



cardboard
BOAT RACE
CHALLENGE 

2020 Teacher Information Package

Saskatoon Industry-Education Council

www.saskatooniec.ca



How to Get Involved

PRE-RACE PROCEDURE

1. Register students using the attached registration form and email completed form to Michelle Hardy at the Saskatoon Industry-Education Council (michelle@saskatooniec.ca)
2. Complete the Carboard Boat Race Lessons with students

WHAT TO BRING ON THE COMPETITION DAY

1. Swimsuit (**Students are required to wear a one-piece bathing suit or wear a t-shirt over a two-piece bathing suit**)
2. Towel
3. Flip-flops/sandals (for the pool deck.) **Street shoes are not permitted on the pool deck.**
4. Students must bring their design and prototype to the competition. These are required as part of the judging. Please emphasize that should a team forget these items they will receive a mark of "0" in this category.
5. Students and staff are to bring their own lunch to the competition.

PLEASE MAKE ARRANGEMENTS WITH YOUR DIVISION COORDINATOR FOR BUSING

SCHEDULE FOR THE DAY:

TIME	DESCRIPTION
9:15 am – 9:45 am	Arrival and Registration
9:45 am – 10:00 am	Announcement / Instructions
10:00 am – 11:30 am	Boat Construction
11:30 am – 12:30 pm	Lunch (BRING YOUR OWN)
12:30 pm – 1:00 pm	Move Boats from Gym to Pool
1:00 pm – 2:15 pm	Boat Races
2:15 pm – 2:30 pm	Awards Presentations
2:30 pm	Dismissal



Information Package

THE CHALLENGE

- After completing the unit of study, students will design, construct and race a boat, made of cardboard, across a swimming pool.
- Participating schools will be provided with the required materials on the day of the event to design and construct the cardboard boat.

OBJECTIVES

- Design and construct a boat with only the supplied materials in **1½ hours or less**
- The boat should float, carry weight and race across a pool

TEACHERS

- This challenge is open ended, problem solving in nature, and covers a broad-base of curricular outcomes. It involves:
 - Design, research & presentation
 - Water permeability
 - Friction and direction control
 - Adhesives and bonding
 - Principles of structure, strength, rigidity
 - Propulsion
 - Buoyancy and displacement
 - Teamwork and FUN

ELIGIBILITY

- Teams must be made up of four grade 8 students from the same school.
- Teacher/Advisors may **NOT** provide any advice to their students/teams.
- Judging will be based on: ***design construction, team work, cleanliness of working area and speed across the pool.***
- Judging will occur throughout the challenge. Judges will be independent members of the community.
- If your school wants, you may bring a school or club banner to cheer on your team! **(Mascots, cheerleaders, and enthusiastic friends and/or family are welcome!!)**
- Only the team members that are competing in the race heat may be on the pool deck. **All other students must** either be in the stands or in the holding area waiting for their race heat.
- Teams are required to dismantle their boat at the end of the competition and place their cardboard pieces in the recycling bins—instructions and directions will be provided on the day of the competition.

BUILDING MATERIALS AND SUPPLIES

Materials supplied by the Saskatoon Industry-Education Council:

1. **1½ pieces** of 4 x 8 feet sheets of ¼ inch laminated cardboard
 - a. **One sheet is 4 x 8 feet**
 - b. **One sheet is 4 x 4 feet**
2. One roll of packing tape
3. One roll of duct tape
4. Two exacto knives
5. Two pencils
6. One sheet of paper with specified team number

Materials supplied by each Team:

Students **MUST** bring the following items to the competition. These supplies will NOT be available.

1. Maximum of two (2) straight edges/rulers of any length or size or Maximum of two (2) tape measures (no speed squares or 90° rulers allowed).
2. Boat Design Sketch
3. Boat Prototype

*****No other tools or equipment may be used during the construction of the boat*****

RULES & REGULATIONS:

1. A design sketch and prototype of each team's boat **must** be made available to the judges during construction on the day of the event. Each team **must** keep a copy of the sketch to refer to when building their boat, as points will be awarded for sketch innovation and how closely their construction follows their sketch.
2. Each team must tape the laminated number on the left side of their boat.
3. No tools may be used other than those listed under *Tools & Materials*. Stencils or templates of any kind will not be permitted in the construction of the boats.
4. **No external advice allowed during the competition** (i.e. teachers, parents, advisors, etc.).
5. All cutting must be done on the floor, in the shop, and students must behave in an appropriate manner with all materials and supplies. Judges will deduct points if students are not responsible with materials and equipment such as exacto knives and rulers, etc.
6. In the speed event, at least one person must ride the boat across the pool.
7. In the Speed Event all teams must start on the pool deck, with their boats out of the water. Once the announcer begins the race, teams will then place their boats into the water.
8. Team members riding and propelling the boat must climb into/onto the boats. **No running starts permitted.**
9. During the *Speed Event* team members in/on the boat must be kneeling or sitting when propelling the boat toward the finish line (**lying down in the boat is not allowed**).

10. The *Speed Event* is completed by having one part of the boat touching or crossing the finish line. At least one competitor must ride in/on the boat across the entire length of the pool.
11. Any devices used to propel the boat during the *Speed Event* (other than arms/hands) must be constructed from the provided material. **Feet may not be used as a propelling device.**
12. In the *Speed Event* teams will race in heats against the clock and other teams—points will be awarded based on placement in each heat and fastest overall times.
13. Look over the judging sheet to determine your strategy for the race as the criteria used for marking is listed on the sheet.
14. Team members will be allowed to help stabilize the boat, but not enter the water, at the start of the race to allow the rider(s) to enter the boat. Team members may **NOT** push the boat to get it started.

POST-RACE:

- Evaluate the design and structure of your boat.
- Make recommendations for improving your boat.
- Begin design package prior to next year's event.



JUDGING CRITERIA

Awards will be presented to the overall top *three* point earning teams based on the following criteria:

A. DESIGN & CONSTRUCTION:

- Sketch innovation and design maximum 15 points
- Construction follows sketch maximum 10 points
- Construction quality maximum 15 points
- Teamwork and Organization maximum 10 points
- Safety and Cleanliness of Area maximum 5 points
- Visual Appeal maximum 5 points

Total maximum points for CONSTRUCTION: 60 points

B. SPEED (fastest time across the pool):

Heats: Placement in each heat will be awarded the following points:

1 st	10 points
2 nd	8 points
3 rd	7 points
4 th	6 points
*Did not finish	1 point

*If a boat sinks or students are not able to complete the race

C. BONUS SPEED POINTS (overall fastest time across the pool):

Top 10 teams will earn the following bonus points:

1 st	10 points
2 nd	9 points
3 rd	8 points
4 th	7 points
5 th	6 points
6 th	5 points
7 th	4 points
8 th	3 points
9 th	2 points
10 th	1 point

Total maximum points for SPEED: 20 points

TOTAL MAXIMUM COMPETITION MARKS: 80 points



Judging Guidelines for Design & Construction of Cardboard Boats

SKETCH (15 points)	
Has a sketch of some sort	+5
Has prototype of boat	+5
Sketch is tidy	+2
Prototype matches sketch	+3
No sketch	-5
No Prototype	-5
CONSTRUCTION FOLLOWS SKETCH (10 points)	
Construction resembles the sketch <ul style="list-style-type: none"> If students make alterations and can provide an explanation as to why the alterations were made the team should not be deducted any marks. 	+5
Explanation of design principles utilized <ul style="list-style-type: none"> Students have a written explanation, in point form, as to the design/construction of their boat based on design principles utilized 	+5
No explanation	-5
Deduct 1 point for each dimension off to a maximum of	-5
QUALITY OF CONSTRUCTION (15 points)	
Lines relatively straight and even	+5
Shape correct	+10
Deduct for each error	-1
TEAMWORK (10 points)	
Deduct -2 for each member standing around to a maximum of	-10
SAFETY & CLEANLINESS (5 points)	
Messy workspace	-1
Knives lying around	-1 per knife
Careless use of the knife	-2
VISUAL APPEAL (possible 5 points)	
Boat construction is neat and appealing	5