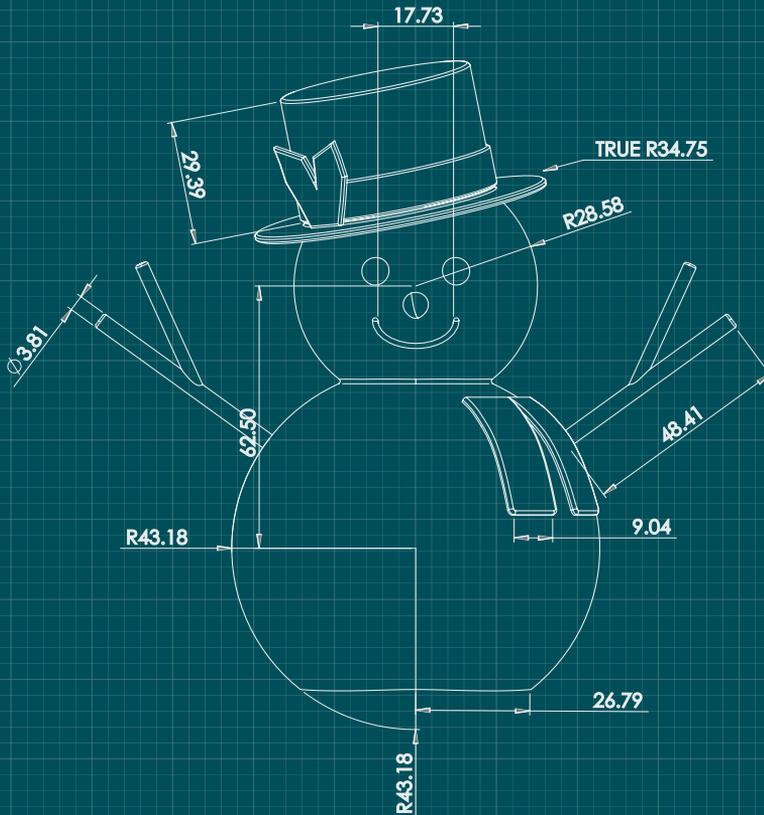


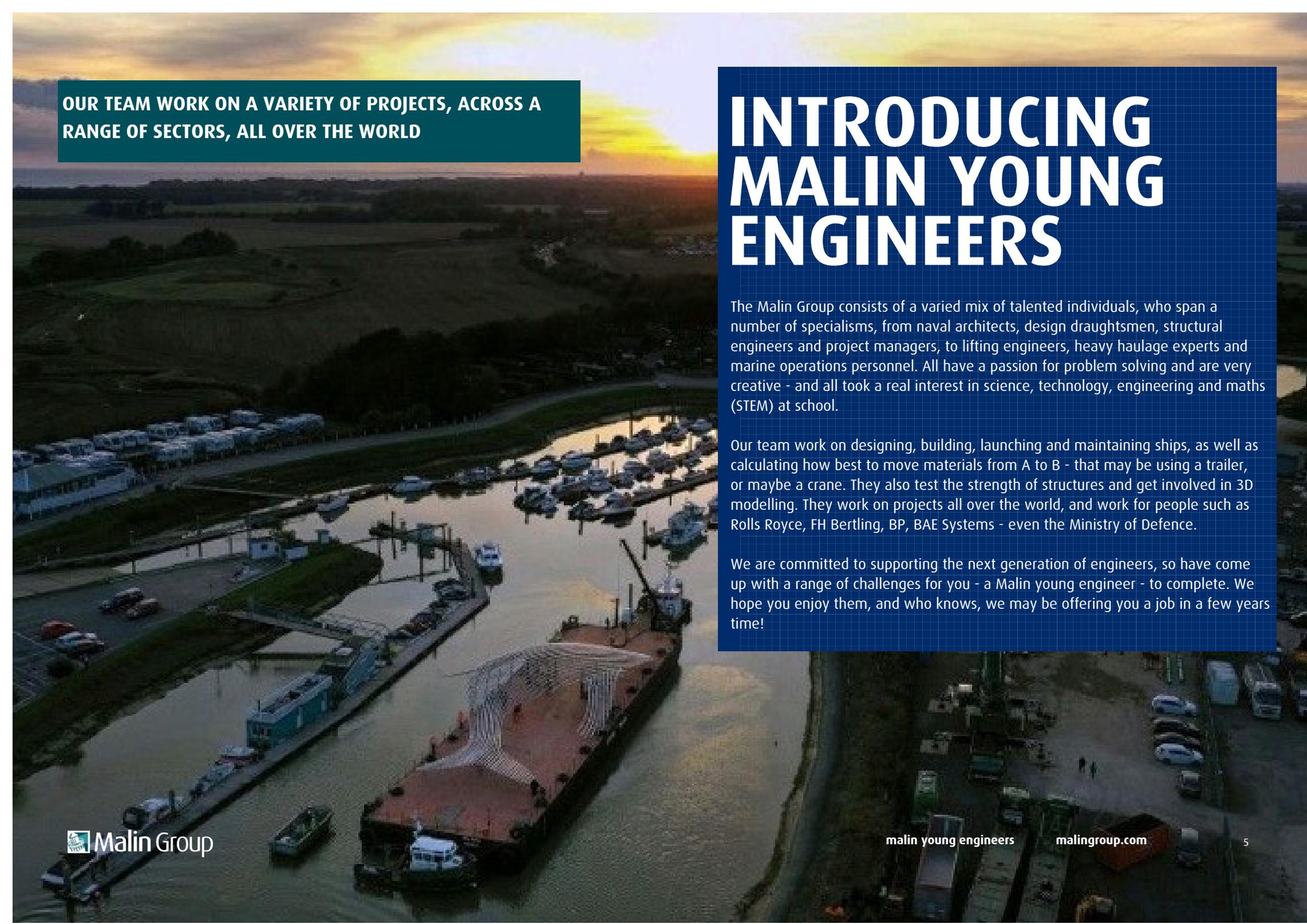
MALIN YOUNG ENGINEERS: EDITION 6





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OUR TEAM WORK ON A VARIETY OF PROJECTS, ACROSS A RANGE OF SECTORS, ALL OVER THE WORLD

INTRODUCING MALIN YOUNG ENGINEERS

The Malin Group consists of a varied mix of talented individuals, who span a number of specialisms, from naval architects, design draughtsmen, structural engineers and project managers, to lifting engineers, heavy haulage experts and marine operations personnel. All have a passion for problem solving and are very creative - and all took a real interest in science, technology, engineering and maths (STEM) at school.

Our team work on designing, building, launching and maintaining ships, as well as calculating how best to move materials from A to B - that may be using a trailer, or maybe a crane. They also test the strength of structures and get involved in 3D modelling. They work on projects all over the world, and work for people such as Rolls Royce, FH Bertling, BP, BAE Systems - even the Ministry of Defence.

We are committed to supporting the next generation of engineers, so have come up with a range of challenges for you - a Malin young engineer - to complete. We hope you enjoy them, and who knows, we may be offering you a job in a few years time!

CHALLENGE ONE: FESTIVE FLOATING

DENSITY AND BUOYANCY

For this challenge you are going to learn about two key concepts in marine engineering, density and buoyancy.

If you are involved in designing or launching a vessel, you will need to understand these concepts to ensure your structure remains on top, not below the water!

DENSITY AND BUOYANCY

Density relates to the ratio of one quantity, mass (kilograms, tonnes etc) to another, volume (metres cubed/ m^3), whilst buoyancy is the ability of an object to stay afloat in fluid. The buoyancy force is the upward force that acts on a submerged object, against gravity. So, if you have a vessel in the water, the water exerts an upward force that acts in a direction opposite to the vessel's weight. The force is more or less depending on what volume of the vessel, or object is underwater - in other words, the volume of the object that is under water, will displace a weight of water and this equals the buoyancy force.

THE CHALLENGE

You are going to predict if a selection of common Christmas items float or sink. Try to find a candy cane, Christmas bauble, Christmas bow, and a few other small festive items to place in a bowl of water.

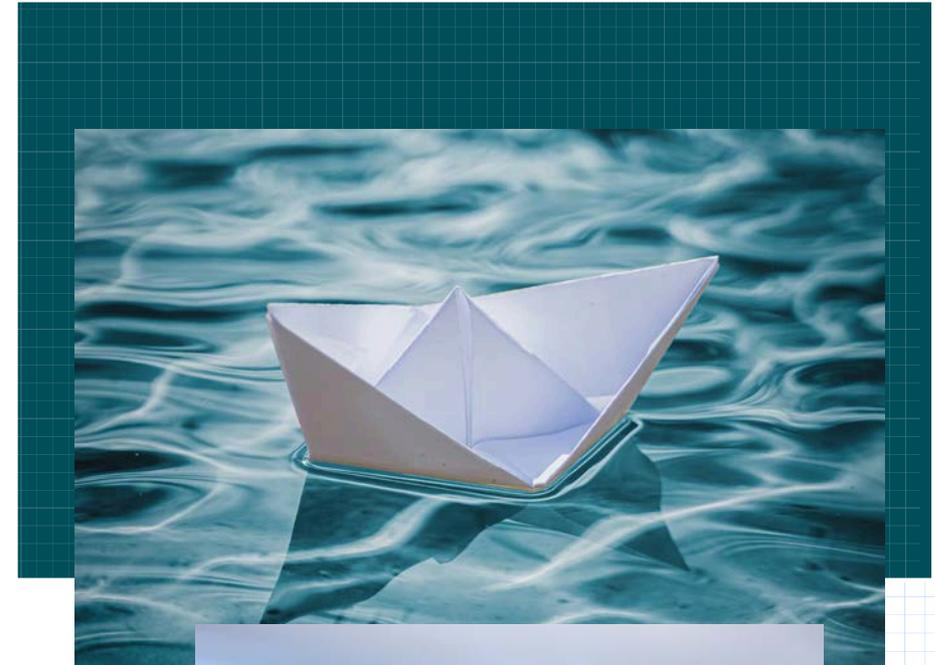
Before you place each item in the bowl, think about the object's density and whether this is more or less than the water it is moving. Note if you are right and wrong in each case. Remember - you are thinking about the volume of the object that will be under the water but also the comparison of the density of water compared to the density of the object.

TOP TIP

Think about trying warm and cold water in your bowl (have an adult there to make sure it is not too hot!). Warm water is less dense than cold - so will that impact on items floating?

BONUS QUESTION

What is the largest ship in the world? And as it is constructed of steel, how does it float?



CHALLENGE TWO: SCRUMMY STRUCTURES

CREATING A HOME THAT IS STRUCTURALLY SOUND

For this challenge you are going to learn about structures and how different shapes are more sound than others.

MATERIALS (AND SHAPES) MATTER

When engineers work to design a structure, they need to consider what it will be used for, and then design it in such a way that it withstands a number of factors. The structural soundness of a building or of a structure is the ability of this building or structure to resist the loads it is designed for, or it is exposed to. This involves not only the shape of the structure, but also how it is made - for example what materials are used and how they are secured together? Will you use steel or wood? A flat or triangular roof?

THE CHALLENGE

Use biscuits to design and create a gingerbread house that you then test for soundness. You can either consider changing the shape of your different houses or the materials you use to build them. Try different biscuits and icing or chocolate to stick? Or maybe a tent shaped building, or a little square hut?

Once they are set, try and lift each structure - does it stay intact? What if you roll a marble into it? Can you rank the houses from weakest to strongest?

TOP TIP

Think about the shapes you see around you when designing your house, for example, what types of shapes are often used in bridges to ensure they can withstand high winds and heavy traffic?

BONUS QUESTION

Which popular fairytale made gingerbread houses popular in the 19th century?



CHALLENGE THREE: ELF OFF THE SHELF

PLANNING A LIFT

For this challenge you are going to learn about how you may plan a lifting operation for an object, or piece of cargo - in this case your elf!

PLAN AHEAD

Heavy lift projects occur in response to the need to move an item or piece of cargo from one location to another. In carrying this out, you need to consider the size, weight and centre of gravity (CoG) of the item being moved, what conditions it is being moved in, and from where to where. The centre of gravity is the place where the weight is evenly dispersed and all sides are in balance, for example, the middle of a seesaw. Factors like weather play a part, as do tides, road routes, bridges... to name but a few. You need to consider the item being moved and the best route to then plan your heavy lift operation in advance.

THE CHALLENGE

Design and successfully carry out the lift of your poor elf, who has fallen off of their shelf. You may consider using something you already have - for example a toy crane, or building a make-shift creation with things you find around the house - maybe candy canes or string?

The lift must safely carry your elf back to their position on the shelf and consider the safest, not quickest route in doing so.

TOP TIP

Think about the height of the shelf and weight of the elf to decide the best way to carry out the lift.

BONUS QUESTION

What impact may it have if you used a different type of cargo?



CHALLENGE FOUR: GIVING BACK

YOUR IMPACT MATTERS

For this challenge you are going to learn about what impact your designs and actions have on the wider environment.

A WIDER DESIGN

When engineers design solutions to a challenge, they need to consider not only what the project has to deliver but also what impact their actions may have - and how they can work to offset any damage. This type of responsible engineering is required to tackle climate change. Examples include creating additional gardens when new buildings are created, or planting trees to offset the carbon footprint of shipping operations.

THE CHALLENGE

Design and create a sponge Christmas tree!

Cut a sponge to create a Christmas tree shape and then soak in water. Add grass seeds and pat into the sponge using a water bottle to spray again. Water every day using the spray bottle - then watch your grass tree grow and trim.

TOP TIP

Keep your sponge on a tray so that any additional water remains and can be soaked up as needed.

BONUS QUESTION

What percentage of plant life is found in the sea?

GOOD LUCK AND GET ENGINEERING...



WORKING WITH US

THE MALIN GROUP OFFERS YOU AN EXCITING RANGE OF EMPLOYMENT OPPORTUNITIES, FOR THE FUTURE, SPANNING A VARIETY OF SPECIALITIES.

With the Malin Group, you are not just joining a team, you're becoming part of a family. Our headquarters, based in the South Rotunda, Glasgow, reflect our group and culture - heritage teamed with innovation and creativity. Inside this historic building, classic features are teamed with modern facilities for our staff to enjoy - including pool table, ping pong, communal lounge area with fresh fruit and snacks, PS4 and a climbing wall. Our conference room also allows a 360 view of the city centre. We have regular social events, including First Friday Drinks, client football matches, and an Annual Ceilidh plus we have a few office dogs on occasion, which is always a nice addition!



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