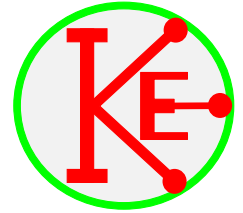


6 Rafts



EQUIPMENT

- Plastic tanks or bowls of water – 1 per group
- A4 paper – 6 per group plus spare sheets
- Foil (optional as an alternative to paper)
- M10 nuts - (10g masses) - 30+ per group
- Sellotape, masking tape, staplers, or other fasteners – provide the same for each group
- Waterproof coverings if you are working on wooden desks
- Towels to mop up spills
- Spring balance (Force meter) to 500g (5N)
- Tin loaded with sand to have a density of just over that of water (1000kg.m^{-3}) (Original tin had a volume of $\sim 380\text{cm}^3$ and a mass of $\sim 420\text{g}$)

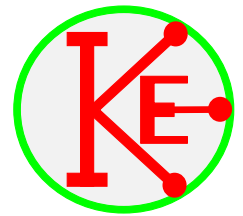
RISKS

Mop up water spills quickly and collect escaped marbles to avoid accidents.

SESSION

- 1). Discuss what objects will float on water or sink.
- 2). Show tin and discuss whether it will float or sink.
- 3). Hang tin from spring balance and note reading.
Gently lower tin into a bowl of water - show what happens to the reading on the spring balance and the level of water in the bowl.
- 4). Discuss with students that weight decreases when an object is placed in water because the water is displaced and provides an upwards force (upthrust) in an attempt to return to how it was.
Discuss that an object floats when it can displace its own weight of water.
Discuss that the water level in the bowl goes up as the tin is lowered into the water, showing water is displaced.
- 5). Show how to fold paper to make a container which floats - note corners are not cut.
Show it will float and support a few M10 nuts.
- 6). Discuss whether a large shallow raft or a narrow deep raft can float with the most weight.
- 7). Students to investigate - remind of 'fair tests' - and note results.

Rafts



NAME:

Equipment

To build your rafts you will need:-

6 sheets of A4 paper

scissors

Glue, Selotape, paper clips

Bowl of water

Weights

Cloth to mop up spills of water.

Construction

Use a single sheet of paper for each raft.

You can make the paper into a raft by bending up the sides and folding the corners.

Fasten the corners. Don't cut your raft or it will leak!!

What different shapes and sizes can you make by folding your pieces of paper in different ways?

Testing

RAFT 1

Draw a diagram of your raft in this space.

Float your raft on the water.

Gradually add weights to your raft.

How many weights did it take to sink the raft?

Why did this raft fail?

.....

RAFT 2

Draw a diagram of your raft in this space.

Float your raft on the water.

Gradually add weights to your raft.

How many weights did it take to sink the raft?

Why did this raft fail?

.....

RAFT 3

Draw a diagram of your raft in this space.

Float your raft on the water.

Gradually add weights to your raft.

How many weights did it take to sink the raft?

Why did this raft fail?

.....

RAFT 4

Draw a diagram of your raft in this space.

Float your raft on the water.

Gradually add weights to your raft.

How many weights did it take to sink the raft?

Why did this raft fail?

.....

Which was your best design for a raft?

How much weight did it support?

How did you ensure that each raft had a fair test?

.....

.....

What happens to the weight of an object when it is put into water?

.....

When does an object float?

.....