



Thinking like an Engineer



This resource has been provided courtesy of Bohunt School, Liphook Hampshire, and was prepared while the school was involved in the 'Thinking like an Engineer' project 2014-2016. Please acknowledge the school if you use this material

Website: <http://www.bohunt.hants.sch.uk/>

Global STEM

Name: _____

Class: _____

Company Name: _____

(Below draw your company logo)



SONY

SIEMENS

dyson

AIRBUS
GROUP



NOKIA
Connecting People



SEAT



PEUGEOT



Microsoft



Do you know what country the companies above are from? Write your answers below.

- Samsung
- Dyson
- Nokia
- Apple
- Peugeot
- Microsoft
- Siemens
- Airbus Group
- GSK – GlaxoSmithKline
- Seat
- Lenovo
- Delonghi
- Ikea
- JCB
- Rolls Royce
- Dell

Work complete? ✓ ✗
Teacher initials _____

Brief

You are going to design and market a product that can be sold internationally. It can be marketed in Europe or globally

In your groups you will need to assign tasks to each member to ensure all tasks are complete and you are using people's skills to your advantage. It is up to you to decide who does what and when. You will be assessed on various aspects of the topic.

You also need to use your foreign language skills as your product needs to be marketed in both English and a language of your choice (remember your teacher is a languages teacher, use this!). Which part is in a foreign language is up to you.

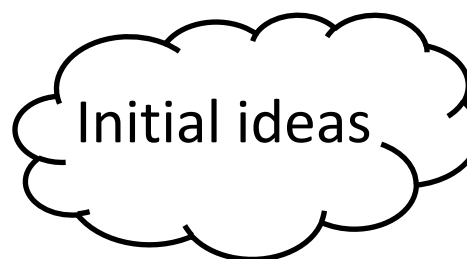
What you need to produce by the end of the topic:

- Design brief
- Initial ideas
- Final idea
- Prototype
- Packaging
- Marketing campaign including a promotional video (1 minute long)
- Dragon's Den style pitch

Work complete? ✓ ✗
Teacher initials _____



Around the cloud below write your initial ideas for products or services you could produce and market.



Work complete? ✓ ✗
Teacher initials _____

Market Research

In the space below present the results to your market research.

Work complete? ✓ ✗
Teacher initials _____

Design brief



When creating a design brief there are certain factors that you need to consider.

Key Features to be Considered	Your answers
Function <ul style="list-style-type: none"> • Where will the product be used? • What will my product be used for? 	
Performance <ul style="list-style-type: none"> • How might the product be used? 	
Purpose Market <ul style="list-style-type: none"> • Who might use the product? • Is there competition with a similar product? 	
Style <ul style="list-style-type: none"> • What will the end product look like? • Will the product appeal to the target market? 	
Cultural considerations <ul style="list-style-type: none"> • Are there any considerations you need to make with your target audience? • Are there any language issues you may face, think about brands that have had to change their names in different countries? 	
Cost <ul style="list-style-type: none"> • What will each item cost to produce? • What is the final cost likely to be? • Will your target audience and country be able to afford it? 	

Work complete? ✓ ✗

Teacher initials _____

Cultural Research



You need to research the culture of the country you are aiming your product at to avoid any issues. Remember you don't want to offend anyone, or be in competition with a product that already exists. In the space below fill in any research you have done and the information you have gathered.

Work complete? ✓ ✗
Teacher initials _____



Final idea

On the next few pages you need to detail your final idea. This can include detailed, annotated diagrams of the product, details of the packaging, language translations and plans for your video and pitch.

Work complete? ✓ ✗
Teacher initials _____

Final idea

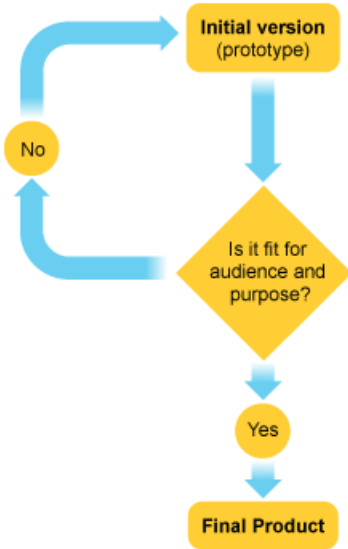
Work complete? ✓ ✗
Teacher initials _____

Final idea



Prototype

In the space below stick a photo of your prototype (if applicable). Remember you do not need to make a final product. A **prototype** is an initial version of a product. The prototype is **tested** to make sure it is fit for the audience and purpose. If there are any errors or problems, the prototype is improved and tested again. This goes on until the product is considered to be fully functional and suitable.



Remember that you need to test your prototype and evaluate it. You need to include details below of the improvements you are going to make based on the tests or market research you have done.



Packaging

In the space below include diagrams or photos of your packaging. Annotate the pictures with your ideas and why you made your choices in materials, colours, wording etc. Remember there needs to be some translation in your packaging into the language of the country you have chosen.

Work complete? ✓ ✗
Teacher initials _____



Marketing campaign

In the space below include detail of your marketing campaign. You can include photos of your posters and your ideas for your 1 minute video. Remember to include aspects of your target country, including language. Ensure that you include detail about your choices and any improvements you have made.

Ideally your product or service needs to be recognisable in whichever country it is in. This can be through the name, logo or colours used.

Work complete? ✓ ✗
Teacher initials _____



Dragons' Den Pitch



In the space below include details of your Dragons Den Style Pitch. You will have 3 minutes to pitch your product or idea to the rest of the class and they will vote whether they are “In” or “Out”. You need to be able to clearly explain what your product is for and who it is aimed at. You need to explain why you chose the country you did and how you have targeted your product at that country.

You may want to include typical questions your classmates and teacher may ask so you can prepare your answers below.

Work complete? ✓ ✗
Teacher initials _____



Evaluation



In the space below you need to detail the improvements and adaptations you have made throughout the project. Remember to be detailed. Explain what the problem was, why it needed improving and how you made the improvement.

E.g. *Our original design was however when we did our cultural research we discovered that the colour we had chosen for our logo was unlucky in that country, so we changed the colour to a luckier one which was*

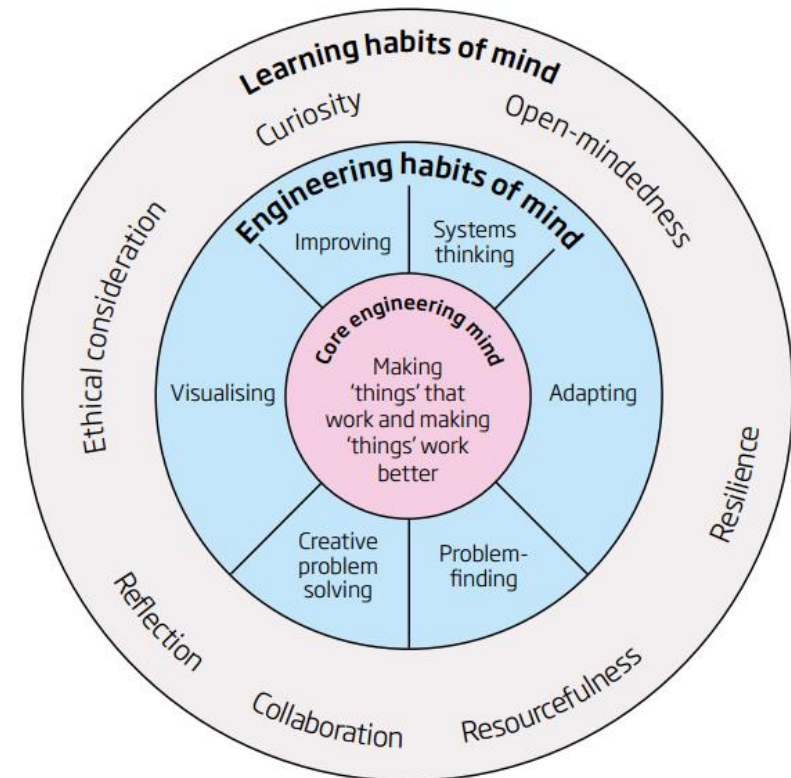
Work complete? ✓ ✗
Teacher initials _____

Engineering Habits of Mind

In STEM lessons we want you to become like a little engineer! There are some key ways that engineers think in order to

“make things that work”
and
“make things work better”

On the next slide are 6 of these ways explained





What are you going to make? Can you picture it in your head? What does the end product look like?

Visualising

Be reflective. How could your project be better? Talk to your peers about how you could've improved your project.

Improving



How are you going to achieve your end goals? Work backwards and decide what steps you need to make

Systems thinking



Engineering Habits of Mind

Creative Problem solving

Think outside the box. Find creative ways to solve your problem? Can you make it more energy efficient or cost effective?



Problem finding



Find and highlight problems in your work. Why is there a problem? What can you do about it?

Adapting

Have you made changes to your project following advice from the teacher/peers/self reflection



Throughout this topic you will see the symbols that related to an “engineering habit of mind”.



You need to log evidence of what you have done on your “EHoM” sheet that your teacher will give you, detailing how you have used the EHoM.

Global STEM

LO: Be able to design a product to be marketed globally

Starter:

Look at the images of the STEM related companies. Do you know what country they are from?

Fill in the countries in your booklet.



SAMSUNG

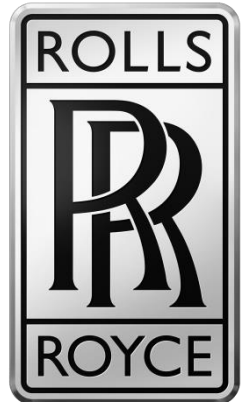
SONY

SIEMENS



AIRBUS
GROUP

dyson



SEAT

NOKIA
Connecting People



lenovo

PEUGEOT



Microsoft



How many did you get?

- Samsung South Korea
- Dyson UK
- Nokia Finland
- Apple America
- Peugeot France
- Microsoft America
- Siemens German
- Airbus Group Netherlands
- GSK – GlaxoSmithKline UK
- Seat Spain
- Lenovo China
- DeLonghi Italy
- Sony Japan
- Ikea Sweden
- JCB UK
- Rolls Royce UK
- Dell America

Global Companies

All these companies have brand names and logos that are recognisable around the world.

They supply goods and services to countries beyond their own. Why is this important and what do they need to consider when doing this?

Share your ideas!

Why is it important to be global?

- *Increase sales*
- *Improve profits*
- *Security*
- *Education*
- *Increase innovation*
- *Increase customer base*

What do you need to consider when becoming global?

- *Cost*
- *Communication – what language will your website be in? What about packaging?*
- *Decide on a specific product or service*
- *Market research – will people want/need it?*
- *Exportability – is it easy to export? Packaging etc.*



Brief



- You are going to design and market a STEM related product that can be sold internationally.
- It can be marketed in Europe or globally.
- You can work in pairs or in teams of a maximum of 4. Every person in the group must be assigned a role within your company.
- You will be assessed at various stages during the topic so must ensure that you are self managing your team.

Schedule

You have the half term to complete the project. You can work at your own pace but must be ready to pitch your product in the last lesson of the half term, so therefore all other tasks must be finished before then. In your booklet there is a space for your teacher to sign that work is complete on each page, so make sure you have shown them what you have achieved each lesson.

In your booklet there is a space for you to fill in your schedule. You need to list the tasks that need completing, who is going to do them and by when. Discuss what skills each person has in your group and assign tasks to use the strengths of your team mates.

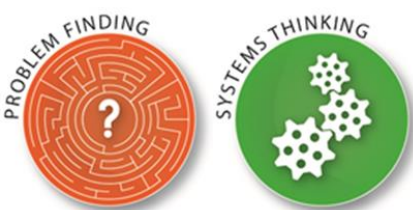
If you are doing work electronically remember to email it to everyone in the group every lesson!

All booklets must be filled in!



Initial ideas

In your booklet start to come up with ideas for products or services you could produce that can be marketed globally.



Market Research

You need to conduct some market research. Market research is the process of collecting valuable information to help you find out if there is a market for your proposed product or service.

Use handwritten questionnaires, Survey Monkey or Google Forms to create your questions to ask to gather the information you want. Think about who you want to answer your survey and the types of answers you are looking for.



Design Brief



In your booklet fill in the table to start considering the major factors.



Cultural considerations

If you are marketing your product at an audience in another country the last thing you want to do is offend anyone or make a mistake with your branding or wording!

On the next slide are some examples of products that have been renamed or should have been!



Jif became Cif when Unilever wanted to create a global super brand. It is also rumoured that it was because “Jif” couldn’t be pronounced in some countries.



The name Milano is used in countries where the name Pizza Express is already taken and to differentiate between the restaurants selling primarily pizza and those offering a wider range of non-pizza meals inspired by Italy.



If you ever take a French person to the popular restaurant chain you may notice them sniggering. The word “Zizi” in French is a slang word, meaning “willy”! Awkward!



The British company Lush clearly didn’t do their homework when naming their henna hair dye. “Caca” in French means poo! Would you want to put that on your hair?!



In most countries around the world asking for a Dove bar would give you some tasty chocolate, but in India, Egypt and the UK you're going to have to ask for a Galaxy to enjoy the same treat!



This Kellogg's breakfast cereal goes under a different guise depending on what part of the world you are in and has different mascots to match! Cocoa Krispies have the trio Snap, Crackle and Pop, Coco Pops and Choco Pops share Coco the monkey and Choco Krispis have Melvin the elephant as a mascot.

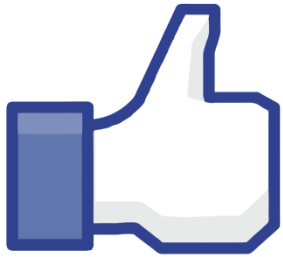


The brand name "Mr. Clean" is owned by Procter & Gamble and is usually simply translated into the language of the country it is on sale in, apart from in the UK, where it is sold as Flash due to a previously existing company with the same brand name.



Lay's crisps, owned by PepsiCo, have several different names worldwide, but are generally recognisable by their underlying logo. In Australia the Smith's brand was acquired by Lay's but the original name was retained. Often the same flavours have different coloured packaging, adding to the confusion. For example a salt and vinegar packet in the UK is green, whilst it is blue in the US.

Gestures and colours that can offend!



While a thumbs-up sign is a positive signal in the UK, it can be used to insult someone in West Africa, South America, Iran, and the Italian island of Sardinia. Facebook now accompanies the thumbs up with the word “Like” so as not to offend anyone in the 70 countries it services.



The meanings of many other gestures can vary across cultures—something that developers of global apps have to keep in mind. Take the okay sign. In Brazil, Germany, Russia, and many other countries around the world, that gesture is offensive. The sign may mean “okay” in the UK, but in Japan it means “money,” and it is commonly used to signify “zero” in France. Clearly it is not okay to use in many parts of the world.



Pepsi lost its dominant market share to Coke in Southeast Asia when it changed the colour of its vending machines and coolers from deep blue to light blue, a colour that’s associated in that region with death and mourning.



Final Idea

You need to detail your final idea in your booklet. This can include detailed, annotated diagrams of the product, details of the packaging, language translations and plans for your video and pitch.



Prototype

A **prototype** is an initial version of a product. The prototype is **tested** to make sure it is fit for the audience and purpose. If there are any errors or problems, the prototype is improved and tested again. This goes on until the product is considered to be fully functional and suitable.

After you have created your prototype you need to show how you are going to improve it based on your testing and research.

If you need any resources for your prototype please create a list for Mr Varney (STEM technician) that includes what resources you need (including sizes/quantities), your names, your teacher's name, your classroom and which day your lesson is.



Packaging

- Packaging is important. It needs to:
 - Attract the attention of your target audience
 - Make it clear what the product is and does
 - Protect the item
 - Make it easy to ship/deliver

Marketing Campaign



You will need to create a campaign to “sell” your product. This CAN include posters, website ideas, advert for magazines etc. It MUST include a 1 minute video advert.

Remember your advertising must appeal to your target audience, especially in the country you have chosen (You may want to translate some of your words, this can be basic).



Dragons' Den Pitch

You will have 3 minutes to pitch your product or idea to the rest of the class and they will vote whether they are “In” or “Out”. You need to be able to clearly explain:

- what your product is for and
- who it is aimed at
- why you chose the country you did
- how you have targeted your product at that country.

In your plan you may want to include typical questions your classmates and teacher may ask so you can prepare your answers.



Evaluation



In your booklet you need to detail the improvements and adaptations you have made throughout the project. Remember to be detailed. Explain what the problem was, why it needed improving and how you made the improvement.

E.g. Our original design was however when we did our cultural research we discovered that the colour we had chosen for our logo was unlucky in that country, so we changed the colour to a luckier one which was

EHoM Tracker

You need to fill in the EHoM tracker. Write down examples of what you did to meet each EHoM. Don't worry if you can't fill in all of them yet, by the end of the year you should have lots of examples.

EHoM	Evidence	
	Student comment	Teacher comment
Adapting		
Creative Problem Solving		
Improving		
Problem finding		
Systems Thinking		
Visualising		