Candidate 1 evidence

ENTER NUMBER OF QUESTION		DO NOT WRITE IN THIS MARGIN
1a	• Mildsteel is suitable because it is durable, this means it can survive the wear and tears of use without being damaged, improving the quality of the product. • Polypropylene is suitable because it is tough. This means it can survive impacts and support the weight of the user. ~~• PVC is suitable because it is chemically resistant. This makes it easy to clean, improving the sustainability of the product.~~ • ABS ~~is~~ is suitable because it has a good strength to weight ratio, this means that they can support the user improving the quality of the product. • Polystyrene is suitable because it is chemically resistant. This makes the product easier to clean which improves the lifetime of the product.	

ENTER NUMBER OF QUESTION		DO NOT WRITE IN THIS MARGIN
	• PVC is suitable because it works with its process ← injection moulding. This means it can be made into complex shapes needed for the design.	
1b	• Rotational moulding is suitable for the hollow ABS wheels. This is because it is repeatable which is needed for the Domestic toy go-kart. • Dip coating has been done on the mild steel frame for the communal go-kart. This is suitable because it protects the ferrous metal from rusting and adds Aesthetic value to the product. • Injection moulding is suitable for the polypropylene seat for the second choice because it is highly accurate and gives a high quality finish.	

ENTER NUMBER OF QUESTION		DO NOT WRITE IN THIS MARGIN
1c	• Junction has influenced the first cart by adding suspension, this makes the product easier to use over multiple and difficult terrian. • Junction has influenced the second kart by adding mudguards and front panel. This protects the user from getting dirty while using it. This improves the comfortability of the product. • Saftey has influenced the first kart by adding reflectors. This lets people know where the product is in the dark, reducing the chance of an accident. • Saftey has influenced the second kart by having caved edges and using tubular ~~steel~~ mild steel. This reduces the chance of someone getting hurt if they hit it. • Saftey has influenced both karts by putting the steering wheel away from any moving parts. This limits the chance of an injury when using the product.	

ENTER NUMBER OF QUESTION		DO NOT WRITE IN THIS MARGIN
1d	• The shape of the first tart wheels makes it seem professional and high quality.	
	• The use of thin plastic means the second tart look cheap.	
	• The use of racing stripes on the second tart makes it appear it is intended for a younger target market.	
	• The limited amount of extra details on the first tart makes it look as if it is intended for serious people who do competitions.	
1e	• The use of standard components may constrict the design, as there are set ways they are produced.	
	• Standard components are easily sourced, which makes the product reusable.	
	• Standard components are common and easy to understand. This makes the product easier to assemble.	
	• When a manufacturer sources standard components they have to deal with a third party, which could have unforeseen issues like delivery.	

ENTER NUMBER OF QUESTION		DO NOT WRITE IN THIS MARGIN
2a	• The container clip could be made from Aluminium, this is because it is light, meaning carrying multiple users effect the climbers performance. • Aluminium is also tough meaning it can survive impacts without being damaged, impacts like being dropped. • A third reason Aluminium is suitable is because it has a high strength to weight ratio, which means it can support the weight of the user.	
2b	• Drop forging is a suitable ~~part~~ process. because it uses sheet material ~~which~~ which improves lead times meaning the product is released to the market sooner. • Drop forging is also a suitable process because it is repeatable. This means it can be mass manufactured reducing the cost per product to produce. ✉	

ENTER NUMBER OF QUESTION		DO NOT WRITE IN THIS MARGIN
2c	• one benefit of CAD is that it works very well with CAM which makes using processes like forging easier.	
	• Another benefit is that it can run simulations to test the performance of a product, which is important when human safety is involved.	
	• A third benefit is that it lets you test variants and revise, which could be used to show clients progress or for advertisement.	
3a	• Anthropometrics has influenced the interior by using the diameter of a adults grip to find the diameter of the steering wheel.	
	• Another way Anthropometrics has influenced the design is by using the length of a adults thumb to determain suitable button placements on the steering wheel.	

ENTER NUMBER OF QUESTION		DO NOT WRITE IN THIS MARGIN
3a	• ~~Phy~~ Physiology has influenced the design by making buttons clear when you press them so you know they are working. • Another way physiology has influenced the design is by adding resistance to the steering wheel, this tells your brain it is moving and prevents your hands slipping. • Physiology has influenced the design by making it easier to pull/push leaves in the car. This makes the product easier to use. • It has also influenced the interior by putting all tools in the same area, this makes them easier to reach again making the product easier to use.	
3b	• The product manager ensures everyone is on task doing their job. The product manager also ensures everyone is meeting their deadlines.	

ENTER NUMBER OF QUESTION		DO NOT WRITE IN THIS MARGIN
	• The accountant sets and gives everyone a certain amount of money to produce the product and do their job. • They make sure everyone stays within the beget. ~~[redacted]~~ and does not go over.	
3c	• One benefit of subcontractors is that they cost less than a full time employee. This is because they are only there for a certain amount of time. • One drawback to subcontractors is that they are not full involved with the ~~team~~ rest of the team. which makes communication harder.	
(ii)	• ~~Touch screens are an example of technology push.~~ Technology push is when new inventions and creations take over the market without the public needing it. An example of this is touch screens. This is because people were happy with buttons on their phones, but now people want	

ENTER NUMBER OF QUESTION		DO NOT WRITE IN THIS MARGIN
	buy a phone without touchscreen.	
4a	Market pull is where the pupils/ target markets need for something drives for new creations and products. An example of this are cameras ~~phones~~. As the market wanted ~~more~~ the ability to take better quality photos and have larger file size to store them.	
4b	• One way to learn the needs of the market is with a user trip, this is when someone outside of the design and production team tests a existing product. This useful because it comes from an unbiased view and the designer can ask specific questions. Information can also be gathers with notes ~~of~~ or photos of the user trip.	
	• Another way is to use a questionnaire, this also allows the designer to ask specific questions but from a larger amount of people. This gives them a better idea on	

ENTER NUMBER OF QUESTION | DO NOT WRITE IN THIS MARGIN

market needs and what the user wants.

4c • Planned obsolescence is when a product degrades or breaks over time forcing you to buy another.

• An example of planned obsolescence are iphones, this is because over time the ~~[illegible]~~ become slow and laggy and ~~[illegible]~~ less the total amount of battery possibly stored.

5a • Elastomers are suitable because they are chemically resistant, which makes the product more hygenic and easier to clean.

• Elastomers are suitable because that are flexible which makes ~~[illegible]~~ wearing the product more comfortable as it fits to the persons face.

5b • One way to improve efficiency during manufacture is by using gant charts. This lets the manufacturer know their time scedual and if the are behind or not.

ENTER NUMBER OF QUESTION		DO NOT WRITE IN THIS MARGIN
3b	• Another way to improve efficiency is to use CAD and CAM. This is because you can use the same model from design and the machines can work all night without needing any breaks unlike their human counter part. • A third way to improve efficiency is to use Gantt charts. These tell the manufacture about important deadlines, checks, or events coming up, allowing them to be prepare. • A fourth way to improve efficiency is by using subcontractors. This is because they can handle other parts of manufacturing while you work on more important parts. • Another way to improve efficiency is to use Standard components. This is because they are "inspired", leaving more time for other parts.	

ENTER NUMBER OF QUESTION		DO NOT WRITE IN THIS MARGIN
5c	• One way to improve market share is with celebrity endorsement. This is because celebrities have a big sway with the public. • Another way is to use billboards. This is because people are constantly driving by them and they stick out which makes them very noticable.	
6a	• One way to identify materials is by doing a flame test. This is how different metals burn with a different flame, and they give off diffent smells. • Another way to test materials is ~~with~~ with a float test. This is how some plastics are less dense than water which means they float. This would limit the possible number of choices. • A third way to test a material is by doing a magnetic test. This is how metals are either ferrous or non-ferrous, which could limite the possibilities by half.	

ENTER NUMBER OF QUESTION		DO NOT WRITE IN THIS MARGIN
6b	• One factor which would influence assembly methods is the state of the economy and how expensive things are. • Another factor would be metres used as you would not be able to weld wood together. • A third factor which would influence assembly methods would be the target market as it would be unsafe to use small standard components for baby toys as it is a choking hazard.	
6c	• ~~One consideration designers would have~~ One way to reduce environmental impact is by locally sourcing materials. this is because it reduces the amount of carbon emissions. • Another way to reduce the environmental impact is by using recyclable materials, which means one someone is done with your product. • Another way to reduce environmental impact is by using renewable energy to power manufacturing machines. this	

ENTER NUMBER OF QUESTION		DO NOT WRITE IN THIS MARGIN
6c	is break solar or hydro power have no carbon emissions..	
	• A third way to reduce environmental impact is by limiting the amount of manufacturing process used. This is break it is ~~easy to produce larger parts rather than multiple small ones~~.	
	• ~~A fourth way to reduce environmental impact is by~~ reduce the amount of wasted material.	
	• A fourth way to reduce environmental impact is by reducing the amount of energy, this is break it also limites the number of process used which reduces the amount of waste materials.	
7	• Initially the designer would use ~~working drawings~~ Preliminary sketches. These are quick and without detail only used to generate ideas. They can be a mix of 2D and 3D and freeform or isometric, whichever best showcases the main ideas, colour could be added to show	

ENTER NUMBER OF QUESTION | DO NOT WRITE IN THIS MARGIN

basic material, but it is better also thoughts go into variations around the quick sketch, ~~[illegible]~~

• As the design process continues the designer will still use quick preliminary drawings to explore as many pathways as possible, ~~[illegible]~~ but as refinement starts they may use some production drawings to determine dimension and moving parts. These will contain fairly more detail as the ideas are refined as it important to get a clear idea down, some drawings here will deliberately contain colour to showcase material, exploded views will also be used here.

• When planning for manufacture a designer will create a working drawing with dimensions, to show how the product is to be produced and assembled. Typically there will be a assembled view, exploded and each component by its self. This part has the most detail. This drawing will also show hidden detail and a section

ENTER NUMBER OF QUESTION		DO NOT WRITE IN THIS MARGIN

- For advertising rendered drawings can be produced via hand or CAD, although CAD is better as it works with CAM, materials and colour are shown visually with shadows, highlight, decals; however the product looks unreal life, so to must it be shown in advertising.
- The working drawing may also contain a view of a true shape depending on the products form.

1a) - galvanised mild steel is a suitable material as it does not rust and is corrosion resistant. This makes the product longer lasting

- ~~Nylon~~ Polypropylene is also suitable because it is scratch resistant. This means that it will keep its aesthetic quality, improving both the products lifetime and quality.
- ~~Mild Steel~~ is tubular mild steel is meable which means it will retain its strength regardless of shape ~~is also~~ ~~has~~ ~~can~~ this improves the products quality

ENTER NUMBER OF QUESTION		DO NOT WRITE IN THIS MARGIN
	1b) Jonathan has influenced the first kart by adding air-filled tyres. This improves how well the product moves making it easier to use.	
	1d) • The chrome wheels makes the first kart appear expensive.	
	1d) • The repeated use of white, red, and black adds harmony and brings the product together.	

Candidate 2 evidence

ENTER NUMBER OF QUESTION		DO NOT WRITE IN THIS MARGIN
1a		
	The polystyrene mud guards were used on the domestic toy because polystyrene is both chemical resistant and has a smooth surface making it easy to wipe down and clean with chemicals. Hollow ABS wheels were also used on this toy as they would be light weight, making it safer and easier to carry. They also have a good strenght to weight ratio, meaning it wont breake under a childs weight. The tubular mild steel frame would also make it light weight, also with the painted finish making it corrosion resistant. The mild steel wheels on the commercial toy have been galvanised, this will increase the hardness, making it longer lasting. The PVC steering wheel will also have a good grip, making it safer and easier to hold and manouver.	

ENTER NUMBER OF QUESTION		DO NOT WRITE IN THIS MARGIN
16)	The Hollow ABS wheels could have been inje-ction moulded. This is because they are hollow and will need to have been made to great accuracy. Two features of injection moulding. The mild steel wheels will have been galvani-sed, this would increase hardness, making it longer lasting and will have made it chemic-al resistant, allowing for easy cleaning.. The corners of the mudguards could have been rounded, this will make them safer than sharp corners as they can't stick out and penetrate into anything. Parts of the Holdall mild steel frame could have been extruded, This is because they are made from metal and is a long continues shape.	

ENTER NUMBER OF QUESTION		DO NOT WRITE IN THIS MARGIN
1c	Function - The steering wheel needs to have some sort of connection to the wheels in order for the go-karts to turn.	
	The seats need to be close enough to the steering wheel so that riders can use the steering wheel.	
	The pedals need to have a connection to the wheels in order for them to turn when pedaled.	
	Safety - The hand operated breaks must work as intended in order to avoid accidents.	
	Everything needs to be tightly secured before use to avoid any accidents when in use.	
	The seat need to be not too high up as to where it's dangerous if someone falls off.	
	The commercial go-kart has reflective lights, making it visiable at nights if they are on roads.	

ENTER NUMBER OF QUESTION		DO NOT WRITE IN THIS MARGIN
1d	Both Seats have a bumpy or crossed texture, this will make sitting in it easier as there will be some sort of grip. Contrasting colours have been used, red & yellow in the commercial go-kart, and black & white in the domestic go-kart. This will make the karts stand out more and be more eye-catching. Both ~~wheels~~ Steering wheels are round, making them easy to grab at any part of it. Symetry has been used on the domestic go kart as the pattern on the front gaurd is mirrored each side (apart from the number.) line has been used in both go-karts in order to make the design on the stickers. The white of the Domestic tog makes it visable. The red is also eye catching on both, appealing to the target market of children.	

ENTER NUMBER OF QUESTION		DO NOT WRITE IN THIS MARGIN
1e)	A manufacturer has to buy and supply the consumer with standard components, this will cost money, and time from those who order stock. They will also have to involve a third party to supply these standard components, this could be a drawback because the business has to trust everything gets delivered on time, and everything is of a high quality, which may not happen. Although it does save some time on the businesses end as they don't need to assembly the product themselves. This will save time and money in wages. It also means it's easier to transport as things won't be prebuild and bulky.	

ENTER NUMBER OF QUESTION		DO NOT WRITE IN THIS MARGIN
20	Mild steel could be used, this is because it has a good strength to weight ratio, meaning it's easy to carry around and reliable when in use, it's not going to break. With a finish it will stand out making it easy to see and identify as well as making it corrosion resistant. It's also chemical resistant which will make it easy to clean.	
21	Drop forging is suitable because the carabiner is made from metal, the material used in drop forging. It also makes it finished product hard, and with good strenght, making it perfect for the carabiner. Also it's very accurate and repeatable, so lots can be made at one time.	

ENTER NUMBER OF QUESTION		DO NOT WRITE IN THIS MARGIN
2c)	CAD modelling is suitable because it lets you do stress tests in the software, letting you know about any weak points. The model can also be 3D printed, perfect for something small like this. Test-s can then be carried out. You can also see how it look to scale when all the parts are fit together. You can also easily edit the model and how it looks. The model can also be shared to other to recieve their input.	

ENTER NUMBER OF QUESTION		DO NOT WRITE IN THIS MARGIN
3a	Anthropomology - The distance from the edge of the seat to the pedals must be close enough as to where the vast majority of people can use them safely - leg length taken into consideration. The seat must also be wide enough as to where people can fit in them comfortably, considering hip width. Also the seat must sit high enough as to where everyone can see out the car, considering the height from your lower back to eyes. Physiology - The medals must be stiff enough as to where you can't just accidentaly press them, but you must also be able to use them without applying much force. The Steering wheels and hand break follow the same rules. It must also be easy enough to adjust your seat back and forwards but not too easy that it moves while driving. Physcology - It must be obvious where the hazard light button is in case of emmergency	

ENTER NUMBER OF QUESTION		DO NOT WRITE IN THIS MARGIN
3a	It must also be easy to identify what gear you are in at any given time. And it must be easy to see the screen behind the wheel telling you speed, petrol level etc. It must also be obvious what the buttons on the car radio are to avoid confussion when diving.	
3d	A market researcher will go out and ask potential customers what it is they want in the product. They will post question-naires and hold focus groups. A lawyer will ensure no one has a patent on the technology in use in the product as well as protecting anything the business is developing themselves. A team leader will organise what everyone is doing and when. Keeping production running on time and smooth.	

ENTER NUMBER OF QUESTION		DO NOT WRITE IN THIS MARGIN
36 b c	Sub contractors will bring new and fresh ideas to the business as they haven't already brought them up. Although they may not fit well with the workforce since they don't understand the culture. They may also not do exactly what is needed. Due to limited understanding of the project.	
ha	Technology Push - Dyson introduced the vaccum cleaner and this new technology was in demand so others stared providing alternatives at a cheaper price. Market pull - This is when the market asked for new technology to be developed possible because other things are outdated. E.g. The launch of Airpods. This made wired head phones less in demand. Allowing apple to remove the headphone jack. Encouraging Air Pod sales.	

ENTER NUMBER OF QUESTION		DO NOT WRITE IN THIS MARGIN
4b	Questionnaires could be created, this will allow the researchers to get excact information on questions they've asked. They are also cheap to create.	
	Online survey could be sent out, this will reach a huge audience and can be done at little to no cost.	
	Focus groups or interviewes could be arranged this will let you ask the public questions face to face on a product. They are more personal so more honest information can come out.	
5c	Planned obsolescence is when the business who launches the product make it deteriorate over time. For example a mobile phone creater may slow down the cpu, servers, or limit the battery. This means products wont be designed to last in order for you to buy a new one when this one breaks down. Increasing sales.	

ENTER NUMBER OF QUESTION		DO NOT WRITE IN THIS MARGIN
8a	They are Stretchy, allowing the to be able to be fit around multiple sizes of head.. They are also water tight, making sure no water gets into your eyes when under water. It's also soft, meaning it wont hurt when pressing againer your face. It can be replaced easily if the band snaps.	
8b	Gnatt charts can be used, this will tell you when certain things need to be done by to keep you on schedual. They can also tell you when parts need to be ordered by. Jigs can also be used this will help when on machines to quickly and safely carry out tasks. CAD could also be used, it will tell you how parts are assembled and sizes before manufacture. JIT could be used, this is when you order stock to come in as you need it, to reduce warehouse storage.	

ENTER NUMBER OF QUESTION		DO NOT WRITE IN THIS MARGIN
8a)	They could launch adverts, as this will help in making the company more well known, worldwide, or just locally. Packaging could be changed as this may spark intrest in the business, due to something new being implemented. A re-brand will do the same. The could launch a rewards promotion, rewarding customers for shopping with them. After a certain number of visits or money spent discounts could be offered	

ENTER NUMBER OF QUESTION		DO NOT WRITE IN THIS MARGIN
6a)	A magnet could be put next to metal so you can identify if it's ferrous or not/containing If it's a plastic you could heat it up to see if it changes shape or not if it does it's a thermosetting plastic. It could be put in water to see if it floats, this will test the bouyancy. It could be put under a press to see if it can withstand weight. And won't shatter	
6b)	The size of the product would need to be taken into consideration. If something is very large it's unlikely you can make batches of it. How in demand it is will be a factor, a business won't make 10,000 of something that they are only expecting to sell 4,000 of. It will waste money. Companies will also only make one of a personalised product; so for the job, or one-off production will be used.	

ENTER NUMBER OF QUESTION		DO NOT WRITE IN THIS MARGIN
6c	They could use recyclable materials, this ensures that not all their products go to land-fill, but a recycling plant. They could use non-toxic materials, this means that if it end up in nature, like a river it won't pollute or kill the wildlife. Businesses could also reduce the amount of packaging they use, this mean less waste to end up in oceans, etc. They could buy and transport products with electric vehicles, this will reduce the amount of Co2 entering the atmosphere. Unlike the use of petrol vehicles. They could buy and buy from sustainable sources, this will increase the longevity of the operation as supplies wont run out.	

ENTER NUMBER OF QUESTION		DO NOT WRITE IN THIS MARGIN
7	Pictorial orthagrics will be used, this will show you how the product looks, including colour, shade, scale, etc. Used in the design and end phase. An exploded view will show you how every part fits/joins together, it will also tell you how many of each part there is. Used in assembly. An auxilery view will show you how some-thing looks from a particular angle. Used in design. A wireframe view will show you how a product looks with only lines, including the inside. Used in design. An (technical) orthagraphic will tell you sizes included in parts of the product. Used when designing and in manufacture A rendered image will be used in the design process. It will show you how the product looks in a realistic view.	

Candidate 3 evidence

ENTER NUMBER OF QUESTION		DO NOT WRITE IN THIS MARGIN
1	tubular	
a)	• mild steel frame → strong → can hold weight of user	
	• ~~galvanised~~ mild steel wheels → corrosion resistant (coated ~~galvanised~~) → will not rust (with ~~weather exposure with outdoor use~~	
	• Plastic coated mild steel frame → corrosion resistant (coating) → will not rust with weather exposure from outdoor use.	
	• tubular mild steel frame → lightweight (tubular) → easier to move around.	
	• solid polypropylene seat → durable → resistant to wear + tear from being rubbed against with users constantly standing up + sitting down	
	• textured polypropylene seat → texture adds grip ~~texture~~ to prevent user from slipping off seat.	
	• Polystyrene mudguards + front panel → impact resistant → can withstand crashes + bumps during use.	
	• Polystyrene mudguards + front panel → chemical resistant → easily cleaned.	

ENTER NUMBER OF QUESTION		DO NOT WRITE IN THIS MARGIN
b)	• Extrusion → tubular mild steel frame → It has a uniform cross continuous section.	
	• Bending → tubular mild steel frame → will create correct shape in	
	• injection moulding → solid polypropylene seat → provides intricate detail + is suitable for mass production.	
c)	• The commercial go kart has an adjustable seat so it can be operated by people of different heights.	
	• The commercial go kart has a lockable break which allows the product to stay stationary when not in use + to allow the user to get on + off in a safer manner.	
	• The textured seat on the commercial go kart helps to prevent the user from slipping down or off the seat so they don't injure themself.	

ENTER NUMBER OF QUESTION | DO NOT WRITE IN THIS MARGIN

f
- The domestic go kart has pedals to allow the kart to move easily + they are textured to stop feet from slipping of.

f
- The steering wheels allow the karts to be steered in an easy way

g
- Minimal finger traps to avoid injury

d)
- The domestic go kart is symmetrical, which makes it look balanced + easy to use
- The go karts are gender neutral colours so they appear to a wider market.
- The checkered pattern on the front of the domestic go kart matches that of a racing finishing line.
- The red frame of the commercial kart harmonises with the yellow lines on either side of "racing".
- The go karts appear easy to use due to simple shapes.
- They appear stable and balanced

ENTER NUMBER OF QUESTION		DO NOT WRITE IN THIS MARGIN
	because they are larger at the bottom + smaller at the top.	
e)	B. There is no need to make them simply ordering, therefore saving time.	
	B. If there are any leftover they can be used in other products, it doesn't have to be the go bad.	
	B. The manufacturer doesn't have to assemble the product, which saves time.	
	D. If the delivery is late this will set back/delay production time.	
	D. The wrong size component could be delivered which would delay production.	
	D. They cannot guarantee quality.	
2		
a)	· Stainless steel → is strong to hold the weight of the user → is corrosion resistant for use outdoors without being effected	

ENTER NUMBER OF QUESTION		DO NOT WRITE IN THIS MARGIN
	by weather.	
	• Durable ~~fast~~ to sustain rubbing against rope + rock.	
	b) • The process is suitable for the material metal	
	• The process is highly repeatable as many will be made.	
	• The process ~~allows~~ creates intricate detail	
	c) • It could be put through stress testing to see if areas need strengthening before it is manufactured	
	• A variety of colours/materials could be applied to the model to see which looks best + is suitable.	
(3)	a) • The diameter of the steering wheel would be influenced by a persons ~~shoulder~~ width between shoulders.	
	• The steering wheel should be	

ENTER NUMBER OF QUESTION		DO NOT WRITE IN THIS MARGIN
	easy for the user to turn without strain/much strength required.	
	• The hazard light button is red as red ~~signifies~~ indicates danger/ there is a problem.	
	• The buttons should be suited to a persons finger tip diameter.	
	• The buttons should be easily pressed without much force required.	
	• The indicators will make a clicking noise so the user knows they are on.	
	• The seat should be adjustable so those of different leg lengths can reach the pedals.	
b)	• The project manager is in charge of the ~~&~~ overall development. They communicate with all members of the team to ensure everything is on track + on schedule + to resolve any issues.	
	• Manufacturers make + assemble the final product. They communicate	

ENTER NUMBER OF QUESTION		DO NOT WRITE IN THIS MARGIN
	with the designer to ensure everything is being made correctly + to plan. The communicate with materials specialist + ergonomist to ensure materials and sizes are best suited for the product. They communicate to the project manager if any problems occur + if anything is behind schedule.	
c)	• You cannot guarantee their work is of high standards + good quality, which puts the quality of the product at risk • Bringing in sub-contractors may introduce new ideas for the company to use in their product that could improve + make it more interesting.	

ENTER NUMBER OF QUESTION		DO NOT WRITE IN THIS MARGIN
4		
a)	£	
(i)	~~Mobile phones:~~	
	• The advancement of facial identification technology which was added in mobile phones means consumers can have a more secured device only accessable by them.	
	• The advancement in camera quality allows companies to include better photo quality in devices such as Ipads, so the consumer will have clearer photos.	
(ii)	• Consumers wanted to be able to fit their device in their pocket to make it more portable, which lead to companies making smaller sized phones.	
	• Consumers wanted to listen to music with having a wire in the way, so companies started using bluetooth for wireless earphones/headphones.	

ENTER NUMBER OF QUESTION		DO NOT WRITE IN THIS MARGIN
b)	• Researching existing products → You can find out which products are already commonly bought by the target market and at what price to find out what they need + want + incorporate this into your product • Survey/Questionnaire → Ask the target market questions about what they would want/need in your product which would make them buy it. This could include things such as aesthetic factors. Record your results + incorporate into design.	
c)	Planned Obsolescence is when companies design there product to fail/need replacing after a certain amount of time. For example, mobile phone companies will design the phones to degrade in quality after a few years meaning the consumer will need to buy a newer version. The company will make their money from continuous replacing.	

ENTER NUMBER OF QUESTION		DO NOT WRITE IN THIS MARGIN
5		
a)	They are stretchy + flexible, meaning the strap can fit to various head sizes + the seal will fit to the user's face to prevent water getting in.	
b)	• Flow charts are ~~xxxxxx~~ tasks arranged in a sequencial order, meaning the worker knows exactly what jobs need done in which order. • Gantt charts show the task, its duration + deadlines, + who is needed for each task. It also shows task dependency so workers know what task needs to be done before another can be. • Mass production systems allow large amounts of products to be produced quicker ~~xxxxxx~~ by machine if they ~~xx~~ are to look identical. • Batch production systems allow products that ~~xxxxxx~~ are similar + consistent to be produced in sets, faster than individually	

ENTER NUMBER OF QUESTION		DO NOT WRITE IN THIS MARGIN
c)	• Creating television advertisements will show the products to a large numbers of people through an easily understood method => a short video clip. • Celebrity endorsement means involving a well known personality in the company's advertisement. This makes the market have more trust in the product as a familiar face is supporting it.	
6		
a)	• Wood types can be identified by the colour + grain. • You can tell if metal is ferrous or non ferrous using a magnet. magnetic = ferrous, not magnetic = non ferrous. • You can identify plastics through the coding system found on the material - eg if it says PP it is polypropylene. • A flame test can identify types	

ENTER NUMBER OF QUESTION		DO NOT WRITE IN THIS MARGIN
	of plastics through colour of flame, smell, and if it is self extinguishable or not.	
b)	• The size of the product • The shape of the product • The amount of the product required.	
c)	• flat packing → more fit on 1 lorry → less trips with lorry → less emissions. • Using less material means less waste. • Less packaging to be thrown out → less waste • Instructions on how to dispose + recycle product. • Using less different materials → easier to recycle if don't have to disassemble → less landfill waste. • Careful use of material during manufacture → less waste.	

ENTER NUMBER OF QUESTION		DO NOT WRITE IN THIS MARGIN
7	Initial ideas • Rough 2D + 3D sketches are used to communicate ideas on the page efficiently. • Detailed view → to show small details at a larger scale Exploration • Pictorial sketches → isometric, oblique, 1 point perspective + 2 point perspective → are used to clearly communicate ideas in 3 dimensions • Exploded pictorial → used to show possible ways that parts could fit together and where they fit together. • sectional view → to explore ideas of internal parts of the product. • Orthographic drawing → To figure out + suggest options for sizing + anthropometrics • Scale drawing → To give an idea of proportions of the idea. • detail view → to show smaller details at a larger scale for	

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clarity.

- rendered pictorial (CAD drawing/manual) → To show potential colours + materials

Refinement

- Pictorial sketches → isometric, oblique, 1+2 point perspective → used to show + finalise in 3 dimensions
- Exploded pictorial → to finalise how each part will fit together + where.
- Sectional view → to finalise the internal components of the design
- Orthographic drawing → to communicate finalised sizes of individual parts
- Scale drawing → to show finalised proportions.
- detail view → to show finalised small details at a larger scale.
- CAD/manual rendered drawing → to show finalised colours + materials of the product.

ENTER NUMBER OF QUESTION		DO NOT WRITE IN THIS MARGIN
	Plan for manufacture	
	• Orthographic drawing → to communicate overall final sizes of the product to the manufacturer.	
	• Exploded isometric → to communicate where + how each part will fit together to the manufacturer.	
	• Rendered graphic → communicate final colours + materials visually to manufacturer	
	• sectional drawing → to communicate internal details to the manufacturer.	
	Marketing	
	• Rendered graphics to give target market a realistic visual that they can understand.	
	• Animated graphic to show the target market how the product is used.	

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1		
a)	tubular mild steel frame → strength to weight ratio → is strong enough to hold weight of vac while being light enough to move easily.	

Candidate 4 evidence

ENTER NUMBER OF QUESTION		DO NOT WRITE IN THIS MARGIN
1a)	The materials chosen for these products are suitable because:	
	• Mild Steel has a good strength to weight ratio. This means that it will be able to hold the weight of a person and also will be easy to lift if it needs to be stored somewhere.	
	- Polypropylene is suitable for the seats of both go-karts because it is quite flexible. This means that it will be more comfortable for the user	
	- The Abs wheels on Domestic toy go-kart are suitable as Abs is scratch resistant, so the wheels will keep aesthetic qualities	
	- Abs also provides grip so the go-kart will be smoother and safer to operate	
	- Polystyrene ~~for~~ for the mudguards &	

ENTER NUMBER OF QUESTION		DO NOT WRITE IN THIS MARGIN
	front panel makes the product easy to clean. This is suitable as it may be used in mucky areas so it is bound to get dirty.	
	- PVC is suitable for the steering wheels as it is a smooth material. This will make turning feel comfortable and won't annoy the user	
7b)	Three manufacturing process which could have been used in the production of the go-karts are:	
	- The mild steel frames could have been extruded. This process is suitable as it creates a continuos cross section which strengthens the kart.	
	- Both seats could have been injection moulded which is suitable as it is a highly accurate process.	

ENTER NUMBER OF QUESTION		DO NOT WRITE IN THIS MARGIN
	- Finally the ABS Wheels could be made by using a CNC lathe. This is a suitable process as it is effective for ~~[illegible]~~ mass production, so alot of wheels can be made quickly and cheaply.	
1c)	Function and ~~[illegible]~~ Safety has influenced the design because:	
	- The pedals on the toy go-kart should be easy to use as a child will be the one using it and they may lack strength	
	- The Steering wheels should be easy to turn to ensure that the product is effective and can turn corners with relative ease	
	- Both bikes have a breaking system to ensure that if people need to stop for any reason they can do so safely.	

ENTER NUMBER OF QUESTION		DO NOT WRITE IN THIS MARGIN
	- The toy go-kart has a front panel. This increase Safety as it will reduce the risk of injury if the younger person were to crash. It also prevents stones flicking up off the ground.	
7d)	Aesthetics has influenced the design because:	
	-The toy go-kart has alot of bright and appealing colours, with even a racing feel about it. This is likely to draw attention from the younger audience.	
	- On Both go-karts the Base and the working parts contrast. This is useful as you will be able to clearly See ~~what~~ how to operate the kart.	
	- The seat ~~the~~ on the Commercial go-kart has a grippy looking Texture. This gives the impression that the seat	

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	will be comfortable and secure	
	- Finally the commercial go-kart has a more narrower look, this implies that it is aerodynamic and will be faster. This may appeal to a wider audience.	
10)	Benefits of Standard components are:	
	- They are easily accessible so they can be aquired when manufacturer needs them	
	- They are also relatively inexpensive, so the manufacturer won't have to spend alot of money.	
	Drawbacks of Standard Components are:	
	- There is no gaurantee that the product will last a long time as components might be faulty or poor	

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	quality.	
	- Furthermore Standard components are less durable and strong compared to other joining methods so manufacturers may need to redesign and use extra materials.	
2a)	The Carabiner could be made from mild steel. This material is suitable because it has good strength qualities, which ensures that the climber will be safe. This material is also quite durable so after repeated use the carabiner will still be sturdy and secure	
2b)	Drop forging is a suitable process because:	
	- highly repeatable process meaning lots of these products could be produce quickly and cheaply.	

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	- drop forging also adds strength to the product which is much need for something like the carabiner as it will need to support someones bodyweight.	
2c	~~C~~ Benefits of CAD are:	
	- CAD allows you to make any changes to the carabiner easily. This means that no materials get wasted making proper models	
	- CAD gives you a rough idea of the aesthetics of the carabiner without having to make a full model.	
3a)	Ergonomics has influenced the design of the car interior because:	
	- The car seats will be adjustable to ensure that even people with the smallest arms can still reach the wheel. This also allows people	

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	with longer arms to be in a more comfortable position when they are driving.	
	- The steering wheel should not require too much force to turn, this is to allow women or older people to still turn effectively without causing strain	
	- The break and accelerator should be a suitable distance from the seat. This is so people with smaller legs can still reach the pedals whilst sitting comfortably.	
	- The pedals should be easy enough to operate without causing people strain in their legs.	
	- All the buttons on the car have some sort of contrasting colour on them. This means that people will know that, that is a useable	

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	button.	
	- Finally the handbreak should not require alot of force to lift up. This is to ensure that it is easy to use without much effort or strain in your arms and maybe even hands.	
36)	Material technologists give information to the manufacturer on what materials are most suitable for select product.	
	Market researchers will research similar products on the market to help establish a reasonable price for the product. They will also look into what people are demanding and feed that back to the rest of the team.	
3c)	A Benefit of a Sub-contractor is that you can focus on other jobs your need done whilst someone else works on another thing	

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	A drawback of Sub-contractors is that there is no gaurantee of quality and they may do the job in a different way than you wanted it done.	
4(i)	Products have been influenced by Technology push because:	
	-Products such as computers now come with wireless keyboards and mouses. This means less wires to get tangled and less clutter	
	- Mobile phones can now be charged using wireless chargers rather than plugs and charger cables.	
(ii)	Products have been influenced by market pull because:	
	- Products such as headphones have added noise-cancellation as people wanted to eliminate background noise and distractions	

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	- Furthermore, Products like TV remotes now come with ~~[illegible]~~ Netflix buttons on them as Netflix becomes more popular.	
45)	Two methods of carrying out research into the needs of the target market would be : - a ~~[illegible]~~ Survey where potential clients are given questions related to the product. For Example a question could Say 'What would you like the product to include~~[illegible]~~. -Another method would be a user trial where potential users get to try a product before it is released. This allows the user to provide~~[illegible]~~ feedback on what they would like added to the design (or taken away)	

ENTER NUMBER OF QUESTION		DO NOT WRITE IN THIS MARGIN
4c	Planned obsolescence is where a product is design to only last a specific amount of time before it breaks and needs replaced. This may mean that some products are lower quality to allow for the company to make more money as the user will need to replace the products	
5a)	Elastomers are suitable for the seal and the strap because:	
	They are very stretchy, so they will be easy to take on and off your head.	
	Elastomers are also suctioned. This ensures that when you go under water the goggles will stay on your eyes and won't let any water in.	

ENTER NUMBER OF QUESTION		DO NOT WRITE IN THIS MARGIN
5b)	Production and planning Systems are used to improve effeciency during manufacture by:	
	- Jigs & templates could be used to ensure parts are highly accurate. It also ensures consistency of part sizes.	
	- Gantt Charts could be used to ensure everyone knows exactly what they are supposed to do. This will make for a more optimal manufacturing process	
	- Just in Time production could be used, which improves efficiency as materials and parts won't take up any storage space.	
	- Furthermore J. I. T production is suitable as no parts or materials will go to waste as you only get what is needed.	

ENTER NUMBER OF QUESTION		DO NOT WRITE IN THIS MARGIN
5c)	Companies could maintain or improve their market share by:	
	- using advertising boards promoting one of their products. This will discuss the attention of anyone passing by and may encourage them to buy from that company	
	- Companies could also put their products on discount to make them more affordable for people which might lead to more sales and more profit.	
6a)	Methods to identify materials are:	
	- A flame test could be carried out. This is where you hold a flame up to a material and you can identify the material based on the colour of the flame	
	- You could also scratch the materials to see how scratch resistent it is and	

ENTER NUMBER OF QUESTION		DO NOT WRITE IN THIS MARGIN
	use that to identify the material	
	- Finally you could identify a material by comparing it to similar materials and look for similarities between the two.	
66)	Factors that could influence choice of assembly methods are:	
	- An assembly method with low wasted materials could be used to protect the environment	
	- A method that ensures a long life cycle could be used, which means products will last longer & new ones won't need to be made.	
	- Furthermore, assembly methods could be selected based on cost and a cheap but good option could be used.	

ENTER NUMBER OF QUESTION		DO NOT WRITE IN THIS MARGIN
6c)	To reduce the environmental impact of their products designers and manufacturers could:	
	- make products from a material which could be recycled or reused after products life cycle. This will reduce waste	
	- They could also reduce packaging to not waste as much plastic	
	- products could be made from sustainable materials which can be regrown rather than fossil fuels.	
	- Make the products durable so that they will last alot longer. This means that no extra materials will need to be sourced or used.	
7	Graphic techniques are used at different stages of the design process because:	

ENTER NUMBER OF QUESTION		DO NOT WRITE IN THIS MARGIN
	- In the initial ideas phase a sketch model could be used. This allows designers to get a quick idea of how a product would look without using materials to make a full product	
	- Sketch models are also suitable at this stage is many different designs can be explored quite quickly.	
	- In the development stage block models such as CAD could be used. This would allow for a quick idea of aesthetics	
	- Block models also allow you to make changes to a design easily and quickly	
	- Furthermore CAD models are highly accurate as human error is reduced, however sizes are not usually included	

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	- In the refinement stage Scale models could be used to explore ergonomics. A Scale model could be used along with an ergonome to check if all the human sizes would be suitable	
	- Finally towards the end of the design process of just before the product is released a prototype could be made. This would allow designers to test the functionality of the product and see if it works as intended	
	- Prototypes can also be used for things like testing the durability of a product before a full model is made.	

Candidate 5 evidence

ENTER NUMBER OF QUESTION		DO NOT WRITE IN THIS MARGIN
1a	• Galvanised mild steel is a suitable material ~~as it~~ for the wheels as it is corrosion resistant.	
	• Plastic coated tubular mild steel is a suitable material for the frame as it has a good strength to weight ratio, allowing it to support the user.	
	• polypropylene is a suitable material for the seat as it is chemical resistant, allowing it to be cleaned easily	
	• ABS is a suitable material for the wheels as it is impact resistant, allowing it to withstand bumps etc.	
	• Solid textured polypropylene is a suitable material for the seat as it provides grip to prevent the user from sliding off.	
	• PVC is a suitable material for the steering wheel as it is strong allowing it to withstand pressure from the user.	

ENTER NUMBER OF QUESTION		DO NOT WRITE IN THIS MARGIN
b	• The tubular mild steel frame is extruded, this is suitable as it has a continuous cross section. • Bending will be used to shape the tubular mild steel frame, this is suitable as it allows it to be shaped into a frame with bends. • Rotational moulding is used to make the hollow ABS wheels, this is suitable because they are hollow and ~~the~~ circular.	
c	• The solid textured polypropylene seat provides grip to the user therefore preventing them from sliding off. • The seat is adjustable on the comercial go-kart to allow differently sized kids to use it. • Mud guards prevent the user and go-karts from becoming ~~dirty~~ as dirty. • ~~Both~~ Comercial go kart has a lockable brake to allow the user to safely stop on a hill without rolling down. • Domestic go kart has a hand operated brake to allow the user to control their speed and prevent them from crashing.	

ENTER NUMBER OF QUESTION		DO NOT WRITE IN THIS MARGIN
	• Tubular mild steel frame means go karts are lightweight and can be pushed and lifted easily.	
d	• The red body contrasts with the black seat • The black wheels are in harmony with the black frame. • The textured wheels contrasts with the smooth seat on the domestic go-kart. • The square cross section frame contrasts with the cylindrical frame leading to the steering wheel.	
e	• Standard components can be bought in bulk which means the company can get bulk buying discounts reducing costs. • less time is required to design parts due to standard components being bought in, meaning less staff are required and therefore reduced wage costs. • Using standard components means that another company takes a cut meaning that they are more expensive.	

ENTER NUMBER OF QUESTION		DO NOT WRITE IN THIS MARGIN
	• Using standard components can make repairs easier for the manufacturer.	
2a	Mild steel could be used; this is suitable because it is strong which allows it to support a lot of weight. It can also be painted to enable it to be corrosion resistant.	
b	• Because no further finishing is required as drop forging leaves a good surface finish.	
	• It allows for intricate details to be created such as the ones on the carabiner.	
c	• Designers can collaborate online, saving them time allowing them to be more efficient.	
	• There is no waste as no physical models are created, reducing the environmental impact.	
	• CAD software can be used again and again with no additional cost.	

ENTER NUMBER OF QUESTION		DO NOT WRITE IN THIS MARGIN
3a	• The ~~thickness~~ thickness of the steering wheel will have been designed by considering grip size. • The diameter of the steering wheel will have been designed considering shoulder width. • The ~~gear selector~~ width of the park button on the gear selector will have been designed considering thumb width. • The height of the flappy paddles will have been determined by the width of all four fingers excluding the thumb. • The force required to pull the handbrake up will have to take into consideration the strength of the user. • The symbol for the hazard warning lights is red as red is a symbol of danger. • The gear selector looks easy to use as the gears are shown on top of it. • The width of the seats will be determined by considering the users hip width	

ENTER NUMBER OF QUESTION		DO NOT WRITE IN THIS MARGIN
b	~~The Materials~~ ~~Planners & Designers~~ • Lawyers are responsible for filing patents for new products, ensuring that all legislation is complied with regarding employees and settling any legal disputes the company may have • Accountants are responsible for ensuring employees are paid the correct amount, producing: cash budgets / income statements, and ~~the amount of tax paid~~; ensuring that money is spent wisely.	
c	A benefit is that the work will be done to a good standard as they will be professionals in their field. A drawback is that it will be more expensive than carrying out the work yourself which may lead to cash flow problems.	

ENTER NUMBER OF QUESTION		DO NOT WRITE IN THIS MARGIN
4a i	• The use of facial recognition in mobile phones is an example of technology push because no one new they wanted it until they had it.	
	• Heated steering wheels in cars are another example of technology push because no one knew they wanted it until they tried it, now its a must have.	
ii	• People wanted mobile phones to be smaller so that they were more portable and as technology advanced this happened.	
	• But technology improved so much that people are now using mobile phones for so much more that phone calls / texting, this resulted in people wanting phones with a larger screen.	
b	• focus groups could be used to determine what the target market need and want. This is where the market researcher meets with a group of people from the target market and asks them questions.	
	• User trials could be used to find out the needs and wants of the target market. This is when an existing product or prototype is given to a member of the target market to be used for a short while and then they give advice on how to improve it at the end.	

ENTER NUMBER OF QUESTION		DO NOT WRITE IN THIS MARGIN
C	Planned Obsolescence is when products are designed to fail after a period of time to make the customer buy more. This could mean that products are designed to be of poor quality on purpose such as Apple when they stop updating their software on older devices to encourage customers to buy newer ones.	
5a	Because they are stretchy, allowing the goggles to sit snuggly on different head shapes/sizes. They are also mallable allowing a good seal to be created around the eyes.	
b	Gant charts can be used task | J | F | M | A | M | J | J 1 2 These show workers what tasks need to be completed when, ensuring deadlines are met	
	flow charts can be used to show employees the order in which tasks must be completed	

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c	• They could have a sale to attract more customers from competitors. • They could increase advertisement of their products, on tv for example to encourage customers to use them over competition.	
6a	• Flame tests can be carried out on plastics to determine whether they melt / char / continue burning. and any smells are recorded. the results can then be compared to a chart of characteristics of common types of plastic and you match it with the ones with the same results. • Magnets can be used to test metals to determine if they are ferrous or non-ferrous • Symbols can be looked for on plastic products • Colour and grain can help determine the type of wood.	

ENTER NUMBER OF QUESTION		DO NOT WRITE IN THIS MARGIN
b	• Equipment the business has	
	• type of product (one off or mass produced).	
	• whether products need to be identical	
	• Skills of workforce	
	• Materials in product.	
c	• They could reduce the amount of packaging used.	
	• They could use electric delivery ~~vehicles~~ vehicles to reduce their carbon footprint	
	• They could use renewable energy to power their factory etc	
	• They could use a supplier with a smaller carbon footprint	
	• They could encourage workers to walk to work.	
	•	

ENTER NUMBER OF QUESTION		DO NOT WRITE IN THIS MARGIN
7	Idea generation – a range of 2D and 3D sketches can be used as they are quick and easy to do, allowing you to come up with many ideas. Exploration – 3D sketches, and exploded drawings can be used at this stage to show how the product sits together and be creative and come up with many ideas. Sectional drawings may also be used. Refinement – Orthographic drawings may be used to show dimensions of the product. Scale drawings can be used to get an idea of proportions. Exploded views may also be used to show how the product is assembled. Presentation – Manually rendered drawings can be used to show aesthetics. CAD rendered illustrations can be used to show material colours.	

Candidate 6 evidence

ENTER NUMBER OF QUESTION		DO NOT WRITE IN THIS MARGIN
1a)	ABS is a good choice of material for the wheels of the domestic go cart as it has good scratch & impact resistance, this is good as it can limit the damage done to the wheels of the cart as it will potentially be bumping & hitting into rocks or other things that could cause damage whilst in use.	
	Mild steel is a good choice of material for the frame of the domestic go cart as it is very strong, this will allow it to easily support the weight of the user without breaking or becoming damaged.	
	PVC is a good choice of material for the steering wheel on both go karts as it can give the user a comfortable grip on the wheel as it is soft. This would be better than something like steel that would be cold & uninviting to touch.	
	Polypropylene is a good choice of material for the seats of both go karts as it is lightweight, this is good as it will reduce the weight of the go kart allowing it to go faster.	

ENTER NUMBER OF QUESTION		DO NOT WRITE IN THIS MARGIN
	Polystyrene is a good choice of material for the mudguards & front panel of the domestic go kart as it is cheap, this is good as it reduces the overall cost of producing the product which can then mean the price of the product can be reduced for the consumer.	
	Zinc is a good choice of material on the galvanised mild steel wheels as it stops the metal underneath from corroding & rusting meaning the product will last longer without breaking.	
b)	Rotational moulding could be used to make the ABS wheels on the domestic go kart as it creates a hollow product, it also creates a product with no weak points which is ideal for wheels which will be taking a lot of bumps & hits.	
	Extrusion would be a good process to use on the hollow mild steel frame on the domestic go kart as it creates a product with a uniform cross section &	

ENTER NUMBER OF QUESTION		DO NOT WRITE IN THIS MARGIN
	consistent strength around the product.	
	Injection moulding is a good choice of	
	material for the textured polypropylene seat	
	as it can add a textured finish to	
	the product, this allows for more grip on	
	the seat which will stop the user	
	from falling off.	
c)	Safety has influenced the commercial go kart	
	with the textured polypropylene seat, this	
	allows the user to have more grip on	
	the seat which ~~[illegible]~~ prevents them	
	from falling off & potentially injuring	
	themselves.	
	Function has influenced ~~the commercial go kart~~ ~~[illegible]~~	
	with the lockable break, this allows	
	the go kart to be placed somewhere	
	when not in use & the user doesn't need	
	to worry about it rolling away &	
	potentially causing damage to itself or something	
	else.	
	Function has influenced the design of the	
	commercial go kart with the adjustable	
	seat position, this allows users to ~~[illegible]~~	
	change the seat to be in a position that is	

ENTER NUMBER OF QUESTION		DO NOT WRITE IN THIS MARGIN
	more comfortable for them, potentially making the go kart easier to use for them. Safety has influenced the design of both go karts with the PVC steering wheel. PVC would be a softer material for the user to hit into if they got into a crash, this could potentially limit any injuries they get to be less significant. The bumper at the front of both go karts has been influenced by safety, this will allow the cart to become much less damaged in the event of a head on crash & reduce the impact of the crash which could prevent or reduce injury for the user	
d)	Aesthetics has influenced the commercial go kart with colour. The plastic coating means that the go kart will be able to come in a range of different colours which could increase the aesthetic appeal to the customer. The commercial go kart uses contrast with the colors red & yellow, this allows the	

ENTER NUMBER OF QUESTION		DO NOT WRITE IN THIS MARGIN
	The design to stand out & catch the eye of customers, making it more aesthetically appealing.	
	The domestic go kart has been influenced by aesthetics with balance, the symmetrical design makes the go kart look more appealing, meaning more people may choose to buy it.	
	The commercial go kart also uses texture to create contrast with the textured seat & the smooth frame on the go kart, which makes it stand out more & look more aesthetically pleasing.	
e)	One benefit of standard components is that they do not have to make them themselves which would cost a lot of time & money, this will reduce costs as they do not need to set up machinery to produce them & can use the space for something else instead.	
	Another benefit is that they are made by a specialist so they will be higher quality than if they were to do it	

ENTER NUMBER OF QUESTION		DO NOT WRITE IN THIS MARGIN
	themselves.	
	One drawback is that they will only	
	be available in certain sizes so the	
	go karts will have to be designed around	
	the size of the standard component	
	which may not be ideal.	
	Another drawback is that if there	
	are any issues with the standard	
	components the company that	
	makes the go karts has to take the	
	blame even if it is the fault of the	
	company who makes the standard	
	components.	
2a)	A material that could be used for	
	the carabiner is stainless steel, one	
	reason this would be good is that	
	it is strong so it could hold up	
	the weight of the user easily, another	
	reason this would be good is that it	
	doesn't corrode or rust, this means	
	the product will be able to last longer	
	without breaking.	

ENTER NUMBER OF QUESTION		DO NOT WRITE IN THIS MARGIN
b)	One reason drop forging would be suitable for the carabiner is that it creates a product with one piece construction, this means production can be quick as nothing else has to be made. Another reason drop forging is a good choice for the carabiner is that it strengthens the product, this allows it to be able to hold heavy weights & be under extreme tension without breaking, which is ideal for something that has to hold a human up.	
c)	One benefit of CAD modelling is that changes & edits can be made quickly and easily by the designer. Another benefit is that the model can easily be shared to other designers etc. via things like email,	

ENTER NUMBER OF QUESTION		DO NOT WRITE IN THIS MARGIN
3)	a) Physiology has influenced the design of the steering wheel as it has to be light enough that it can be operated easily without causing problems by the user, but heavy enough that it is not too sensitive to movements making it difficult to drive. Physiology has also influenced the design of the materials with the gear stick, the gear stick must be light enough to be moved easily by users but heavy enough so that it doesn't move & change gears with the slightest touch. Which could be dangerous. Anthropometrics has influenced the design with the diameter of the steering wheel grip, it must be small enough so that the 5th percentile female can get their hand around it but large enough so that the 95th percentile male can comfortably grip it. Anthropometrics has influenced the design of the gearstick, it must be small enough	

ENTER NUMBER OF QUESTION		DO NOT WRITE IN THIS MARGIN
	that the 5th percentile female can get their hand around it but. large enough that the 95th percentile male can comfortably grip it.	
	Psychology has influenced the design of the interior with the position of the buttons & controls in the middle of the car, the radio is in the middle & so are the buttons which makes it easy to understand how to operate it.	
	Psychology has influenced the position of the speedometer, it is behind the steering wheel ~~[illegible]~~ where it is easy to locate for the driver, this makes it easy for the driver to quickly check their speed whilst driving,	
b)	One other member of the design team is the accountant, they handle everything to do with money such as costs & budgets. ~~[illegible]~~ they give advice to other team members about what would be too expensive ~~[illegible]~~ what would be cost effective.	

ENTER NUMBER OF QUESTION		DO NOT WRITE IN THIS MARGIN
	Another member of the design team would be the materials specialist, they have specialist knowledge about materials & their properties & which materials would work best for the project. They also have knowledge on new materials which could also be of use.	
c)	One benefit of using a sub-contractor is that they will typically specialise in the task they are given meaning the business knows they will get high quality work.	
	One disadvantage of using sub-contractors is that the business has to take the blame for any faults with the finished product even if the sub contractor is at fault.	

ENTER NUMBER OF QUESTION		DO NOT WRITE IN THIS MARGIN
4	a)(i) The mobile phone was influenced by technology push as it was not expected for it to have a touch screen when it was introduced however it is now expected	
	(ii) The mobile phone was also influenced by market pull as people now expect them to have a camera even though it is not the original purpose of them to take pictures.	
	[redacted]	
4	c) (i) Another way a product has been influenced by technology push is earphones as nobody was expecting them to have bluetooth connection when it first came out however now most earphones are bluetooth	
4	(ii) Another way a product has been influenced by market pull is telephones. they were originally made with a cord attatched to them but are now expected	

ENTER NUMBER OF QUESTION		DO NOT WRITE IN THIS MARGIN
	to be cordless and able to move freely.	
b)	One method of carrying out research is user trials. This is when the company sends out the product for customers to try before release & give feedback on so that the company can find out needs & wants.	
	Another method of carrying out research is questionnaires/surveys. A survey is sent out to customers in the target market with questions about their needs & wants. They then send it back & the company reviews the feedback.	
c)	planned obsolescence is when a business intentionally makes their product unusable after a certain time, this could be through breaking, making parts hard to replace or by holding back technology for later products. An example of this is apple making it very difficult for people to replace the battery in their phones so customers just buy a new phone with	

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	"new" features that apple has been holding back. This influences products as they are not as good as they could be just so the company can make a better version & have repeat customers & higher profits.	
5a)	An elastomer is suitable as it is very stretchy so it can fit around bits of different sized heads easily. Another reason is that they are cheap which can reduce the cost of producing the product. Another is that they are durable so they will last a long time without breaking.	
b)	One production & planning system that can improve efficiency is standard components. This is when a business buys parts like nuts & bolts ready made from someone else so they don't have to make them themselves, which makes production more efficient. Another is just in time production, this is when a business orders the exact amount of parts they need for exactly when they need them, this can reduce space required	

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	For storage as they aren't holding excess parts, this improves efficiency as the space can be made for something else.	
	Another is Gantt charts, this is when tasks are plotted on a timeline showing when they have to start & finish, this allows for concurrent engineering which is when multiple tasks are done at once, which speeds up production increasing efficiency.	
	Another is Jigs / templates, these can be used to aid in production so that each product doesn't have to be made from scratch again, a Jig is a tool used to ensure each product is accurate for example making sure each product has the same size hole cut out in the same place, a template is a finished product that is scanned by machinery then copied exactly.	

ENTER NUMBER OF QUESTION		DO NOT WRITE IN THIS MARGIN
c)	One marketing technique a company could use is rebranding, this can get rid of bad publicity about the business causing an increase in sales. Another marketing technique is releasing a new variant of a product, this can create excitement & increase sales	
b)	a) One way to identify if a meteorite is porous or non porous is by putting it in water, if it soaks up any then it is porous. One way of telling if a metal is ferrous or non ferrous is by putting a magnet on it, if it is ferrous it will stick and is magnetic, meaning it contains iron. One way of telling what kind of plastic it is, is by scratching it, if nothing shows then it could be something like polypropylene or ABS. All of these methods can help to narrow	

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	obtain what material has been used.	
b)	One factor that would influence the assembly method is the demand for the product, if it is small then it would be pointless using mass production. Another factor could be the size of the location used for production and how much machinery can fit inside. Another factor could be the budget of the company and what type of process they can afford funding. Another could be the product & how much detail & time has to go into it.	
c)	Another way to reduce the environmental impact is by using as little amount of materials as possible, this means people are less likely to just throw it in the bin and are more likely to dispose of it properly. Another way would be to make it easily dismantleable so that the cusbmer is more likely to take it apart to dispose of each material in the correct way.	

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	Another way would be to place signs on the product on how to properly dispose of it so customers know what to do with it. Another way would be to reduce packaging sizing, this will allow more of each product to fit onto things like lorries or vans meaning less of them are needed, reducing the environmental impact of transport.	
7.	One graphic technique is free hand drawings, these are used at the start of the process to quickly get ideas down before they are forgotten. Another is an exploded view, this is used at the end of the design process and shows how parts fit together, can be used in things like instruction manuals on how to build. Another is CAD, this can be used to design the finished product to test aesthetics as it can add different	

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	materials & colors to the product.	
	CAD can also be used to simulate	
	stress testing on products to see how long	
	it takes to break them.	
	Another is 2 point perspective drawings,	
	these are used near the start of	
	the design process to test aesthetics.	
	Another is	

Candidate 7 evidence

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1a) One reason why tubular mild steel is suitable for the commercial go-kart frame is that it is a strong material, this means it ~~is~~ is less likely to bend and can hold the weight of the user.

One reason why galvanised mild steel is suitable for the commercial go-kart wheels is that as it is galvanised it is corrosion resistant meaning that they will not need to be as regularly replaced.

One reason why polypropylene is a suitable material for the commercial go-kart seat is because it is easy to clean, as multiple people are using this it is important that its sanitary.

One reason why tubular mild steel is suitable for the domestic go-kart frame is because of its good strength to weight ratio, meaning that although the product is light in weight it is still able to hold the weight of the user.

One reason why ABS is ~~a~~ a suitable material for the wheels is because it is scratch resistant, meaning that the wheels

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	will maintain its aesthetic for longer. One reason why polystyrene is a suitable material for the mudguards & front panel is because it is impact resistant meaning that if ~~a child~~ the user ~~us~~ hits anything the front guard wont be affected.	
b	One suitable manufacturing technique is extrusion, this is used for the mild steel frame and is suitable as it creates a uniform shape which is important as these will be sold. Another manufacturing process is die casting which could be used for the mild steel wheels, this suitable as die casting can create accurate measurements and dimensions. Another manufacturing process is injection moulding, this is used for the ABS wheels and is suitable because the wheels have intricate detailing in them which injection moulding can create.	

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C	One way in which function has influenced the design of the product is through how easy it is to pedal and move as because they operated by children they have to be able to easily move in it. One way in which safety has influenced the design is through the height of the steering wheel as the child has to be able to have full control over the kart and if they are struggling to reach then they may lose control of the go-kart. Another way in which function has influenced the design is through how heavy it is, as the go-kart both have to be carried or moved it is important that they are not too heavy. Another way in which safety has influenced the design of the go-kart is through their not being any small parts that a child could trap their finger in that could cause an injury. Another way in which ~~fun~~ safety has influenced the design is through the ~~width of the wheels~~ length between the two front o	

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	back wheels, as the go-kart has to have a wide base so that it doesn't easily fall over.	
d	There is a contrast of colours in both go-karts between the red and black offering a pop of colour against a dark background. There is also a contrast of shapes as in the commercial go-kart the frame is rectangular whereas the seat is rounded. This is different to the domestic go-kart which consists of a rounded body and a rounded seat creating a sense of harmony.	
e	One benefit of using standard components is that it can reduce the lead time as the components are bought in and not made in the factory. Another benefit is that special training is not required to use the standard components as any worker understands how to use them in assembly.	

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	One drawback of standard components is that it introduces a third party into production which can come along with contracts and other aspects. Another drawback is that if their is a problem with delivery or the suppliers this can delay production a significant amount or potentially stop production mild	
2a	Steel would be a suitable material for the carabiner as it is ~~impact resistant~~ durable meaning that it will not easily break which is very important for this product. This is also a suitable material ~~as~~ due to its strength, it has to be a very strong material as it has to support the weight of the user.	
b	Drop forging is a suitable manufacturing process due to the material being used being compatible with this process. It is also a suitable process as it creates a uniform shape, which is important as each product needs to be exactly the same.	

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C	One benefit of using CAD modelling during the design is that it can create an accurate representation of what the product will look like, using accurate dimensions and measurements. Another benefit is that no material will be wasted by making multiple models as changes can be made quickly to the CAD model.	
3a	One way in which anthropometrics has influenced the design of the car interior is through the grip sizes on the steering wheel, as all drivers have to be able to comfortably grip it. Another way in which anthropometrics has influenced the design is through the length between the steering wheel and the gear stick as the driver has to be able to comfortably reach it without straining. One way in which physiology has influenced the design is through how easy it is to turn the steering wheel as it has to have some resistance ~~as so~~ but it also cannot	

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	be too ~~easy~~ hard to move in case of an emergency. Another way in which physiology has ~~used~~ influenced the design, is through the pressure needed to press ~~it~~ the buttons, as they cannot be too hard that it distracts the driver. One way in which physcology has influenced the design is by the bright red colouring of a button showing that it has an important meeting. Another way in which it has influenced the design is through the colouring above the air conditioning button which indicates what way to turn the knob if you want cold or warm air.	
b	An accountant will provide financial advice for designers on what and where is a suitable place to spend their budget. They are also in charge of giving advice ~~of~~ on what materials or production methods would fit in best with the budget, A production specialist provides advice	

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	on what the best production process to use will be depending on the materials being used and the volume they are being produced at.	
C	See page 17	
4ai	Technology push has influenced phones. as large companies are continuously working to improve and develop phones that the target market hasnt asked for. This can be done by adding more features or making them larger. It has also influenced earphones as in recent years large tech companies have been pushing newer versions of wireless earbuds into the market.	
ii	Market pull has influenced products such as laptops through asking for better quality of a product or wishing that it was capable of holding more storage.	

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b	One method of market research is Surveys this is were the target market gets asked a series of questions that will allow them to express their opinion, these surveys are set up by the designer or client so that they can tailor the questions to fit what they need to know. Another method is through looking at existing products or potential competitors in order to understand what is successful within the target market and what can be improved on.	
c	Planned ~~closed~~ obsolescence is were a company will give their own product a limited lifespan so that ~~when~~ they can successfully launch a new product. This can be done through the businesses slowing down products so that they arent as effective as they once were. It can also be done through buttons purposefully breaking or parts of the producting falling off or breaking.	

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5a) Elastomers are suitable for these parts as they are not affected by elements such as water, meaning that they will not corrode or lose their pigment. They are also suitable as they are durable, meaning that if the user stretches them then it will be hard to snap or break making them last longer.

b) Production systems such as Just in Time can improve efficiency as the materials needed for the product are bought in specifically for that product and made to order, as all materials needed are bought just for that order it can improve efficiency.
Planning systems such as GANTT charts can also improve efficiency as it lays out all what is needed to be done in one space making it simpler to understand and therefore more efficient.
Their are multiple production systems such as one-off, batch and flow that

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	can be ~~used to im~~ chosen by the designer based of off the volume of product needed, if chosen the right one then it can improve efficiency.	
C	One marketing technique is celebrity endorsement ~~as~~ if customers see their favourite celebrity endorsing a product they are more likely to buy the product as they trust the celebrity, this can help maintain the companies market share. A company can also use new media such as social media to advertise their products, this can help them reach a wider audience and therefore help them grow their market share.	
6a	One method that can be used to identify materials is through looking for a symbol or marking on the product to indicate what material it is. Another method is the magnetic test,	

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	if the material seems to be a metal then you can see whether the material is magnetic which can indicate what materials it is. Another method is comparing the aesthetics of the material to others, this can include the weight or colour of the material and can help narrow down what material it is.	
b)	One factor that can influence the choice of assembly method is the volume of products being made as depending if their is a small amount or large amount can affect the assembly method used. Another factor is how many parts need to be assemble together do as that can affect what assembly method is used. Another factor is the materials being used as some assembly methods work work for some materials. Another factor is whether the product is standardized as whether they arent can effect	

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	whether it is done through machinery.	
C	~~The~~ One way in which manufacturers can reduce their environmental impact is through using solar energy or energy from wind farms during the production process, this can ~~reduce~~ help reduce their environmental impact. Another way is through using JIT production so that no materials are being wasted or thrown out. Another way is through training their staff to utilise every part of the material so that no unnecessary waste occurs. Another way is through reducing the amount of packaging that protects the product. (C)	

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7	During the Initial ideas Stage of the design process, quick 2D Sketches can be made in order to translate the designers ideas onto paper and allows them to get a rough view of potential ideas for the product. 2D Sketches allows the designer to see the form and shape of the initial product before asking for the clients feedback. Using a 3D sketch also allows the designer and client to have a clearer view of the aesthetics of the product in its early Stages. During the development stage of the design process graphic techniques such as CAD can aid the designer in seeing what the product will look like and what changes can be made to it, this can then be done quickly. ~~as~~ This graphic technique allows a clear view of the product whilst changes are being made. During the presentation to the client, graphics can be used to create a simple yet effective demonstration of the product	

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	and all its different aspects and components and allows the client to have a clear visual of what the final product will look like once production has finished. During the production stage, graphic techniques such as a 3D sketch or CAD model, previously made, can help the manufactures have a clear understanding of what they are aiming to create and what the end product should look like. If done effectively then graphic techniques should also help improve the efficiency of production as manufacturers will have a clear idea of what they are aiming for.	

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3c	One benefit of using a sub-contractor is that they may bring new knowledge and advice during the development of the product concerned. One drawback of using a sub contractor is that they will need to learn what the product is aiming to do and what it should be which can take up time which could be used for developing the product.	

Candidate 8 evidence

ENTER NUMBER OF QUESTION		DO NOT WRITE IN THIS MARGIN
1a)	Commercial go-Kart	
	Polypropylene Seat has been used because it's cheap to buy and it's very durable so it won't break easily if being bashed around.	
	Plastic Coated tubular mild steel is very lightweight because it is hollow this means it can be lifted when needed without strain.	
	glavanised mild steel wheels have been used because it has good strength to weight so will not break when high impact happens.	
	mild steel also isn't corrosion resistant so a finish has to be added to stop rust	

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	Domestic toy go-kart	
	hollow ABS wheels have been used because they are very scratch resistant so they aren't ruined after use.	
	~~ABS wheels have also~~	
	PVC steering wheel has been used because pvc is very chemical resistant so can be easy cleane if it gets dirty.	
	Polypropylene can also be injection moulded so it can be made very quickly but still accurate	

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b)	[redacted]: Commercial go-Kart	
	Extrusion [redacted] would have been used to make the complex cross section of hollow poles connected to create the metal frame.	
	[redacted]	
	Injection moulding would have been used to created the textured seat [redacted] because it creates very complex detail which is seen on the chair.	

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Domestic toy go-kart

Vaccuum forming would have been used to create the hollow abs wheels because it's used to make a more simple shape of plasic like the wheels but is still the exact shape needed. With texture.

c) Function (commercial go-kart)

Pedals are located at your feet so you can pedal the kart yourself without help.

Steering wheel placed in reaching distance so children

ENTER NUMBER OF QUESTION		DO NOT WRITE IN THIS MARGIN
	Can navigate the Kart easily to avoid objects.	
	Seat Can be adjusted so that pedals and steering wheel can be reached easily.	
	Safety (Commercial go-Kart)	
	The break is located at the side which can be operated easily by there hand if they need to stop	
	Textured seat so grip is given when using so children don't slip out while moving.	

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Function

Domestic toy go-kart

Mudguards to stop mud flying up onto the child using it.

Handle is part of the seat so it can't be easily lifted.

Safety (Domestic toy go-kart)

It has metal bars at the front so if they bump into anything they don't get injured

Mud guards also stop them putting there hand on the wheel and getting to hurt

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	~~because~~ & because they are like a barrier	
D)	A contrast of red and black has been used to make it more ~~as~~ aesthetically pleasing to look at.	
	~~That~~ The black wheels ensure dirt on them isn't as visible which makes the product look better for longer.	
	It's got a lot of geometric shapes used throughout as there is standard straight poles making all of the base in the commercial go-kart	

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	The wheels in the Commercial go-kart look very realistic along with silver looking alloys which make it look more expensive.	
	The Domestic toy-kart has sticker strips on it to make it like a traditional go-kart which will make you want to buy it.	
e)	Standard component would be good to use on these go karts because they can be easily replaced if ~~they~~ there is a problem as they can be found at your local hardware store.	
	They are also good to keep the price down on the ~~product~~ go-kart as standard ~~to~~	

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Components are ~~easy to~~ cheap to buy.

Standard Components are also a good thing for part of the go-karts because standard and normal tools can be used instead of having to buy specilised ones.

A bad thing ~~about~~ about standard components is they might not fit properly with a part of the go-kart and a specilised one will have to be used.

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2a)	Stainless steel could be used because it ~~is~~ has very good strength to weight so it will not break.	
	~~It is also~~ Stainless steel is also corrosion resistant so it ~~can~~ won't rust and ~~break~~ break down over time.	
	It's also scratch resistant so it won't get ruined when being harshly rubbed against the rocks.	
b)	Drop forging is suitable because it pushes the material into place and ~~is~~ is very accurate.	
	~~It is also~~ It ensures it won't break because it's been forged into place and will stay in that shape.	

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c)	using a CAD model to design a Carabiner is good because you can make sure it all fits together like it's supposed to.	
	using a CAD model also gives you a visual picture of what the product looks like before it's made.	

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3a)	Ergonomics	
	The seat isn't too far away from the pedals so they can be easily reached.	
	The gear stick has to be within easy reaching ~~distance~~ distance so you don't have to stretch.	
	The Steering wheel isn't too thick so it's easy to get a good grip.	
	Physiology	
	The gear stick has to be easy to move so it can be easily changed without strain.	
	The handbreak has to be able to go up and down	

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without emense effort so the driver can operate it without strain and dificultly.

~~Physo~~

Phsycology

It is easy to identify what each button does so they can be used efficently while driving.

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3b)	Accountant also has a big role they have to look at the costs of materials and processes and ensure they stay in the budget.	
	Lawyer deals with all the legal aspects of the design and ensures it doesn't break legislation	
c)	Subcontactor is specilised in that task so can carry out the job quickly and correctly.	
	The down side is they can be vere expensive for the company.	

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4a) i)	i) Technology Push is based of the development of other new products and technology Mobile phone have been a big part of technology push as there are lots of Companies bringing out similar products but have new or better features which make people want to buy them.	
ii)	ii) Market pull is when new products are made from what people want. Digital Cameras were made because people wanted a camera they could take more than one photo and also could access them almost instantly without having to be developed. Contactless and mobile payments are also market pull as people wanted to be able to pay from there mobile phone	

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b)	Questionnaires are used to provide market research on what Consumers are looking for in a product.	
	user trials are also used to gather research on what products and style of product Consumers are looking for and gives a clear answer of what works best	

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c)	Planned obsolescence is when a Company brings out a new product and ~~advertising~~ advertises how much better it is and all the new features it's done to make you feel like what you have isn't good enough anymore so you buy the new product.	
	This ~~the~~ inflences the design of new Phones because when they bring a new one out each year people feel they need to buy it because there's is old and slow.	
5a)	elastomers ~~They~~ Provide a seal ~~because~~ because ~~they~~ it is water proof So no water can get past and it isn't absorbed.	
	They also & Can act as a suction so they ~~they~~	

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Create a barrier on the skin to stop water passing.

b) Jit is used to stop Companie needing big warehouses instead they can order the product they need and they will be delivered straight away as needed. This reduces storage costs

Standard Compants are ~~used to speed up~~ are good because they are widely available and are quick to get which means Companies don't have to wait on ~~specilist~~ specilised parts.

Subcontractors are good because they can be brought in to help with a specific part of the.

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	development. They are also more specilised in the specific area so they can get the job done faster.	
	Gantt charts are used to give a ~~visual~~ visual picture of what has already been done and whats still to be done.	
c)	Branding this is used a lot because it helps bring back customers and helps spread the word of the company. People often go back to a brand if they thought the product was of good quality.	
	Loyalty cards are also used to try bring people back because they want to get a discount with there card or build	

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	up there points.	
6a)	The flame test is used to identify materials by putting it in the flame and seeing if it gives off a certain color or smell.	
	density test is also used to test how dense the material is. If the material is less dense than the liquid it will float but if it's more dense it will sink.	
	Drop test is used to test the durability of the product to see how much impact it can take before breaking.	
b)	self-assembly if the product is very basic to build instructions can be added to allow consumers to build it	

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	themself	
	If only some was complicated they would get assembled before sales and only easy sections would be build by Consumers.	
	If everything was small and Couplex the manufacturer would assemble it before sales and it would com built.	
c)	They can use Products that can be Locally Sourced so they don't have far to travel. Less Polution is Caused.	
	use lighter ~~materials~~ materials to make it easier to transport so there isn't as much ~~Extra~~ seperate transport needed.	

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	Only order what you need so there aren't lots of spare material that will go to waste.	
	Order everything at once so there is only one trip and not lots of small ones. to save travel pollution	
7)	Modelling is a graphic technique used in the development stage to give a visual picture of what the product will look like.	
	CAD Models are used to in the development process to ensure the components all fit together before they	

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are being properly manufactured.

Sketches are used to show parts of the design in 2D like the basic shape of the product. in the development process.

Mockups can be used to show exactly what the product should look like but it won't actually work like the product will.

Test models can be used and sections to test diffent parts of the product to ensure they work correctly and the way they are required. and used in the development process.

Prototypes can be used to show the full product and how it works. It's like a final test used in the final stages of the development