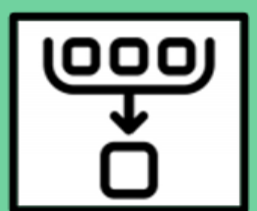
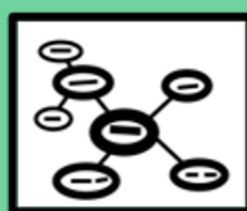


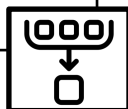
Year 8

Design and Technology Homework



1. Keywords spelling/definition test.

C.A.D	The use of computer software to create, modify, analyze, or optimize a 2D or 3D design. In commercial industry, CAD allows designers to apply real-world physics to models (e.g., virtual stress testing) and export precise vector data rather than basic pixel drawings.
C.A.M	The use of software and computer-controlled machinery to automate manufacturing processes. CAM software acts as the bridge: it translates visual CAD models into numerical coordinates that directly control automated tools.
C.N.C	The specific internal system driving CAM machinery. CNC machines read automated software code (traditionally called G-code) which dictates precise operational coordinates across standard Cartesian axes (X, Y, and Z). This removes human error entirely.



2. Deep Dive: CAD (Computer Aided Design)

Industrial Advantages of CAD	Industrial Disadvantages of CAD
Rapid Prototyping & Testing: Designs can be modified instantly without redrawing. Advanced software can perform Finite Element Analysis (FEA) to simulate stress loads before material is purchased.	High Upfront & Ongoing Costs: Commercial-grade software licenses are highly expensive subscriptions, requiring powerful high-specification workstation PCs to operate.
Global Collaboration: Modern cloud-based parametric CAD environments allow teams distributed across different countries to work live on the exact same complex assembly.	Cyber Security & Data Risks: Digital assets and intellectual property are highly vulnerable to server hacking, accidental data corruption, or theft.



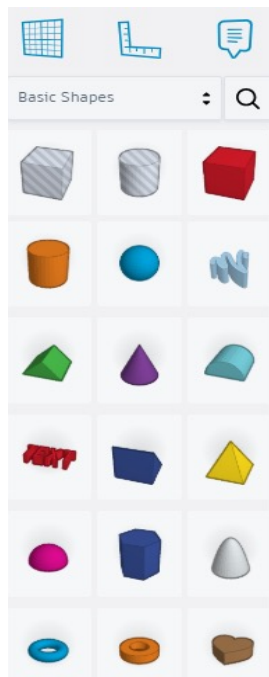
3. Advantages and disadvantages

Industrial Advantages of CAM/CNC	Industrial Disadvantages of CAM/CNC
Extreme Precision & Tolerance: CNC machines can manufacture thousands of identical parts flawlessly to tolerances measured in fractions of a millimeter.	Complex Setup & Tooling Time: Writing, checking, and optimizing the initial G-code programming and fixtures requires significant initial downtime before a run.
24/7 Production (Lights-Out Manufacturing): Automated hardware does not require rest or shifts; production can run unattended overnight, maximizing throughput.	Skill Displacement: Traditional manual craft trades (like manual woodturning or manual milling) are displaced as the industry pivots toward programming roles.

4 Tinkercad

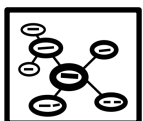
What is Tinkercad?

Tinkercad is a FREE web app for 3D design, electronics, and coding. We're ad-free and certified as COPPA compliant by the kid SAFE Seal Program, meaning you can feel comfortable using Tinkercad in a classroom environment.



These are the basic shapes that you would use to start any design. You can then change the height, width and depth, add a colour, and combine shapes to make new shapes.

Most of the shapes are 3D geometric shapes from cuboids and prisms, to square based pyramids and doughnuts.



5 TINKERCAD – 3D DESIGN

The software that you will use to design and make your work in your Computer



3D Design



If you can dream it, you can build it. From product models to printable parts, 3D design is the first step in making big ideas real.

Place a shape

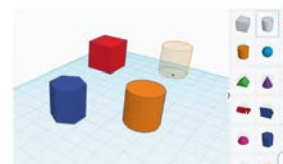
Shapes are the building blocks of Tinkercad. You can add pre-existing shapes or import your own.

Adjust objects

Simply rotate the work plane to adjust shapes or change views. Input exact dimensions with the ruler.

Combine elements

Create custom shapes to build detailed, intricate models. The sky's the limit!



6. TINKERCAD - CIRCUITS

The software that you will use to design and make your work in your Computer



Circuits



From blinking your first LED to building autonomous robots, this is where you can create and make the buttons, and breadboards of electronics.

Design electronics

Place and wire electronic components (even a lemon) to create a virtual circuit from scratch or use our starter circuits to explore and try things out. No additional hardware required.

Program with ease

Using our interactive circuit editor, you can explore, connect, and code virtual projects.



7. TINKERCAD - CODEBLOCKS

Write programs that bring your designs to life.

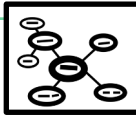
Block-based code makes it easy to create dynamic, parametric, and adaptive designs.



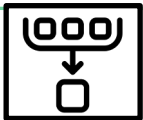
Drag and drop

To begin, simply drag blocks of code and snap them together to form a stack of actions. Code blocks is a great way to learn and teach coding principles.

1. Keywords spelling/definition test.



Injection moulding	a process used to create products out of plastic.
Product analysis	Looking at existing products to establish their strengths and weaknesses.
Vacuum forming	A way of created a clear plastic pocket/ shape using a mould with the plastic forced over it when heated.
Net	A flattened piece of packaging that shows the cut lines, fold line and tabs.
Display stand	A way of displaying a product..
silicon	A flexible material used to create the moulds for our Lego people



3. Facts about Lego

The History of Lego

The name 'LEGO' is an abbreviation of the two Danish words "leg godt", meaning "play well". The LEGO Group was founded in 1932 by Ole Kirk Kristiansen. The company has passed from father to son and is now owned by Kjeld

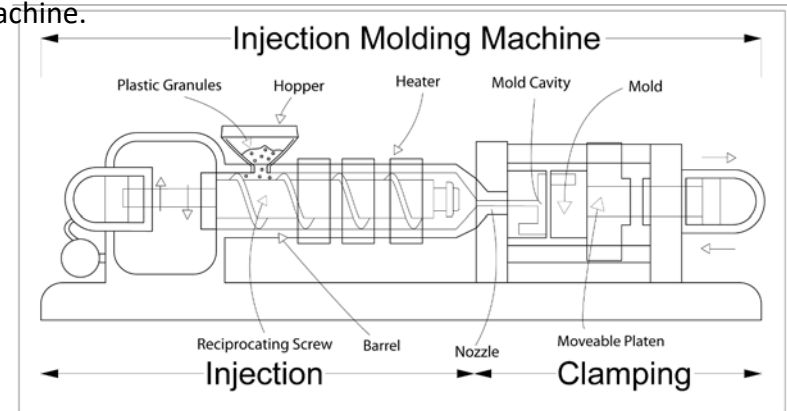
Kirk Kristiansen, a grandchild of the founder
The first LEGO logo was introduced in 1934. It was a rather uninspiring design, though, with the words LOGO spelled out in an ordinary, black font. Over the years, the logo would undergo a few changes before the company settled on the logo, we are now familiar with.

2. What is Lego made from and how is it produced?



Most LEGO® pieces are made from a high-quality plastic called ABS. It provides the unique connective grip, high gloss, and the colour stability our LEGO bricks are known for. It meets a long list of safety, durability and quality rules and they have been using it ever since 1963.

LEGO bricks are plastic injection moulded and so the process starts with tiny plastic granules. Inside the moulding machine these granules are superheated to around 230 degrees Celsius and are fed into moulds inside the machine.

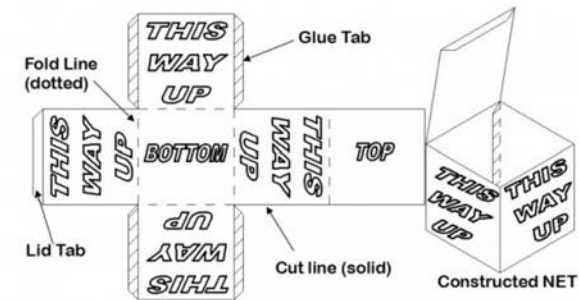


4. Net construction lines

A NET needs different types of lines to turn the 2D shape into a 3D shape.

————— Cut lines are seen as solid lines

- - - - - Fold lines are seen as dashed lines



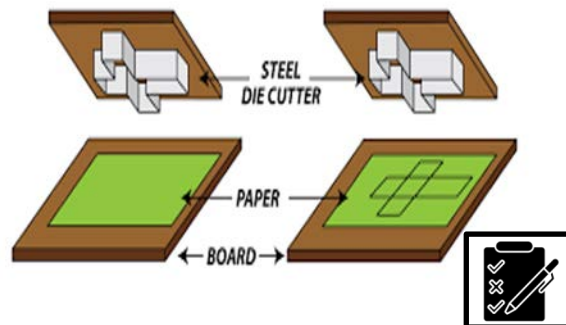
5. Blister package

Blister packaging' is often used for hygiene, cosmetics, DIY, stationery, food and many other products. They are always used wherever products ought to be almost completely visible, but protected at the same time, hence why they are also frequently referred to as 'visibility packaging'.



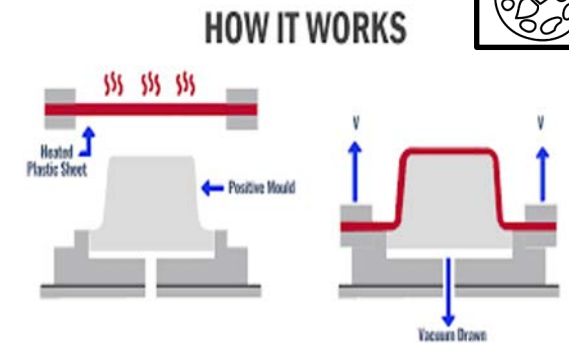
6. Die cutting

Die-cutting is a process whereby a die is used to cut through materials such as paper and card on a die press. The process allows you to make an identical cut into material numerous times. How die cutting machines work. For each job, a die, which is a shaped blade, is custom made for the item being created.



7. Vacuum forming

Vacuum forming is a simplified version of thermoforming, where a sheet of plastic is heated to a forming temperature, stretched onto a single-surface mould, and forced against the mould by a vacuum. This process can be used to form plastic into permanent objects such as turnpike signs and protective covers



8. Facts about different Boards

Corrugated Card

Corrugated card, often referred to as corrugated cardboard, is a versatile packaging material composed of three layers of paper. Its central layer features a wavy or corrugated structure, with two flat outer layers. This construction gives it strength and rigidity while remaining lightweight.

What is it Used For? Corrugated card is primarily used for packaging and shipping purposes. It provides excellent cushioning and protection for items during transportation.

Laminated Card

Laminated card consists of paperboard covered with a layer of plastic film or coating. This lamination process adds durability, moisture resistance, and a polished finish to the cardstock.

What is it Used For? Laminated card is commonly used for items requiring enhanced durability and visual appeal. It finds applications in making business cards, identification cards, menus, book covers, and promotional materials. The plastic layer protects against wear and tear and gives the material a professional look.



Challenge!

Design a blister package for a new Apple smart watch.

You will need to design the front and back of the packaging and include important items such as the Name, logo, price, description of the product etc

1. Sustainability

Three pillars of sustainability:

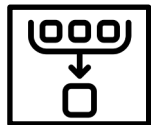
environmental, social and economic.

Sustainability is an essential part of facing current and future global challenges, not only those related to the environment.

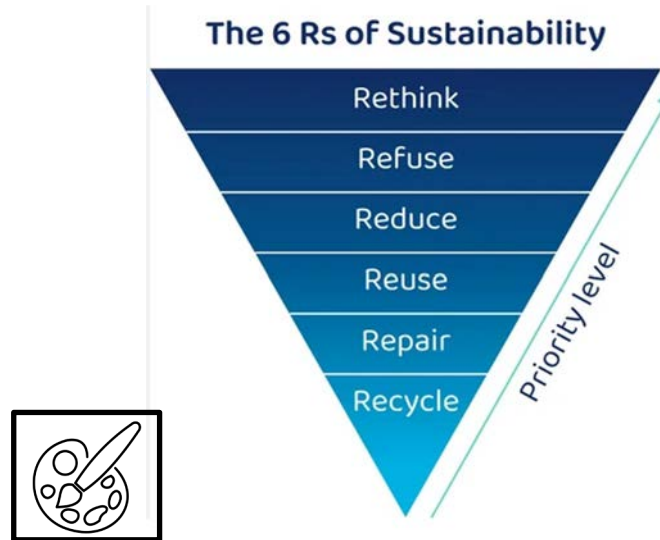
Environmental sustainability is the ability to preserve and protect the natural environment over time through appropriate practices and policies, meeting present needs without compromising the availability of resources in the future.

Social sustainability involves a focus on the well-being of people and communities. It's about promoting equity, human rights, access to education and health care, and decent work.

Economic sustainability is the approach whereby economic activities are conducted in such a way as to preserve and promote long-term economic well-being. In practice, it aims to create a balance between economic growth, resource efficiency, social equity and financial stability.



2. The six Rs of Sustainability



4. Repair



Definition: When a product breaks down or does not work properly, try to fix it.

Fewer than one in 10 people in the UK attempt to repair or restore items if they are broken, according to new research.

Throw away or repair?

Yes, flat-screen TVs can be repaired, but the repair cost will depend on the extent of the damage. Some common problems with flat-screen TVs include a malfunctioning backlight, a damaged mainboard, or a failing power supply.

3. Recycle



Definition: Reprocess a material or product and make something else.

An ordinary plastic bottle can be broken down into a t-shirt or sweater, a fleece jacket, or jacket insulation.

In fact, about 10 bottles are enough to make a t-shirt.

63 to make a sweater.

Recycled plastic also makes sleeping bags,

**100% Recycled Down,
100% Recycled Fabrics**



5. Reuse

Definition: Use a product to make something else with all or parts of it.

The difference between reuse and recycle is that when you reuse you can still see what the product was in the beginning.

Reused and Recycled



MAKE A TOTE BAG FROM OLD JEANS

When was the last time you wore *that* pair of jeans? Declutter your wardrobe, dust off your old denim and bag yourself a handmade tote, and don't worry – even beginner stitchers can make one of these.



6. Reduce

Definition: Cut down the amount of material and energy you use as much as you can.

For example;

<Bottle>



Resin of container:
39% reduction

CO₂ emissions:
66% reduction
(per on load)

<Refill>

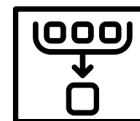


Resin of container:
56% reduction

↓
CO₂ emissions:
58% reduction
(per on load)

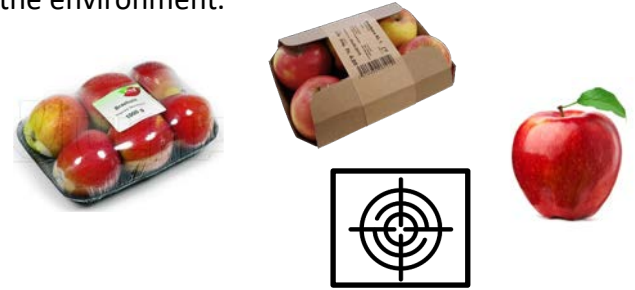
By boosting the performance of concentrated liquid laundry detergent *Attack ZERO* and reducing packaging size, we have been able to greatly reduce use of packaging material resources.

Compared to *Attack 3X*, our existing liquid detergent, the weight of plastic resins used has been reduced by about 39% for the plastic packaging and by about 58% for the refill pack (per one use).



7. Refuse

Definition: Do not use a material or buy a product if you do not need it or if it is bad for people or the environment.



8. Rethink

Definition: Do we make too many products? Design in a way that considers people and the environment.

Burfeind designed Sneature is a sustainable sneaker alternative for the eco-conscious sneakerheads.

The shoe is crafted from many waste materials. The yarn made of dog hair (Chiengora) is a biological waste being upcycled.

The membrane is a protein-based 3D knit made from dog hair.



1. Key Words



Eatwell Guide – the guide which helps us eat the right sort of foods in the correct quantities.

Consistency – how thick or runny a sauce is in cooking (add liquid to make it runnier, boil longer or add something like cornflour to thicken).

Coagulation – when an egg becomes solid by cooking. The eggs in the Savoury Flan coagulate when it cooks in the oven. You know it is cooked when it is no longer runny.



2. Making Shortcrust Pastry



This is the easiest pastry to make from scratch. It can be used to make meat pies, fruit pies, quiches, flans and sweet tarts.

Method:

1. rub-in plain flour and butter (twice as much flour as butter)
2. add tablespoons of water to form into a dough
3. Roll out, fill dish, bake in oven

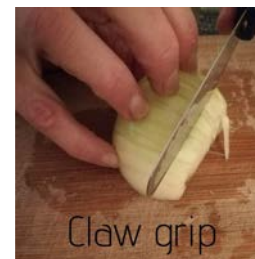
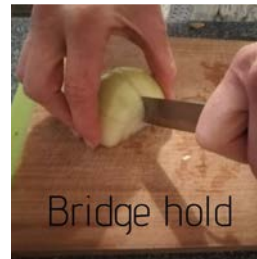
Its best if you have cold hands when rubbing-in. Chill the pastry in the fridge for 10+ minutes if you have time before rolling out.

3. How to chop an onion

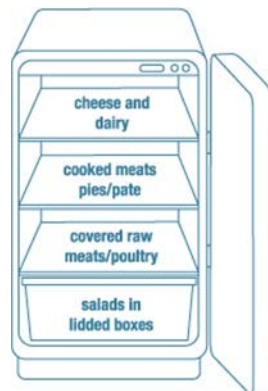


- 1 – Trim off the root (hairy bottom!)
- 2 – Cut the top where the stalk used to be
- 3 – Cut in half through the root end
- 4 – Peel the dry skin off the outside
- 5 – Cut the Hawaiian skirt – lots of cuts towards the root end
- 6 – Cut across to make lots of small pieces of onion

Knife grips:

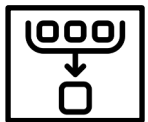


4. Storing foods in the fridge



High-risk foods should be stored in the fridge. Raw meat should be covered and stored BELOW cooked meat. The fridge should be between 1 and 5°C.

5. Foods links to celebrations



ANZAC Biscuits are linked to an important event in history find out what it is! Other foods that are linked to historical events are:

The Victoria Sandwich Cake:



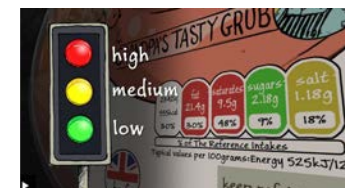
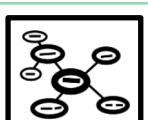
Supposedly a favourite of Queen Victoria for her afternoon tea when entertaining guests.

Coronation Chicken Sandwich Filling:

For the coronation of Queen Elizabeth II in 1953 - diced chicken with a creamy sauce and touch of curry powder



6. Traffic Light Labels



The traffic light labelling system will tell you whether a food has high, medium or low amounts of fat, saturated fat, sugars and salt. It will also tell you the number of calories and kilojoules in the product.

Challenge! Find some foods at home with these labels. How healthy are they?

7. The Nutrition Program

Challenge! Read the instructions below explain how to find out how healthy your recipes are. You can also find out the cost to make your recipe.

Y8 NUTRITIONAL ANALYSIS

Task 1: You will need access to the internet. I would like you to do a Nutritional Analysis of a recipe using The Nutrition Program (link below).

[Nutrition Program : Login : by Jenny Ridgwell](#)

The Login and Password are both

PyrlandY8



Below are ingredients to make Bolognese: (or use another recipe that you have ingredient quantities for)

- 1 onion
- 1 clove of garlic
- 1 carrot
- 1 celery stick (optional)
- 250g minced beef (or turkey, pork, lamb - or vegetarian alternative)
- 1 tin chopped tomatoes (400g)
- 1 tablespoon tomato purée (or ketchup)
- 1 teaspoon mixed dried herbs

Choose 'Create A New Recipe'. Enter the recipe name with your initials and the number of portions (how many people it serves).



Then search for the ingredients and enter the quantity used in the recipe – it will give help on how many grams a normal portion is. Once done click on the **NUTRITION** tab at the top of the page to show the traffic light label. Change the selection (at the top) to 'SHOW 8'. Screen print & copy into a Word document or print this page. This shows the same information that you see on food labels on food packaging to help you decide if a food is healthy.



Task 2: Now use the website of a supermarket to find a similar ready meal (eg: Bolognese ready meal for one). For example - Tesco: [Tesco Groceries](#) or ASDA: [ASDA Groceries](#)

Find the details of the ready meal so it shows the Traffic Light Label with the green/orange/red nutritional label. Screen print it & paste into the same Word document or print out the page.



Task 3: Now write a paragraph on paper or in your Word document saying which is a healthier meal and why. Remember that we need to reduce Saturated Fat, Sugar and Salt in our diet and increase Fibre. The number of calories depends on whether you are an active person or not.

8. Utensils and Equipment



grill pan – to place under the grill



palette knife – to lift pastry off the worktop



rolling pin – to roll out pastry



Quiche dish – porcelain dish to cook quiche in



Wok – for stir-frying



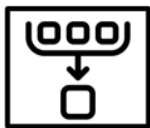
Fish Slice – for lifting food off trays or frying pans

1. Pewter

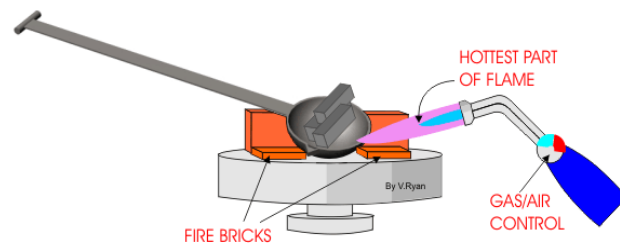
Pewter is an alloy made of tin mixed with antimony and copper. It is soft and flexible, and it can be melted easily. It dissolves in hydrochloric acid to produce tin(II) chloride, leaving the antimony and copper behind in the hydrochloric acid. A long time ago, it was used to make knives, forks, spoons and other pieces of cutlery because it did not take much effort to melt down many times. It used to contain poisonous lead, but it does not contain lead anymore as the lead would make people ill when making things with pewter.

An **alloy** is a uniform mixture. It is made up of two or more chemical elements, of which at least one is a metal. An alloy has properties different from the metals it is made of.

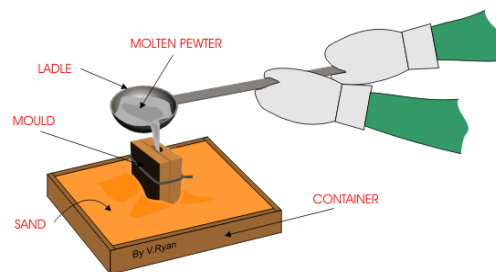
Most alloys are made by melting the metals, mixing them while they are liquid to form a solution, then leaving them to cool and turn solid again.



2. Casting



The diagram below shows pieces of the pewter ingot cut to a size suitable for heating in a ladle. Fire bricks have been arranged around the bowl of the ladle so that the heat from the brazing torch flame is reflected back onto the ladle. As the temperature rises the pewter begins to melt and quite quickly forms a molten liquid.



The molten pewter is then carefully poured into the mould. The mould is set in sand in case any of the molten pewter runs down the side of the mould. If this happens the molten pewter will simply stay on the surface of the sand and cool down. The mould should never be placed on a cold surface. If molten metal comes in contact with a cold surface it will 'splatter' violently. Anyone close to the area will be in serious danger.

3. Health and safety

Carefully pour the pewter into the mould, trying not to over pour the metal. Melt the pewter. **HEALTH AND SAFETY:** As with all casting, it is important to think about safety.

Wear:

Leather apron to protect against spillages.

Leather gloves to protect hands as the mould gets very hot.

Protective eyewear to protect against splashes if the mould is over filled.

Place the mould on a fire-safe surface, ensure the area is well ventilated, and have a fire extinguisher nearby.



4. Observational drawing

When you are asked to produce an observational drawing, it is much more than just copying what you see.

You are trying to show an understand of:

Why and how was the product made?

What influenced the designer?

What do you think the designer was trying to achieve?

What materials have been used?

Why did you choose to write about this product?

What do you like dislike about the design?

Is the design relevant to what it is you want to achieve?

What can you see?



5. Observational drawing

To develop the quality of our written work we use the mantra:

Talk – Explain – Justify – Apply.

Talk and Explain = Year 7

Talk, Explain and Justify = Year 8

Talk, Explain, Justify and Apply = Year 9

Task:

What do you think the designer was trying to achieve?



6-8. Observational drawing

What do you like about this design?
What do you not like about this design?
How might you use this idea in your own work?
(Focus on 1 design each week)



Design and Technology Notes and Reminders Page

