



Maryland Engineering Challenges

2027 Hovercraft Challenge

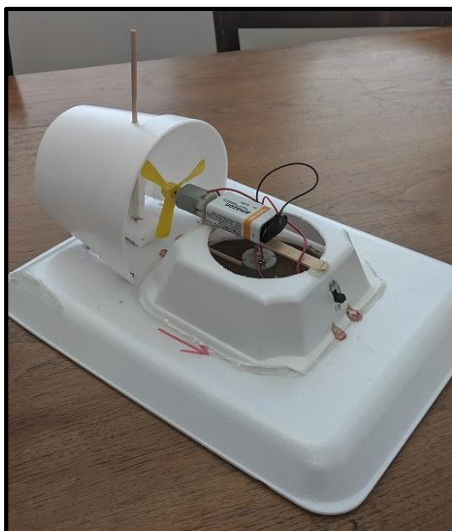
Middle School Level – Grades 5 to 8

Sponsored By:

American Institute of Chemical Engineers, Maryland Section

Engineer Contact:

Kathy Gunkel wildwoodenvironmental@comcast.net



Important Dates

Registration Due

⇒ **Friday, April 16, 2027**

Prior to 4:00 PM

- In order to be a registered team, each team must have their adult Coach register online: <https://bit.ly/2027MECRegistration>

Written Report Due

⇒ **Friday, April 23, 2027**

Prior to 4:00 p.m.

⇒ Submit the team's Written Report in PDF format emailed to challenges@thebmi.org

Hovercraft Competition

⇒ **Saturday, May 8, 2027**

Program begins at 9:00 AM

- Competition will be at the Baltimore Museum of Industry, 1415 Key Highway, Baltimore
- Teams should bring their completed hovercraft to the competition ready to be tested
- Full details about the Challenge event will be emailed to Coaches after the registration deadline.

Questions about Challenge specifications or judging should be sent to the Engineer Contact:

Kathy Gunkel wildwoodenvironmental@comcast.net

Other questions? Jessica Celmer challenges@thebmi.org

THE CHALLENGE

Design and construct a Hovercraft vehicle (a land-and-water transportation vehicle that Maryland could use for a ferry service across the Chesapeake Bay) from a kit to be the fastest vehicle in a race across a 20-foot stretch of floor. Imagine you are transporting vehicles and families from Fells Point to Kent Island in a “Reach the Beach” program for the State!

ENGINEERING TEAM REQUIREMENT

For the benefit of the students, it is recommended that the team not exceed 4 students. There is no limit to the number of teams a school may have.

DESIGN & CONSTRUCTION STANDARDS

- Please see the [Project Construction Guide](#) for instructions on how to build your Hovercraft. This documents can be found at <https://bit.ly/BMIChallenges>
- *Up to 3 hovercraft kits can be provided for each school free of charge from the Baltimore Museum of Industry. Please contact Jessica at challenges@thebmi.org to request the kits. Additional kits can be provided at \$6.00 per kit through the BMI.*

PERFORMANCE DEMONSTRATION GUIDELINES

- Each team can race their Hovercraft, starting from either side of the Bay, twice across the Bay and use the best time between the two runs.
- The Hovercraft cannot be “pushed” at the start of its Bay crossing.
- The Hovercraft cannot be touched or adjusted after the start of its crossing.
- Adjustments and/or repairs can be made between the two runs.

SCORING EVALUATION CRITERIA AND POINTS

Written Report and Drawings

20 competition points

- The quality of the written report has made a difference in the past between 1st and 2nd place!
- Timeliness of report submission is important– if it is not submitted when it is due, it will not be evaluated.
- No supplements will be accepted the day of the competition, instead incorporate any additional information into your Oral Report.

Oral Report

15 competition points

You will be evaluated on the poise of your team members, how well you demonstrate the knowledge you have gained about the Hovercraft and how well you prepared for the Oral Report.

- Consider having answers ready for the following questions:
 - Why is the Hovercraft a good choice as an auto transport vehicle?
 - Why is it a good choice as a rescue vehicle?
- Up to five (5) Bonus Points are available for going above and beyond a simple oral report.

Design and Construction

30 competition points

Achievement of design specifications, quality of construction, creativity of structural design, and finish enhancements are the main focus of the Judges’ evaluation of your project.

- Finishing enhancements for the model vehicle should look like a passenger ferry vehicle. It will be a factor in the award of points for this category.
- Plan the Hovercraft as though the team is presenting the design to MDOT, the Maryland Department of Transportation.

Performance Demonstration

35 competition points

Each Hovercraft will be required to race across the “Chesapeake Bay”, from Fells Point to Kent Island, a 20-foot distance over a flat, dry surface, under battery power.

- Performance scoring points will be awarded as follows:
 - 35 points-fastest time across the Bay
 - 30 points-2nd fastest time
 - 25 points-3rd fastest time
 - 20 points-4th fastest time
 - 10 points-each successful “Bay” crossing
 - 5 points-each successful launch that reaches the midpoint of the “Bay”

Written Report for the Hovercraft Challenge

The Written Report plays an important role for the Engineer. It is how engineers communicate their ideas to parties in a permanent format. These parties might be investors, a boss, a client, employees, or maybe the Patent Office if one is trying to get a patent for their work. An oral presentation enhances the written report, but the written report serves as the “take-away”, the means by which an individual may refresh their memory with regard to what you covered in your presentation. How much easier is it for you to remember what your teacher told you when you have something in writing from them, along with your notes? A patent application requires that everything be submitted in writing to create a permanent record of your patented “gizmo”.

In the case of the written report you are preparing, the Sponsor is looking for your ability to put together a standard report, one which includes a Title Page, Table of Contents (in a normal format), an Abstract, a Summary, an Introduction to the report, “THE REPORT”, your

Conclusions and Recommendations, your Acknowledgements to the people who supported you in this endeavor, a Bibliography listing sources of your information and research, Appendices as needed, original Drawings (hand or computer), and Photos to supplement your discussion. And, most important is a Certification that you and your teammates did the work yourselves, that it was not done by your teacher(s) or parent(s). This is YOUR project, not theirs!!

Here are some notes to help you develop and prepare a quality written report. In addition to “THE REPORT”, you should consider including the following features:

Title Page —include name of challenge, team name and logo, name of school or organization, names of students, name of teacher or advisor. An original logo design and its details will earn an extra 3 points. *Copying a graphic from a website and using it for your logo will result in loss of points...better no logo than stealing somebody else’s work.* These Title Page requirements have been established by the Maryland Engineering Challenges program.

Abstract, Summary, Introduction, Conclusion—Conduct an internet search to find out how the Abstract differs from the Summary, how the Summary differs from the Introduction and Conclusion, etc.

Conclusions and Recommendations —How successful was the project? What did the team members learn by participating in an engineering challenge? What did each team member learn about their aptitude for engineering related careers?

Acknowledgments —List the names of the adults who assisted in the project with a brief description of what they did. Required...lose 5 points if not included.

Certification —Include a certification, signed by all student team members and adult coaches/assistants, stating: “We hereby certify that the majority of the ideas, design, and work was originated and performed by the students, with limited assistance by adults, as described in the Acknowledgements.” Required...lose 5 points if not included.

Bibliography —list all references used, including internet website/webpage, books and magazines. (An internet website URL address is not enough...provide a few words about the information you obtained from it.)

Appendices —conduct an internet search about Appendix (Appendices) and use them appropriately to include information about the Safety precautions you considered and incorporated, the Team Members with short biographies about each, scheduling and accomplishments achieved, special tools and/or machines used to design and build the Hovercraft.

Photos – Not required, but you can earn up to 5 bonus points with the inclusion of relevant photos.

Remember, a good report can make or break a team as far as placing First, Second, or Third, if your Hovercraft crosses “the Bay”. Only 5 points separates the fastest Hovercraft from the 2nd fastest. And, it has happened in the past that First place was won by a team with the second fastest Hovercraft because they achieved more points with the quality of the report they submitted. An example of a Hovercraft Report can be found at <https://bit.ly/BMIChallenges>

Please note: At least 1 competition point will be deducted for poor grammar, poor spelling, or clear evidence that only “spell check” was used and no proofing was performed. The report is evaluated on a scoring scale of 100 points and the scoring points are scaled to the equivalent of 20 competition points...a score of 100 points on the scoring scale is equivalent to 20 competition points and a score of 50 points is equivalent to 10 competition points. *How do we know there was only “spell check”? When we see correctly spelled words used out of context, for example, “four” instead of “for”, “form” instead of “from”, “touché” instead of “touched”, we know spell check was used and didn’t stop at the word because it was spelled correctly, even though it was the wrong spelling for the context of the discussion.*

**GOOD LUCK TO YOUR TEAM...WE LOOK FORWARD TO REVIEWING YOUR
REPORTS AND MEETING YOU TO DISCUSS YOUR HOVERCRAFT AND
ACHIEVEMENTS WITH THIS ENGINEERING CHALLENGE.**