

2017 Eastern Shore Crab Boat Engineering Competition Scoring Rubrics

Design/Written Report

*Written report should thoroughly address each item with supported sources cited correctly using APA format. Reports **not following APA guidelines** will be assessed a **penalty of up to 5 points**.

Resources for APA formatting can be found at: <https://owl.english.purdue.edu/owl/resource/560/01/>. The overall report should be **no longer than 5 double spaced pages**. The boat drawings/designs are not included in this 5 page limit (submit as many detailed drawings/designs as deemed necessary). The written report should be submitted to tslove@umes.edu by **April 21, 2017**.

Criterion	0	1	2	3	4
Government Regulation and Environmental Impacts of Crabbing	The report presents little to no information about positive or negative influences that the Department of Natural Resources (DNR) has on crabbing and the environmental impacts of crabbing on the Delmarva Eastern Shore.	The report briefly discusses one positive or negative influence that the Department of Natural Resources (DNR) has on crabbing and the environmental impacts of crabbing on the Delmarva Eastern Shore.	The report vaguely discusses some positive and negative influences that the Department of Natural Resources (DNR) has on crabbing and the environmental impacts of crabbing on the Delmarva Eastern Shore.	The report thoroughly discusses some positive and negative influences that the Department of Natural Resources (DNR) has on crabbing and the environmental impacts of crabbing on the Delmarva Eastern Shore.	The report thoroughly discusses many positive and negative influences that the Department of Natural Resources (DNR) has on crabbing and the environmental impacts of crabbing on the Delmarva Eastern Shore.
History of Crabbing and Crab Boats	The report presents little to no information about the history of crabbing, crab boats, or the Chesapeake Deadrise.	The report briefly discusses one of the following: the history of crabbing, crab boats, or the Chesapeake Deadrise.	The report vaguely discusses two of the following: history of crabbing, crab boats, and the Chesapeake Deadrise.	The report discusses some of the history of crabbing, crab boats, and the Chesapeake Deadrise.	The report thoroughly discusses the history of crabbing and crab boats, especially the Chesapeake Deadrise.
Designs: Scaled 1"=1'-0"	No measurements were accurately scaled or provided for the necessary	Few measurements were accurately scaled and provided for few of the	Some measurements were accurately scaled and provided for some of the	Most measurements were accurately scaled and provided for most of the	All measurements were accurately scaled and provided for all of the

	boat components.	necessary boat components.	necessary boat components.	necessary boat components.	necessary boat components.
Science and Math Connections	Critical science concepts and a budget are not included.	Critical science concepts that contributed to the design and testing of the boat are vaguely described without pictures/ diagrams, or a description of how the items were used to design/ construct/test the boat is included.	Critical science concepts that contributed to the design and testing of the boat are described in little detail with or without pictures/ diagrams and sources cited. A budget plan is included but missing one of the following: price, quantity, or description of how the items were used to design/ construct/test the boat is included.	Critical science concepts that contributed to the design and testing of the boat are described in some detail with pictures/ diagrams and sources cited. A broad list with price, quantity, and description of how the items were used to design/ construct/test the boat is included.	Critical science concepts that contributed to the design and testing of the boat are described in great detail with pictures/ diagrams and sources cited. A detailed/ itemized budget plan with price, quantity, and description of how the items were used to design/ construct/test the boat is included.
Stability	X	Did not include any calculations, work, or pictures for determining the metacentric height of 3/4" or roll period of less than 2 seconds.	Included inaccurate calculations and work for determining the metacentric height of 3/4" or roll period of less than 2 seconds. Does not include pictures of testing this.	Included inaccurate calculations and work for determining the metacentric height of 3/4" or roll period of less than 2 seconds. Includes pictures of testing this.	Included accurate calculations and work for determining the metacentric height of 3/4" or roll period of less than 2 seconds. Includes quality pictures of testing this.

Total = ____/20

Boat Design and Construction

Criterion	2	3	4	5	6
Completed Product	No boat or an incomplete boat was brought to the event.	Boat required major modifications prior to the event. It had no resemblance to a Chesapeake Deadrise crab boat.	Boat required minor modifications prior to the event. It had little resemblance to a Chesapeake Deadrise crab boat.	Boat required limited modifications prior to the event. It had some resemblance to a Chesapeake Deadrise crab boat.	A completed boat was brought to the event and no modifications were required prior to the event. It had all characteristics resembling a Chesapeake Deadrise crab boat.
Paint	X	The boat was not painted or marked with a team name.	The boat was carelessly painted or the team name was not easily identifiable.	The boat was adequately painted and marked with an identifiable team name. The paint provided little enhancement the visual appeal of the boat.	The boat was neatly painted (no runs, etc.) and marked with an easily identifiable team name. The paint greatly enhanced the visual appeal of the boat.
Size Constraints	X	None of the following meet the required specifications : boat length, beam length, or hull.	Two of the following do not meet the required specifications : boat length, beam length, or hull.	One of the following does not meet the required specifications : boat length, beam length, or hull.	The boat meets all of the following specifications : beam does not exceed 40", length does not exceed 12", hull draft does not exceed 2" when empty.

Cabin, Load Line	X	The boat does not include a maximum load line and the cabin occupies more/less than 10% of the hull and is not 5" inches above the deck.	Two of the following do not meet the required specifications : a maximum load line 2" below the cabin edge measured mid-hull. Cabin occupies 10% of the hull and is 5" inches above the deck.	One of the following does not meet the required specifications : a maximum load line 2" below the cabin edge measured mid-hull. Cabin occupies 10% of the hull and is 5" inches above the deck.	The boat meets all of the following specifications : a maximum load line 2" below the cabin edge measured mid-hull. Cabin occupies 10% of the hull and is 5" inches above the deck.
Crab Basket Space	No free space is provided on the hull for the crab baskets.	X	At least 15% of the hull length is free of crab baskets.	X	At least 35% of the hull length is free of crab baskets.

Total = ____/30

Oral Report at Event

*Based on responses to judges questions at the event.

Criterion	1	2	3	4	5
Engineering Design Process (EDP)	Students failed to clearly explain how they went through any phases of the EDP to design, test, and troubleshoot their boat.	Students demonstrate confusion in explaining how they went through some of the EDP phases to design, test, and troubleshoot their boat.	Students provided vague explanations of how they went through some of the EDP to design, test, and troubleshoot their boat.	Students provided clear explanations of how they went through all phases of the EDP to design, test, and troubleshoot their boat.	Students provided very detailed explanations of how they went through all phases of the EDP to design, test, and troubleshoot their boat.
Application of Science and Math Concepts	Students failed to clearly explain how	Students demonstrate confusion in explaining	Students provided vague explanations	Students provided clear explanations	Students provided very detailed explanations of

	they applied any science or math concepts to design, test, or troubleshoot their boat.	how they applied science or math concepts to design, test, and troubleshoot their boat.	of how they applied some science or math concepts to design, test, and troubleshoot their boat.	of how they applied some science and math concepts to design, test, and troubleshoot their boat.	how they applied multiple science and math concepts to design, test, and troubleshoot their boat.
Presentation Skills	Students demonstrated very little if any knowledge of STEM/crabbing concepts to answer the judges' questions or used resources. Students rarely displayed an upright posture, made eye contact with the judges, and projected their voice.	Students demonstrated limited knowledge of STEM/crabbing concepts to answer the judges' questions or used resources sparingly. Sometimes , students displayed an upright posture, made eye contact with the judges, and projected their voice.	Students demonstrated average knowledge of STEM/crabbing concepts to answer the judges' questions while using no resources. At most times , students displayed an upright posture, made eye contact with the judges, and projected their voice.	Students demonstrated adequate knowledge of STEM/crabbing concepts to answer the judges' questions while using no resources. At all times , students displayed an upright posture, made eye contact with the judges, and projected their voice.	Students demonstrated exceptional knowledge of STEM/crabbing concepts to answer the judges' questions while using no resources. At all times , students displayed an upright posture, made eye contact with the judges, and projected their voice.

Total = ___/15

Performance Demonstration

Criterion	2	4	6	8	10
Boat Navigation	Boat could not navigate the entire course remotely.	Boat remotely navigated the entire course with help from team members on more than 2 occasions.	Boat remotely navigated the entire course with help from team members on 2 occasions.	Boat remotely navigated the entire course only with initial assistance from team members.	Boat remotely navigated the entire course with no assistance from team members.

Boat Maneuverability/ Steering	Poor/limited boat control, resulting in the vessel striking other objects or boats on 5 or more occasions.	Below average control, resulting in the vessel striking other objects or boats on 4-5 occasions.	Average control, resulting in the vessel striking other objects or boats on 2-3 occasions.	Above average control, resulting in the vessel striking other objects or boats on one occasion.	Exceptional control, never allowing the vessel to strike other objects or boats.
Basket Rate	9th or 10th best basket rate.	7th and 8th best basket rate.	5th and 6th best basket rate.	3rd and 4th best basket rate.	1st and 2nd best basket rate.
	1	2	3	4	5
Boat Integrity	Boat failed to complete the competition.	Boat failed to complete the competition still in one piece.	Boat completed the competition while incurring some significant damages.	Boat completed the competition in tact while incurring very minor damages.	Boat completed the competition in tact while incurring no significant damages.

Total = ____/35

TOTAL SCORES

Design/Written Report ____/20

Boat Design & Construction ____/30

Oral Report ____/15

Performance Demonstration ____/35

Grand Total ____/100

Awards

- Best design/written report
- Highest Overall Rubric Score
- Runner-up Overall Rubric Score
- Sportsmanship/Team Spirit Award