Name _____
Class Period_____

Boat Hull Design Project
(50 points)

The purpose of this assignment is to give the students a chance to build and race a foam boat. Students will be introduced to different hull designs and the reasons behind those designs. After an introduction to hull designs and background information about marine transportation students will be given class time to design and build their model boats.

Class time given to complete: Students will be given 3 class periods to design and build their boats. They will be able to use hot wire foam cutters and sand paper to shape the hulls out of builders foam. Students will be given a variety of materials to use for the construction of the boat and will be allowed to use all or portions of those materials. Before materials are distributed to the students, a sketch will be required showing the design of the boat they intend to build.

Two thirds of the world's surface is covered with water so it only makes sense that we discuss some of the ways people use it as a mode of transportation. Water has been a major mode of transportation for exploration, shipping purposes, and pleasure activities. There are a number of different types of boats and ships and each has its own purpose.

Christopher Columbus sailed to America over 500 years ago. When Lewis and Clark traveled across the United States they also used the waterways as a way to get from one place to another quickly. We still rely on water vehicles to get us into some places that are not accessible with roads or airplanes.

Today we use the oceans and rivers to haul products to and from the suppliers and stores. All of the cars that are produced in Japan are shipped here using huge cargo ships. Oil is also transported using ships. If you ever travel through the Columbia Gorge or along the Mississippi River you will see barges hauling grain, timber, and many other items that require a great deal of space. One barge can haul more cargo than many trains. In the city of Venice, Italy there are no asphalt roads. The streets are canals of water and people travel by boat from place to place.

Water skiing and Jet Skiing are ways we can enjoy the water for recreation. Boats are also used for fishing, camping (house boats), and just relaxing in the sun. Many people plan their vacations with boats and ships as the center part of the vacation. Cruise ships travel all over the world and take people to exotic beaches and countries that they have never visited before.

Water travel has been a major mode of transportation with the use of rafts, canoes, and ships. Many of the things that we enjoy are brought to us at some point with water transportation. We also use the water to get us around during fishing season and when we play in the sun.

Name _____

Class Period _____

Vocabulary:

Displacement Boats:

Planing Boats:

Buoyancy:

Hull:

Stern:

Bow:

Beam:

Port side:

Starboard side:

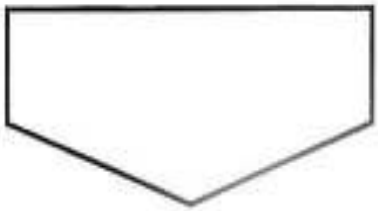
Name _____

Class Period _____

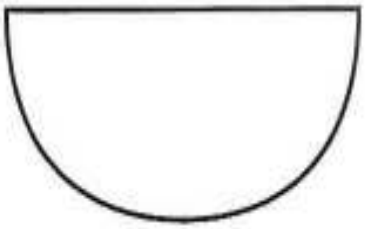
BOAT HULL SHAPES

A. _____

B. _____

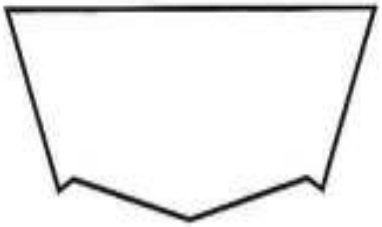


C. _____

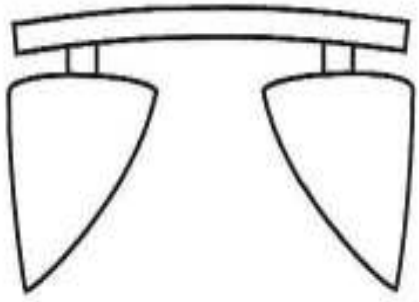


D. _____

E. _____



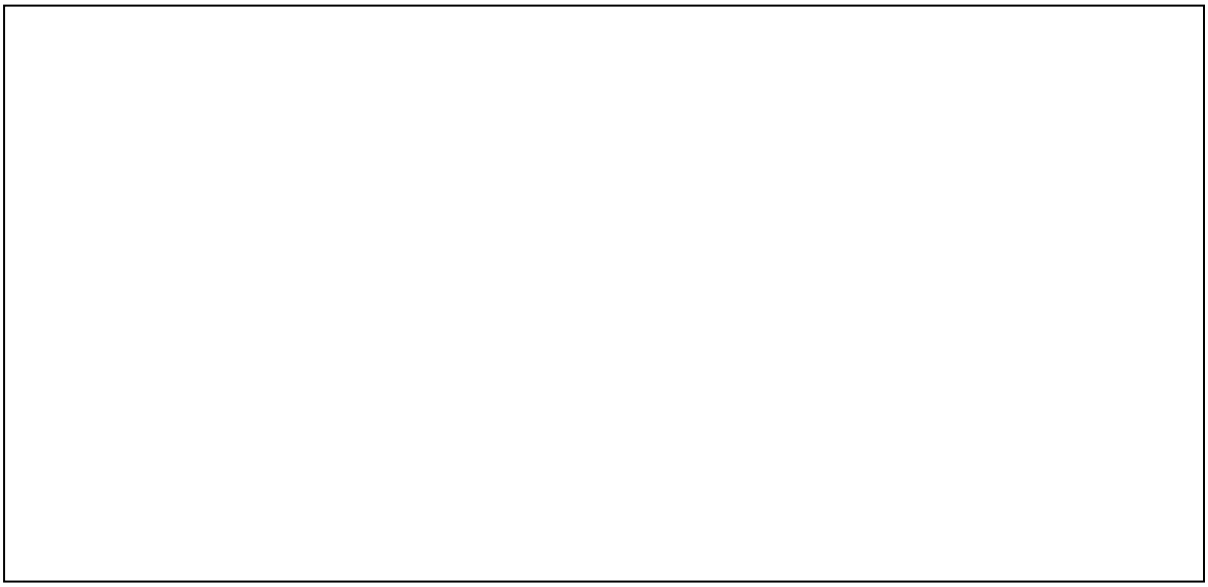
F. _____



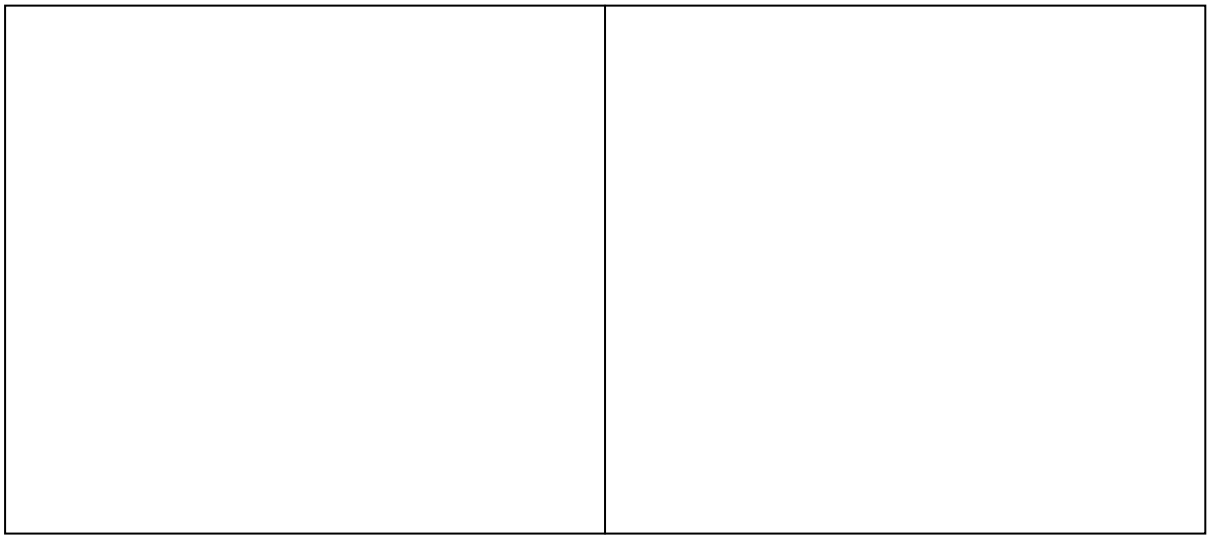
Name _____

Class Period _____

Boat Design Sheet



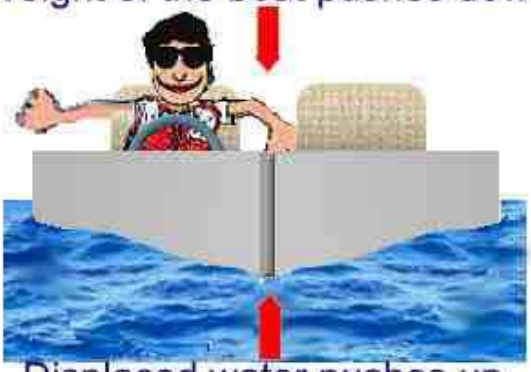
Side View



Bow View

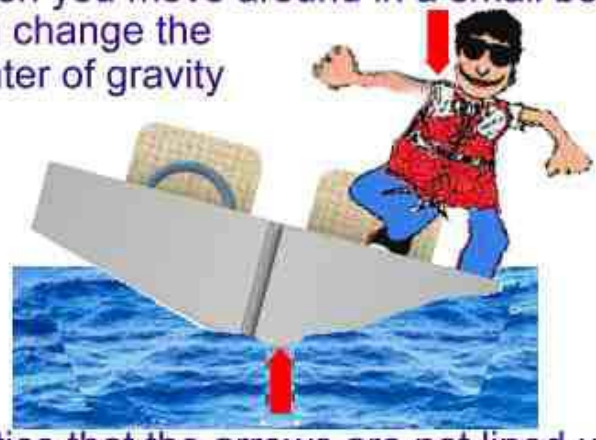
Stern View

Weight of the boat pushes down



Displaced water pushes up

When you move around in a small boat
you change the
center of gravity

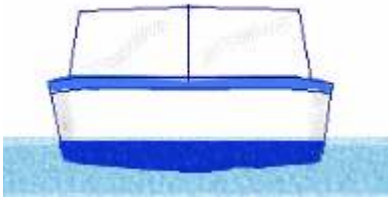
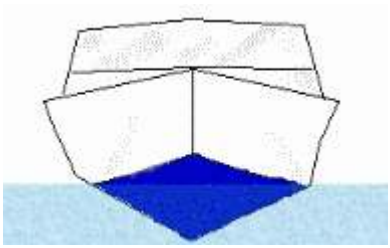
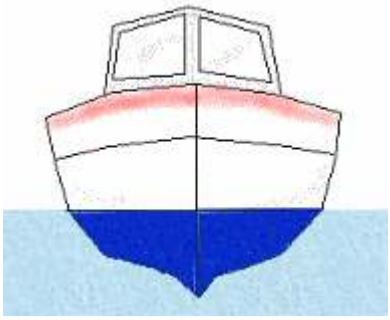
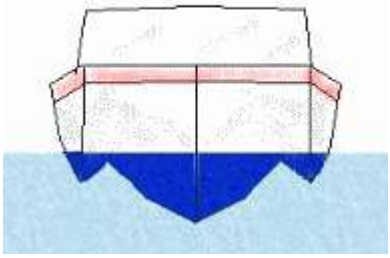


Notice that the arrows are not lined up

If the center of gravity (pushing down)
is lower than the center of bouyancy
(pushing up)

Guess what happens!

Types Of Hulls

	**Flat bottom boat** - These boats are generally less expensive to build and have a shallow draft (the part of the boat that's under the water). They can get up on plane easily but unless the water is very calm they tend to give a rough ride because of the flat bottom pounding on each wave. They also tend to be less stable and require careful balancing of cargo and crew. Examples of flat bottom boats might be Jon boats, small utility boats, and some high speed runabouts.
	**Vee bottom boat** - The vee bottom tends to have a sharper entry into the water which provides for a smoother ride in rough water. They do, however, require more power to achieve the same speed. Many runabouts use the vee-bottom design.
	**Round bottom boat** - These move easily through the water, especially at slow speeds. They do, however, tend to roll unless they are outfitted with a deep keel or stabilizers. Many trawlers, canoes and sailboats have round bottoms.
	**Multi-hull boat** - Catamarans, pontoon boats and some house boats use a multi-hull design. The wide stance provides greater stability. Each of the hulls may carry any of the above bottom designs.

Vocabulary:

Displacement Boats: Designed to ride easily in the water with minimal power. These boats are usually very stable and ride smoothly. Examples are sail boats, canoes, and cargo ships.

Planing Boats: Designed to rise to the top of the water at faster speeds. These boats can travel very fast but require more power to operate properly. Examples are water ski boats and speed boats.

Buoyancy: The tendency of an object to float.

Hull: The body of a boat or ship – not the sails or engines

Stern: The back of the boat.

Bow: The front of the boat.

Beam: The width of the boat from side to side at the widest part.

Port side: The left side of the boat.

Starboard side: The right side of the boat

Chine: The joint between the bottom and sides of some boats, especially those with flat or V-shaped bottoms.

BOAT HULL SHAPES

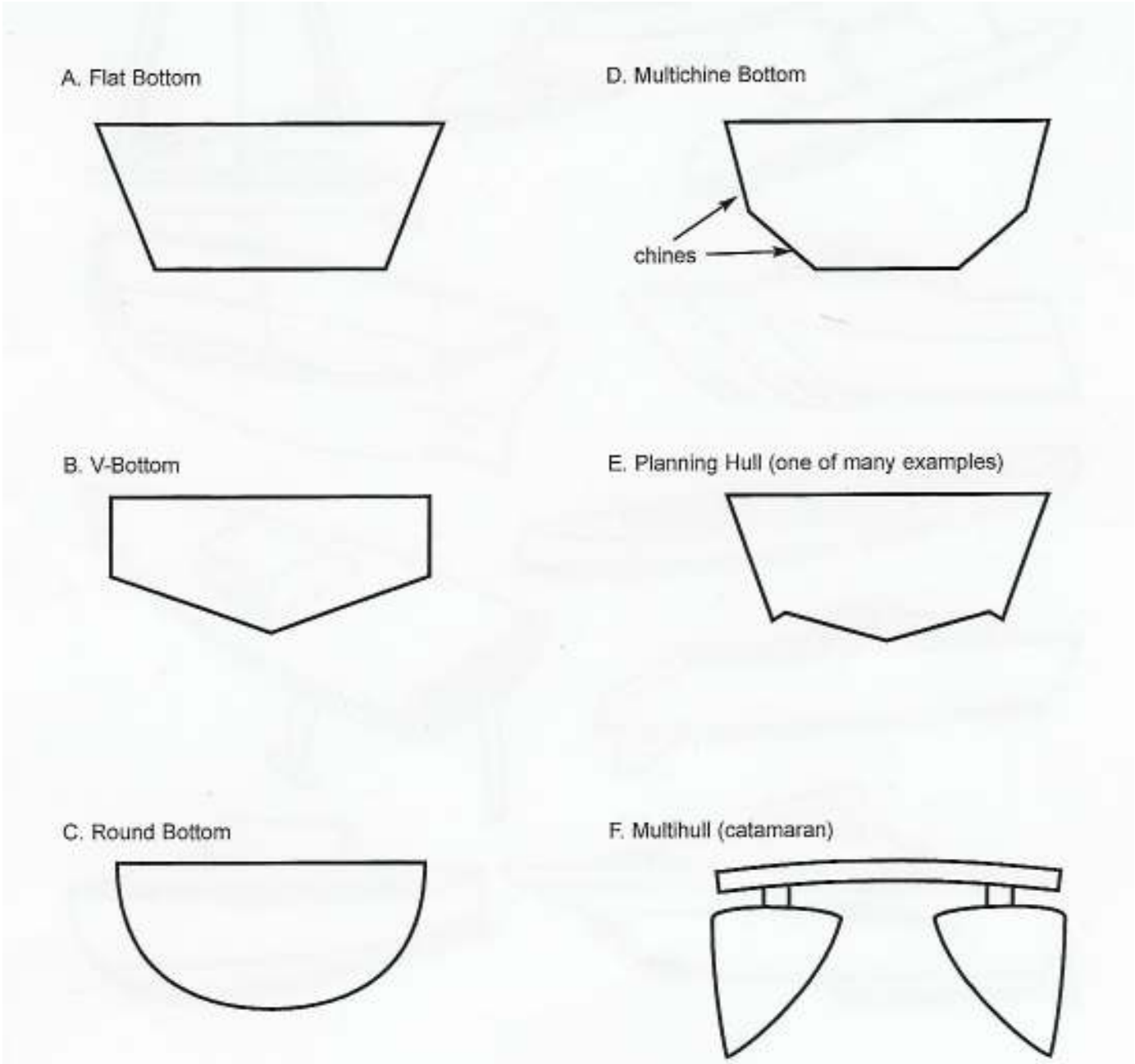


Figure 6 *Common hull bottom shapes*

NAME_____

PERIOD_____

Boat Unit Self Grade Sheet (50 Points)

Did you complete your boat?

NO- 0 points **YES-** 10 points

Did your boat work?

NO- 0 points **YES-** 10 points

Did you plan how you wanted the boat before you started?

1 2 3 4 5 6 7 8 9 10 POINTS

Did you try a creative design?

1 2 3 4 5 6 7 8 9 10 POINTS

Did you use your time wisely in class?

1 2 3 4 5 6 7 8 9 10 POINTS

TOTAL POINTS EARNED_____

What would you have done differently the next time?

Did you like this project?

What other projects would you like to do in this class?

Name _____

Class Period _____

Pop Quiz (48 Points)

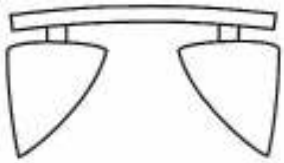
Label each of the boat hull designs:

1. _____

2. _____

3. _____

4. _____



Define the following terms:

5. Draft

6. Stern

7. Bow

8. Port

9. Starboard

10. Hull

11. Give an example of a displacement boat

12. Give an example of a planing boat