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duct tape boat races

SUGGESTIONS & CONSIDERATIONS

- Set design goal: Fun, Speed & Appearance

- Sketch out your design

- Build a scale model from manila paper

- Estimate materials orplan how to use what you have

- Plan out what construction technique will be used

- A box measuring 1' x 1' x 3' will float 187 lbs

- In theory: If it's big enough to hold you, it will float you

- Flat bottom, sit-to-paddle & canoe styles have been the most popular and successful designs in the past

- Long boats go fast, but are harder to turn

- Short boats (<8') are difficult to paddle straight

- Best Length: 8-12'

- Best Height: 18" (allows room to sit/kneel & still paddle over the edge)

- Best Width: 18"- 30" (max) for 2 or more people in a row
  Minimum 48" wide for 2 people side by side

- Kneeling is a "power" position but sitting is more comfortable
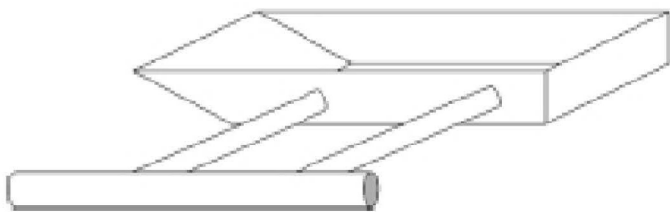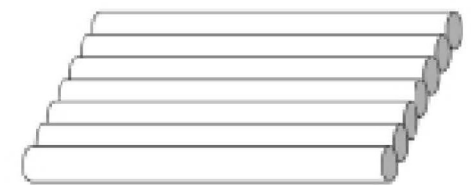
Basic boat styles

Simple
Box

Slanted
Box
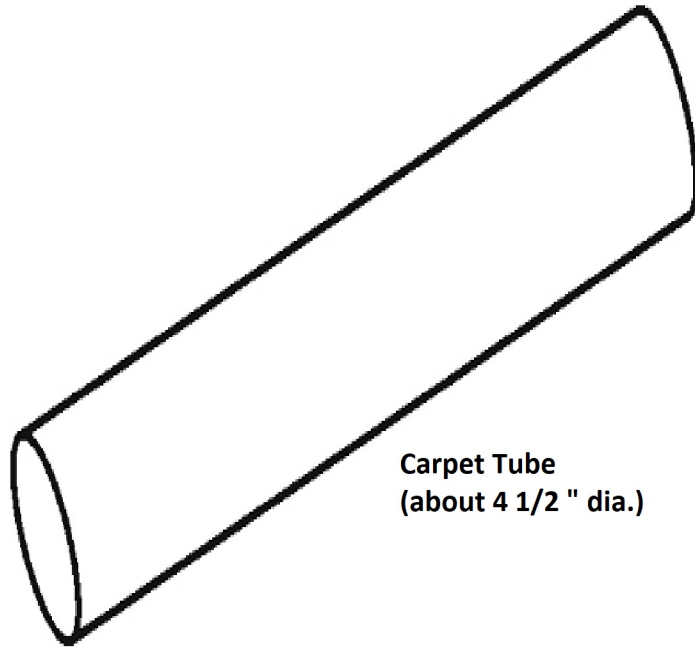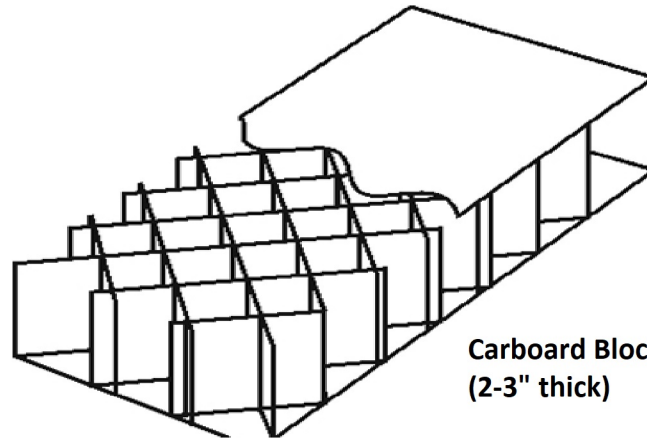
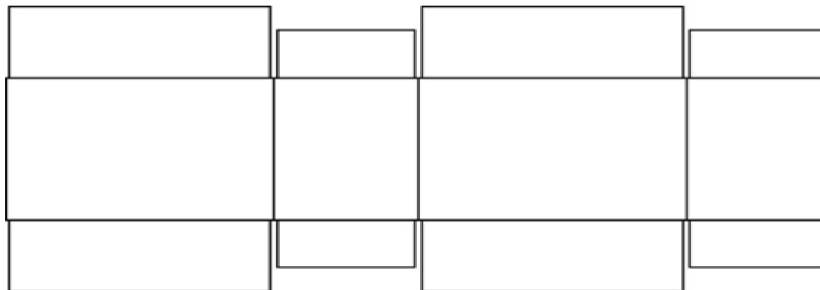V-Shaped
Bow

Outrigger
Design

Pontoon
Design

Raft
Design

CONSTRUCTION

Carpet Tube
(about 4 1/2 " dia.)

Carboard Block
(2-3" thick)

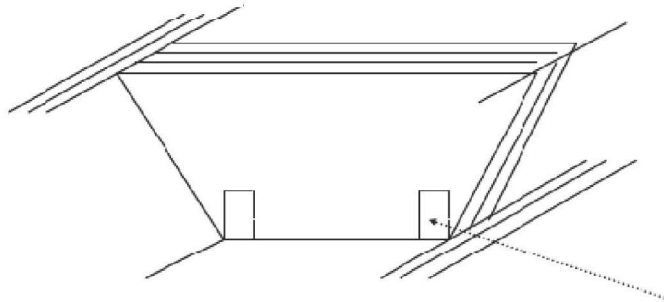Cardboard Box - cut
open

SUGGESTIONS

• Cover all edges and joints. Cardboard acts like a siphon

• Cardboard tubes make great frames. (Cut for joining & bending)

• Cardboard Hull: 1 or more layers, fasten & cover the seams. With 2 layers, overlap the seams & duct tape like crazy. Decorate with Latex paint (if desired).

• Reinforce the area where the crew will sit, kneel or stand

• Duct tape only non-painted surfaces (duct tape shrinks with painted)
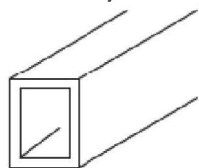
CONSTRUCTION

Multiple cardboard layers "adhered" together with duct tape on the sides strengthen *the hull*
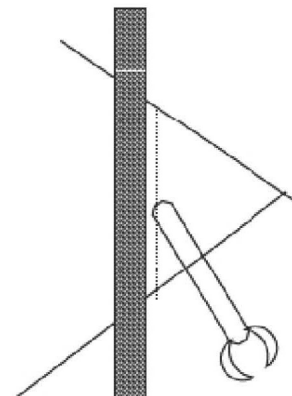
Multiple trapezoid-shaped pieces "adhered" together with duct tape to form a "*support block*"

A sheet of cardboard could be folded & "adhered" together with duct tape to form *tubes/beams*
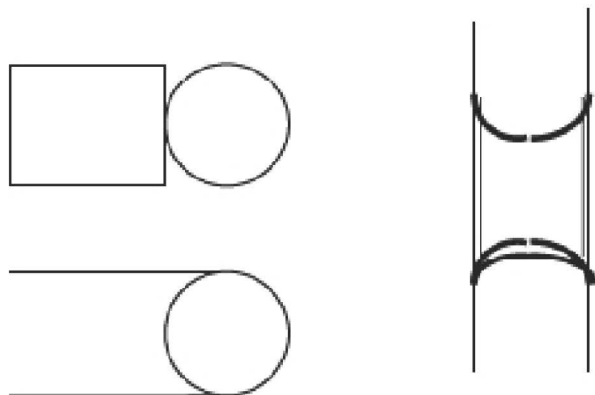
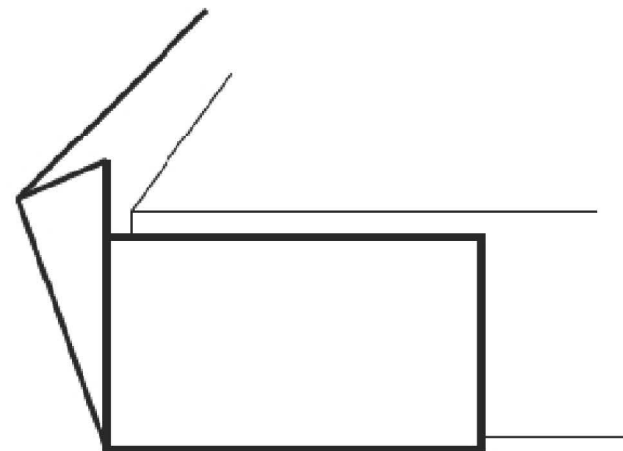Crease/Score a line for a nice

STRAIGHT FOLD

CONSTRUCTION

FUNduct RAISER.org
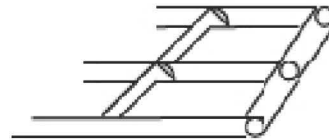duct tape boat races

TUBE CUTTING TEMPLATE

FOLD & OVERLAP CARDBOARD AROUND CORNERS

CONSTRUCTION

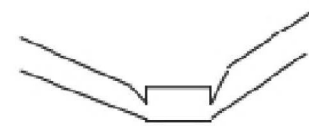FUNdUC+RAISER.org
duct tape boat races
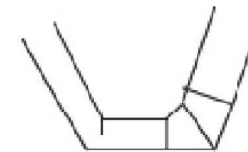
FRAMES

Solid Tube
Frame

Center/Cross
Beam
Frame

FRAME ANGLES

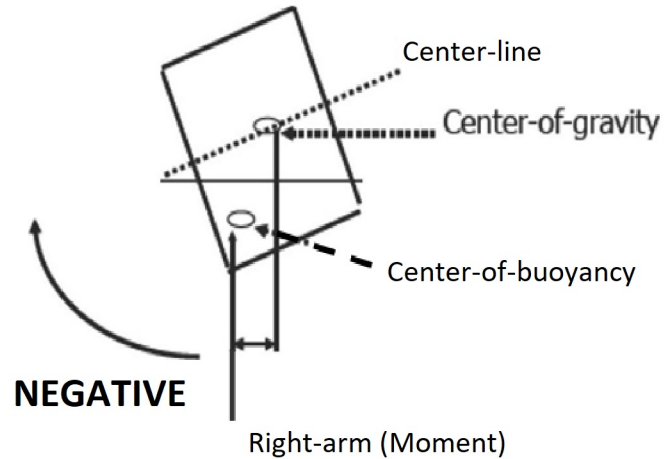V-Shaped Cuts

Multiple Cuts
for Sharper Angles

CONNECTING
TUBES

Cardboard
Wrapper for Tubes
End-to-End

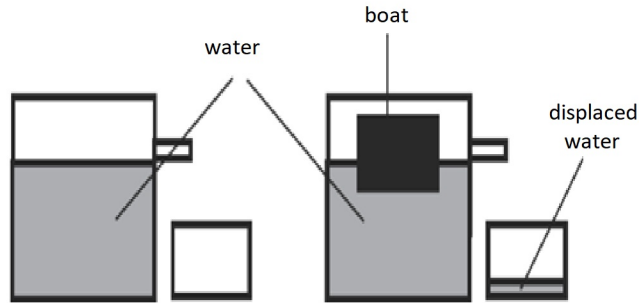Cardboard
Wrapper for Tubes
At Right-Angles

PHYSICS

WIDER IS STEADIER

Center-line

Center-of-gravity

Center-of-buoyancy

Right-arm (Moment)

POSITIVE

Center-line

Center-of-gravity

Center-of-buoyancy

NEGATIVE

Right-arm (Moment)

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HOW MUCH WILL YOU SINK?

water
boat
displaced water

displaced volume of water (V)

$$V = L \times W \times H$$
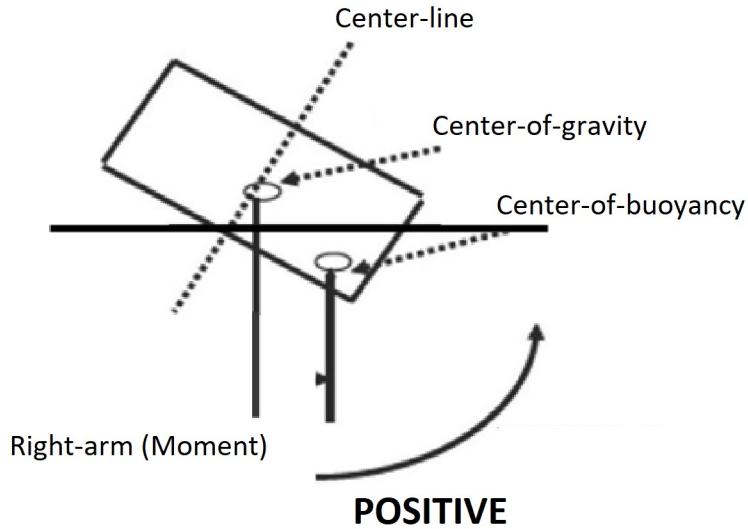
Weight of Water =
62.4 pounds/cubic-foot
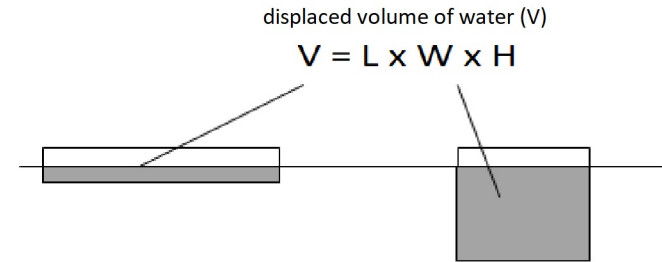
Water displaced (ft³) = weight-of-boat & people (lbs)
$$\overline{}$$
62.4 lbs/ft³-H₂O

Depth (ft) boat sinks _____

Example: Box boat, 3 ft x 6 ft tall (high)
       Boat volume = 3' x 6' x 1' = 18ft³
       Boat displacement = 18 ft³ x 62.4 lbs/ft³ = 1123.2 lbs
       Which equates to 93.6 lbs per inch of boat height