RECYCLE REGATTA

New England Science & Sailing
EDUCATIONAL PASSAGES
NAMEPA

# RECYCLE REGATTA TEACHER TOOLKIT

The Recycle Regatta is a free, fun, hands-on competition that students can participate in from anywhere! First, students will build a model sailboat out of recycled and repurposed materials. Then, students will race their boat to victory while learning all about engineering, mathematics, sailing, buoyancy, and stewardship. The organizers of the event put together this Teacher Toolkit to help you bring the Recycle Regatta into your educational space. To officially take part in the challenge, visit **recycleregatta.info** for all the details. There will be a prize for fastest and most creative submissions.

## HERE'S HOW TO HOST YOUR OWN RECYCLE REGATTA:

### PREPARE
Gather recyclables or otherwise discarded materials. Students can bring these items from home or encourage a Recycle Regatta donation bin in your school, classroom, or meeting space. If you are able, organize a litter clean up and repurpose the materials!
All items should be washed and safe for handling (no sharp edges, etc.). Please note – other supplies will need to be accessible, including: ☐ scissors, ☐ tape, ☐ glue, ☐ pencil, ☐ paper, ☐ testing bin, ☐ calculator, and ☐ stopwatch).

### INTRODUCE
Set students up for success by introducing key concepts needed for the Recycle Regatta. Visit the Recycle Regatta website for free educational videos on the physics of sailing, marine debris, buoyancy, the engineering method, and more. You can also book an Online Experiential Learning Program with New England Science & Sailing!

### DESIGN
Allow students time to design a blueprint. This step is imperative for the engineering process! Students will brainstorm what materials they will use for their boat and draw out a sketch. This can be done on scrap paper, in a class journal, and on the Student Data Form.

### BUILD
Students will bring their blueprints to life with the materials they are repurposing, working alone or with a partner. Make sure they know making changes and modifying is okay! When students feel their boat is ready to test, move to the next step.

## TEST

Set up the testing bin – a container (the bigger the better) with water, and mark a "start" and "finish" line. This will be your distance. Students will first put their boat in the bin to test if it stays upright and floats. Then, test speed by providing a wind source and time how long the boat takes to cross the finish line. The wind source can be anything from a small paper fan to a piece of cardboard, or a powered fan (spaced away from water source). Be sure to keep it consistent for all students. Each student should have a minimum of three trials so there is an opportunity to learn more about scientific averages. Students should record their data on the STUDENT DATA FORM that we've provided at the end of this toolkit for this.

## CALCULATE

Students will "race" against others in their fleet by submitting speed calculations. To calculate speed, use the formula **SPEED = DISTANCE/TIME**.
Start by measuring the distance (length) of the testing bin with students. Students will time how long their boat takes to cross the bin per trial. Divide the length of your bin (distance in cm) by time. Make sure to record your data on the STUDENT DATA FORM, and include units you used.

### EXAMPLE

Bin length (distance) = 10 cm
Time to sail across bin distance (time) = 2 seconds
Speed = 10 cm/2 seconds which is **5 cm/second**

## MODIFY

Engineers learn from their mistakes! Change and re-test boats again and again until students feel they have the fastest or most creative vessel. Refer to the Engineering Design Process (see diagram to right) as you work. In the official Recycle Regatta, each fleet will have a prize for fastest as well as most creative entries.

## HOST YOUR OWN REGATTA

To host your own Recycle Regatta, use the last two pages of this Teacher Toolkit. One is "Classroom Challenge" instructions. Print or virtually display this list so all participants can see it. The second is the "Student Data Form". Each vessel (individual or team) should have their own to record on. Then, set up your station and bin with water and wind source, encourage your builders, and start testing! Keep a leaderboard to track the fastest boats and decide which boats will be submitted to the official Recycle Regatta by March 31.

**THE ENGINEERING DESIGN PROCESS:**

ASK - IMAGINE - PLAN
CREATE
TEST
IMPROVE

RECYCLE REGATTA

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## DOCUMENT

Take a photo of each completed vessel. All student submissions for the official entry will need to have an accompanying photo or a video of their boat for verification (photos do not need to include the student). Blueprint photos are also encouraged as it is great to see the process. Previous winning designs and boats can be viewed on our website.

## SUBMIT

Once students have completed all the steps, submit official entries by using our online form between February 15th and March 31st at midnight. Teachers can submit their students' boats individually, or students can submit on their own. Visit our website for all the details.

## STAY TUNED

Winners will be contacted by email and will be officially announced on April 15th. We will also post the winners on our website and in the Facebook Group.

## THIS ACTIVITY SUPPORTS THE FOLLOWING CURRICULUM STANDARDS

**NEXT GENERATION SCIENCE STANDARDS**

Grades K–2: K–PS2–2, K–ESS3–3, 2–PS1–2, K–2–ETS1–1, K–2–ETS1–2, K–2–ETS1–3

Grades 3–5: 5–ESS3–1, 3–5–ETS1–1, 3–5–ETS1–2, 3–5–ETS1–3

Grades 6-8: MS–ESS3–3, MS–ETS1–1, MS–ETS1–2, MS–ETS1–3, MS–ETS1–4

Grades 9–12: HS–ESS3–4, HS–ETS1–2

**OCEAN LITERACY PRINCIPLES**

Principle 6: The ocean and humans are inextricably linked.

Grades K–2: 6.A.1, 6.A.5, 6.C.3, 6.C.5, 6.C.6

Grades 3–5: 6.A.6, 6.B.1, 6.C.1, 6.C.3, 6.C.7, 6.C.8, 6.C.11

Grades 6–8: 6.A.10, 6.B.2, 6.D.20, 6.D.21, 6.E.7, 6.E.12

Grades 9–12: 6.D.11, 6.E.6, 6.E.9, 6.E.14

**CASEL SOCIO-EMOTIONAL LEARNING STANDARDS**

Responsible Decision–Making:

• Recognizing how critical thinking skills are useful both inside and outside of school

• Reflecting on one's role to promote personal, family, and community well–being

• Evaluating personal, interpersonal, community, and institutional impacts

Self–Management:

• Setting personal and collective goals

• Using planning and organizational skills

## QUESTIONS?

Full rules and guidelines, official entry form, and how to contact the partners, can all be found at **recycleregatta.info**.

# RECYCLE REGATTA SIGNS

Print and copy these signs for your classroom and school to help collect materials, and spread excitement!

## STOP!

Can that item be used for the Recycle Regatta? If so, put it in the Recycle Regatta collection bin!

Recycle Regatta
February 15-March 31

## RECYCLE REGATTA COLLECTION BIN

## STOP!
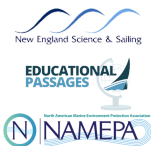ITEMS FOR BOAT BUILDING ONLY

RECYCLE REGATTA
FEBRUARY 15-MARCH 31

# WE ARE ENTERING THE _____
# RECYCLE REGATTA

# GO TEAM _____

RECYCLE REGATTA
FEBRUARY 15-MARCH 31

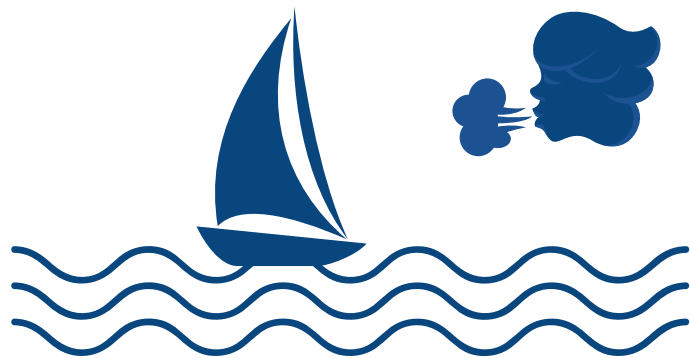recycleregatta.info

# RECYCLE REGATTA CLASSROOM CHALLENGE

1. **BUILD** A SAILBOAT WITH MATERIALS PROVIDED

2. **WRITE** YOUR NAME ON A *STUDENT DATA FORM*

3. **PLACE** YOUR BOAT IN THE BIN AT THE START LINE

4. **SETUP** YOUR WIND SOURCE

5. **IDENTIFY** YOUR TIME KEEPER WHO WILL USE THE STOPWATCH

   TO RECORD HOW LONG IT TAKES FOR YOUR BOAT TO SAIL THE TRACK

6. **ASK** YOUR TIME KEEPER TO GIVE YOU "READY, SET, GO!"

   ANNOUNCEMENT, AND THEN **RELEASE**

7. **RECORD** YOUR TIME ON THE ENTRY FORM

8. **CALCULATE** SPEED OF YOUR BOAT

   *SPEED = DISTANCE / TIME*

   TRACK DISTANCE IS _____CM

9. **TEST** AND **RECORD** AT LEAST THREE TIMES

10. **SUBMIT** YOUR TOP ENTRY TO SEE IF YOU MADE IT ON THE LEADERBOARD!

11. *WILL YOU ALSO **ENTER** THE OFFICIAL RECYCLE REGATTA?*

recycleregatta.info

# RECYCLE REGATTA STUDENT 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:**