



## Isambard Kingdom Brunel

### LINKED CHALLENGE

Construct a boat that will carry an object without sinking

### ACTIVITY OVERVIEW

Two groups with two different sets of equipment (see resources list).

Children to work to construct a boat that will float a certain distance (when pushed) without sinking. This must be done whilst carrying a number of marbles. The number of marbles should be increased for each test to see how strong the vessel is.

Activity leader to set initial challenge for children and let them explore the equipment. Children reminded they can decide to ask for a 'top tip' as a group if they find the challenge difficult. Activity leader to then determine how much of a pointer the group needs to get on track.

### RESOURCES

#### Group 1

Lollipop sticks  
Cotton reels

#### Group 2

Plastic bottles  
Yoghurt pots

#### General resources

Sticky tape	Marbles
String	Tank/large plastic guttering
Card	
Scissors	

### KEY FACTS/SCIENCE

Brunel's boat was made from iron and driven by propellers. The most important challenge of all was to ensure this heavy vessel would float.

Whether an object sinks or floats depends on the gravitational (downwards) force and the buoyancy (upwards force – also called upthrust). When a boat enters the water, it pushes aside (displaces) a volume of water. The buoyancy created is equal to the weight of this displaced water. The boat's volume (and weight) depends on the boat's material and the air that is inside it. For a boat to float, the buoyancy pushing up must be equal to or greater than the gravitational force pulling it down. So, if the weight of water displaced is equal to or greater than the weight of the boat, the boat will float.

### QUESTIONS/FURTHER LEARNING

- Which vessel worked best and why do you think it did?
- Would changing some of the boat materials/string affect how far the vessel could travel or how many marbles it could carry?