Science - Year 5

Forces – Block 5F

May the Forces Be With You

Session 6

Resource pack

Guidance questions for boat investigations

Shape of hull investigation

- *What are your variables?*
- *What needs to stay constant to ensure the push and journey of each boat is the same?*
- *How many times will you test each boat?*
- *What equipment will you use?*
- *How will you record the speed?*
- *How will you record your results?*
- *What will you look for in your results to make your recommendations?*
- *What key pieces of information need to be included in your text message?*
- *Are there any improvements to your investigation that might have made the results more accurate?*
- *What other things could you investigate about boats and water resistance?*

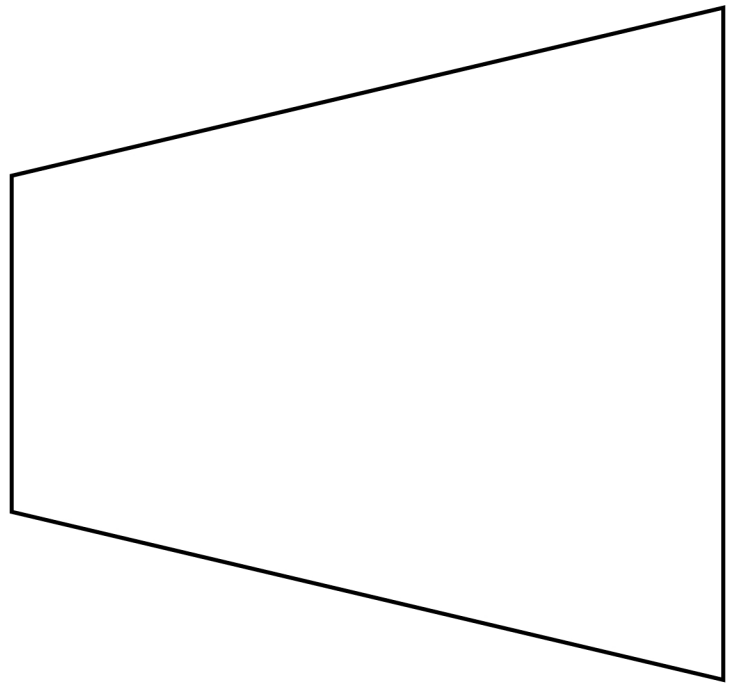
Salty water vs fresh water investigation

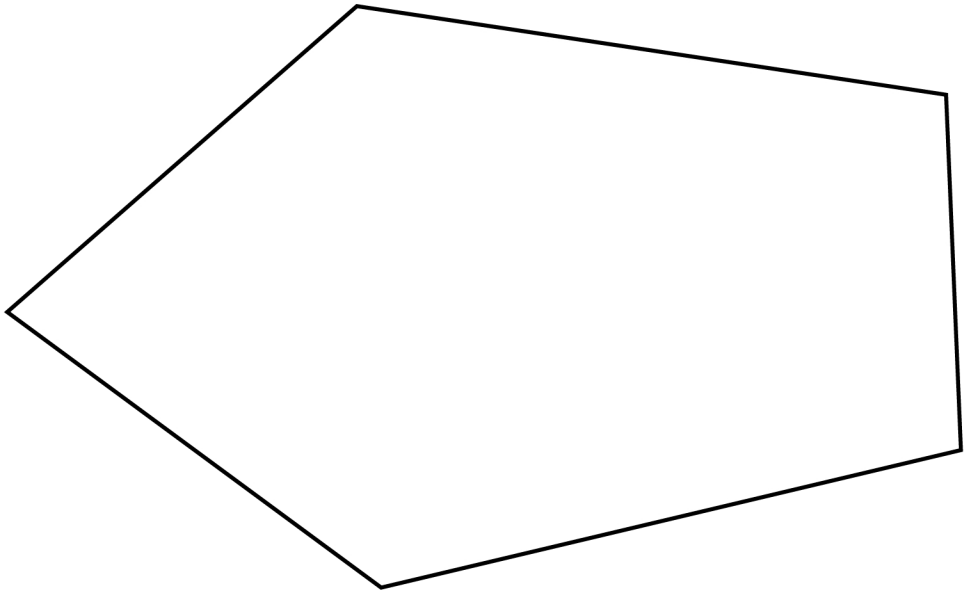
- *What are your variables?*
- *What needs to stay constant to ensure the test is fair?*
- *How will you test each type of water?*
- *What equipment will you use?*
- *How will you record the weight of the cargo?*
- *How will you record your results?*
- *What will you look for in your results to make your recommendations?*
- *What key pieces of information need to be included in your text message?*
- *Are there any improvements to your investigation that might have made the results more accurate?*
- *What other things could you investigate about boats and upthrust?*

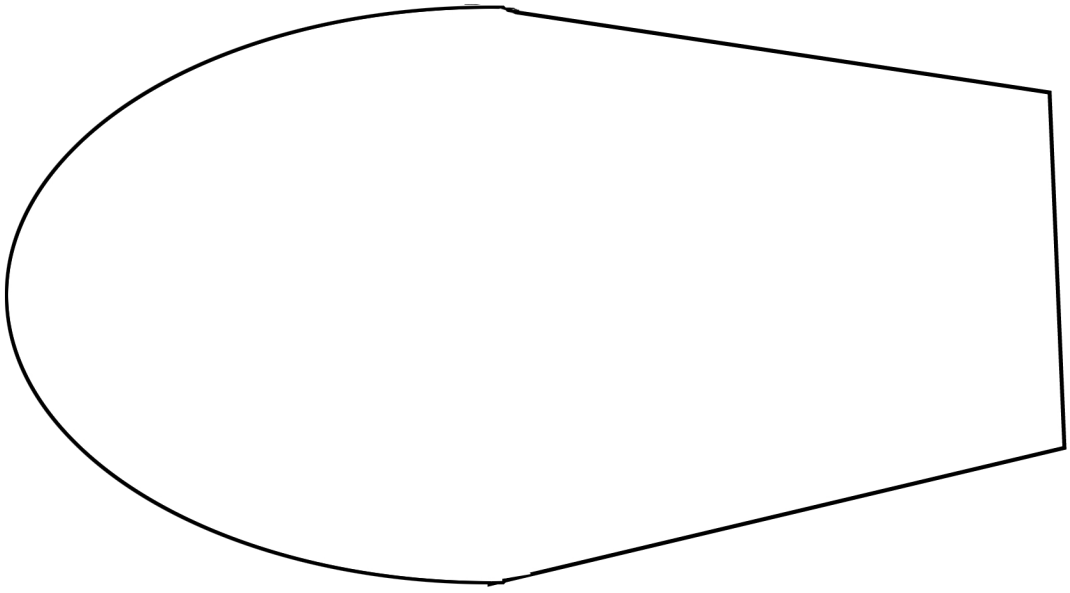
Equipment for boat investigations (see guidance)

Have available a range of tin foil and a print off of the three possible boat shapes - ask chn to hypothesise which shape and why. Encourage chn to experiment in small gps with a range of different shaped boats that they have created, testing them across a tray of water using a fan.

Boat/ship shapes







Making boat shapes from tin foil – sample

Sample results tables (blank and complete) for boat investigations

BOAT INVESTIGATION	Enquiry question/s:			
Variables we kept the same:			Variable/s changed:	
	Test one	Test two	Test three	Overall result
Variable change 1 ***BOAT SHAPE***				
Variable change 2 ***WATER TYPE***	***FRESH WATER***		***SALTY WATER***	
Number of ____ _____ held				
Overall recommendations	BOAT SHAPE:		WATER TYPE:	
Scientific rationale				
Possible improvements to our investigation				
What else could we have investigated?				

BOAT INVESTIGATION	Enquiry question/s: *Does a boat experience more or less upthrust in salty water?* *Which general shape of boat experiences the least amount of water resistance?*			
Variables we kept the same: *Blowing source, water way, type and weight of material of boat, weights*			Variable/s changed: *Shape of boat, type of water*	
	Test one	Test two	Test three	Overall result
Variable change 1 ***BOAT SHAPE***				
Flat front	*8.5sec*	*9.3sec*	*9.6sec*	*9.3sec*
Triangular front	*5.6sec*	*5.8sec*	*4.9sec*	*5.6sec*
Curved front	*6.0sec*	*6.5sec*	*6.1sec*	*6.1sec*
Variable change 2 ***WATER TYPE***	***FRESH WATER***		***SALTY WATER***	
Number of 1p coins held	*22*		*23*	
Overall recommendations	BOAT SHAPE: *Triangular front*		WATER TYPE: *Salty*	
Scientific rationale	*The water moves around this shape of boat with the smallest amount of resistance because it allows the water to flow more. It bashes less against the water as it moves through it, decreasing the water resistance*		*The salt adds molecules to the water and so there is a greater density, creating more upthrust. Boats would have greater buoyancy.*	
Possible improvements to our investigation *Make boats that were more robust*				
What else could we have investigated? *How much weight each shape of boat could carry* *Different shapes of hull (part under the water)* *Bubbly water or temperature of water*				