testing bin**, and be sure to note the size, as your boat should fit inside your testing bin and have at least 25 cm left to move. If it is too large, it will be difficult to calculate speed.
4. **Build a prototype**, you might end up changing your design and that's perfectly okay.
5. **Test your design!** See how the boat moves, floats, and sails! Does it stay upright? Does it float? If not, change your design until you have the perfect vessel!
6. **Test and document your speed** for at least 3 trials (see submission form on website and Data Form). To test speed, place your boat in testing bin with water and markers for a distance (try 1 foot with a ruler). Then create "wind" using your breath by blowing on your boat or using a reusable straw. Document how much time it takes to travel that distance. Submit your best 3 trials on the entry form. Use the formula $\text{Speed} = \text{Distance}/\text{Time}$ to calculate speed. All speed calculations should be done in cm/second. Write down your results.
7. **Improve your design** based on the testing process and start the testing process again! Can you make your boat go faster by changing the design?
8. **Submit your entry form** by MARCH 31 on our webpage: educationalpassages.org/recycle-regatta/. Each fleet will have two winners - Most Seaworthy (Fastest) and Most Creative. Submissions will be accepted from **February 15-March 31**.



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Building Requirements:

We encourage you to be a steward of the environment in addition to an honorable mariner. Your boat must be built from recycled or discarded materials- i.e. objects that have already been used at least once. The Recycle Regatta team *strongly discourages* participants to buy new materials for this project. Design is left to engineers! **Let your imagination take over.** These lists are not all inclusive! Our goal is to convert and repurpose waste to create fantastic boats!

Materials you **may use** in boat construction:

- Plastic
- Cans - aluminum, tin, any that will float
- Duct tape
- Cardboard
- Glue
- Fishing line
- Other recyclable/discarded items with positive buoyancy (they float)! [Check these guidelines](#) for more information on what can and cannot be recycled.
- Decorations and crew costumes are allowed and encouraged!

Materials you **may not use** in boat construction:

- Wood
- Rubber
- Inflatables - raft, pool toys, etc.
- Fiberglass
- Caulking compounds
- Electrical systems
- Engines - gasoline powered, battery powered, etc.
- Paint or varnish (can be used for decoration, but not for waterproofing)
- Raw materials made out of recycled content (Trex decking, etc).

Safety Requirements:

Please read the following carefully. Failure to comply with safety requirements will result in disqualification.

1. All participating mariners must wear a personal floatation device (PFD) in the water, near the water, or on a dock. If you are testing a boat in a controlled location (such as a bathtub), a PFD is not required, but an adult should be present.
2. Animals cannot occupy a boat.
3. Sunken or discarded boats must be recycled if possible.
4. You must have a means of recovering your vessel after launch, from the surface of the water, or, if your vessel sinks, from Davy Jones' Locker.
5. Most importantly, HAVE FUN! Participants are expected to maintain the decorum and dignity expected of a yachtsperson. Inappropriate behavior at the discretion of the Recycle Regatta team will not be permitted and will disqualify your entry.



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Speed Calculations:

1. Measure and record a specific distance that you know your boat is able to travel. Mark this distance (ex. tape on the side of the tub/testing bin as a start/finish line). Measure this distance with a ruler, meter stick, tape measure, or other device.
2. Time how long it takes your boat to travel that entire distance.
3. Speed = Distance/Time. So, if your boat traveled 10 centimeters in 2 seconds, you would set up your equation as 10 centimeters/2 seconds. Your final speed would be 5 cm/second. This answer came from dividing 10/2 and combining the units used. Check out the Recycle Regatta website for extra help with speed calculations!
4. Calculate your speed for 3 trials.
5. Find the average distance, time, and speed! We use averages to summarize a group of data or measurements.
 - a. Mean average= total sum of the three trials divided by 3
 - b. Let's look at an example of finding our average distance in cm.
 - i. Add together the 3 distances that we measured:
 $3\text{cm} + 7\text{cm} + 6\text{cm} = 16\text{cm}$
 - ii. Then take that total, and divide it by the number of trials: $16\text{cm} / 3 \text{ trials} = 5.333\text{cm}$
 - iii. Here you have your average distance, 5.333cm!

Challenge yourself! Convert from speed in cm/second to Knots

Sailors and mariners use a special type of unit to talk about speed. These units are called knots! They take into account nautical miles, which are used in distance measurements out at sea. We've given you the conversion formula for knots, if you want to see how your boat would compare to a life size sailing vessel!

Knots = Nautical Miles per Hour

1. Take your speed in cm/second and divide it by 51.4444

$$5.333\text{cm/s (speed)} / 51.4444 = 0.1036 \text{ knots}$$

The speed in knots might seem small, but remember, you are calculating your speed in nautical miles/hour!

Please email Nina Quaratella, NESS Associate Program Director, at nquaratella@nessf.org with questions and to receive more information on a discounted Sailing at Home online learning program.

Be sure to check the website for all Recycle Regatta updates and other resources, too!

educationalpassages.org/recycle-regatta





RECYCLE REGATTA DATA FORM

ENGINEER'S NAME(S):

FLEET (CHECK ONE):

MINIBOAT (GR K-2)
 OPTI (GR 3-5)
 HARTLEY (GR 6-8)
 LASER (GR 9-12)

BOAT NAME:

SKETCH YOUR DESIGN HERE:

BRIEF LIST OF RECYCLABLE MATERIALS USED:

DATA ENTRY:

	TRIAL #1	TRIAL #2	TRIAL #3	AVERAGE
DISTANCE (cm)				
TIME (s)				
SPEED (cm/s)				
SPEED IN KNOTS (nm/hr)				

CHALLENGES YOU HAD TO OVERCOME TO SUCCEED: