Design Technology in Primary Schools

Flying High Partnership

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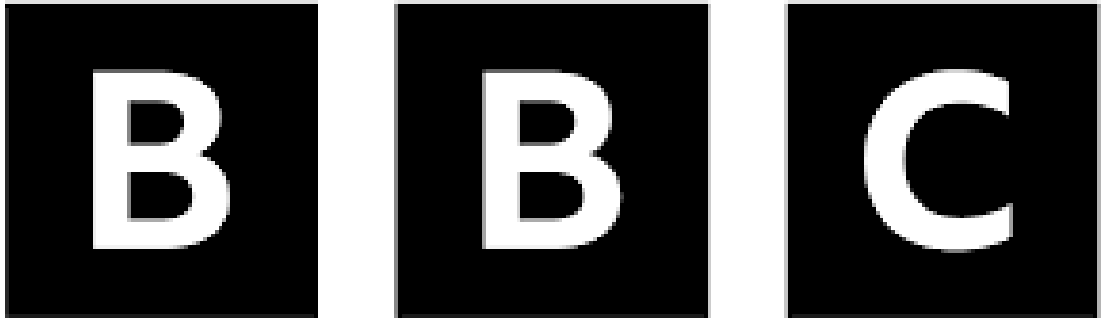
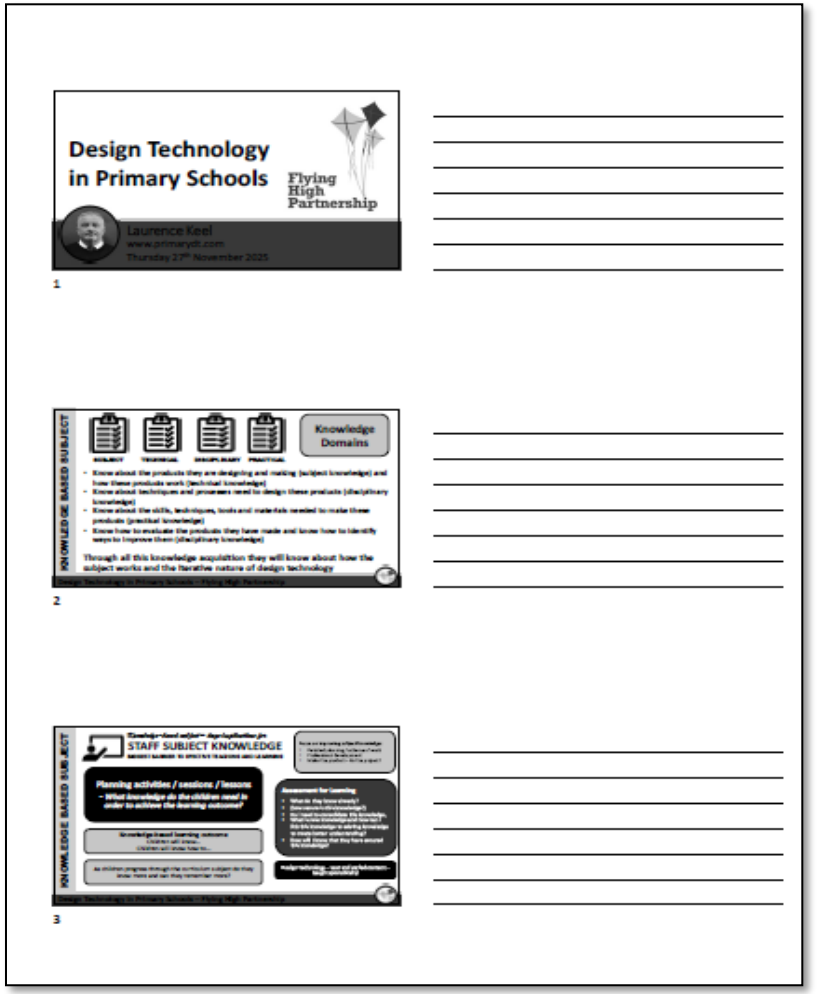
www.primarydt.com

Thursday 27th November 2025



INFORM, EDUCATE, ENTERTAIN

1. We need to talk about Design Technology!
2. Time for a bit of jeopardy!
3. It's about what you know!
4. Principles of Design Technology
5. Creating a Product
6. The Curriculum in Design Technology
7. Decoration Workshop
8. Lesson Types in Design Technology
9. Electrical & Program Systems
10. RoboWars!



216 SLIDES

We need to talk about Design Technology!

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What keeps you awake at night?

LIFE IS DESIGN TECHNOLOGY

DESIGN TECHNOLOGY IS LIFE

life and (teaching) is design technology

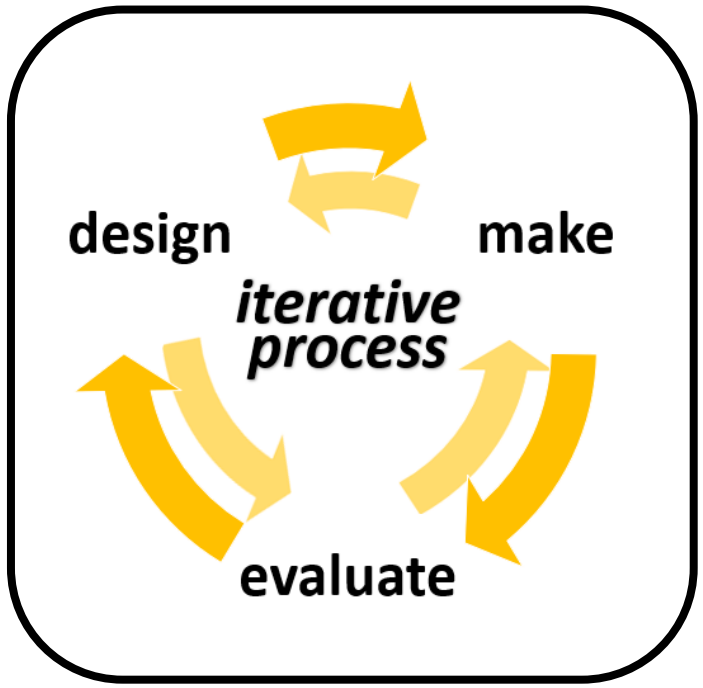
TRAINING OVERVIEW

Outline of the professional development session from a Design Technology perspective

Better understanding of the nature of design technology as a subject

DISCIPLINARY NATURE OF DT

design → make → evaluate



ITERATIVE NATURE OF DT

Cycle of continuous improvement

- *What has worked well before?*
- *What do I want to achieve?*
- *Responding to feedback*
- *Personal reflection*

Planning for today but also 'live' process as the day progresses

Designing is being creative

- To solve a problem
- To find a solution
- To develop a product that fulfils a need
- To create a product that people can use

Training package is a product
Scheme of work is a product

Somebody somewhere has identified a problem – more training is needed in DT?

Solution: Laurence Keel
Product that meets your need and that you can use to solve the problem

Creativity = Knowledge + Imagination

DESIGNER

A designer is someone who has ideas and creates plans for making products

PRODUCT

A product is something that is made to do a job or fulfil a need.

CLIENT

A client is someone who needs, wants or buys the product.

A successful designer designs a product that the client will use or buy.

DESIGNING THE TRAINING

Commissioning Client

- In-person training day (Curriculum, Challenges, Practical & Curriculum Audit)
- 1 x Webcast – Design technology in EYFS
- 1 x Webcast – Design technology in KS1
- 1 x Webcast – Design technology in KS2

Reference Primary DT Scheme of Work

Client Audience

- **Market Research**: What do you need? What do you want?
- **National surveys** – Ofsted Subject Report (there isn't one!)
- Previous experience of providing training / working in schools
- Similar products in the 'marketplace'

DEFINE
the problem or product

Design Brief:

Design and make a training package for DT subject leads.

IDENTIFY
what will make it successful

Design Specifications:

1. Package to be a mixture of face to face and remote recorded training.
2. Focus on the content and delivery of the DT curriculum in primary schools.
3. Include opportunities for practical DT workshops.
4. Support schools in auditing current provision for Design technology in their setting.
5. Showcase curriculum content in PrimaryDT scheme of work

The list of successful features is often called the design specifications.

Design Briefs & Design Specifications

The design brief tells you about the product you are going to create or the problem that you are going to solve.

The design specifications are a list of successful features that tells you what should be in the product, how it should be made and how it should work.

KNOWLEDGE TO MAKE THE PRODUCT

Organisational skills
- Time management
- Timetabling & sequencing
- People skills & management
- Resources

Presentation skills
- Powerpoint (death by…..)
- Public speaking & engagement

Technical Knowledge
- Structures
- Woodworking
- Program systems

Subject Knowledge
- Nature of design technology
- Design technology curriculum

Confidence
- **Training subject content**
- **Troubleshooting when things go wrong (and they will!)**

OUTCOMES FOR THE DAY

DELEGATES (Client Audience)

Evaluation (Outcomes)

- Better understanding of the design technology curriculum and how it can be implemented in schools.
- Confidence in leading the subject and being able to support colleagues.
- Possible solutions to providing an effective scheme of work in design technology.

WHAT ELSE DO YOU WANT?

OUTCOMES FOR THE DAY

FLYING HIGH PARTNERSHIP (Commissioning Client)

Evaluation (Outcomes)

- Improved experiences and outcomes for children in design technology across the partnership.
- Teachers feel supported and confident in teaching design technology.
- Training package delivers the design brief and design specifications.
- Positive feedback from delegates.
- Value for money.

OUTCOMES FOR THE DAY

PROVIDER (Designer)

1. To inspire you to ‘want to teach design technology as opposed to have to teach design technology’.
2. Provide you with the best possible learning experience through delivering activities that improve your knowledge and understanding of design technology.
3. Enable you to confidently support colleagues back at school to deliver effective design technology.

SOURCES OF SUPPORT

PRIMARY DESIGN TECHNOLOGY

Website: www.primarydt.com

- Resources and support
- Webcasts
- Dedicated page for Flying High Partnership

Flying High Partnership Webcasts

3 x Webcasts arranged by phase (EYFS, Key Stage 1, Key Stage 2)

- Curriculum ideas by strands of learning & technical/subject knowledge
- Key learning in design
- Making skills
- Evaluation activities
- Progression of learning

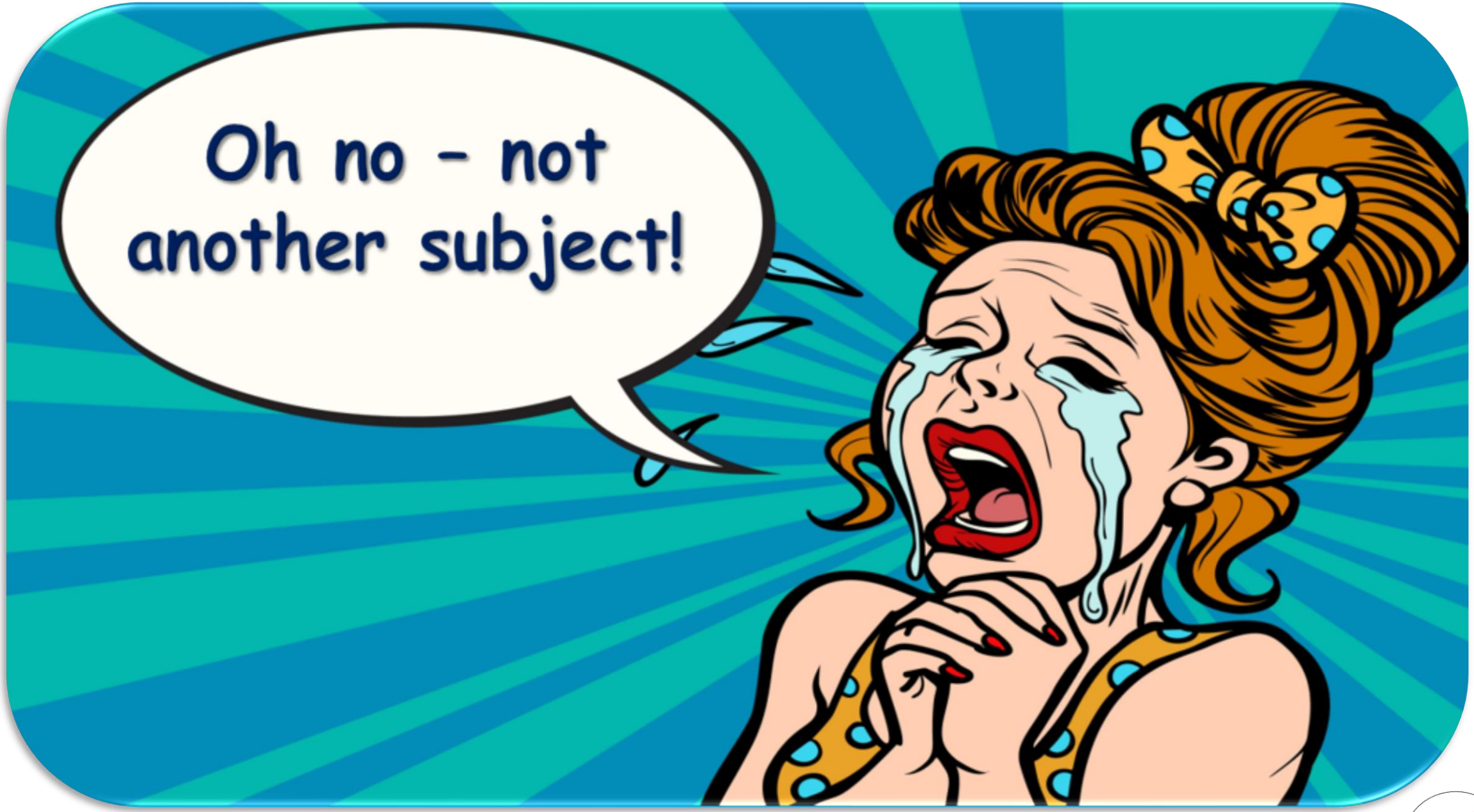
Design Technology Audit of Provision

Staff Confidence & Capability Audit

Access to PrimaryDT scheme of work - £100 per school.

OUTCOMES FOR THE DAY

What we do today is important, but what you do tomorrow, next week and the months that follow is more important!


Oh no - not another subject!

Challenges for Teachers

- Vast curriculum covering many areas / out of comfort zone
- Subject knowledge – confidence and capability
- Practical subject – jeopardy
- Resources – organisation
- Additional support for teaching and learning
- Hyper-children – very excitable
- Focus on curriculum progression – taught sporadically

Opportunities for Pupils

- Chance to shine – different skill sets and abilities
- Hyper-children – practical subject (little writing or adding up)
- Opportunity for meaningful group work/collaboration
- Teach soft (but vital) skills such as team-work, reflect on learning, brainstorming, organisational skills.
- Apply skills from English and Maths (measuring, non-fiction writing)
- Defined end-point – product at the end (children take home, eat it or display it).

What other challenges for teachers and opportunities for pupils are there in Design Technology?

Are we teaching design technology because we must teach it or because we want to teach it?

Teachers wanting to teach Design Technology

- Resources readily available
- Planning, lesson sequencing
- Additional adult support
- Subject knowledge (CPD)
- Skills training (CPD)
- Time to make products

Confidence and capability to teach the subject.

Curriculum & Assessment Review

- **Primary DT is broadly working well and that content is relevant and 'deliverable with guidance' by non-specialist teachers.**
- **Most concern about KS3 – not building upon what has been taught in primary schools.**
- **More specificity over the content of what should be taught to support students to think like designers and engineers**
- **Greater focus on children working with a range of materials and making choice of materials based on their properties.**
- **When designing to consider social responsibilities and sustainability**
- **Realising designs remains integral to pupils' experiences in DT**

Rename: food and nutrition

More details about what is taught in terms of core knowledge and skills:

- **Cooking skills**
- **Food hygiene**
- **Healthy eating**
- **Sustainability**

Time for a bit of Jeopardy!

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Making a Wooden Framework

Measuring Your Frame

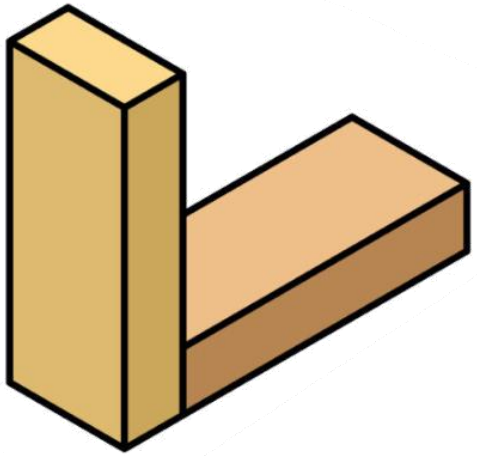
Your photograph frame should surround your photograph.

Measure the length of your photograph and then add an extra 2cm.

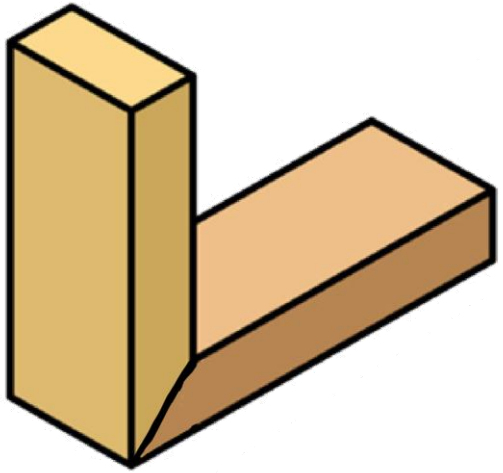
Measure the width of your photograph.

KNOWLEDGE & SKILLS

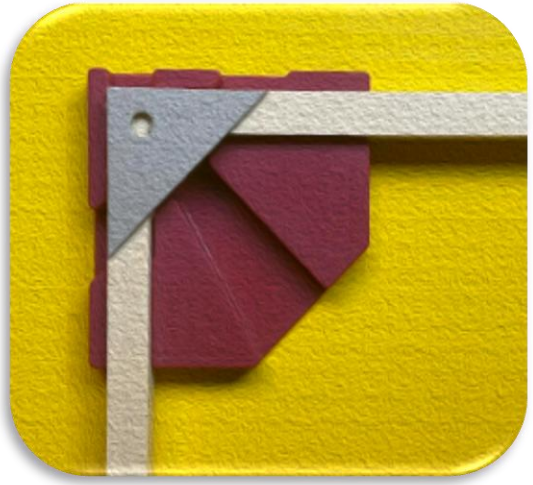
Joining Wood Together



Butt Joint



Mitre Joint



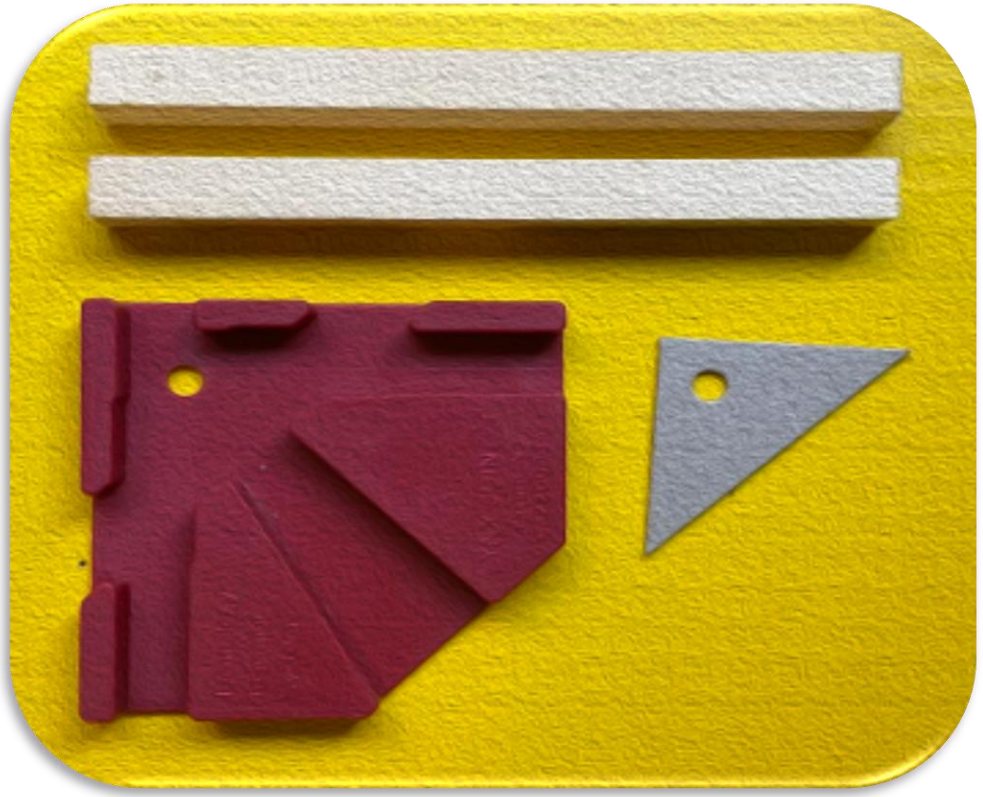
The Jinks Method

In this session you will learn how to:

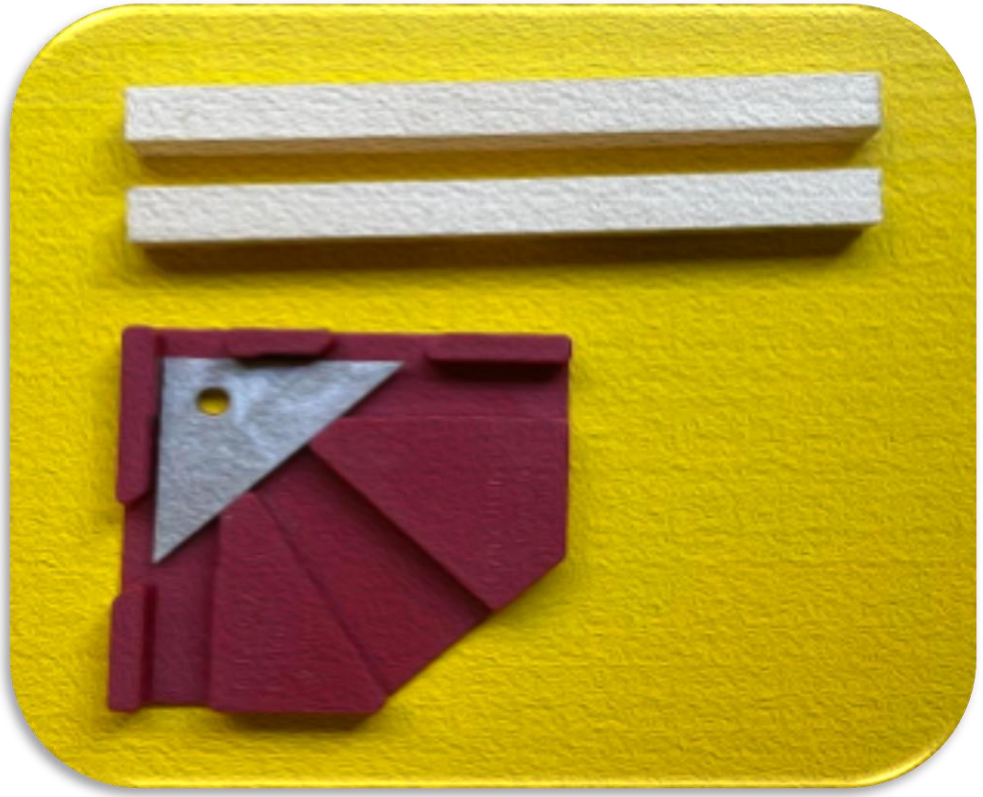
- Make a wooden frame that is strong, stiff and stable.
- Join wood together to create a corner
- Strengthen frameworks by using triangle card corners.

KNOWLEDGE & SKILLS

Making a Wooden Framework

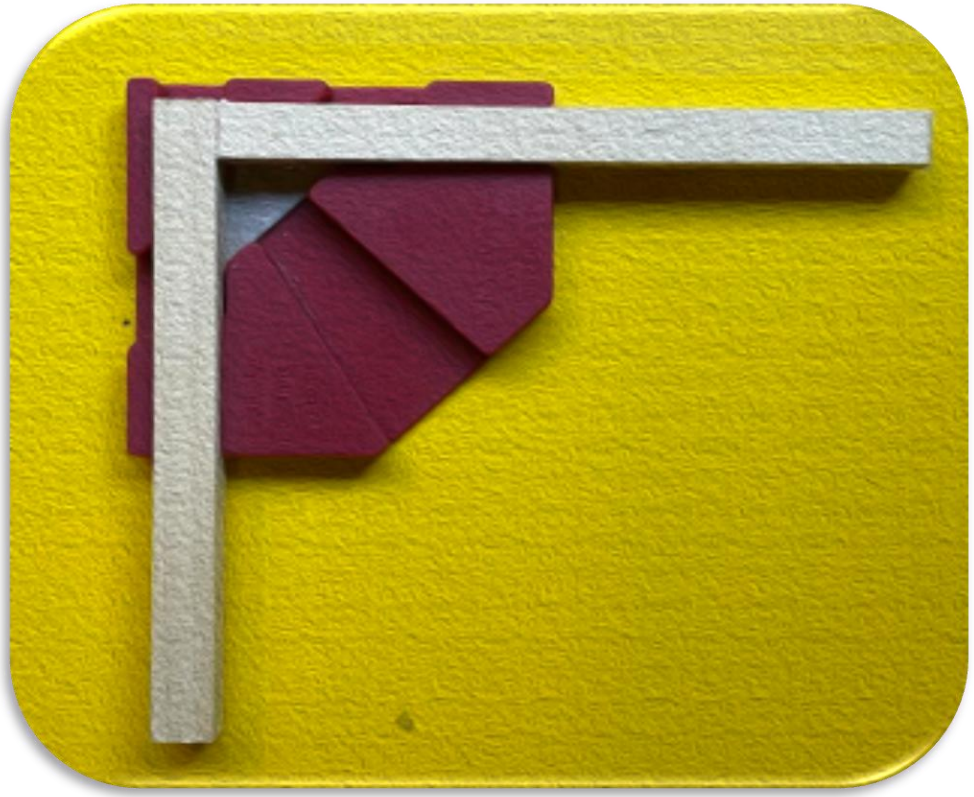


You will need: 10mm squared wood
Lynx Jointer PVA Glue
Card triangle Glue spreader

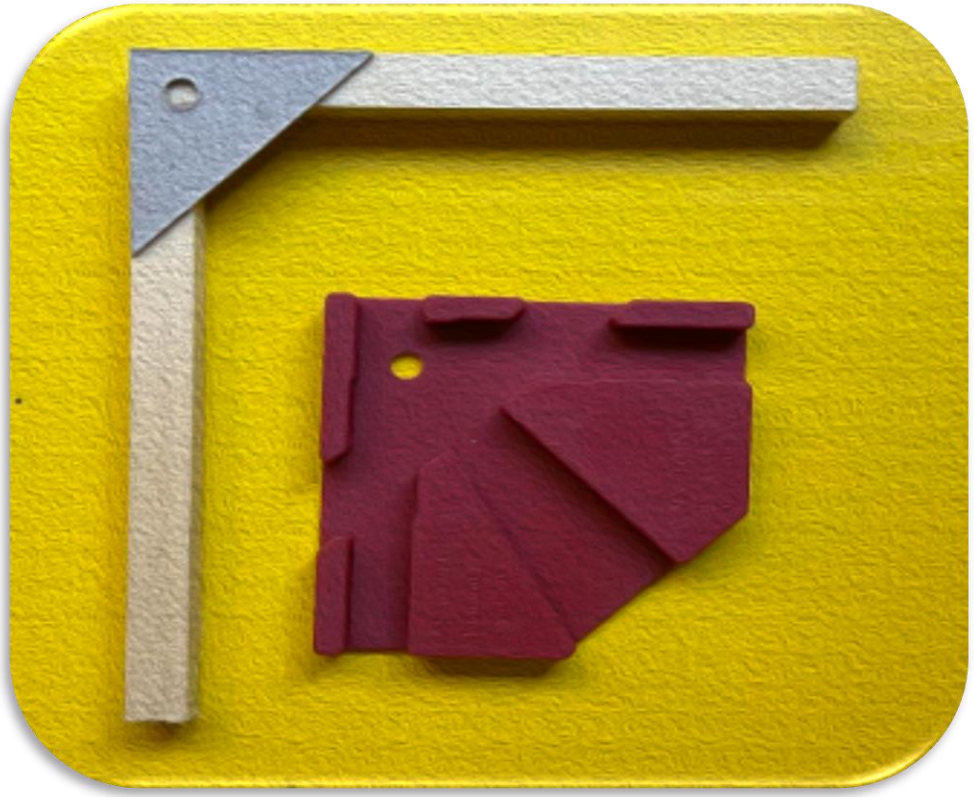


Smear one side of the triangle with PVA glue and place in Lynx jointer, with glue side facing up

Making a Wooden Framework



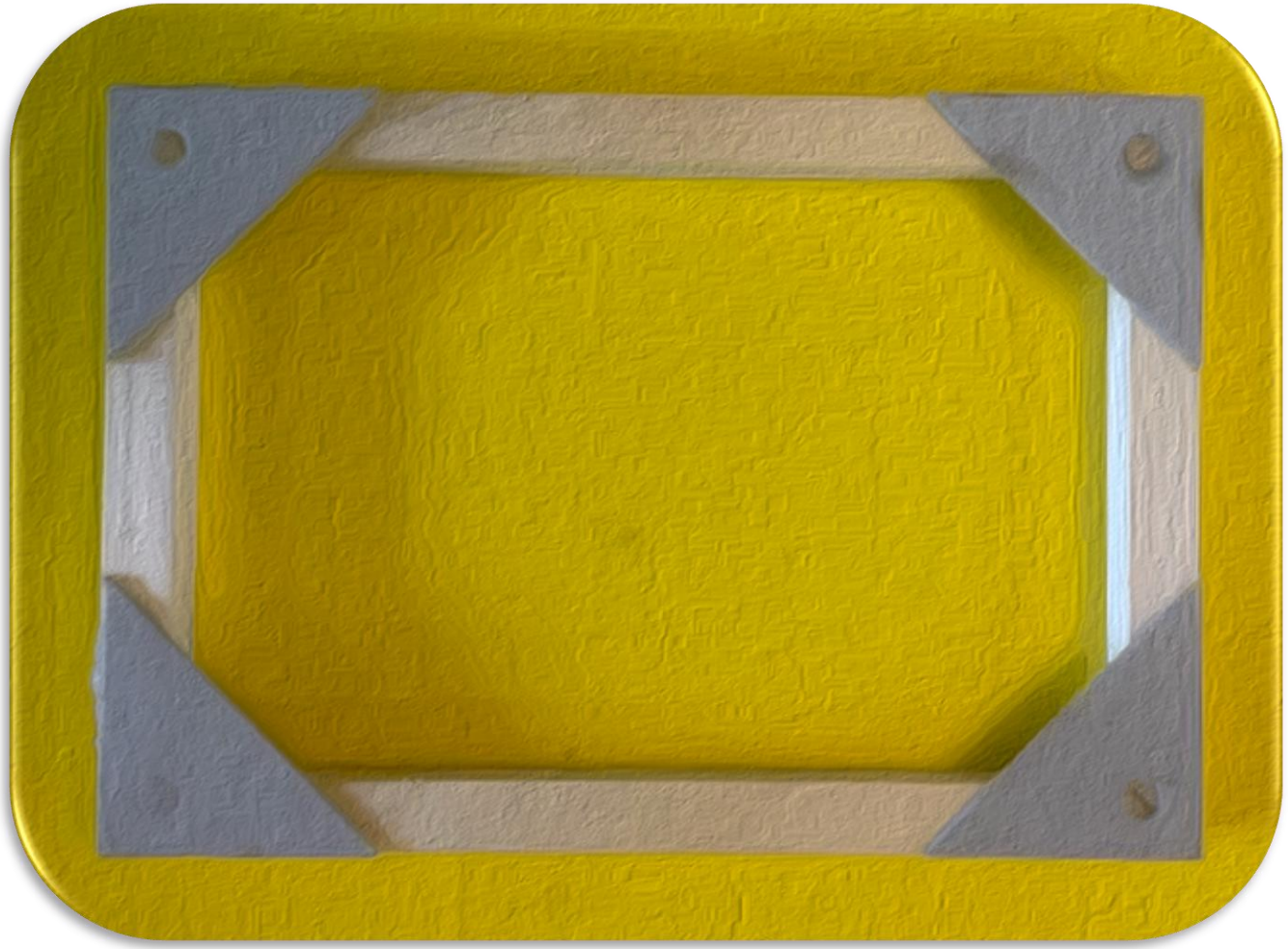
Fit the two pieces of wood into the Lynx jointer, adding PVA glue (or a spot of glue from a glue gun) to the join.



Leave to dry for 20 minutes before removing the wooden joint from the Lynx jointer.

KNOWLEDGE & SKILLS

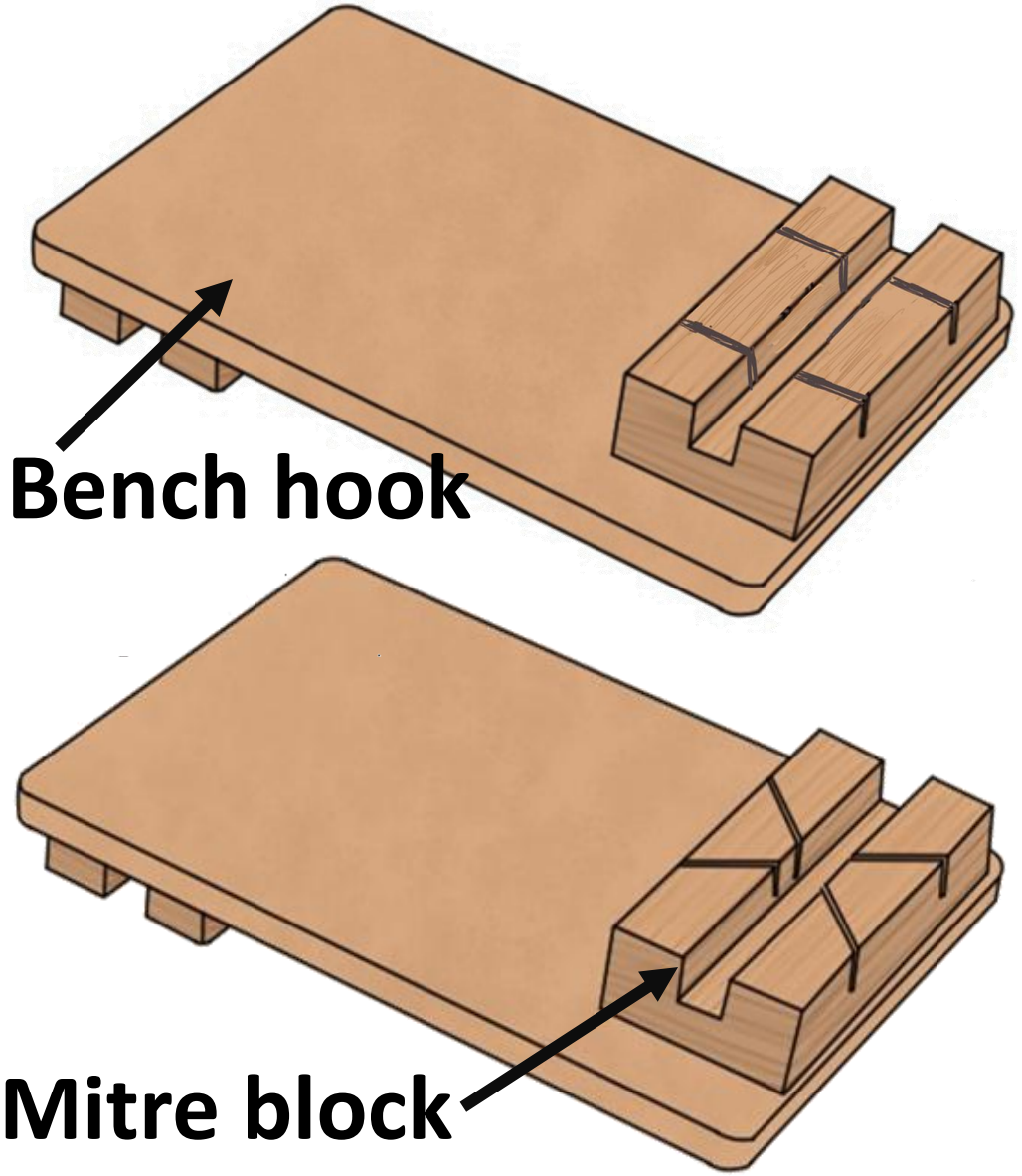
Making a Wooden Framework



Wood is a material that offers strength and stiffness when using it to make a product.

The cardboard triangles in each corner help to provide added strength and stability.

CUTTING WOOD USING A BENCH HOOK



Place the wood strip in the mitre block of the bench hook.

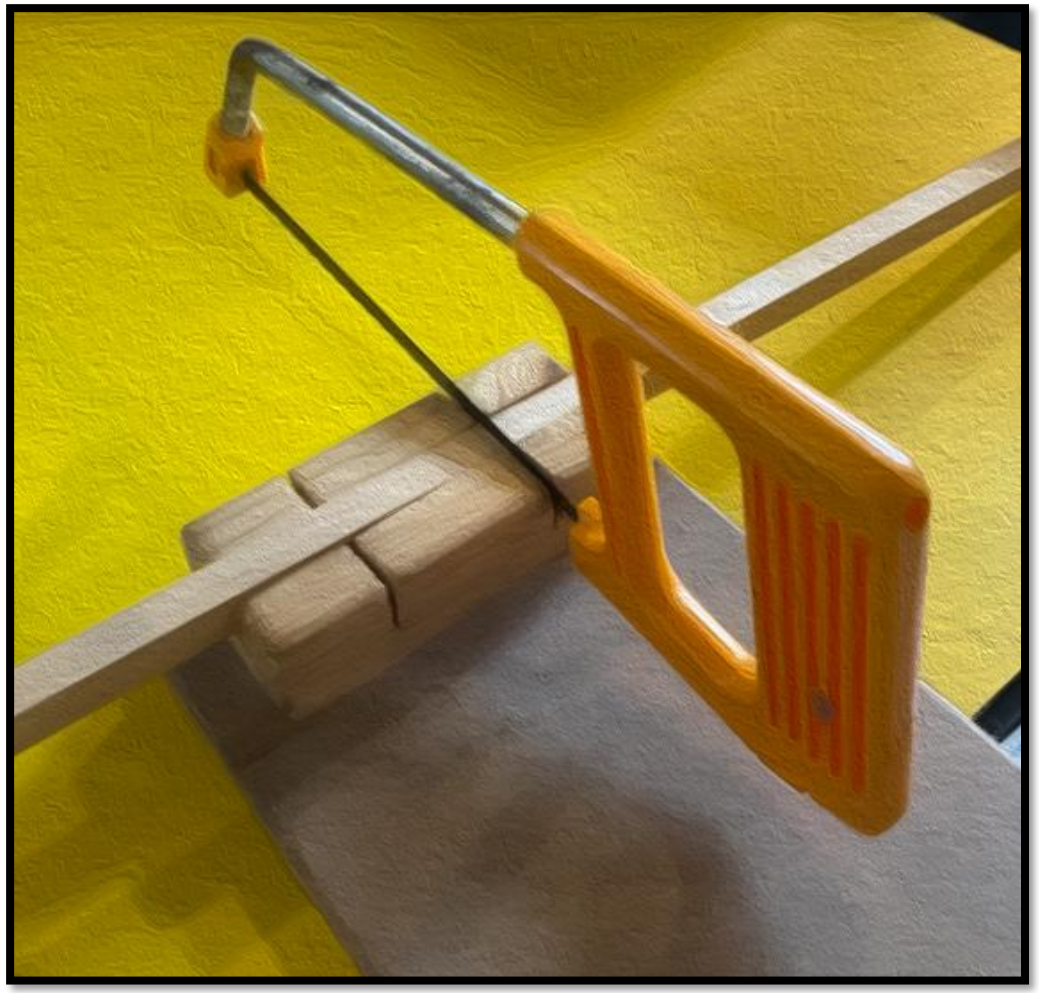
Hold the hack saw with one hand.

Place the other hand on the bench hook, away from the saw.

Begin by pulling the saw back before gently sawing the wood – try to keep the cut straight.

KNOWLEDGE & SKILLS

CUTTING WOOD USING A BENCH HOOK



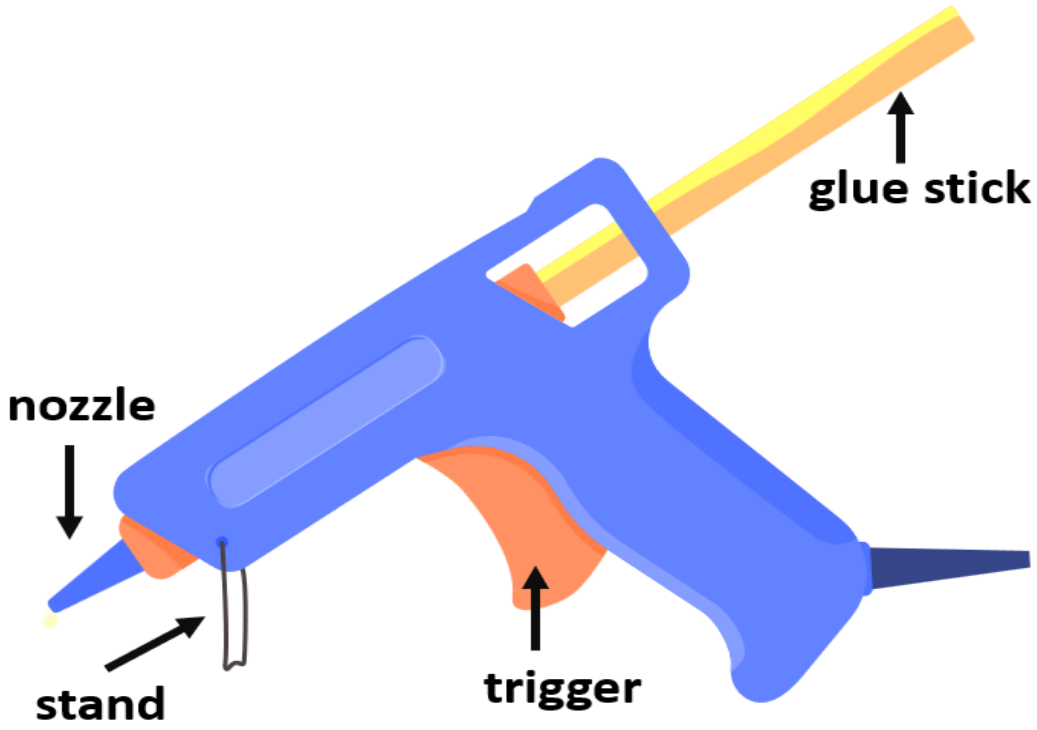
Basic Butt Joint

Basic Mitre Joint

KNOWLEDGE & SKILLS

Using a Glue Gun

- Always place a glue mat or sheet of paper under where you are working
- Allow time for the glue gun to heat up (5 minutes)



- **Never touch the hot glue**
- **Place the glue gun back on its stand when you are not using it**
- **Always follow the instructions of the teacher**

As you press the trigger the glue stick is pushed forward and the heat inside the glue gun melts the glue stick and pushes the molten glue out of the nozzle.

CHILDREN'S SAFETY BRIEFING

GLUE GUN SAFETY BRIEFING

PRIMARY DESIGN TECHNOLOGY

USING A GLUE GUN PROPERLY

Only use a glue gun if the teacher has said that you can and there is an adult nearby to supervise its use.

Do not touch the hot glue gun nozzle.

Only use a small amount of glue – do not let it drip.
If there are drips – don't touch them – they may be hot.

PRIMARY DESIGN TECHNOLOGY

USING A GLUE GUN PROPERLY

Never point a glue gun at anyone else – they are not toys to mess around with.

Wear safety goggles at all times when using the glue guns

Always replace the glue gun back in its stand after use.

PRIMARY DESIGN TECHNOLOGY

GLUE GUN – WHAT IS THE RISK?

Touching the hot nozzle or your skin coming into contact with the hot glue will result in a burn.

What to do if you get burnt

- Hold the burnt area under a cold running tap for ten minutes
- Tell the teacher – you may need more first aid

PRIMARY DESIGN TECHNOLOGY

KNOWLEDGE & SKILLS

WOODWORK LICENCE

Tasks that need to be completed successfully to gain your woodwork licence

1. Accurately measure and mark out a strip of wood 10cm long using a ruler.
2. Accurately measure and mark out a strip of wood 5cm long using a ruler.
3. Demonstrate how to hold a hacksaw using the pistol grip.
4. Accurately cut strips of wood 5cm and 10cm long using a bench hook and hack saw.
5. Create a right-angle corner joint using the lengths of wood using the Jinks method.
6. Correctly join materials using PVA glue and a glue gun.
7. Demonstrate the correct procedures for keeping themselves safe when working with wood.

KNOWLEDGE & SKILLS

WOODWORK LICENCE

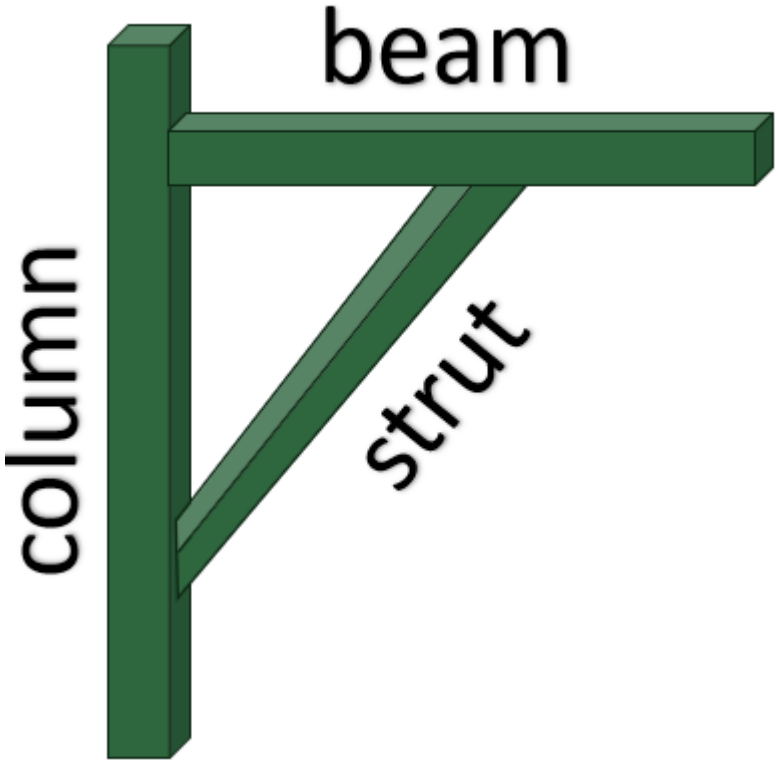
This is to certify that

_____

has successfully demonstrated key skills in woodwork

FRAMEWORK STRUCTURES

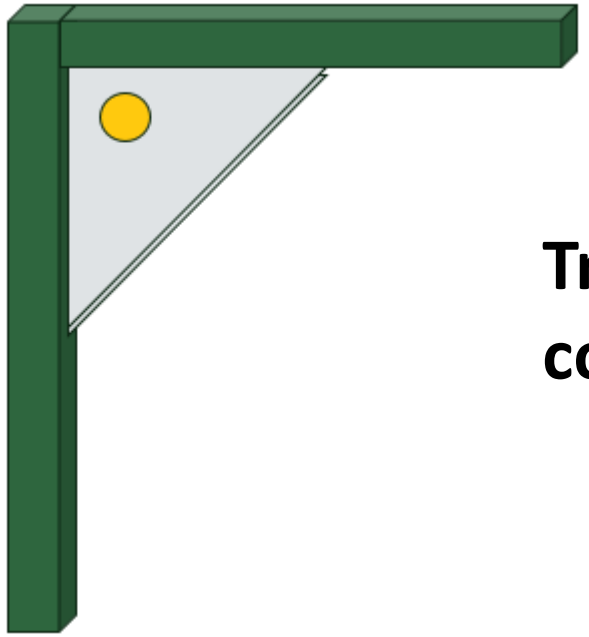
Framework structures are composed of vertical and horizontal pieces known as columns (vertical) and beams (horizontal).



Struts are used to create triangles between the columns and beams to increase strength and stability.

FRAMEWORK STRUCTURES

Framework structures can be made stronger, stiffer and more stable by using triangulation.



Triangular card can be added to the corners to strengthen the corners.

It’s all about what you know!

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KNOWLEDGE BASED SUBJECT

SUBJECT

TECHNICAL

DISCIPLINARY

PRACTICAL

Knowledge Domains

- Know about the products they are designing and making (subject knowledge) and how these products work (technical knowledge)
- Know about techniques and processes need to design these products (disciplinary knowledge)
- Know about the skills, techniques, tools and materials needed to make these products (practical knowledge)
- Know how to evaluate the products they have made and know how to identify ways to improve them (disciplinary knowledge)

Through all this knowledge acquisition they will know about how the subject works and the iterative nature of design technology

KNOWLEDGE BASED SUBJECT

Knowledge-based subject – huge implications for

STAFF SUBJECT KNOWLEDGE

BIGGEST BARRIER TO EFECTIVE TEACHING AND LEARNING

Focus on improving subject knowledge:

- Detailed planning / scheme of work
- Professional development
- Make the product – do the project!

Planning activities / sessions / lessons

- *What knowledge do the children need in order to achieve the learning outcome?*

Knowledge-based learning outcome

Children will know…

Children will know how to…

As children progress through the curriculum subject do they know more and can they remember more?

Assessment for Learning

- What do they know already?
- (how secure is this knowledge?)
- Do I need to consolidate this knowledge,
- What is new knowledge and how can I link this knowledge to existing knowledge to create better understanding?
- How will I know that they have secured this knowledge?

Design Technology – vast and varied content – taught sporadically!

KNOWLEDGE BASED SUBJECT

WHAT KNOWLEDGE HAVE YOU LEARNT?

WHAT DOES IT MEAN TO LEARN?

SUBJECT KNOWLEDGE
Knowing about the product

TECHNICAL KNOWLEDGE
Knowing how the product works

DISCIPLINARY KNOWLEDGE
Knowing how the subject works

PRACTICAL KNOWLEDGE
Knowing skills & techniques to create a product

Principles of Design Technology

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The principles of effective design technology are that children:

- Design and make a product
- Build knowledge
- Understand the iterative process
- Make design decisions
- Work in relevant contexts

DESIGNING & MAKING A PRODUCT

At the end of the unit of work, children should have created a product.

When thinking about a product for the children to design and make, ask yourself these questions:

- Is there an intended user/client for the product?
- Does the product have a purpose or a function?
- Does the product fulfil a need?
- Is the product meaningful?
- Can it be easily tested? (does it function as intended?)

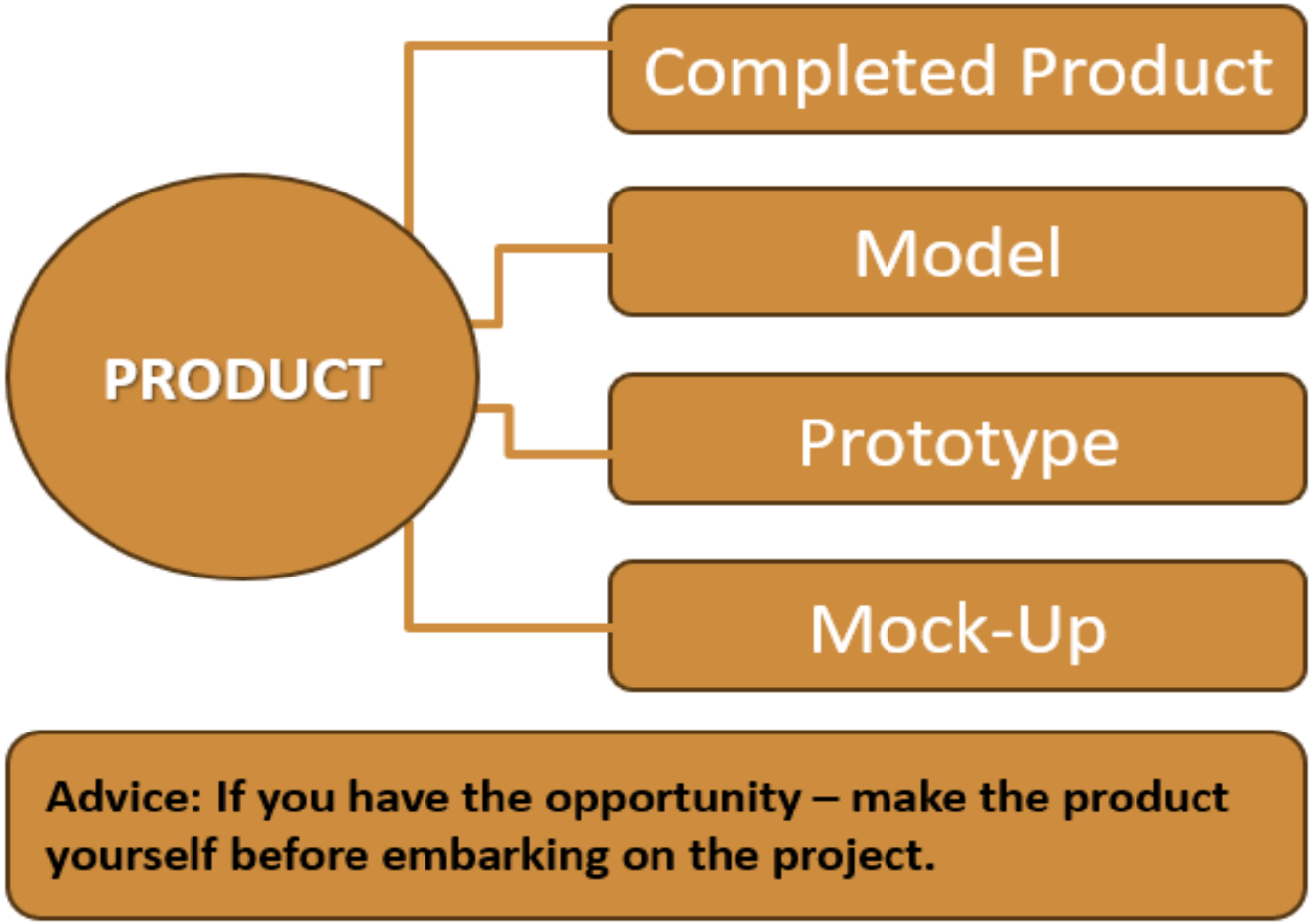
Moon Buggy

Tudor House

Mayan Headdress

DESIGNING & MAKING A PRODUCT

At the end of the unit of work, children should have created a product.



Advice: If you have the opportunity – make the product yourself before embarking on the project.


Mock Up: Marble Run Toy

DESIGNING & MAKING A PRODUCT

At the end of the unit of work, children should have created a product.

Who is the intended user of the product?

You

Someone you know

Organisation

Event

Having a known client makes it real-life, relevant and testable

KNOWLEDGE BUILDING

The national curriculum for design and technology aims to ensure that all pupils:

Build and apply a repertoire of knowledge, understanding and skills in order to design and make high-quality prototypes and products for a wide range of users.

SUBJECT **TECHNICAL** **DISCIPLINARY** **PRACTICAL**

GETTING BETTER

- Knowing more
- Remembering more
- Designing, making and evaluating
- Linking knowledge to create better understanding
- Applying knowledge and understanding in new situations

Applying a range of skills

- Wider skill set
- Accuracy
- Confidence
- Independence
- Quicker
- Safer

KNOWLEDGE BUILDING

Developing a Design Technology Curriculum that:

- Identifies key knowledge that children must know at each stage of their learning.
- Teaches this key knowledge, ensuring that it is remembered and retained (learning).
- Knowledge is built up in small chunks of learning that are carefully sequenced.
- Builds in opportunities to revisits key knowledge.
- Builds upon existing knowledge linking it to new knowledge to create a better understanding.

↓

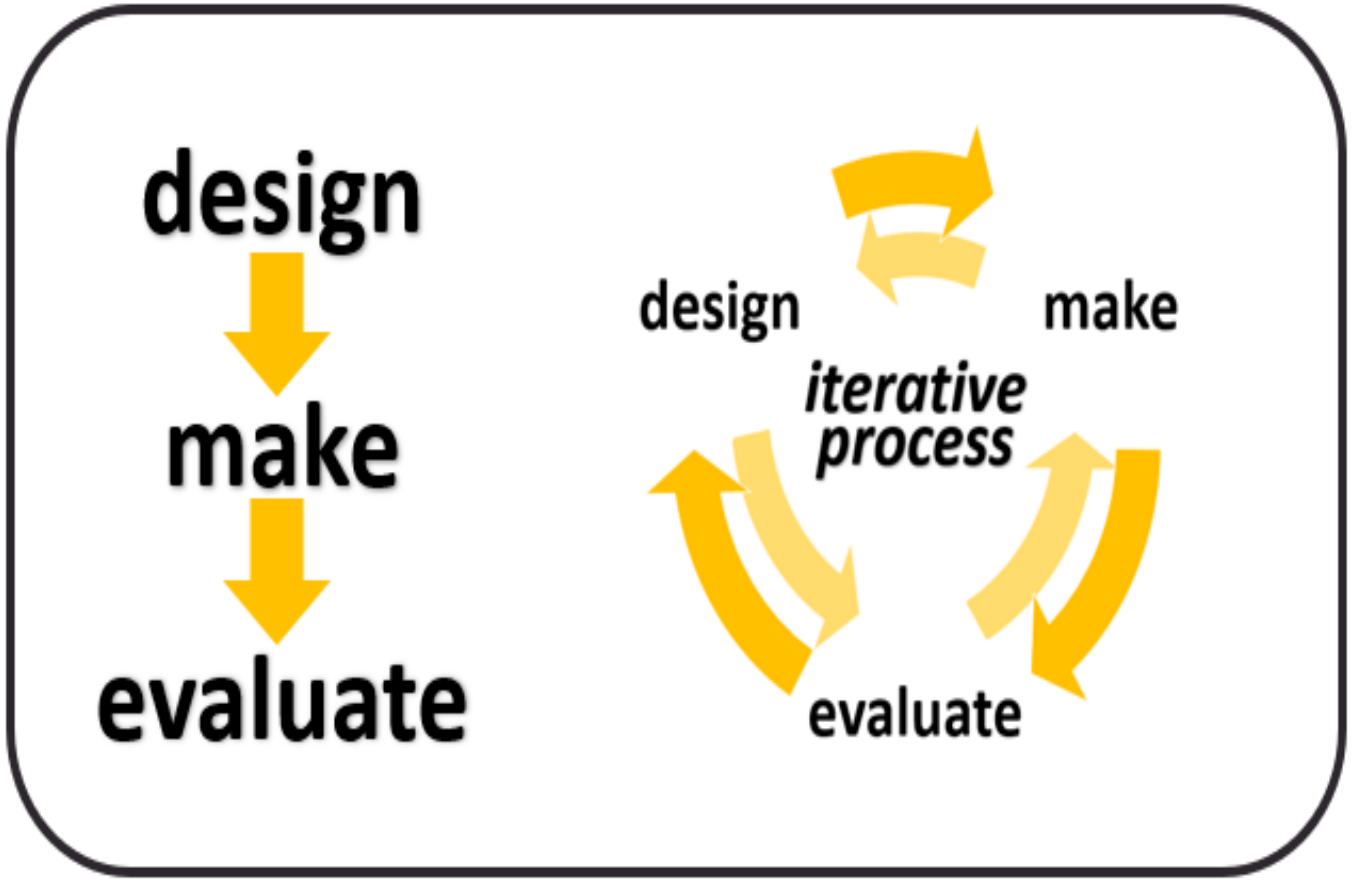
PROGRESSION DOCUMENT

↓

ASSESSMENT & TRACKING

THE ITERATIVE PROCESS

Design Technology National Curriculum: Through a variety of creative and practical activities, pupils should be taught the knowledge, understanding and skills needed to engage in an iterative process of designing and making.



MAKING DESIGN DECISIONS

CREATIVITY = KNOWLEDGE + IMAGINATION

Design is about being creative to:

- Solve a problem or find a solution.
- Develop a product that fulfils a need.
- Create a product that people can use.

Children as designers:

- Need knowledge to combine with their imagination to be creative.
- Are not experts – they need to be taught the disciplines of design
- Need to make decisions that affect the design of the product they are creating to be authentic.

RELEVANT CONTEXTS

National Curriculum Key Stage 1
They should work in a range of relevant contexts
[for example, the home and school, gardens and playgrounds, the local community, industry and the wider environment].
National Curriculum Key Stage 2
They should work in a range of relevant contexts
[for example, the home, school, leisure, culture, enterprise, industry and the wider environment].

School can develop a design technology curriculum that is local and reflects the school context and community making the subject culturally relevant for the children.

Opportunity to engage stakeholders

- Parents (help, support and resources)
- Community and local businesses
- Enrichment opportunities

Creating a Product

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WHAT IS THE PURPOSE AND FUNCTION OF A PHOTOFRAME?

- Who has photograph frames at home?
- What's in the photograph frame?
- Why do people have photograph frames? - Purpose
- What should a photograph frame do? – Function
- How has the photograph frame been made?
- What materials have been used and why?
- How does the choice of material relate to its properties?
- How has the photograph frame been made stronger, stiffer and stable?

SUBJECT KNOWLEDGE
Knowing about the product

TECHNICAL KNOWLEDGE
Knowing how the product works

Challenge: Can you make the photograph stand up by itself?

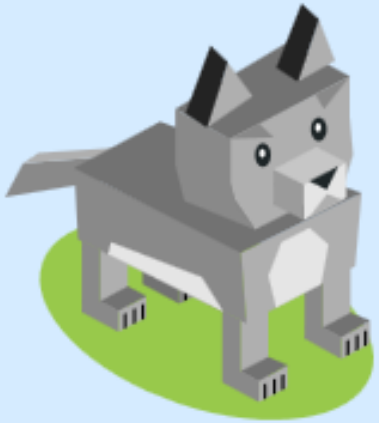
Test out your ideas

Trying out ideas, making models and testing whether they work, is an important part of designing.

Carefully cut out the photograph.
With the remaining paper, can you make a structure that will make the photograph stand upright by itself?

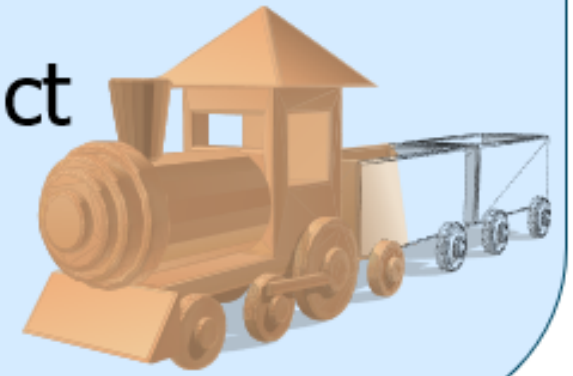
WHAT IS A MODEL?

A model is a small version of your product or product design.



A model can be used to try out your design ideas to see whether you like them or if they will work.

A model can help when designing a product or can be used to help to understand or explain how a product works or is made.

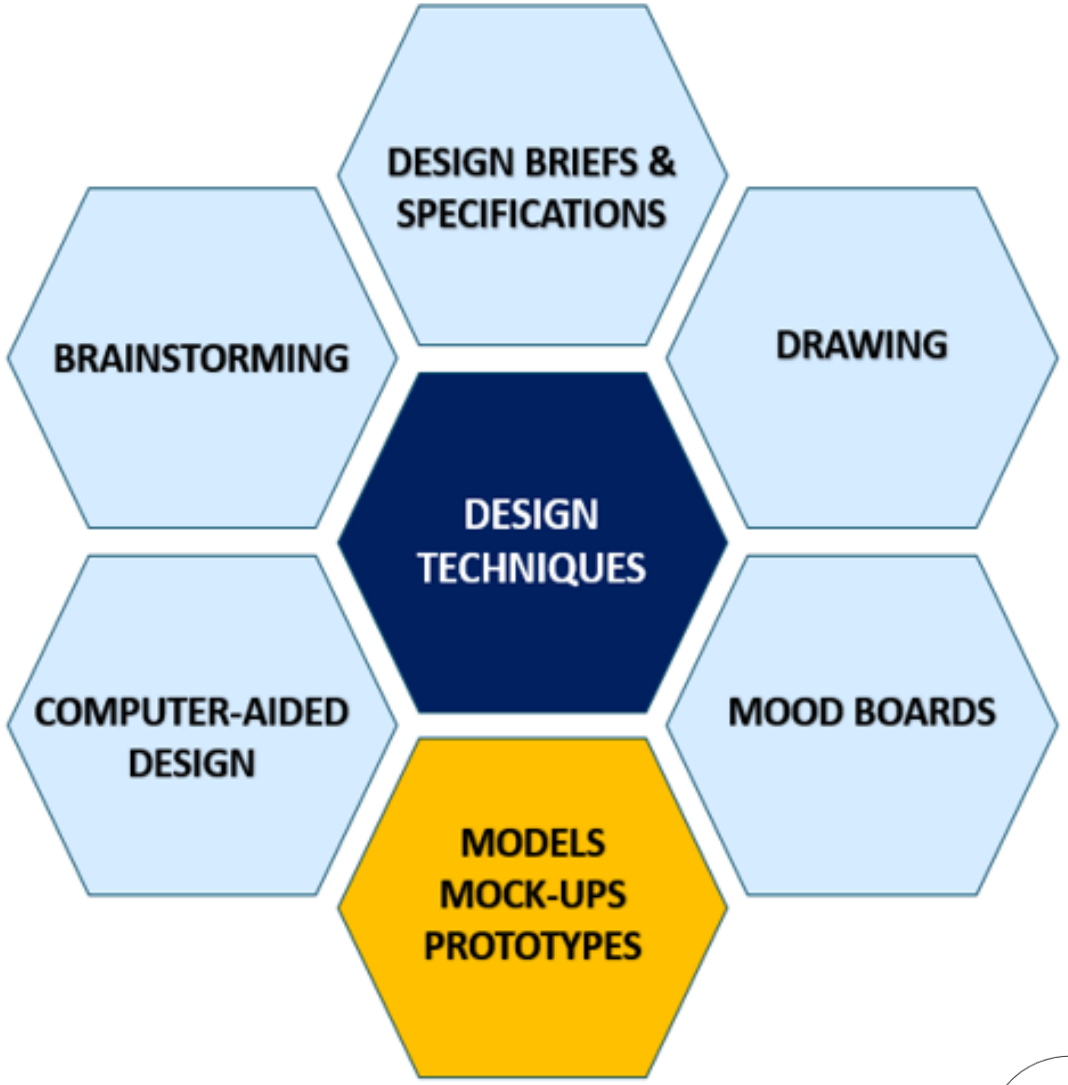


THE CREATIVE PROCESS: DESIGNING

DISCIPLINARY KNOWLEDGE
Knowing how the subject works

DESIGNING

- Look at existing products / solutions
- Finding out what the client wants
- Gathering together thoughts and ideas
- Firming up ideas / choosing solutions
- Creating a final design



THE CREATIVE PROCESS

DESIGN

- Look at existing products / solutions
- Finding out what the client wants
- Gathering together thoughts and ideas
- Firming up ideas / choosing solutions
- Creating a final design

MAKE

- Making the product, following designs
- Making a model / mock-up / prototype
- Adapting and improving as you are making

EVALUATE

- Evaluating the product
- Evaluating the process
- Evaluating the project

Trying out ideas – to see if they work or can be used. Communicating with clients

Evaluating and refining ideas Making improvements.

Decide on a Final Design for your product. Explain how it will be made and the materials that are needed

Use the design to make the product

USING MODELS TO TRY OUT IDEAS

Waistcoat Challenge

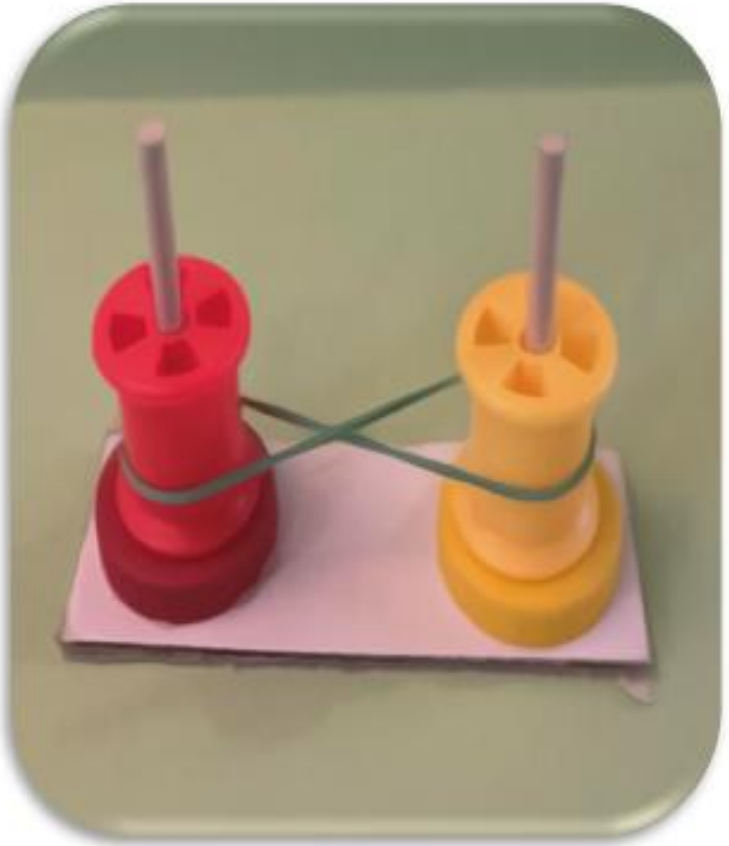
Paper Phone Cover

Photograph frame

USING MODELS TO SEE HOW IT WORKS

Levers and Linkages

Shadow Puppet Theatre



Pulley System

USING MODELS TO COMMUNICATE IDEAS

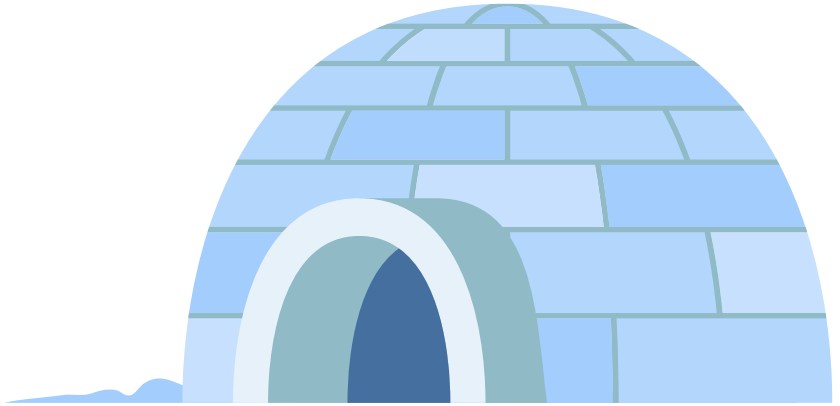
Monkey Enclosure

Marble Run Toy

Build a Buddy

What is a structure?

A structure is made by combining materials or parts to create a three-dimensional shape.



What material has been used to create the dog kennel?

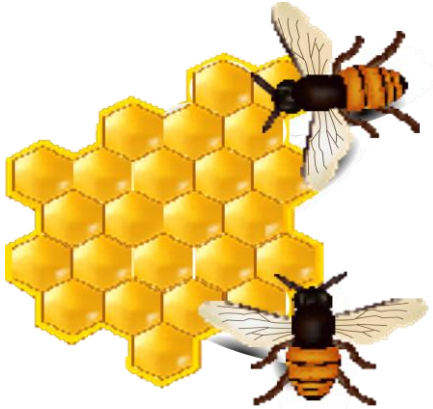
What materials has been used to create the igloo?

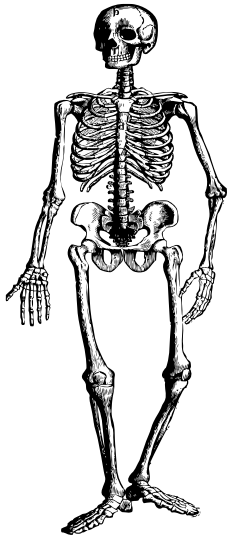
TECHNICAL KNOWLEDGE

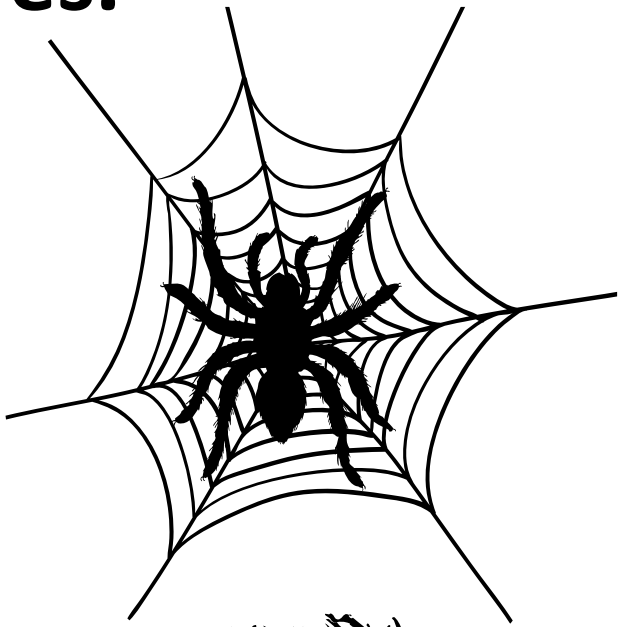
STRUCTURES

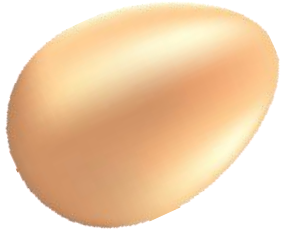
The world around us is full of structures.

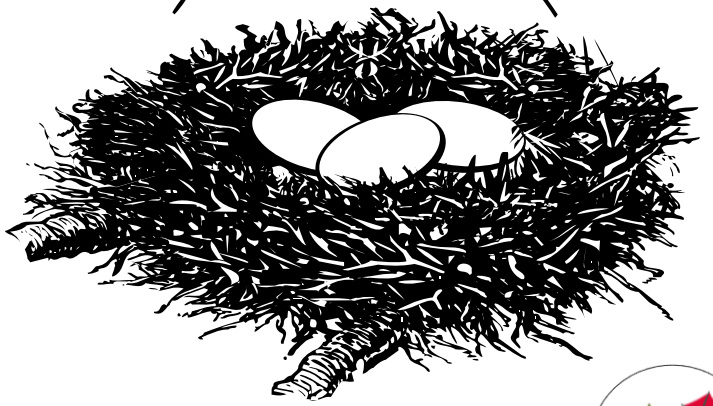
Some structures are natural.







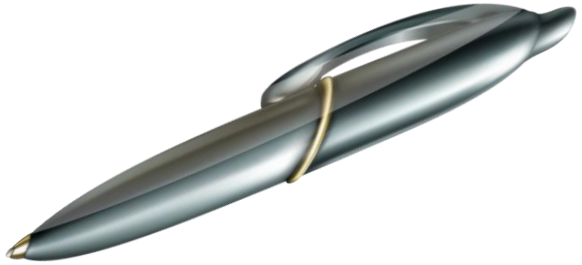


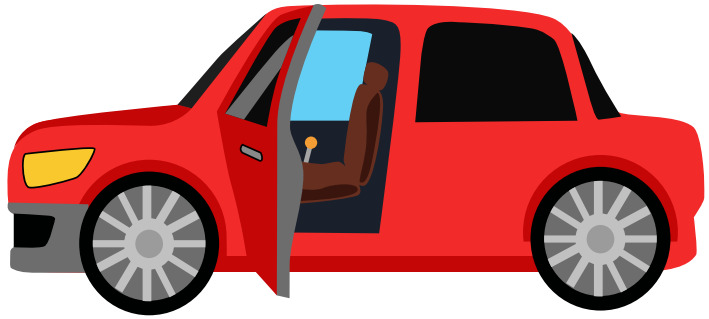


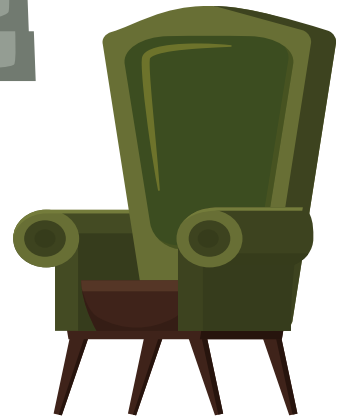
STRUCTURES

The world around us is full of structures.

Some structures are made by humans (man-made).







STRUCTURES

There are 3 basic types of structures:

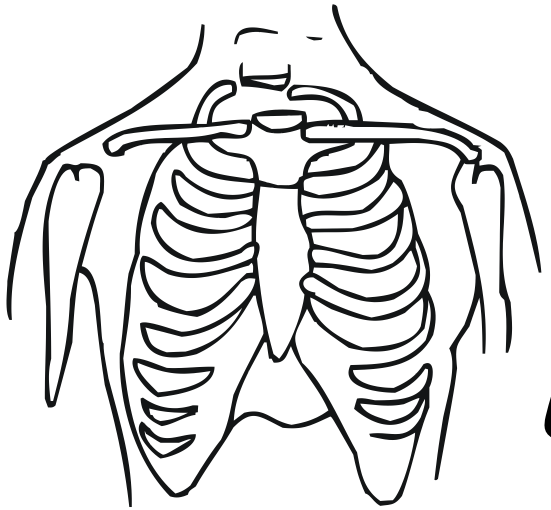
- Frame structures
- Shell structures
- Solid structures

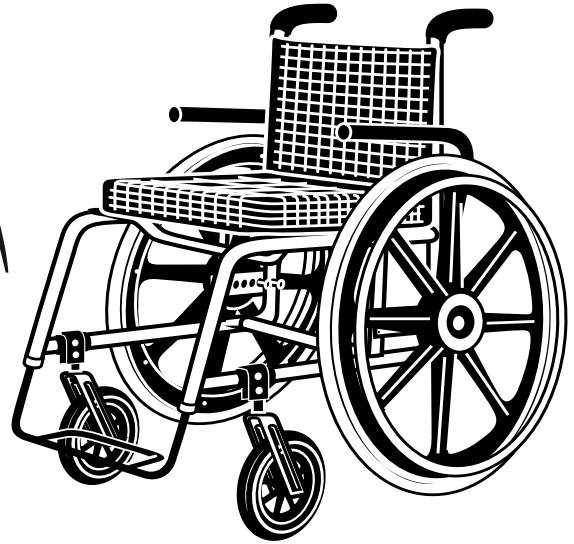
Solid structures are strong, stiff and stable due to their mass.
Examples: ***Dams, the pyramids, brick wall***

FRAME STRUCTURES

Frame structures are constructed from pieces linked together to create a strong unit.

Examples of Frame Structures

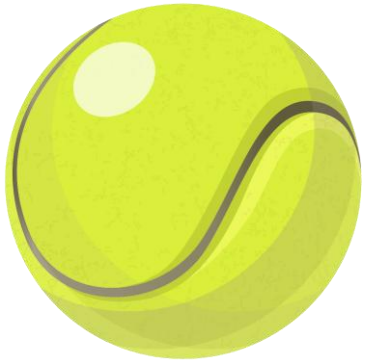




SHELL STRUCTURES

A shell structure is a hollow structure made from a thin outer layer. Shell structures get their strength, stiffness and stability from their shape and the materials that they are made from.

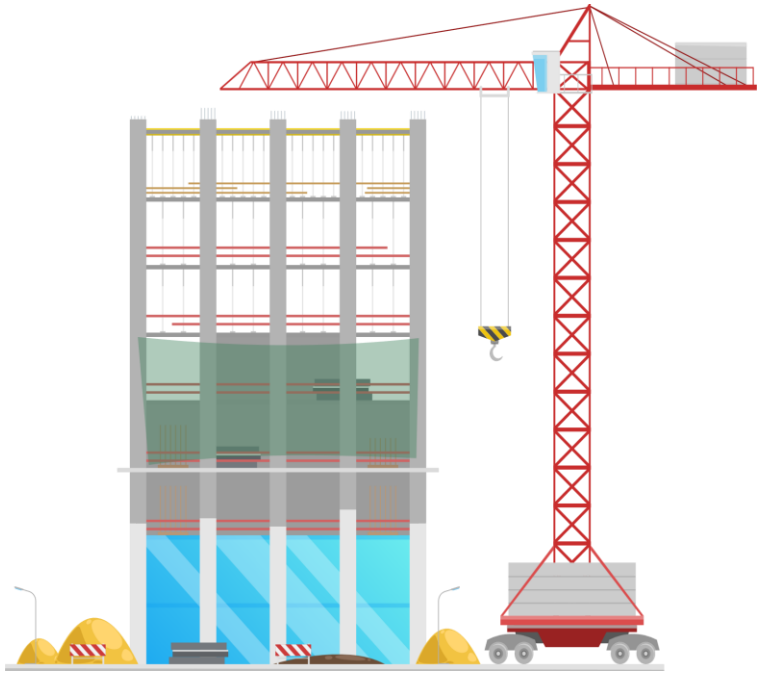
Examples of Shell Structures



COMBINED STRUCTURES

Many structures are created by combining both frame and shell structures

Tents are a framework structure covered by sheet material to create a shell structure.

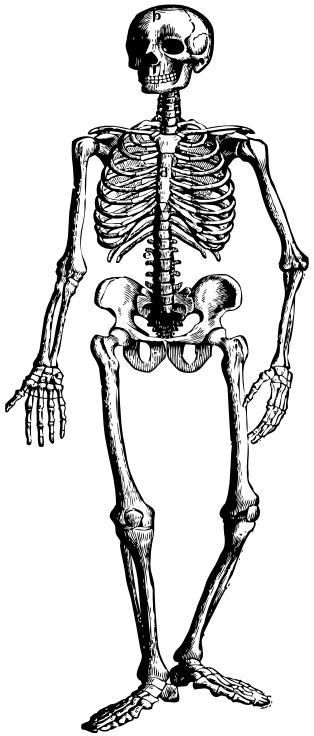


Many tall buildings are made by creating a strong framework then adding an outer shell **– this shell is called cladding.**

STRUCTURES

Structures are things that provide support.

Structures support weight or hold things together



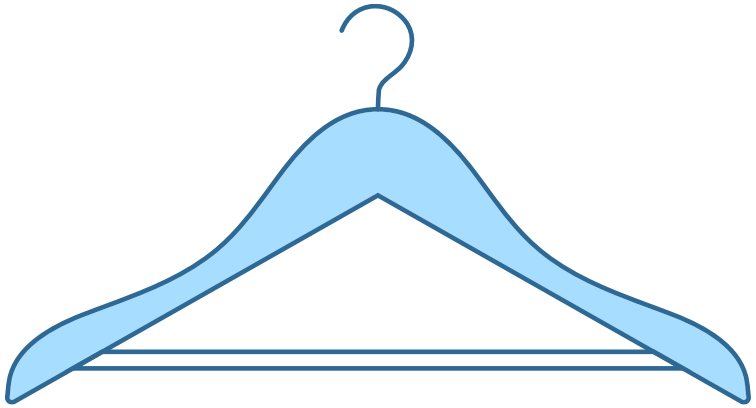
Our skeleton holds up our body and allows us to move

Our skin is a structure that holds all our organs inside our body

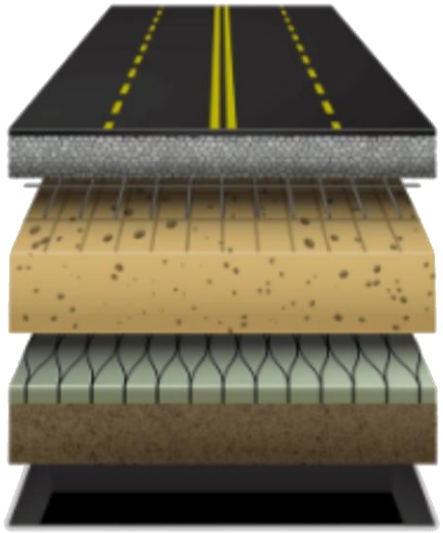
STRUCTURES

Structures are things that provide support.

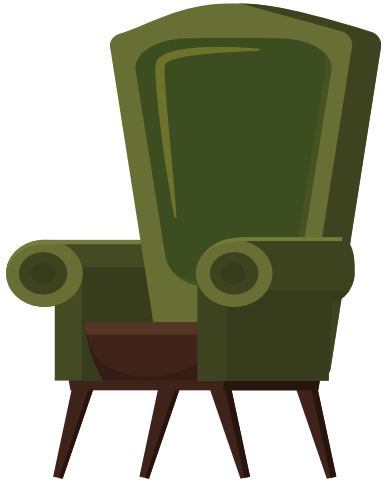
Structures support weight or hold things together



A coat hanger supports the weight of clothes



The layers of a road support the weight of vehicles and stop them sinking into the mud



A chair supports the weight of the person sitting in it

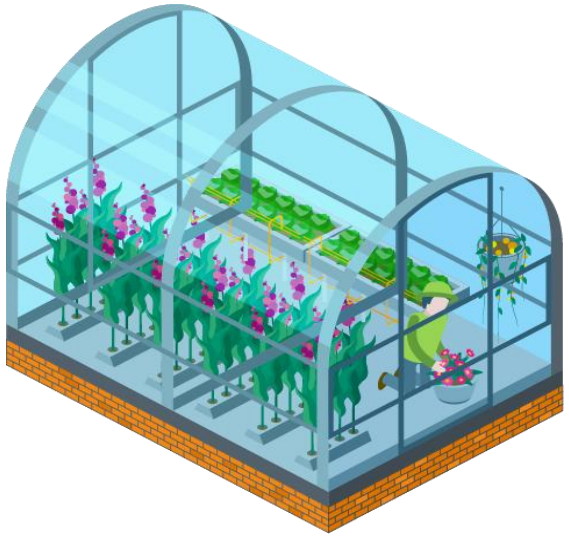
STRUCTURES

Structures are things that provide support.

Structures support weight or hold things together

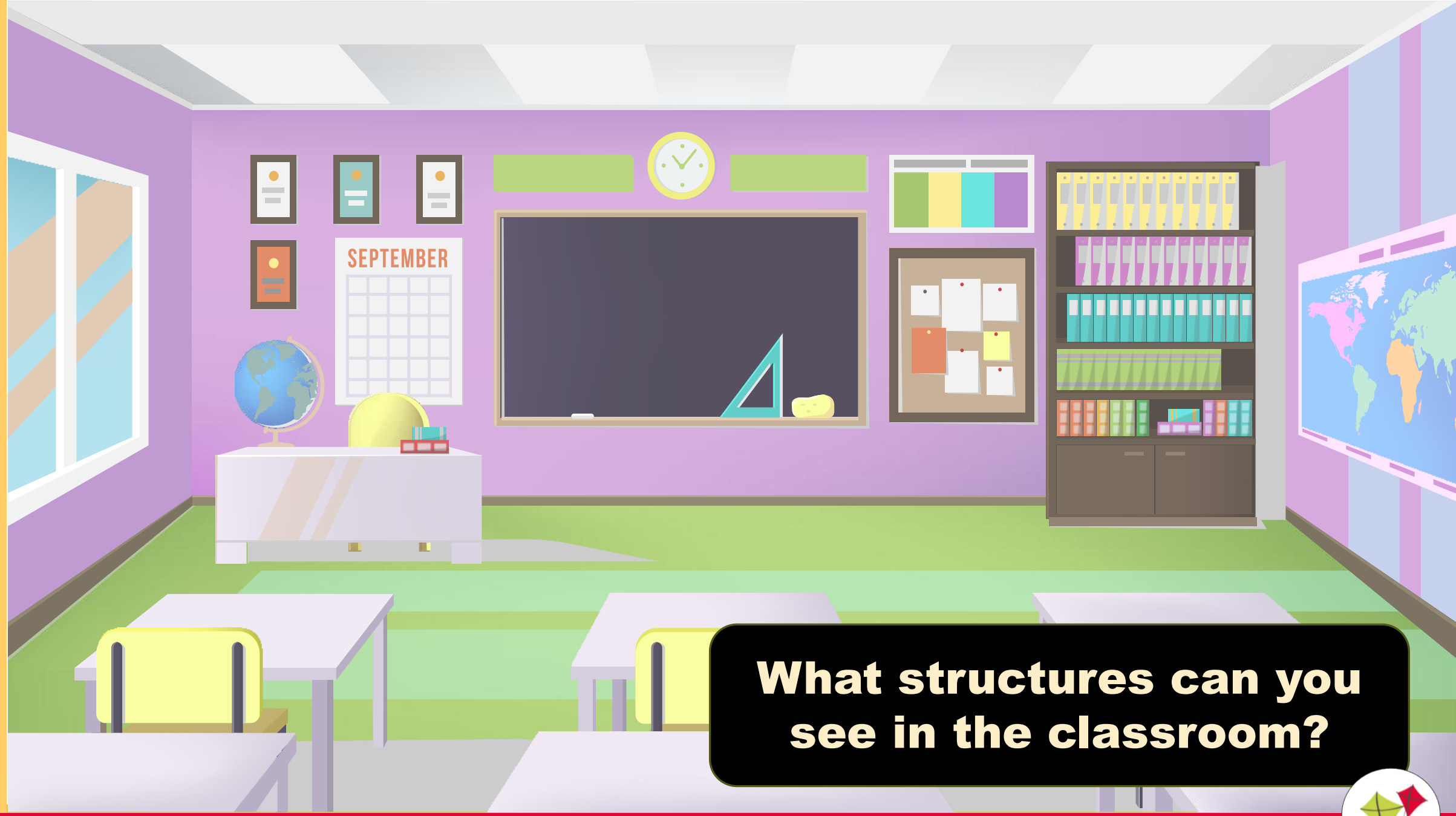
A milk carton holds all the milk inside

A pencil case holds pens and pencils inside



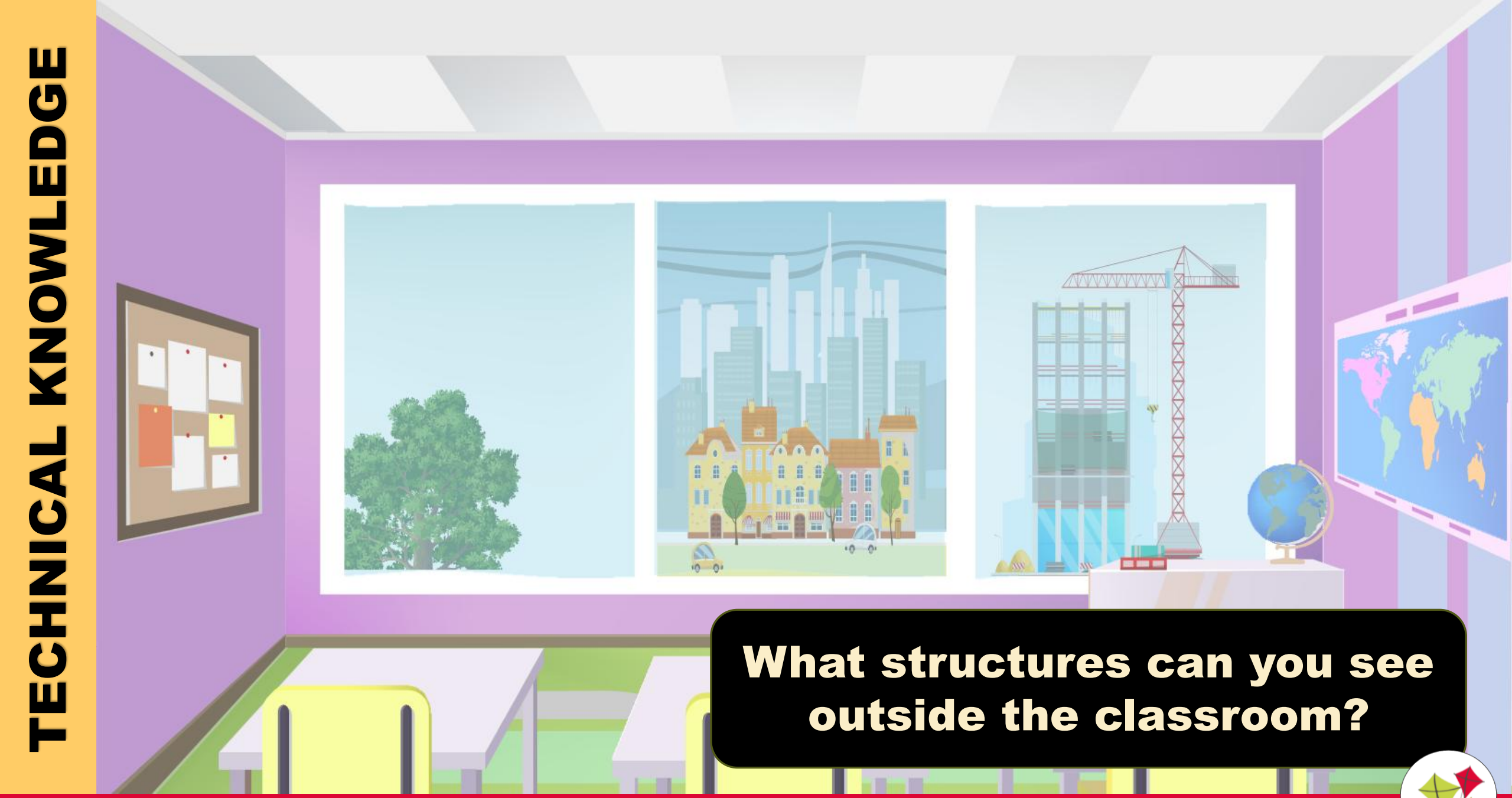
A greenhouse supports and holds the glass together

TECHNICAL KNOWLEDGE



What structures can you see in the classroom?

TECHNICAL KNOWLEDGE



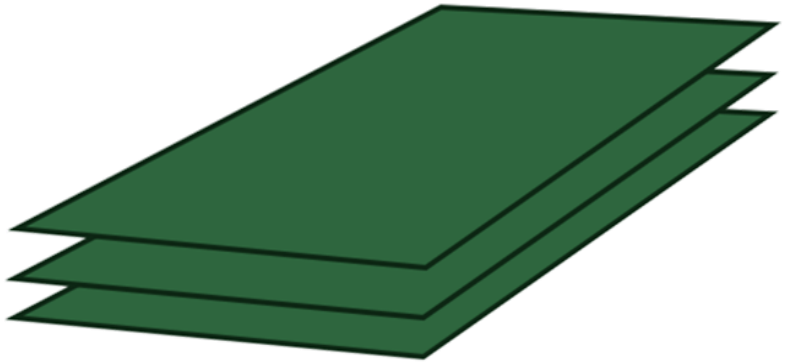
What structures can you see outside the classroom?

TECHNICAL KNOWLEDGE

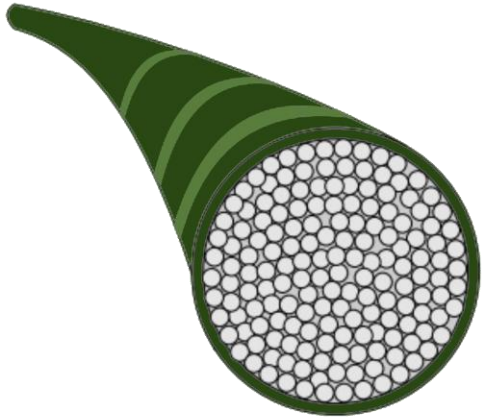
Frame structures in the playground

STRUCTURES: STRONG, STIFF & STABLE

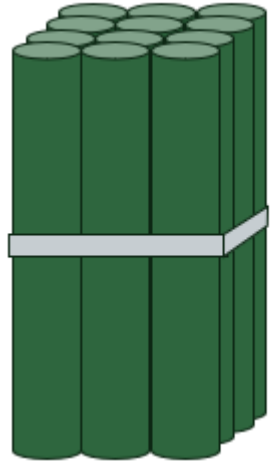
Some materials are stronger than others and using them will make a structure stronger. Adding layers of materials will make a structure stronger.



Laminating is gluing together several layers of material



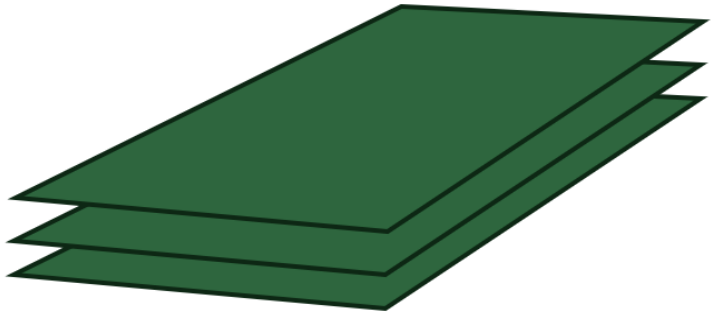
Cables for bridges are made from many individual wires arranged in circular layers



Columns can be arranged in layers so that each column takes a little of the weight.

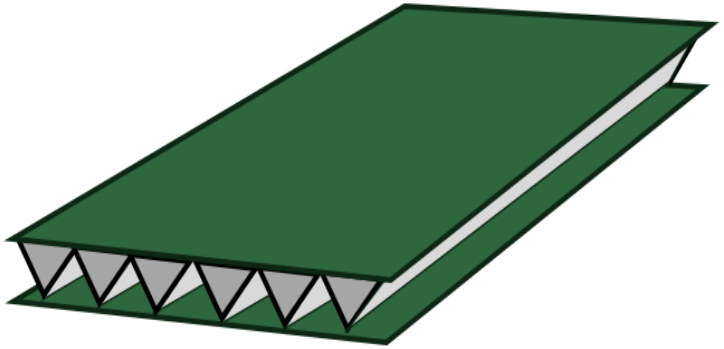
STRUCTURES: STRONG, STIFF & STABLE

Making materials stiffer and stronger will also make the overall structure stiffer and stronger. There are three types of technique to make sheet materials stronger and stiffer:



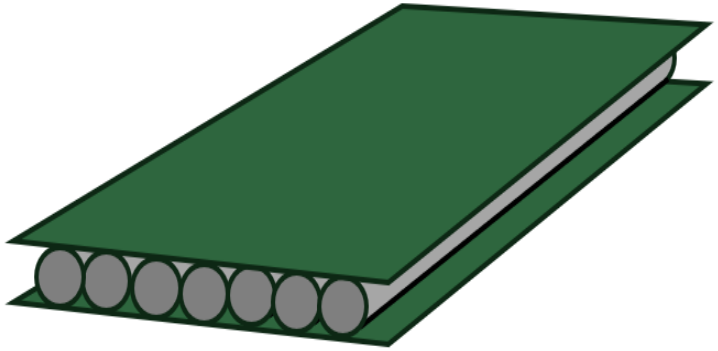
Laminating

Gluing together several layers of materials



Corrugating

Gluing a zig zag layer of material between two sheets of material

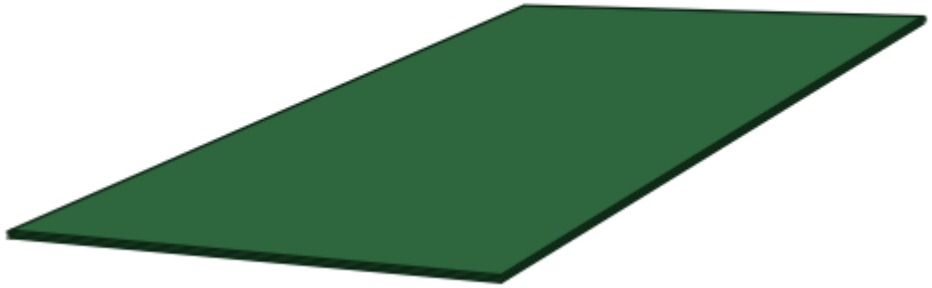


Ribbing

Gluing a layer of tubular material between two sheets of material

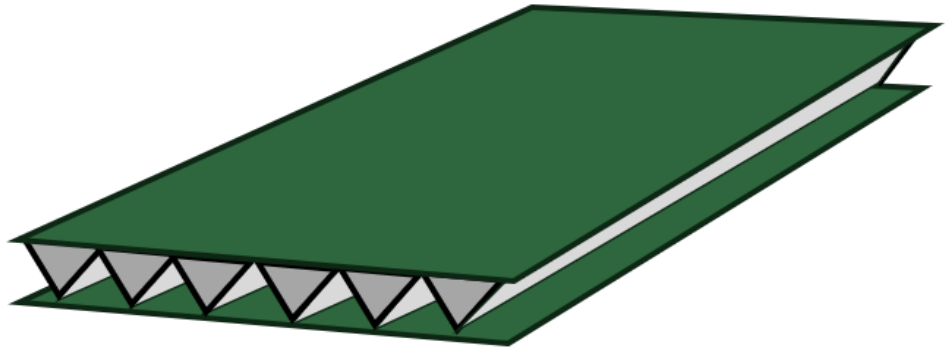
STRUCTURES: STRONG, STIFF & STABLE

SHEET MATERIALS: PAPER & CARD



Card

Card is thick paper. Its thickness makes it stronger and stiffer than paper.



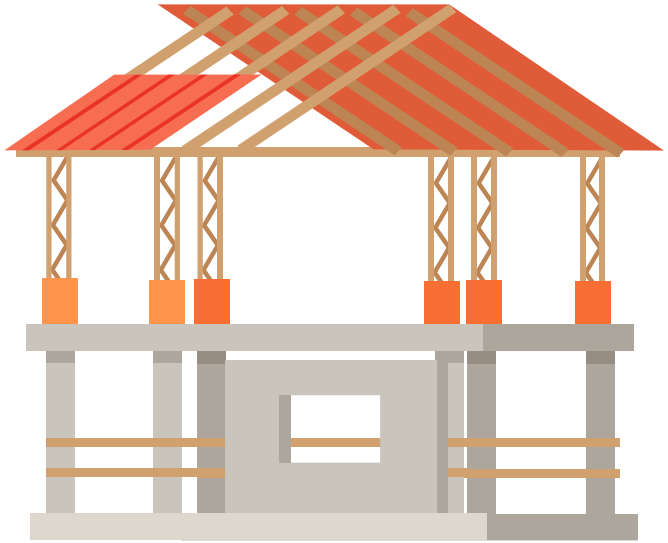
Cardboard

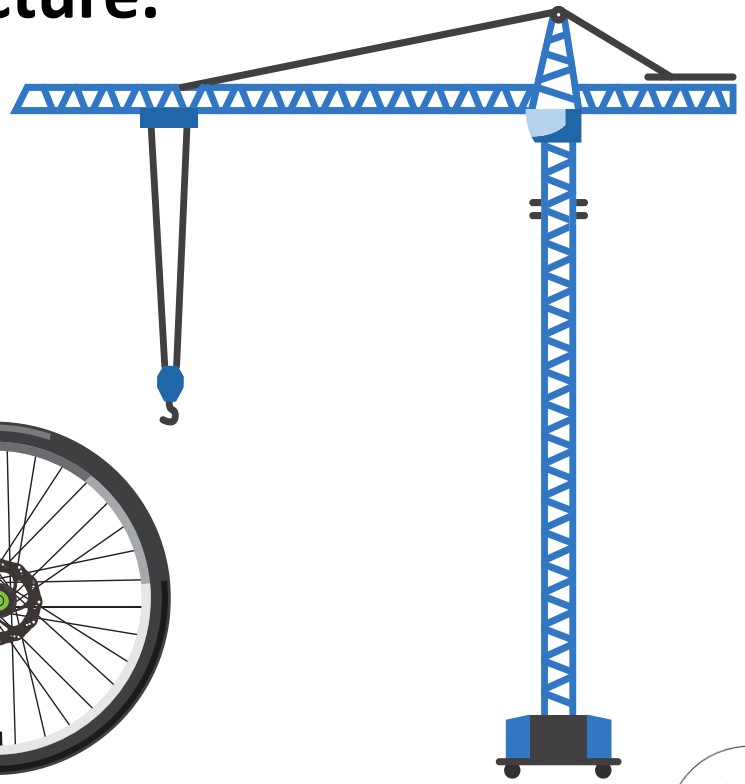
Cardboard in engineered card. Two sheets of card sandwich a layer of folded zig-zag card.

STRUCTURES: STRONG, STIFF & STABLE

STRONG FRAMEWORKS

Triangles are the strongest frame shape. When designing structures to be strong, designers will often include triangular shapes into the structures to increase the strength of the structure.

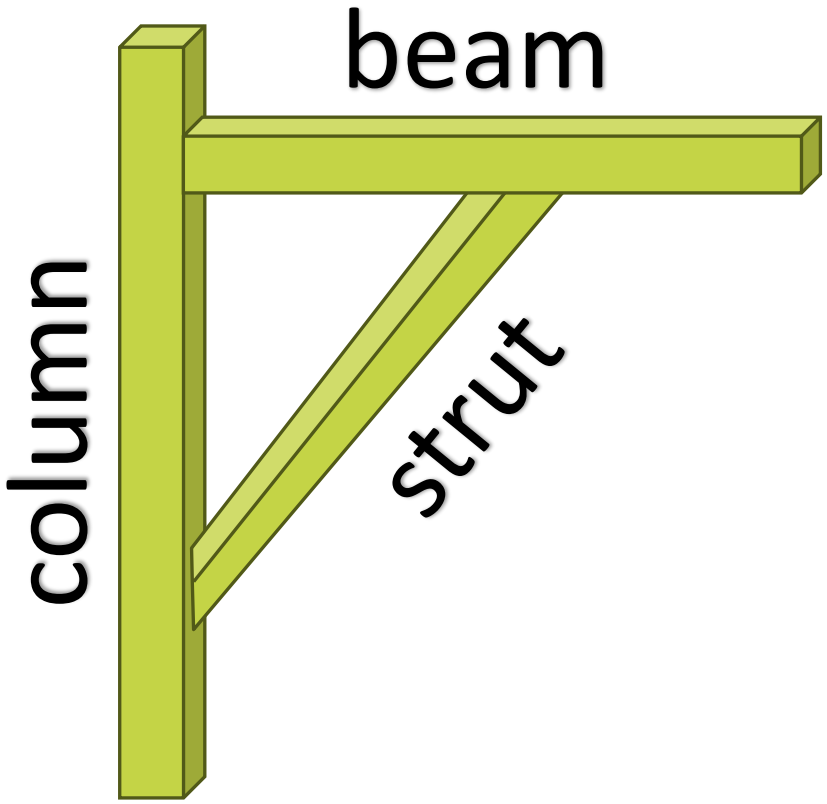




STRUCTURES: STRONG, STIFF & STABLE

STRONG FRAMEWORKS

Framework structures are composed of vertical and horizontal pieces known as columns (vertical) and beams (horizontal).

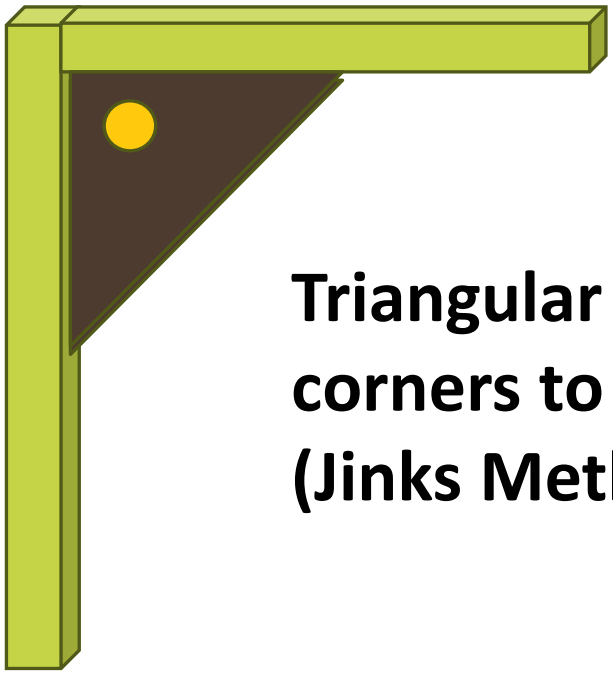


Struts are used to create triangles between the columns and beams to increase strength and stability.

STRUCTURES: STRONG, STIFF & STABLE

STRONG FRAMEWORKS

Framework structures can be made stronger, stiffer and more stable by using triangulation.

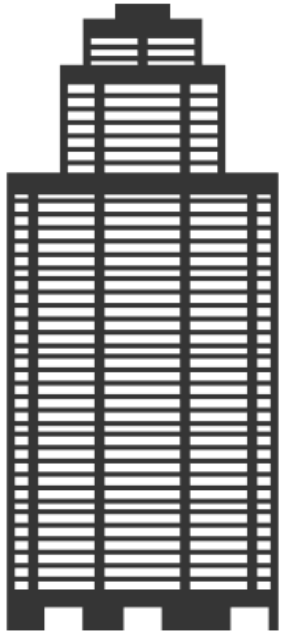


Triangular card can be added to the corners to strengthen the corners. (Jinks Method)

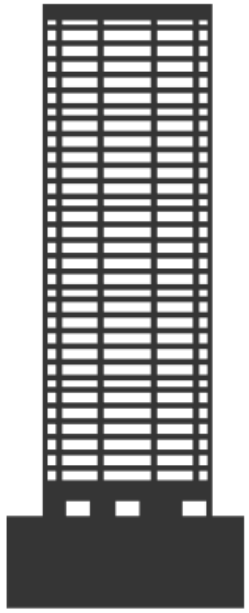
STRUCTURES: STRONG, STIFF & STABLE

STABLE STRUCTURES

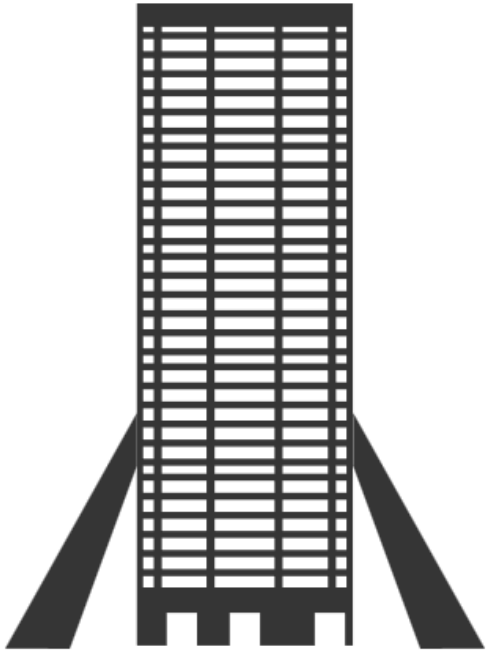
A stable structure is less likely to fall over. Structures are more stable when they have a wide base, have a heavy base, or are supported by buttresses.



wider base



heavy base

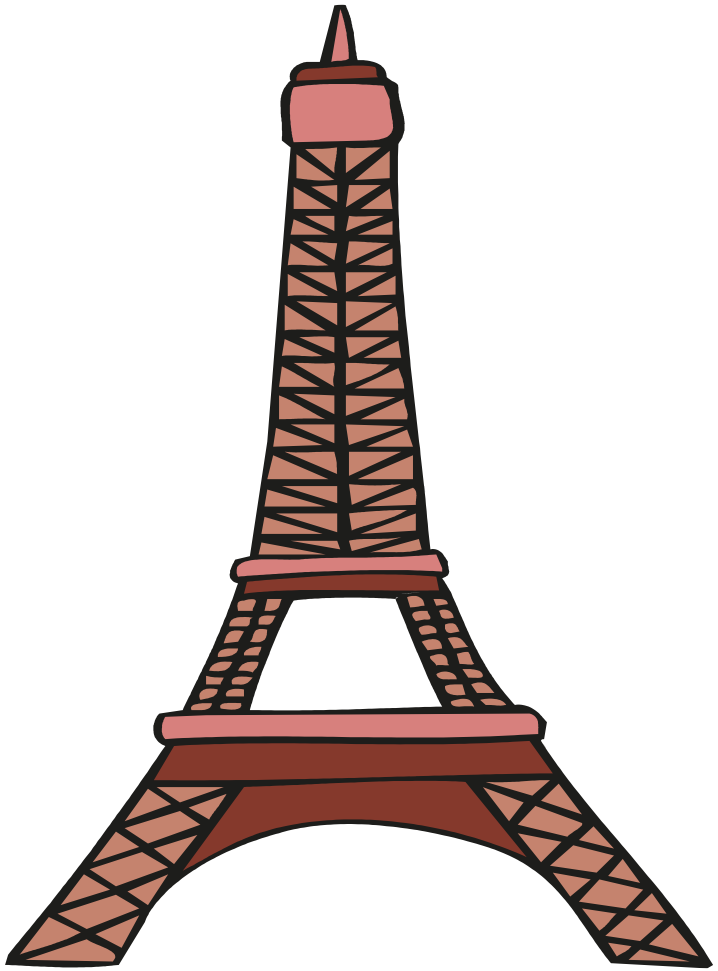


buttress

STRUCTURES: STRONG, STIFF & STABLE

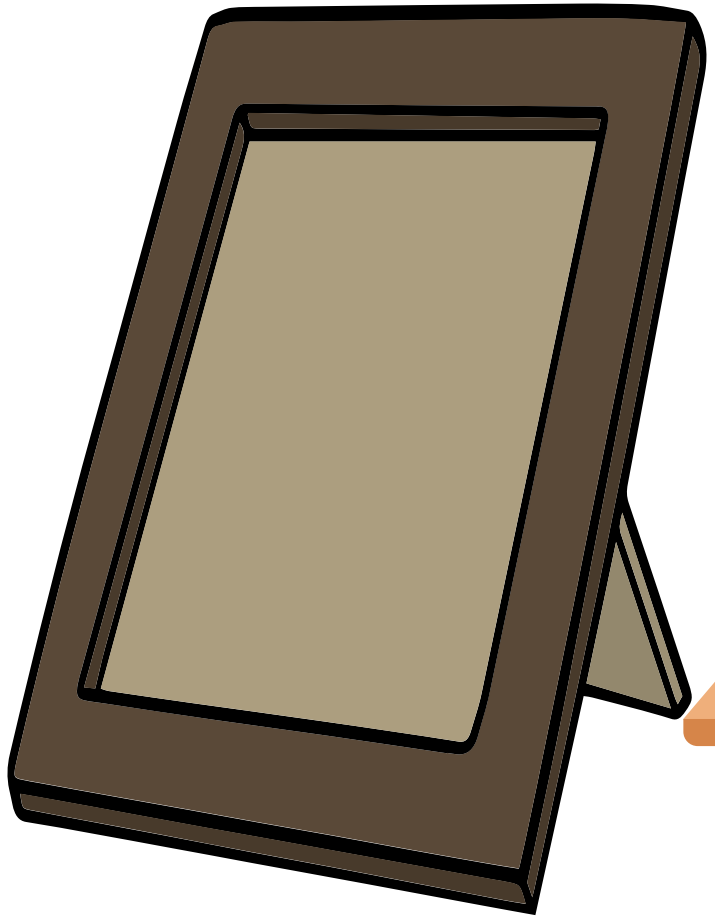
The Eiffel Tower

- The Eiffel tower has 4 legs which gives it a wide base and makes it stable.
- The Eiffel tower is made of steel which is a strong metal.
- The Eiffel tower is made of a framework of steel which makes it stiff and rigid.



PHOTOGRAPH FRAMES

MAKE YOUR PRODUCT



TECHNICAL

What technical knowledge is needed to design and make a photograph frame?

TECHNICAL

What technical knowledge is needed to design and make a photograph frame?

Properties of materials
Strong and stiff structures
Transparency

Cardboard Engineering
Cutting, scoring and folding sheet materials

Frame structures
Joining pieces together to create a frame
Triangulation adds strength and stability.

Mechanical Systems
Hinge mechanism is a simple linkage system.

Stable structures
Increasing the area of the base increases the stability of the structure.

HAVE WE MET THE 5 PRINCIPLES OF EFFECTIVE DT?

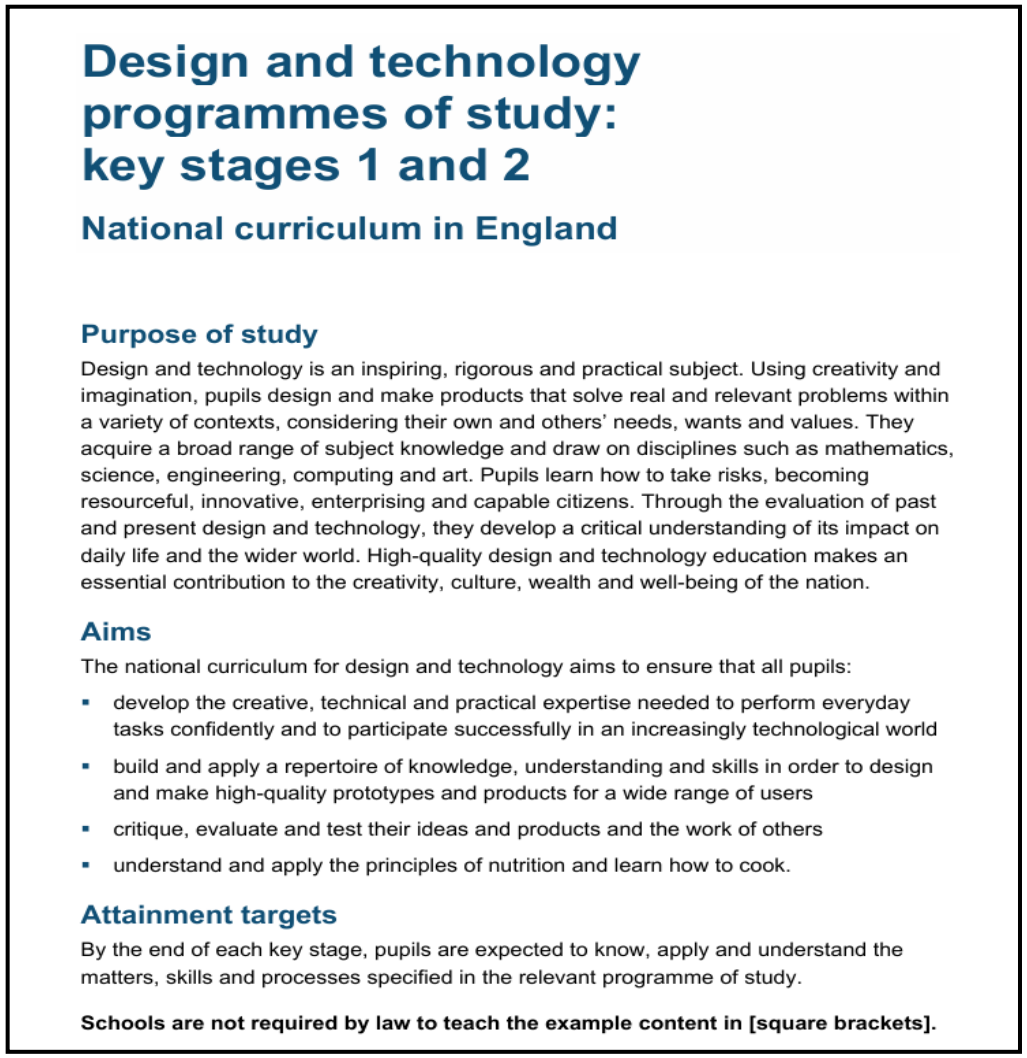
The principles of effective design technology are that children:

- Design and make a product
- Build knowledge
- Understand the iterative process
- Make design decisions
- Work in relevant contexts

The Curriculum in Design Technology

Flying High Partnership

The National Curriculum (Key Stages 1 & 2)



Design and technology programmes of study: key stages 1 and 2

National curriculum in England

Purpose of study

Design and technology is an inspiring, rigorous and practical subject. Using creativity and imagination, pupils design and make products that solve real and relevant problems within a variety of contexts, considering their own and others' needs, wants and values. They acquire a broad range of subject knowledge and draw on disciplines such as mathematics, science, engineering, computing and art. Pupils learn how to take risks, becoming resourceful, innovative, enterprising and capable citizens. Through the evaluation of past and present design and technology, they develop a critical understanding of its impact on daily life and the wider world. High-quality design and technology education makes an essential contribution to the creativity, culture, wealth and well-being of the nation.

Aims

The national curriculum for design and technology aims to ensure that all pupils:

- develop the creative, technical and practical expertise needed to perform everyday tasks confidently and to participate successfully in an increasingly technological world
- build and apply a repertoire of knowledge, understanding and skills in order to design and make high-quality prototypes and products for a wide range of users
- critique, evaluate and test their ideas and products and the work of others
- understand and apply the principles of nutrition and learn how to cook.

Attainment targets

By the end of each key stage, pupils are expected to know, apply and understand the matters, skills and processes specified in the relevant programme of study.

Schools are not required by law to teach the example content in [square brackets].

Basic overview of the curriculum from which schools need to add the specificity and detail to create a scheme of work to deliver the curriculum.

School curriculum / scheme of work

- Areas that will be studied (which in-depth).
- Knowledge (including skills and techniques) that children will be expected to know and remember – and at what stage of their learning journey.
- How children will acquire the disciplinary knowledge – how the subject works (designing, making and evaluating).
- Vocabulary – technical words and their meaning.

The National Curriculum (Key Stages 1 & 2)

Purpose of Study

Design and technology is an inspiring, rigorous and practical subject. Using creativity and imagination, pupils design and make products that solve real and relevant problems within a variety of contexts, considering their own and others' needs, wants and values. They acquire a broad range of subject knowledge and draw on disciplines such as mathematics, science, engineering, computing and art. Pupils learn how to take risks, becoming resourceful, innovative, enterprising and capable citizens. Through the evaluation of past and present design and technology, they develop a critical understanding of its impact on daily life and the wider world. High-quality design and technology education makes an essential contribution to the creativity, culture, wealth and well-being of the nation.

- **Practical Subject**
- **Creativity = Knowledge and Imagination.**
- **Knowledge-based subject.**
- **Impact of technology on daily lives.**
- **Contributes to the creativity, culture, wealth and well-being of the nation.**

The National Curriculum (Key Stages 1 & 2)

Aims

The national curriculum for design and technology aims to ensure that all pupils:

- develop the creative, technical and practical expertise needed to perform everyday tasks confidently and to participate successfully in an increasingly technological world
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- critique, evaluate and test their ideas and products and the work of others
- understand and apply the principles of nutrition and learn how to cook.

- **Perform everyday tasks confidently**
- **Participate in a technological world**
- **Build and apply knowledge, skills and understanding**
- **Make prototypes and products**
- **Evaluate and test their ideas and products**
- **Learn how to cook**

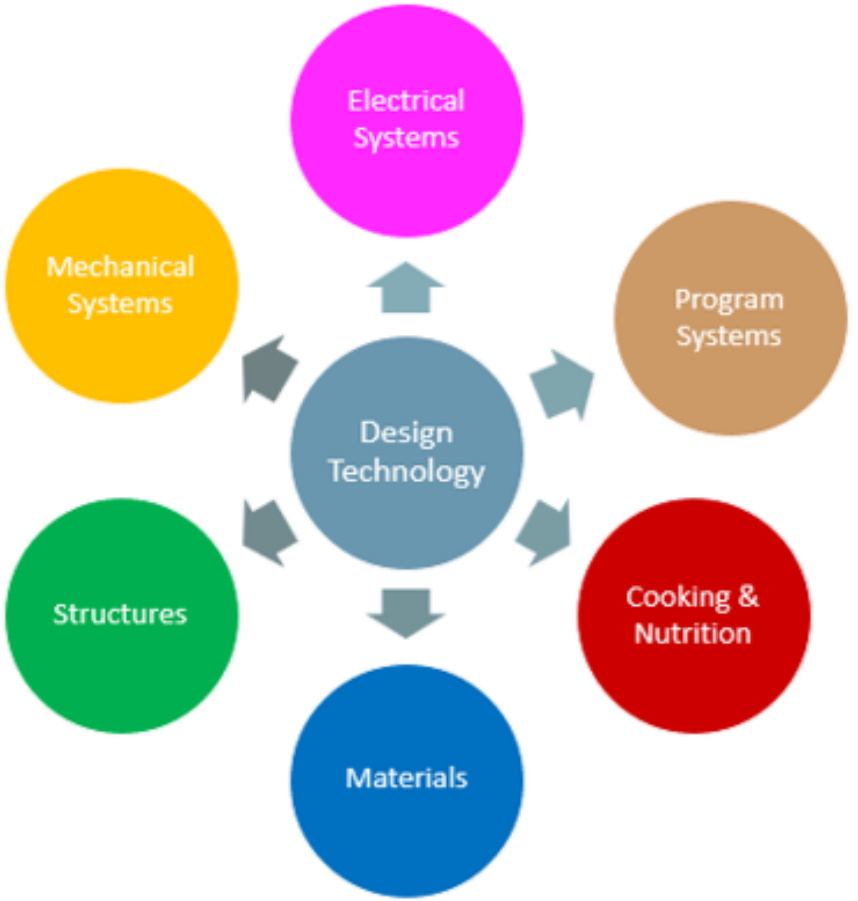
The National Curriculum (Key Stages 1 & 2)

Disciplinary Knowledge

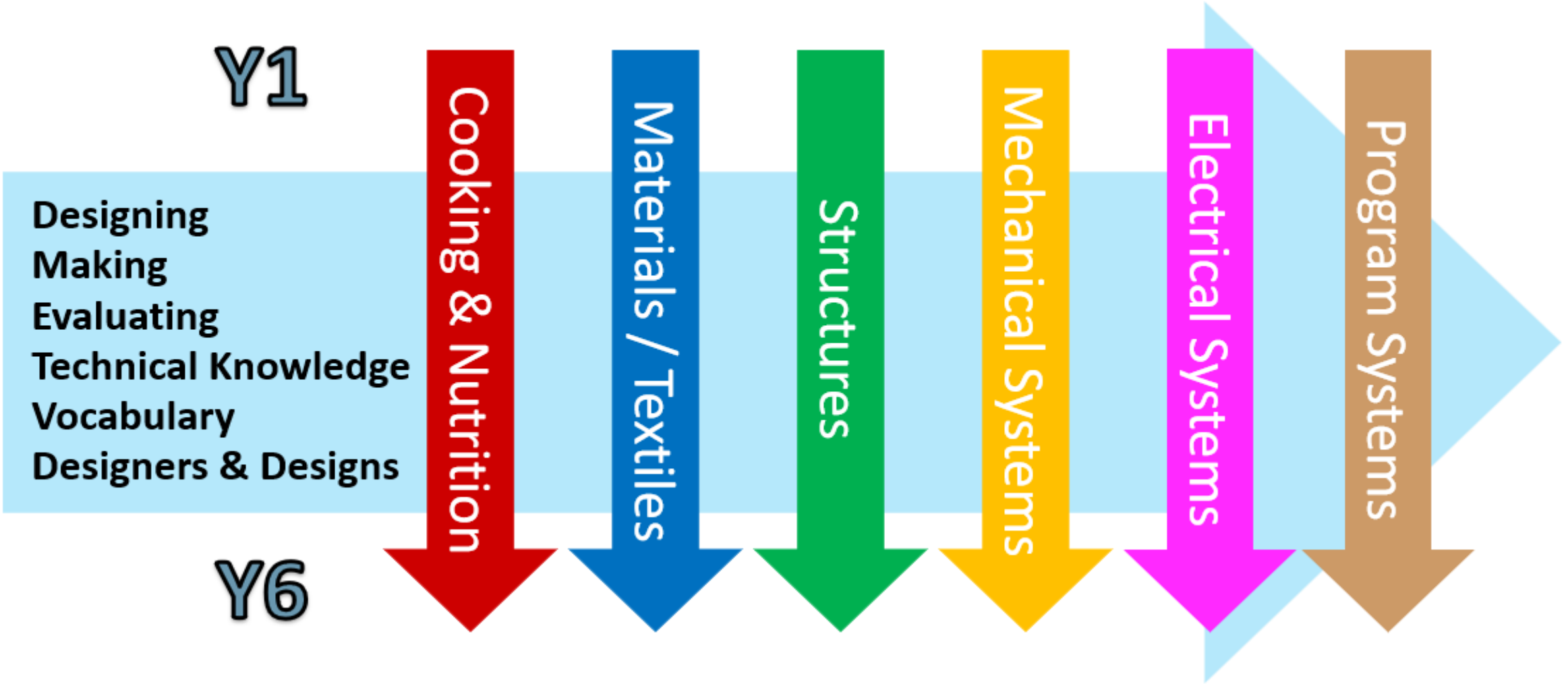
How the subject works

Technical Knowledge

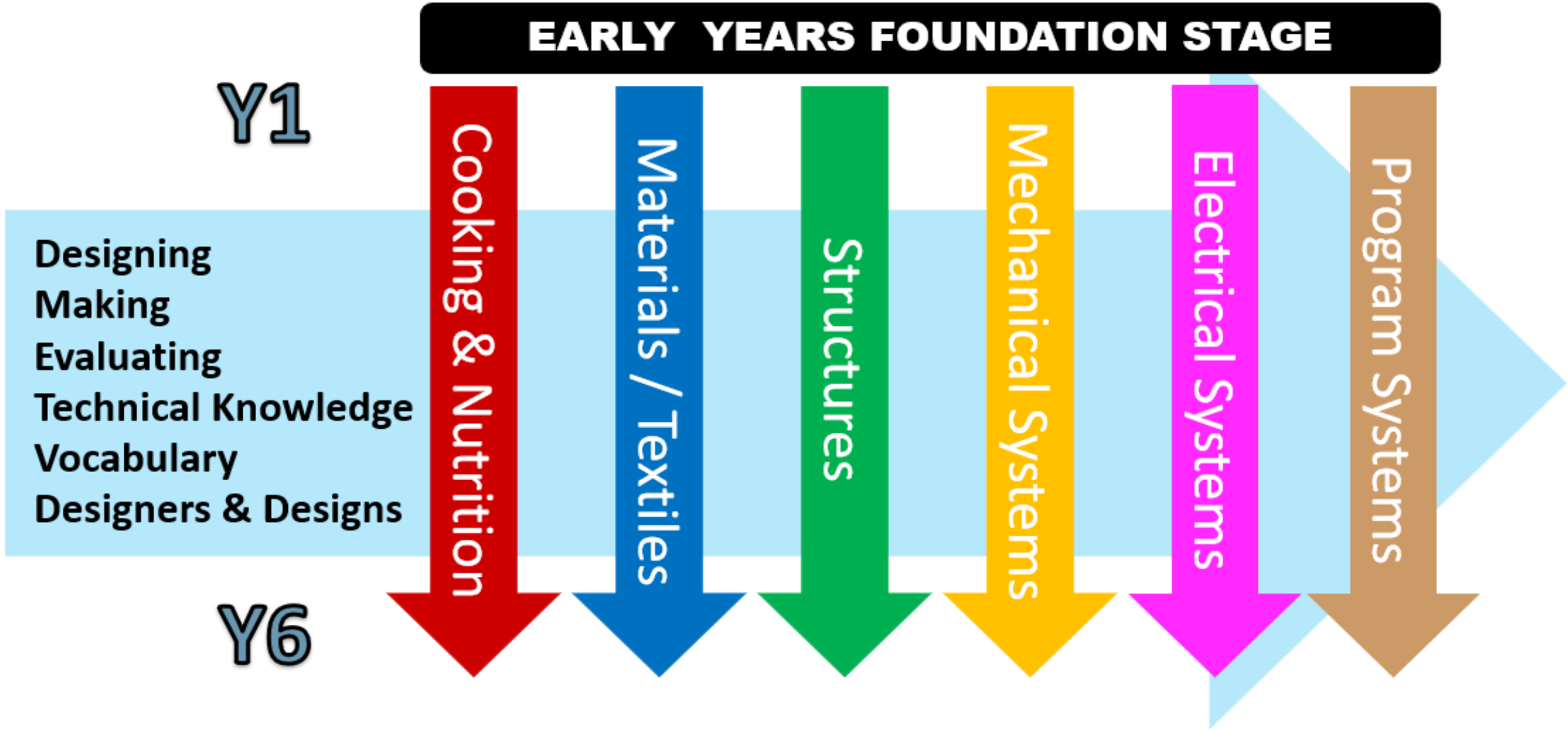
& Practical Knowledge / Substantive Knowledge



The National Curriculum (Key Stages 1 & 2)



DESIGN TECHNOLOGY CURRICULUM MODEL



DESIGN TECHNOLOGY CURRICULUM MODEL

YEAR GROUPS			
Y1	Cooking and Nutrition	Materials/Textiles	Mechanical Systems
Y2	Cooking and Nutrition	Structures	Mechanical Systems
Y3	Cooking and Nutrition	Materials/Textiles	Mechanical Systems
Y4	Cooking and Nutrition	Structures	Electrical Systems
Y5	Cooking and Nutrition	Materials/Textiles	Program Systems
Y6	Cooking and Nutrition	Structures	Program Systems

THE CURRICULUM IN DT

Viking Primary School Curriculum Overview

	Textiles/ Structures	Systems	Cooking & Nutrition
Year 1	Puppets	Celebration Card	Fruit Kebabs/Fruit Salads
Year 2	Photo Frames	Teddy Explorer	Snack Dippers
Year 3	Desk Tidy	Mechanical Book Page	Healthy Cereal Bar
Year 4	Cushions	Table Lamp	Seasonal Tarts
Year 5	Shadow Theatre	Orrery	Greek Streetfood
Year 6	Temple Marble Run	Build a Buddy	Toni's Trattoria

THE CURRICULUM IN DT

Viking Primary School: Textiles / Structures

- Y1: Puppets
- Y2: Photo Frames
- Y3: Desk Tidy
- Y4: Cushions
- Y5: Shadow Theatre
- Y6: Temple Marble Run






THE CURRICULUM IN DT

Viking Primary School: Systems

- Y1: Celebration Card
- Y2: Teddy Explorer
- Y3: Mechanical Book Page
- Y4: Table Lamp
- Y5: Orrery
- Y6: Build a Buddy

THE CURRICULUM IN DT

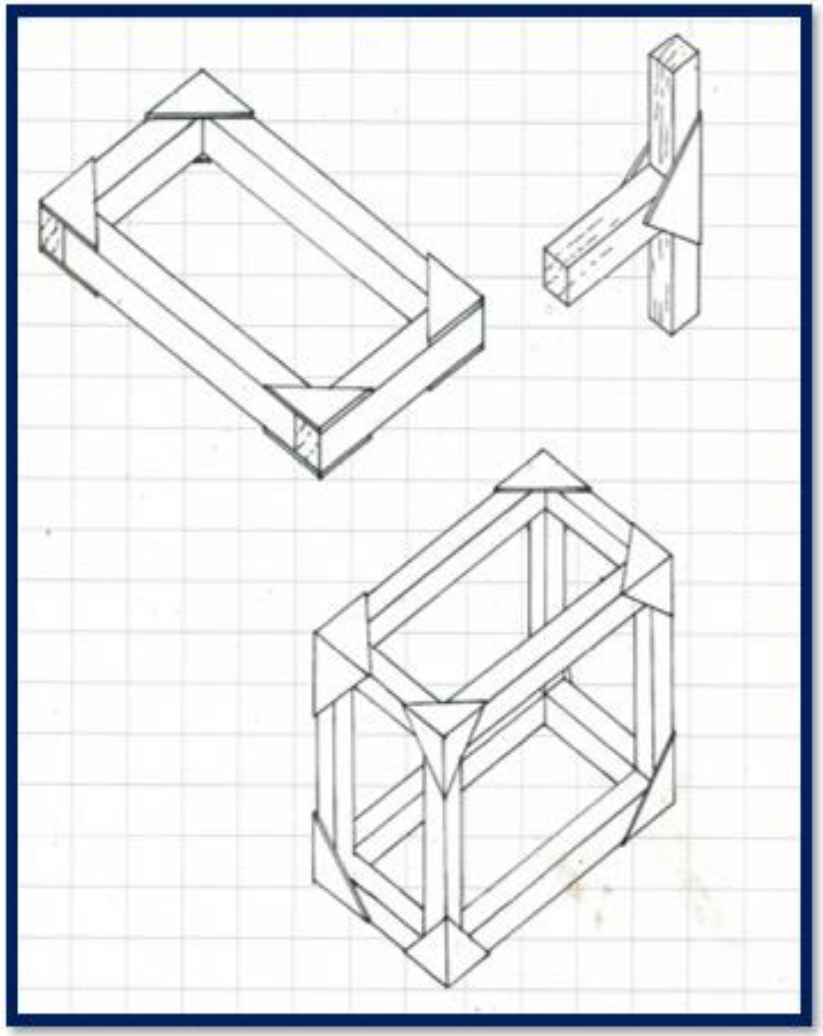
Viking Primary School: Cooking & Nutrition

- Y1: Fruit Kebab/Salad
- Y2: Snack Dippers
- Y3: Healthy Cereal Bar
- Y4: Seasonal Tarts
- Y5: Greek Streetfood
- Y6: Toni's Trattoria






Viking Primary School: Structures / Jinks Method



THE NATIONAL CURRICULUM: STRUCTURES

Key Stage 1

When designing and making, pupils should be taught to:

- select from and use a range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing] .
- select from and use a wide range of materials and components, including construction materials, textiles and ingredients, according to their characteristics.
- **Technical Knowledge:** build structures, exploring how they can be made stronger, stiffer and more stable.

Key Stage 2

When designing and making, pupils should be taught to:

- select from and use a wider range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing], accurately.
- select from and use a wider range of materials and components, including construction materials, textiles and ingredients, according to their functional properties and aesthetic qualities.
- **Technical Knowledge:** apply their understanding of how to strengthen, stiffen and reinforce more complex structures

STRUCTURES: TECHNICAL KNOWLEDGE

Key Stage 1: Pupils should be taught to build structures, exploring how they can be made stronger, stiffer and more stable.
Key Stage 2: Pupils should be taught to apply their understanding of how to strengthen, stiffen and reinforce more complex structures

Children knowing the two types of structures:

- Framework structures
- Shell structures

Children knowing that structures are made stronger stiffer and more stable by:

- Choosing appropriate materials (based on their properties)
- Combining and layering materials (card & cardboard, Papier mache)
- Joining parts together to create a structure and applying different techniques to create strength, stiffness & stability

Children create structures using a range of techniques and through junk modelling, making 3D shapes from nets, working with card and cardboard and building simple frameworks.

Children create structures by choosing the correct tools and techniques.
Children developing their knowledge and understanding of structures using construction kits, trying things out.

THE NATIONAL CURRICULUM: PROGRESSION

	Technical Knowledge Children should know:	Practical Knowledge Children should know how to:
Key Stage 1	• Different types of structures that are found in the natural world and in the man-made world. • Different structures are used for different purposes. • A large base can make a structure stable.	• Join different materials to create a structure. • Create a simple rectangular framework with corner struts for added strength. • Use shape to increase the strength and stiffness of a structure.
Lower KS2	• Whether a structure is a frame structure or a shell structure • Suitable techniques to strengthen materials. • Suitable techniques of making structures more stable	• Choose suitable materials, techniques, and tools to construct or repair products. • Apply a range of techniques to create shell structures using paper. • Apply a range of practical skills and techniques to create stable and strong frame structures.
Upper KS2	• Different properties of some common materials and how these properties are used when designing and making structures. • Ways of reinforcing structures, including using triangulation techniques.	• Make frame structures that can support mechanical systems within a product.

THE NATIONAL CURRICULUM: ASSESSMENT

	Technical Knowledge Children should know:	**Practical Knowledge** Children should know how to:
Key Stage 1	• Different types of structures that are found in the natural world and in the man-made world. • Different structures are used for different purposes. • A large base can make a structure stable.	• Join different materials to create a structure. • Create a simple rectangular framework with corner struts for added strength. • Use shape to increase the strength and stiffness of a structure.
Lower KS2	• Whether a structure is a frame structure or a shell structure • Suitable techniques to strengthen materials. • Suitable techniques of making structures more stable	• Choose suitable materials, techniques, and tools to construct or repair products. • Apply a range of techniques to create shell structures using paper. • Apply a range of practical skills and techniques to create stable and strong frame structures.
Upper KS2	• Different properties of some common materials and how these properties are used when designing and making structures. • Ways of reinforcing structures, including using triangulation techniques.	• Make frame structures that can support mechanical systems within a product.

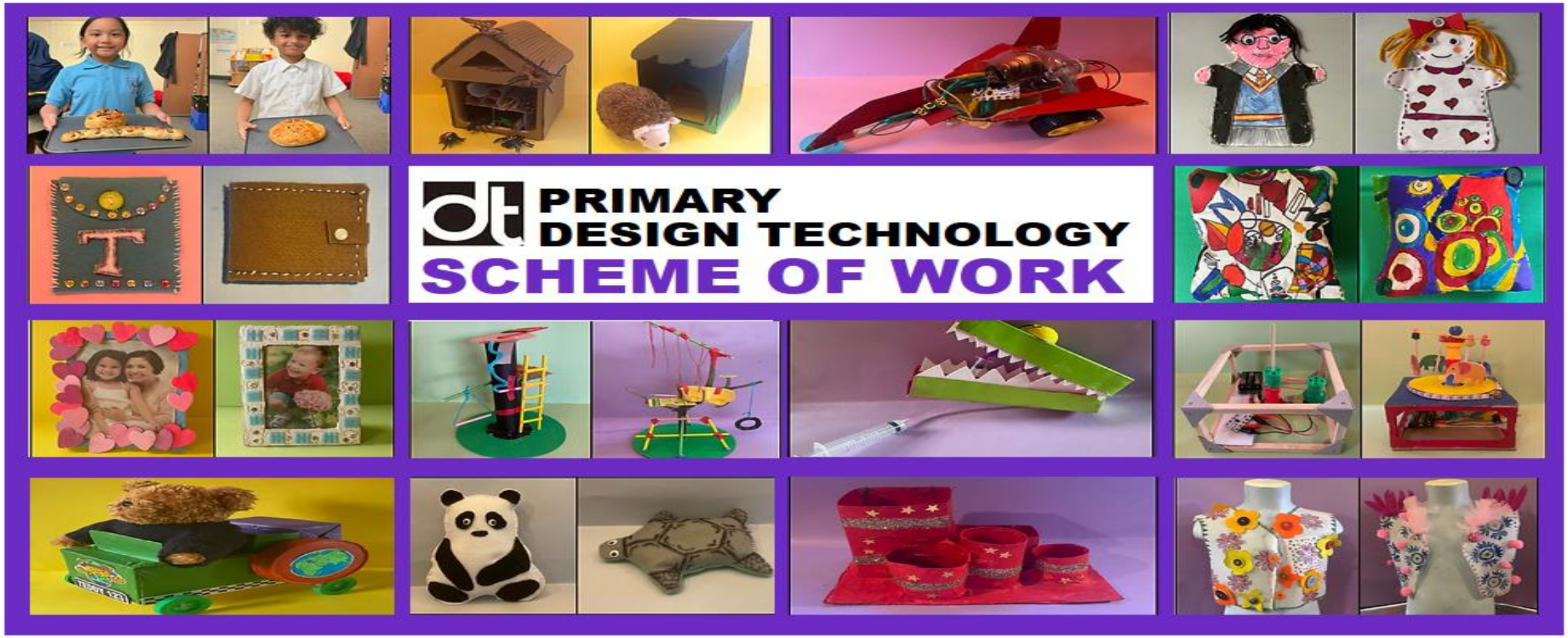
DESIGN TECHNOLOGY SUPPORT

PRIMARY DESIGN TECHNOLOGY

Ensuring outstanding teaching in Design Technology

contact: support@primarydt.com

Primary Design Technology | DT Scheme of Work | DT Buy Units | DT Key Stage 1 | Upper Key Stage 2 | DT Lower Key Stage 2



Buy the Scheme of Work

www.primarydt.com

DESIGN TECHNOLOGY SUPPORT

Primary Design Technology Scheme of Work (overview)

	Cooking and Nutrition		Textiles	Structures	Mechanical Systems	Electrical & Program
Key Stage 1	Fruit Kebabs (Available Now)	Fruit Salads (Available Now)	Puppets (Available Now)	Model Playground (Available Now)	Celebration Cards (Available Now)	
	Summer Smoothies (Available Now)	Snack Dippers (Available Now)		Model Treehouse (Available Now)	Great Toy Race (Available Now)	
	Rainbow Salads (Available Now)			Monkey Business (Available Now)	Teddy Explorer (Available Now)	
Lower Key Stage 2	Sharing Bread (Available Now)	Lunchtime Wraps (Available Now)	Arty Cushions (Available Now)	Desk Tidy (CAD) (Available Now)	Mechanical Book Page (Available Now)	Table Lamp (Available Now)
	Focaccia (Available Now)	Healthy Cereal Bar (Available Now)	Kandinsky Cushions (Available Now)	Mini-Greenhouse (Available Now)	Rainforest Monsters (Available Now)	Torches (Available Now)
	Yummy Yoghurt (Available Now)	Seasonal Tart (Available Now)	Money Containers (Available Now)	Windows (Available Now)		
			Charity Soft Toy (Available Now)	Photograph Frame (Available Now)	Shadow Puppets (Available Now)	
			LKS2 Cleopatra Cushions (Available Now)	Garden Escapes (Available Now)		
Upper Key Stage 2	Eatwell Pizza (Available Now)	Indian Streetfood (Available Now)	Monster Mobile Phone Case (Available Now)	Temple Marble Run (Available Now)	Automaton Toy (Available Now) • Christmas Themed • Halloween Themed • Habitats Themed • Generic Theme	Crumble Nightlight (Available Now)
	Class Restaurant (Available Now)	Hola Mexico (Available Now)	Fashion Waistcoat (Available Now)			Digital Decorations (Available Now)
	Eco Airline Meal (Available Now)	Spoonful of Pierogi (Available Now)	Carnival Costumes (Available Now)			Robo Wars (Available Now)
	Street Food Fiesta (Available Now)	Yeah Sushi (Available Now)	Eco Tote Bag (Available Now)		Orrery (Cam mechanism) (Available Now)	Fairground Ride (Available Now)
	Toni's Trattoria (Available Now)	Greek Streetfood ((Available Now)	Teddy Mascot (Available Now)		Orrery (Gear mechanism) (Available Now)	Soft Toy Tamagotchi (Available Now)
						Build a Buddy (Available Now)

Special Offer: Flying High Trust Schools £100 – 18 units of Work

DESIGN TECHNOLOGY SUPPORT

PRIMARY DESIGN TECHNOLOGY SCHEME OF WORK

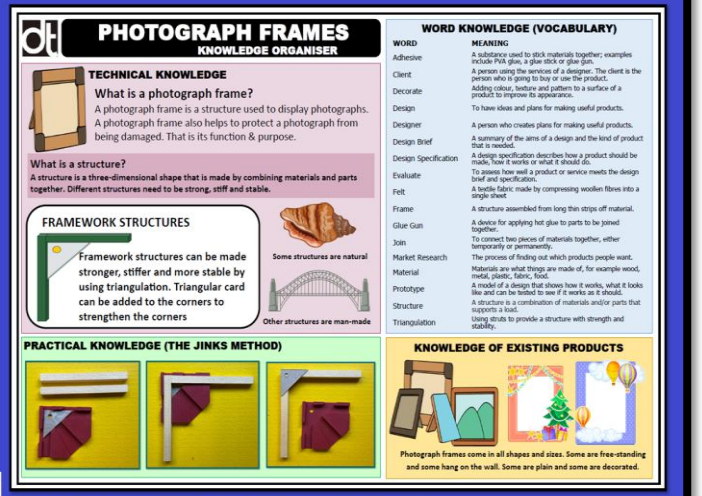
IN THIS SESSION

WE ARE LEARNING...

- To discuss and investigate photograph frames.
- About the function of a photograph frame.
- How different materials are used to create a photograph frame.
- To make models to test out our ideas for a free-standing photograph frame.

PRIMARY DESIGN TECHNOLOGY

KNOWLEDGE



PRIMARY DESIGN TECHNOLOGY

DT Vocabulary Focus

Frame	A structure assembled from long thin strips off material.
Design	To have ideas and plans for making useful products.
Design Brief	A summary of the aims of a design and the kind of product that is needed.

PRIMARY DESIGN TECHNOLOGY

KNOWLEDGE

PRIMARY DESIGN TECHNOLOGY

Investigate 2

DESIGNING

Design Briefs & Design Specifications

The design brief tells you about the product you are going to create or the problem that you are going to solve.

The design specifications are a list of successful features that tells you what should be in the product, how it should be made and how it should work.

PRIMARY DESIGN TECHNOLOGY

Design & Make

EXAMPLES

PRIMARY DESIGN TECHNOLOGY

Design

DESIGN TECHNOLOGY SUPPORT

- Clear sequence of learning that delivers both new knowledge and builds on children's prior knowledge to develop understanding in the subject.
- Projects that result in children designing and making a product that is real-life and relevant to them.
- Focus on developing children's vocabulary
- Supports teachers in terms of subject knowledge, particularly around the different skills that need to be taught and the technical knowledge that is needed for children to successfully complete a project.
- Provides challenge to children who could potentially excel in the subject and supports the children who may struggle in the subject.

- Deliverable
- Achievable
- Affordable
- Opportunity to teach high quality design technology
- Challenging for pupils

DESIGN TECHNOLOGY SUPPORT

MEDIUM TERM PLANNING

Photograph Frames

Design Technology Learning Strands: Materials, Structures

Suggested Year Group: Lower Key Stage 2

Design Brief: Design and make a free-standing photo frame for a specific theme, person or celebration.

Sequence of Learning for Teachers

In this unit of work children learn about creating a wooden framework that is used to create a free-standing photograph frame. They investigate how frames are constructed so that they are strong and stable, and the different techniques that allow them to be free-standing. They apply this technical knowledge when designing and making their own wooden photograph frame using the Jinks method. Children learn about ideas of theming and decorating products and apply this knowledge to their own photograph frame.

This knowledge, skills and understanding is delivered through the following six sessions:

1. Investigate 1: Investigating Photo Frames
2. Investigate 2 - Understanding Structures & Focus Task 1 – Making Photo Frames
3. IDEA Task 3 – Understanding Theming
4. DME: Frame Designer
5. DME: Frame Maker
6. Evaluation Session

Prior to the beginning of this unit of work, children should have chosen/taken the photograph that they are designing their frame for.

Some activities / sessions can be re-arranged or delivered in different ways in the learning sequence to allow for whole-class teaching and/or small adult-led sessions to take place at the same time.

Prior Learning

Children may have experience of creating a wooden framework using the Jinks method as part of their learning about creating a buggy chassis and will have had experience of using the properties of materials when deciding the materials to use when making a product. They may have had experience of designing a product for a specific celebration or event as part of their learning in Key Stage 1.

For more information about Primary Design Technology Scheme of Work visit: www.primarydt.com

DESIGN TECHNOLOGY SUPPORT

MEDIUM TERM PLANNING

Core Knowledge (Curriculum Pathway)	
Substantive & Technical Knowledge	**Practical Knowledge (Skills)**
Pupils should know: • The difference between a design brief and design specifications. • Design specifications describe how a product should be made, how it works or what it should do. • There can be a range of people and places that can be clients for a product. • Rules and procedures for keeping themselves safe when making products. • The properties of materials that they are working with and how these determine the tools and techniques that they use. • That a list of the main stages of turning a design into a product will aid the making process. • When evaluating products, it is important to use the design brief and the design specifications as a guide. • Peer review of their product is useful in identifying ways in which it could be improved. **Materials** • That products are made of materials that are chosen because of their properties. **Structures** • Whether a structure is a frame structure or a shell structure • Suitable techniques to strengthen materials. • Suitable techniques of making structures more stable	**Pupils should know how to:** • Generate ideas for a product, considering its purpose and who the client is. • Use design specifications as a guide to the making process. • Follow instructions to ensure that they work safely. • Select suitable tools, equipment, materials, and components for the task. • Explain their choices of materials, techniques and tools when making a product. • Measure, mark out, cut and shape materials with increasing accuracy. • Select and apply a finishing technique to create a quality product. • Identify the characteristics of a design which makes the product useful and successful. • Test for the strength and stability of different structures • List the ways in which a finished product meets the design specifications. • Evaluate their product using a range of sources including client review, peer review, design brief and the design criteria. • Use consumer surveys to evaluate their finished product. **Materials** • Measure, mark-out, cut and shape a wide range of materials. • Cut internal shapes and joining slots in sheet materials. • Join and combine materials and components using a variety of methods. • Manipulate different materials to create different effects by cutting, creasing, and folding. **Structures** • Choose suitable materials, techniques, and tools to construct or repair products. • Apply a range of practical skills and techniques to create stable and strong frame structures.

MEDIUM TERM PLANNING

Resources:	Background Information & Technical Knowledge
Presentation Slides Lesson presentation slides Additional Presentation: Working with Wood **Knowledge Organiser** **PDF Worksheets** PDF: Photo Frame Design Sheet PDF: Queen Elizabeth Photo Sheet PDF: Photo Frame Design Sheet **Jinks Wooden Framework Resources** • Mitre bench hooks • Junior hacksaws • Lynx corner frames • Thick card corners • Soft wood (Jelutong) 10mm strips • PVA glue and glue spreaders • Low melt glue guns Sheets of Cardboard Card Snips or craft knife **Materials for decoration:** Felt, fabric, wadding & scissors. Sequins, plastic gems. Plasticene, cake making stamps / stencils Natural found objects. Other decorative items.	The school photographer is often a good source of cardboard photograph frames that the children can examine for the structure that keeps them upright. **Working with Wood** As part of this project children are required to make a wooden frame as the basic structure for their photograph frame. Children should have experience of working with wood to create a framework in previous units of work. An additional presentation and short video clip is provided to support children in working with wood and creating a wooden framework using the Jinks method. The presentation slides for Focused Practical Task 1 include guidance on creating a basic Jinks frame structure used for creating the photo frame. **Woodwork Licence** For this unit of work, children need to use the Jinks method to create a wooden framework. As part of the learning sequence, children can demonstrate their proficiency in working with wood by gaining their woodwork licence. Additional slides and a certificate are included to enable them to gain their woodwork licence by carrying out the following tasks: • Accurately measure and mark out a strip of wood 10cm long using a ruler. • Accurately measure and mark out a strip of wood 5cm long using a ruler. • Demonstrate how to hold a hacksaw using the pistol grip. • Accurately cut strips of wood 5cm and 10cm long using a bench hook and hack saw. • Create a right-angle corner joint using the lengths of wood and using the Jinks method. • Correctly join materials using PVA glue and a glue gun. • Demonstrate the correct procedures for keeping themselves safe when working with wood. **Focused Practical Task 2 – Decorating the Frame Workshop** Children should have the opportunity to experience a range of different decorating techniques to enable them to make an 'informed decision' about which technique to use for their frame. This is a form of evaluation that informs the design and making process. The range of techniques for the children to experience will depend upon available resources. **Part of the focus for this unit of work is children making design decisions about a theme for the photograph frame. To support this activity, slides are included that contain images related to the following themes:** • Birthday • Christmas • Halloween • Diwali • Summer • School • Soccer • France

MEDIUM TERM PLANNING

Key Vocabulary for this unit of work

Design technology by its very nature has technical words that are specific to the subject content. Children understanding the vocabulary is vital as it promotes understanding of the subject and promotes and unlocks further learning in the subject. Understanding technical vocabulary aids independent research (with access to unlimited knowledge) and allows children to articulate and discuss their learning.
Each lesson in this unit of work begins with a vocabulary session highlighting three design technology words. When introducing new vocabulary, the teacher should pronounce and spell the word, discuss its meaning and model how the word is used in sentences and design technology contexts. For known words, children should say the word, spell, discuss its meaning and use the word in the context of design technology and/or use the word in a sentence.

Adhesive	A substance used to stick materials together; examples include PVA glue, a glue stick or glue gun.
Client	A person using the services of a designer. The client is the person who is going to buy or use the product.
Decorate	Adding colour, texture and pattern to a surface of a product to improve its appearance.
Design	To have ideas and plans for making useful products.
Designer	A person who creates plans for making useful products.
Design Brief	A summary of the aims of a design and the kind of product that is needed.
Design Specification	A design specification describes how a product should be made, how it works or what it should do.
Evaluate	To assess how well a product or service meets the design brief and specification.
Felt	A textile fabric made by compressing woollen fibres into a single sheet
Frame	A structure assembled from long thin strips off material.
Glue Gun	A device for applying hot glue to parts to be joined together.
Join	To connect two pieces of materials together, either temporarily or permanently.
Market Research	The process of finding out which products people want.
Material	Materials are what things are made of, for example wood, metal, plastic, fabric, food.
Prototype	A model of a design that shows how it works, what it looks like and can be tested to see if it works as it should.
Structure	A structure is a combination of materials and/or parts that supports a load.
Triangulation	Using struts to provide a structure with strength and stability.

DESIGN TECHNOLOGY SUPPORT

MEDIUM TERM PLANNING

	Teaching & Learning	Outcome
Investigate Task	**Investigate 1: Investigating Photo Frames** The sessions begins with a teacher-led investigation of existing picture and photograph frames. Through answering questions and investigating actual photograph frames, children develop an understanding of the purpose and function of photograph frames. Questions are provided to support pupil discussion. Children should investigate: • The materials that are used to create the frame and their properties. • The structure for holding the image in pace in the frame. • How the image is protected from being damaged in the frame. • The structure used to stand the frame upright. (Further focus could be on how the frame can be positioned so that the image can either be landscape or portrait). Once the initial investigation/discussion is complete, provide children with a small photograph of someone famous printed on to card or paper, they will also need a small piece of paper and a glue stick. Challenge them to make the photograph stand up vertically or as near to vertically as possible. Allow children to observe each other's efforts and to comment on the different ways that this has been achieved. Explain to the children that testing out ideas to see whether they work is an important part of the design process. (A PDF sheet of images of Queen Elizabeth II is provided that matches the image on the presentation slides). **Investigate 2 - Understanding Structures** This session consolidates and develop children's technical knowledge and understanding of structures. Children learn that structures are all around and that some structures occur naturally, and some are 'man-made'. They learn that structures are built for a purpose, to provide support and hold things together and that they come in all shapes and sizes. They learn that there are two types of structures – shell structures and frame structures. Focusing on frame structures, they learn how triangles are included in the design to make them stronger, stiffer, and more stable. **Investigate 3 – Understanding Theming** In this session children are provided with images of themed photo frames and are challenged to link these themes to a specific celebration and who might use the photo frames. Slides are included with images of different themes as an example. This session provides an opportunity to consolidate children's understanding of the relationship between the designer, product and client. Set the children a challenge to design a photo frame for a specific purpose / celebration using the Photo Frame Design Sheet (PDF provided) – this could be linked to the wider curriculum.	**Investigate 1: Investigating Photo Frames** • Children will know the purpose of a photo frame and understand that they are used to show photographs of family, friends, and special occasions. • Children know what materials are used when creating photo frames and can explain why they are suitable for their purpose. • Children will have investigated a range of free-standing photo frames and understood the different structures thar are used to make them free-standing. • Children will know how models are used to test out design ideas. • Children apply their knowledge of photograph frames and different techniques of paper folding, cutting, shaping and joining to create a free-standing photograph. **Investigate 2 - Understanding Structures** • Children will know that some structures are natural, and some are man-made by humans. • Children will know that structures are things that provide support, support weight or hold things together • Children will know that triangles are the strongest shape and are used by designers to make their frames stronger, stiffer and more stable **Investigate 3 – Understanding Theming** • Children will know that photo frames can be themed to reflect different occasions and celebrations. • Children will know that a designer creates designs for a product that a client will wither use or buy. • Children will know how to design a photo frame for a specific theme.

MEDIUM TERM PLANNING

Design, Make & Evaluate Task	
Pre-Requisite Knowledge • Children should know how to work with cardboard. Measuring and accurately cutting sheets of cardboard to size using card snips and or a craft knife. • Children should know how to score cardboard before folding to make an accurate and crisp fold. • Children should know how to create a simple wooden frame using the Jinks method. • Children should know how to use a low-melt glue gun correctly and safely. • Children should know and understand how products can be themed for a particular purpose.	For this project children work individually to create their photograph frame. For the design and make activity, children have already selected the photograph for their frame and constructed a wooden jinks frame for the photograph to fit into as part of Focus Task 1. **Design Brief: Design and make a free-standing photo frame for a specific theme, person or celebration.** **Design Specifications:** 1. The frame should have a theme. 2. The frame should be free-standing. 3. The frame should protect the photograph. **Session 4: Frame Designer** The session begins with the introduction of the design brief. Explain that the design brief informs the children about the product they are going to design and make. This is followed by a slide explaining the design specifications for the project. Subsequent slides help children to understand the design specifications: Design Specification 1: The frame should have a theme. Slides remind children of the relationship between the designer, the product and the client. They also guide children on the design decisions they need to make when designing a photograph frame. Decorated photograph frames from Investigate 3 are provided to remind children of what is meant by theming of a product. Encourage the children to try out some themes for their frame by creating sketches of their ideas. Children then draw the design for the frame or can use a software paint program to design their frame. A PDF is provided for the design activity. Children should write a short explanation of the technique they will be using to decorate the frame and they create a short list of the resources they will need. Design Specification 2: The frame should be free-standing. Using and applying their knowledge from Investigate 1, children create a 3D drawing to demonstrate how they are going to make their photograph frame stand upright. This is an opportunity to teach children how to create 3D drawings using isometric paper (Guidance slides provided). Design Specification 3: The frame should protect the photograph. The session finishs with a discussion about the ways in which a photograph frame protects the photograph. This can be linked to properties of materials and how the protective sheet needs to be transparent to allow the photograph to be seen.

DESIGN TECHNOLOGY SUPPORT

MEDIUM TERM PLANNING

Challenge & Support

Sawing Wood: Younger children can struggle with the technique of sawing wood accurately. Whilst it is important to provide them an opportunity to develop this technique, it is equally important that they are given the opportunity to create a framework for their photograph frame. For those children that struggle with sawing wood, they can be provided with ready-cut pieces of wood.

Challenge for More Able

- Challenge pupils during the DME sessions to adapt and refine their design when making the product.

Support Strategies

- Check that children have the necessary pre-requisite knowledge needed for this unit of work (Have they remembered key knowledge and skills from previous units of work that are necessary for them to achieve fully in this unit of work).
- Ensure that pupils fully understand the technical vocabulary for each session.
- Some children may struggle with deciding on a theme for their photograph frame or creating icons, images and pictures to decorate their frame. For those children experiencing difficulty – provide them with a theme for their photograph frame and some images that are linked to the theme to support them in developing their designs.
- Pupils with SEND often find designing activities problematic, provide adult support with any labelling or annotating activities.
- On-going assessment during the focused practical tasks will identify those children who may need additional adult support during the making phase in terms of using a range of materials and tools properly and with increasing accuracy.
- Consider 1:1 or small group with adult-support when undertaken focused making activities.
  When evaluating products, children could work as part of a guided group or have guidance to follow or answer a set of questions to enable them to evaluate effectively.

Indicators that children are keeping up with the curriculum	
1	Children will know that making models and testing out their ideas is an important part of designing a product.
2	Children will know how to create and develop design ideas using the design brief and design specifications for guidance.
3	Children will know how to make a stable frame structure and the technique of using card triangles to strengthen this framework
4	Children will know how to measure and cut accurately and use particular tools and equipment when making a product.
5	Children will know that there are a range of sources than can contribute to the evaluation of a product.

Advice for using Glue Guns in Primary Classrooms

Low temperature glue-guns are a useful tool that may be used in schools to help pupils to assemble components in their design technology project work, quickly and easily.
Some local authorities do not allow these in the classroom for Health and Safety reasons or stipulate that glue-guns can only be used by the class teacher, check local advice regarding the use of glue guns in your school.

For primary school children use low-melt glue guns that operate at a lower temperature than conventional glue guns.

- Pupils should be supervised by a responsible adult at all times when using the glue guns.
- Designate a table or area of the classroom for the use of glue guns. Children should only go to this area when directed by the class teacher.
- For each session that involves the use of glue guns, explain to the children how to use the glue guns. Slides are included in the lesson presentations to support this safety briefing.
- If a burn occurs, hold the affected area under cold running water for 10 minutes and then seek further first aid advice and record the incident in the school accident book following agreed procedures.

Teacher Physical Checklist

- Glue guns should not be switched on until after the safety briefing from the teacher
- As with all electrical equipment in use, the teacher conducts a visual check before the session begins to ensure that the leads are undamaged.
- Teacher checks that all electrical leads, including extension leads, are run where they cannot be tripped over.

Organisational note: Schools can provide safety goggles for children to use when using glue guns. Match the number of goggles to the number of glue guns in use – no child should be using a glue gun if they are not wearing a pair of safety goggles.

DESIGN TECHNOLOGY SUPPORT

Copy of Presentation Slides

Recorded Presentations

- Design Technology in Early Years
- Design Technology in Key Stage 1
- Design Technology in Key Stage 2

Documentation

- Scheme of Work Overview
- Curriculum Pathway
- Vocabulary List
- Curriculum Audit of Provision
- Staff Confidence & Capability Audit

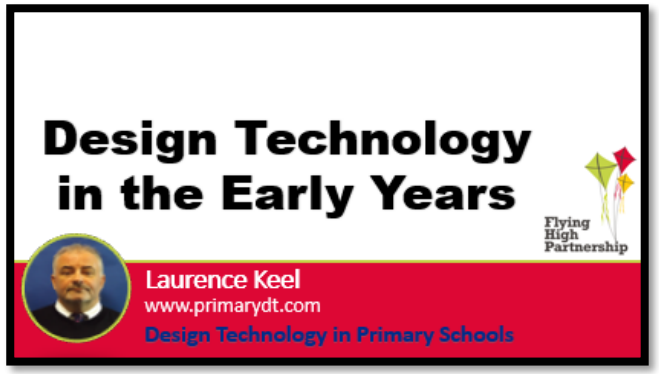
Resources for Cooking and Nutrition

Other Useful Presentations

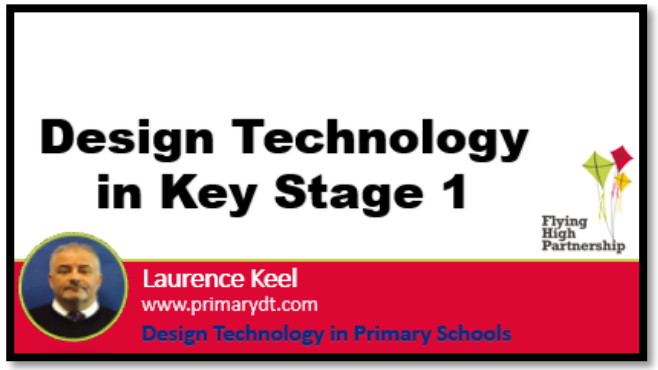
www.primarydt.com/flyinghigh

DESIGN TECHNOLOGY SUPPORT

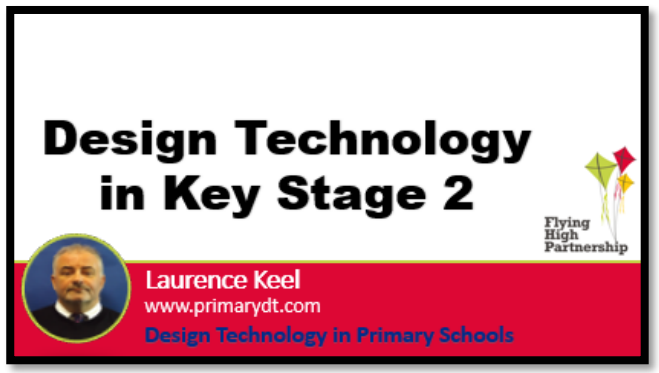
RECORDED PRESENTATIONS



- Overview of Design Technology in the Early Years
- Useful curriculum guidance for design technology in EYFS
- The Learning Environment promoting effective DT provision
- Developing Provision
- Audit of Provision - EYFS



- Challenges & Opportunities in Design Technology
- The Design Technology Curriculum in Key Stage 1
- Principles of Design Technology (Overview)
- Teaching Design Technology
- Disciplinary Knowledge – How the subject works
- Technical Knowledge (Cooking, Textiles, Structures & Mechanical Systems)



- Challenges & Opportunities in Design Technology
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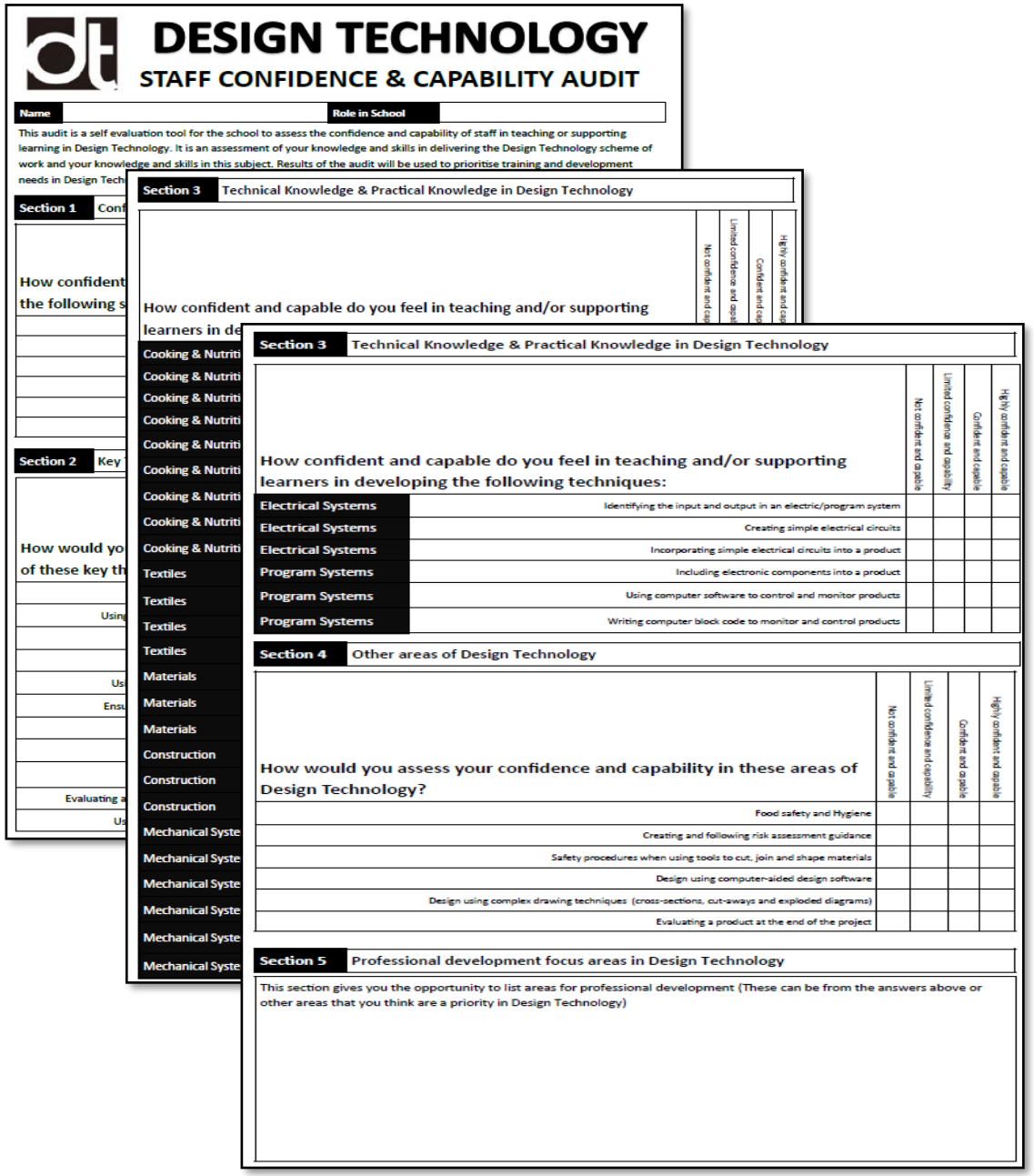
1st January 2026

DESIGN TECHNOLOGY SUPPORT



Staff Confidence & Capability Audit

Section 1

- Identifying strengths and weaknesses in curriculum coverage (strands of learning).

Section 2

- Understanding about key themes linked to disciplinary knowledge (designing, making and evaluating).

Section 3

- Subject knowledge of techniques linked to the six strands of learning in the design technology curriculum.

Section 4

- Other key areas of design technology (health and safety, drawing techniques).

Section 5

- Space for staff to contribute additional information and identify training needs.

DESIGN TECHNOLOGY SUPPORT

DESIGN TECHNOOGY CURRICULUM AUDIT

FOCUS AREA: CURRICULUM PROVISION

SECTION 1: National Curriculum Strands of Learning

Key Questions:

- Does the current curriculum provision meet the requirements of the National Curriculum in design technology?
- Is there a long-term plan / curriculum overview for design technology?
- Is provision for design technology clearly identified within a cross-curricular approach?
- Is there a rationale for the curriculum in design technology?
- Do the key stage end points match the ambition of the National Curriculum?
- Are the six strands of learning covered in sufficient depth to ensure coverage matches the ambition of the National Curriculum?
- Is there evidence that any scheme of work has been adapted to meet the context of the school and reflect the school community?

Strengths	Weaknesses

Improvement Actions:

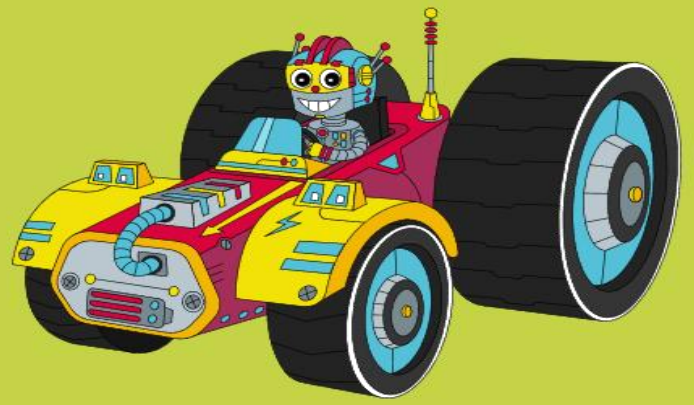
Curriculum Audit of Provision

- Curriculum coverage – strands of learning
- Design technology in EYFS
- Principes of Effective Learning in DT
- Disciplinary Knowledge – opportunities to design, make and evaluate
- Designs and designers
- Vocabulary
- Technical knowledge content
- Progression and assessment

DESIGN TECHNOLOGY SUPPORT

DESIGN TECHNOLOGY SHORT COURSES

DIPS & DIPPERS



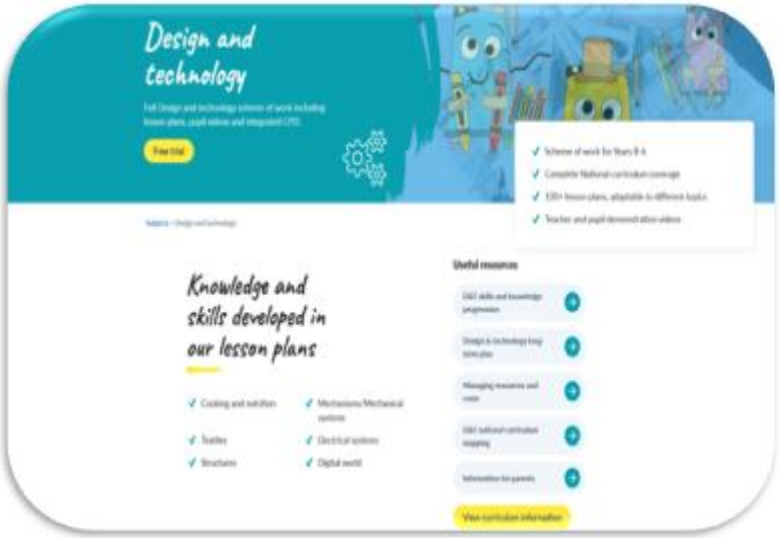
ROBOWARS!

TEDDY TEXTILES

PHOTOGRAPH FRAMES

- www.primarydt.com
- Email: support@primarydt.com
- Webcasts
- Each other! (lights under bushels)
- Online (Youtube)
- Make the product beforehand

DESIGN TECHNOLOGY SUPPORT



www.kapowprimary.com

www.designtechnology.org.uk

www.primarydt.com

www.thenational.academy

Learning Challenge CURRICULUM

www.learningchallengecurriculum.com

PlanBee

www.planbee.com

Prim-Ed Publishing

www.prim-ed.co.uk

PKC Primary Knowledge Curriculum

www.primaryknowledgecurriculum.org

twinkl

www.twinkl.co.uk

Decoration Workshop

Flying High Partnership

DESIGN DECISIONS

In becoming designers, children design and make products that are innovative and authentic to them

Children are not going to design something brand new – after all James Dyson hasn't done that either!
It is likely that they will be adapting or modifying an existing product

Children making meaningful decisions about their end product:

- What it will look like. (decorative ideas, theming)
- What it will do.
- Who it will be for.
- How it will be made.

In making these design decisions children will be:

- Applying their knowledge of existing products. (including designers and designs)
- Applying their knowledge of designing, making and evaluating.
- Applying their technical knowledge and practical skills.
- Applying their knowledge from other curriculum areas.
- Taking into account the needs or wants of the intended user.
- Developing their creativity. (Knowledge + Imagination)

FACTORS AFFECTING DESIGN DECISIONS

DESIGNER

A designer is someone who has ideas and creates plans for making products

PRODUCT

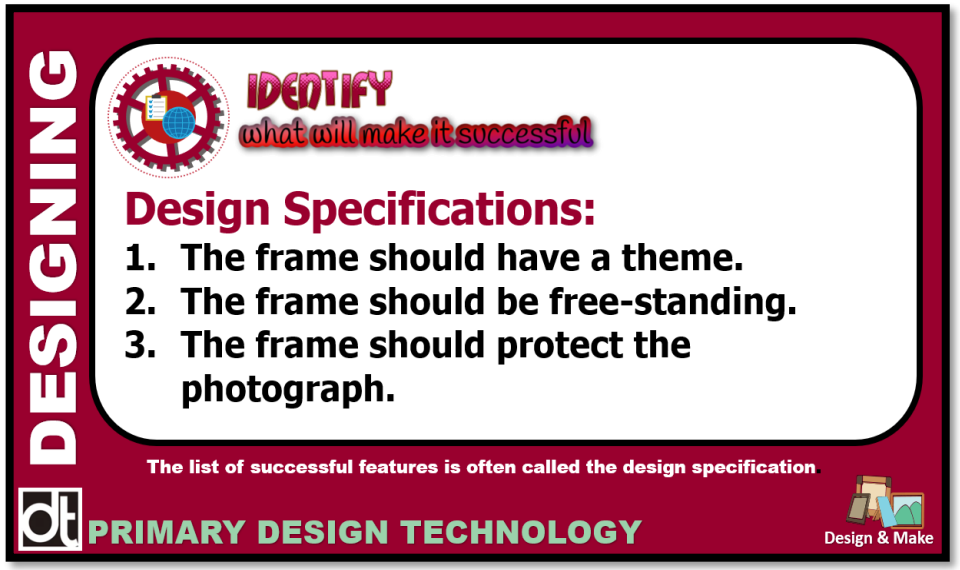
A product is something that is made to do a job or fulfil a need.

CLIENT

A client is someone who needs, wants or buys the product.

FACTORS AFFECTING DESIGN DECISIONS

The design brief tells you about the product you are going to create or the problem that you are going to solve.



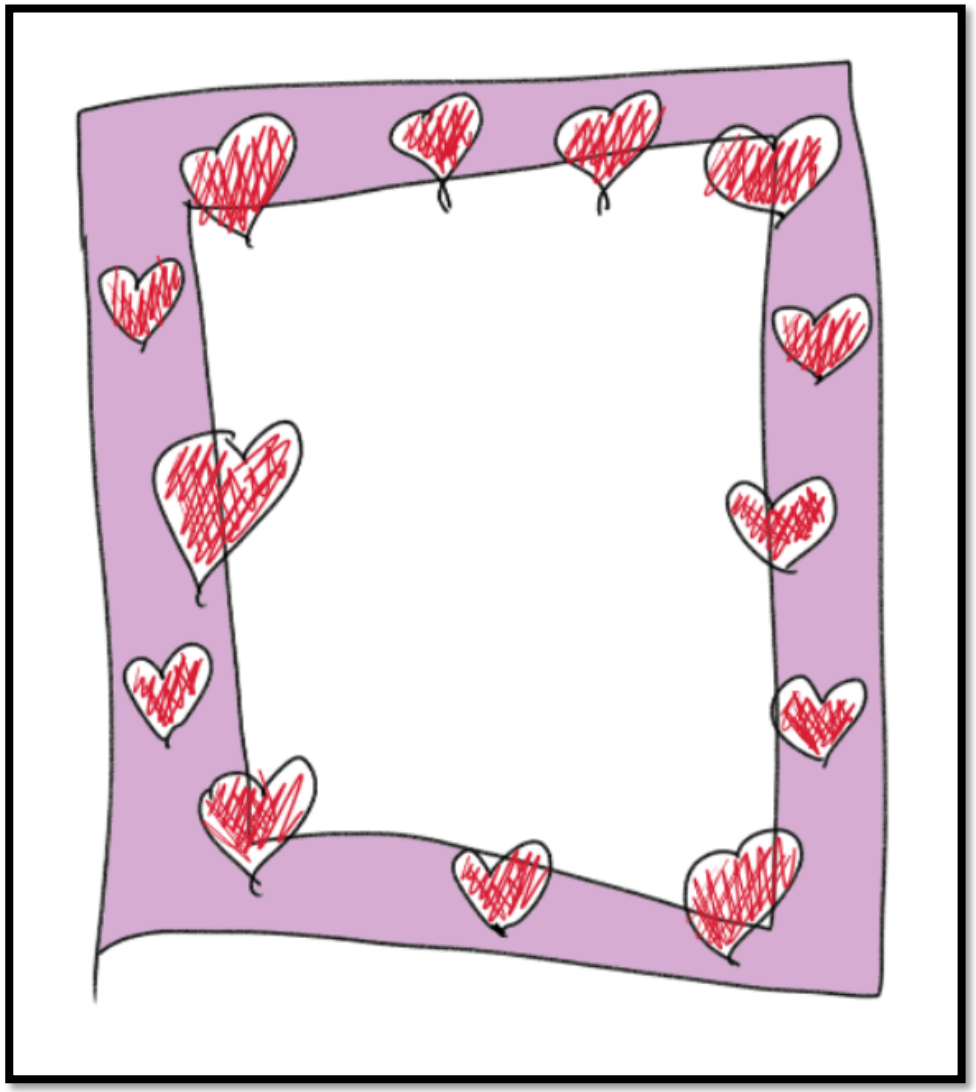
The design specifications are a list of successful features that tells you what should be in the product, how it should be made and how it should work.

FACTORS AFFECTING DESIGN DECISIONS

Designers make many decisions about the design of their product so that their client will like it and want to buy it

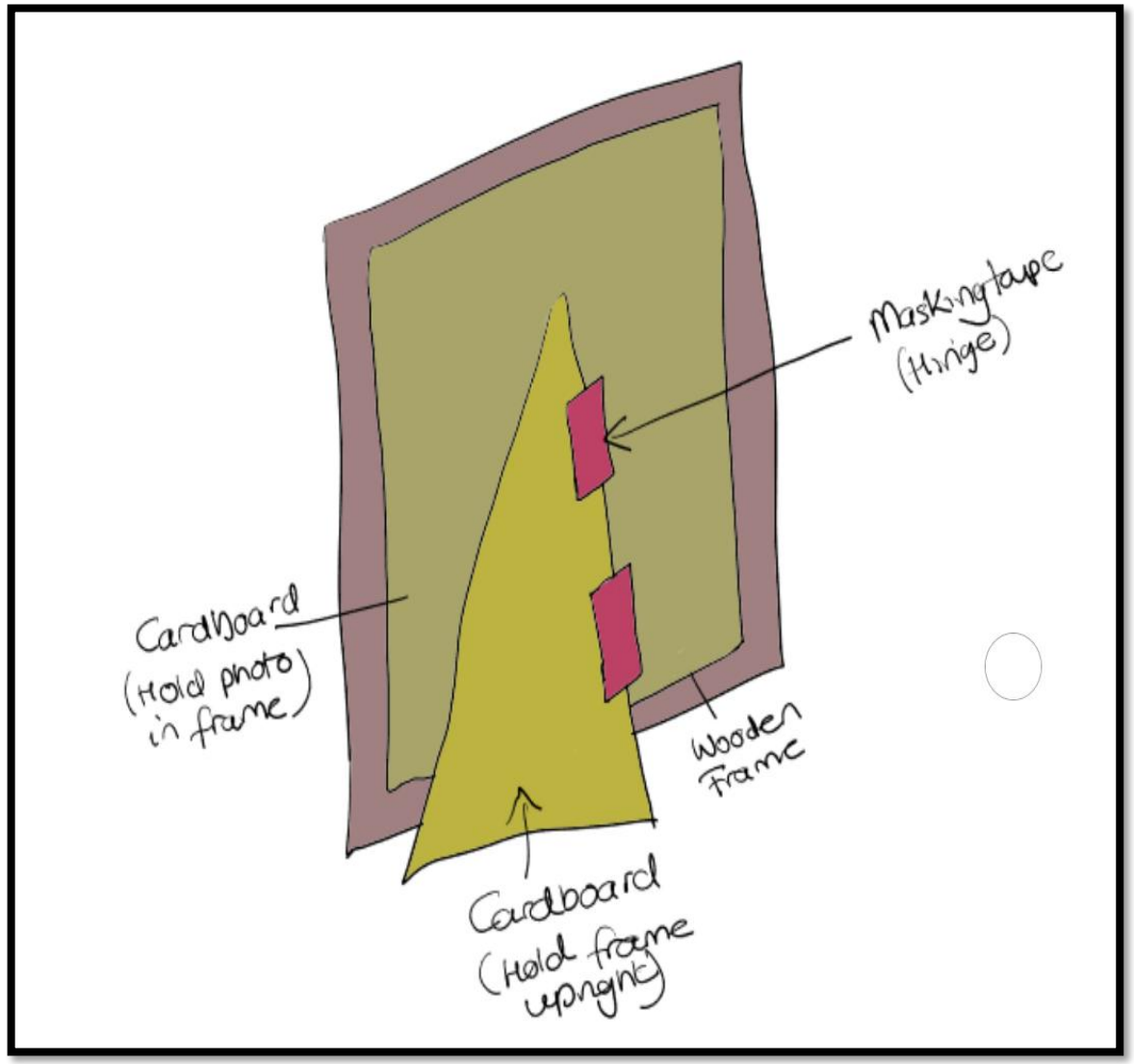
- What materials to use
- Portrait or landscape?
- How will it stand up?
- Colour of the frame
- Theming and decoration

COMMUNICATING DESIGN DECISIONS



Sketching is a very important skill for designers when developing ideas for a product. It is a way of getting their ideas and thoughts down quickly on paper. It is also a very effective way of communicating ideas – much better than having to write them down. The only tool you need for sketching is a pencil.

COMMUNICATING DESIGN DECISIONS



Labels are an important part of a technical drawing as they identify different parts of the drawing and help people to understand the drawing.
Labels can also be used to show accurate measurements.
Annotations are notes that are added to labels in technical drawings to provide more information about the drawing and the label.
Often annotations are used to explain how a product or part of a product works or how it has been made.

DECORATE YOUR PRODUCT

Is this an opportunity to teach a specific decorative technique?

HAVE WE MET THE 5 PRINCIPLES OF EFFECTIVE DT?

The principles of effective design technology are that children:

- Design and make a product
- Build knowledge
- Understand the iterative process
- Make design decisions
- Work in relevant contexts

Lesson Types
in Design Technology

Flying High Partnership

KNOWLEDGE BASED SUBJECT

Knowledge-based subject – huge implications for

STAFF SUBJECT KNOWLEDGE

BIGGEST BARRIER TO EFECTIVE TEACHING AND LEARNING

Focus on improving subject knowledge:

- Detailed planning / scheme of work
- Professional development
- Make the product – do the project!

Planning activities / sessions / lessons

- *What knowledge do the children need in order to achieve the learning outcome?*

Knowledge-based learning outcome

Children will know…

Children will know how to…

As children progress through the curriculum subject do they know more and can they remember more?

Assessment for Learning

- What do they know already?
- (how secure is this knowledge?)
- Do I need to consolidate this knowledge,
- What is new knowledge and how can I link this knowledge to existing knowledge to create better understanding?
- How will I know that they have secured this knowledge?

Design Technology – vast and varied content – taught sporadically!

TEACHING DESIGN TECHNOLOGY: 4 LESSON TYPES

INVESTIGATE

- Understand and evaluate existing & similar products.
- Linking real-life products to subject knowledge.
- Research about products.

FOCUS TASKS

- Teaching practical knowledge (skills & techniques).
- Linking practical knowledge with technical knowledge.

DESIGN & MAKE

- Applying knowledge to meet a challenge or create a product.
- Consolidating disciplinary knowledge of design technology.

EVALUATE

- Evaluating the product that has been designed and made.
- Evaluating the process.
- Reflecting (and evaluating) the project.

TEACHING DESIGN TECHNOLOGY: 4 LESSON TYPES

LESSON TYPES IN DT

INVESTIGATE

FOCUS TASKS

Guide
Instructor

Teacher as guider
- Investigating
- Researching
- Playing / Testing
- Tasting (food)

Teacher as provider
- Subject
- Technical
- Practical (Skills and techniques)
- Disciplinary (Designing, making & evaluating)

KNOWLEDGE ACQUISTION

DESIGN & MAKE

EVALUATE

Coach
Critical Friend

No new teaching of knowledge in these sessions - children should have all the knowledge needed

Knowledge more secure in some children – they will need support – use assessment information from the investigate sessions and focus tasks.

KNOWLEDGE APPLICATION

4 LESSON TYPES: ASSESSMENT FOR LEARNING

LESSON TYPES IN DT

KNOWLEDGE BUILDING

PRIOR LEARNING

UNIT OF WORK

What knowledge do the children need to design and make the product?

FUTURE LEARNING

What knowledge and skills are the children bringing with them to this unit of work?
Sources of information:
- Scheme of work / Progression Document
- Assessment information (how reliable?) passed on to the teacher

What new knowledge and skills do the children need for the unit?
Delivered through:
- Investigative activities
- Focus tasks

Assessor
- Prior learning and knowledge
- Pre-Requisite knowledge for the design and make activity
- Identifying those children that will need support

CURRICULUM END POINTS

4 LESSON TYPES: PEDAGOGY

- The Investigate tasks and Focus tasks should build upon children's previous knowledge (& skills) to provide all the pre-requisite knowledge (& skills) that the children need to successfully complete the design and make task.
- Some Investigative tasks may need to be taught as a focus task if children have no pre-knowledge of the Investigative task.
- Investigate and Focus tasks are an opportunity to assess whether children have the necessary knowledge needed for the Design and Make activity and identify children who might need support.
- Focused tasks can be used to create a component part of the end-product that the children will be creating.

INVESTIGATE LESSON

INVESTIGATE: FINDING THINGS OUT

- Finding out about existing and similar products.
- Finding out how products work.
- Finding out about how products are made.
- Finding out what makes products successful.
- Finding out who uses and needs a product.
- Finding out what products people like and why.

INVESTIGATE LESSON

WHAT DO THE CHILDREN KNOW ALREADY?

BIG QUESTIONS

Talk about to find out…

What is a photograph frame?

What does a photograph frame do?

This is called its function

Who has a photograph frame?

What photograph do you have in your frame?

INTRODUCING KNOWLEDGE

BIG QUESTIONS

Talk about to find out...

Class Discussion:

- What materials have been used to create the photograph frame?
- How do the properties of these materials make them suitable for making a photograph frame?

LINKING TO FUTURE LEARNING – POSING PROBLEMS

BIG QUESTIONS

Talk about to find out...

Class Discussion:

- What does free-standing mean?
- How does the photograph frame stand up?
- How do you get the photograph into the frame?

LINKING INVESTIGATION & EVALUATION

BIG QUESTIONS

Talk about to find out...

Evaluating Photograph Frames:

- Which do you prefer and why?
- What features make a good photograph frame?

FOCUS TASKS

CHILDREN GAINING & CONSOLIDATING KNOWLEDGE

Teacher-led activities that focus on consolidating/extending pupils' knowledge:

- Knowledge of how a product is made
- Practising key skills needed to make a product
- Using tools and applying techniques properly
- Deepening understanding of the properties of materials / ingredients
- Providing technical knowledge
- Designing skills (mood boards, brainstorming, drawing, CAD)
- Conducting research (questionnaires, surveys, desktop searches, taste tests)
- Evaluation skills (guided)

FOCUS TASKS

INVESTIGATE

Challenge: Can you make the photograph stand up by itself?

Test out your ideas

Trying out ideas, making models and testing whether they work, is an important part of designing.

PRIMARY DESIGN TECHNOLOGY

Investigate 1

APPLICATION

PHOTOGRAPH FRAME DESIGNER

PRIMARY DESIGN TECHNOLOGY

Investigate 3

TECHNIQUE

Making a Wooden Framework

Measuring Your Frame

Your photograph frame should surround your photograph.

Measure the length of your photograph and then add an extra 2cm.

Measure the width of your photograph.

PRIMARY DESIGN TECHNOLOGY

Focus Task 1

What other knowledge do the children need to complete the project?

- Designing and drawing skills
- Using glue gun
- Cutting and measuring
- Painting and decorative skills

Challenge & Support

CHILDREN CREATING A PRODUCT

DESIGN & MAKE

Starting Point

KNOWLEDGE
- Technical Knowledge
- Practical Knowledge (skills)
- Disciplinary Knowledge
- Vocabulary

Product Knowledge
Knowledge of existing or similar products – life experiences and from investigate tasks

Knowledge & Imagination = Creativity

Design & Make Activity → Product

DESIGNING

Making Design Decisions
Adapting Designs

Designer-Product-Client

Design Brief/Specifications

Models
Mock-Ups
Prototypes

Brainstorming Techniques
- Individual
- Group Brainstorm
- Recording ideas

Drawing
- Sketching initial ideas
- 2D Drawing
- 3D Drawing techniques (crating)
- Labelling
- Annotating
- Cut-Away Drawings
- Cross-Sectional Drawing
- Exploded Diagrams

Research
- Desktop research
- Market research
- Investigating existing products
- Testing things out

Mood Boards

MAKING

Plans of Action
- Being 'prepared to make'
- Recipes
- To do list
- Ordering actions
- Task Boards

Tools and Equipment
- Vocabulary
- Uses and correct uses

Materials
- Experience range of materials
- Understand their properties

Techniques
- Cutting
- Joining
- Shaping
- Decorating

Safe & Hygienic Working
- Cooking and Nutrition
- Safety with Tools & Equipment
- Following rules & procedures

Planning a Unit of Work – decide the product, make it yourself, plan backwards

DESIGN & MAKE A PHOTOGRAPH FRAME

DESIGN & MAKE

DESIGNING

DEFINE
the problem or product

Design Brief:

Design and make a free-standing photo frame for a specific theme, person or celebration.

PRIMARY DESIGN TECHNOLOGY

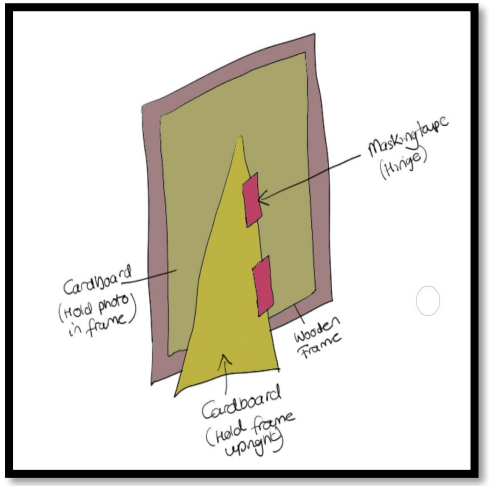
Design & Make

Design Decisions

Designers make many decisions about the design of their product so that their client will like it and want to buy it

- What materials to use
- Portrait or landscape?
- How will it stand up?
- Colour of the frame
- Theming and decoration

Design Drawing



DESIGNING

IDENTIFY
what will make it successful

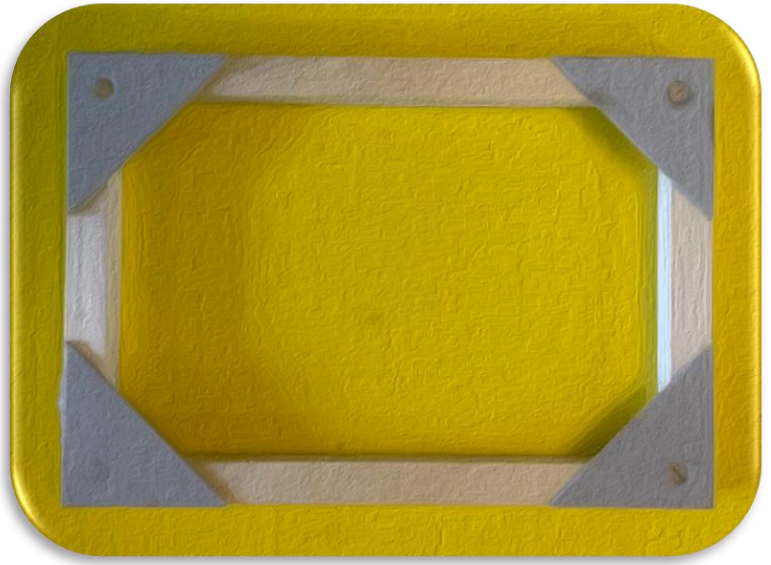
Design Specifications:

1. The frame should have a theme.
2. The frame should be free-standing.
3. The frame should protect the photograph.

The list of successful features is often called the design specification

PRIMARY DESIGN TECHNOLOGY

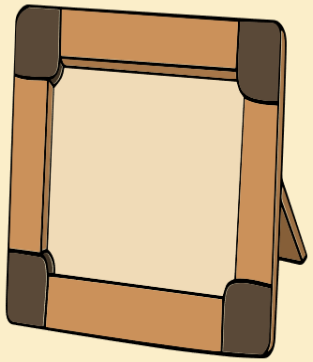
Design & Make



EVALUATE THE PHOTOGRAPH FRAME

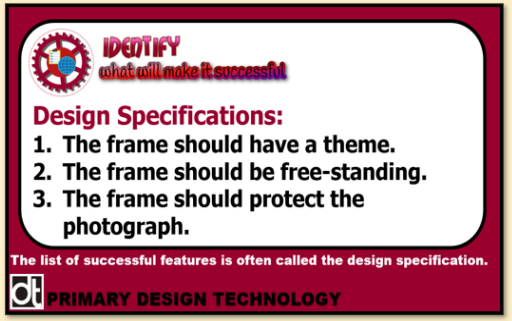
EVALUATION

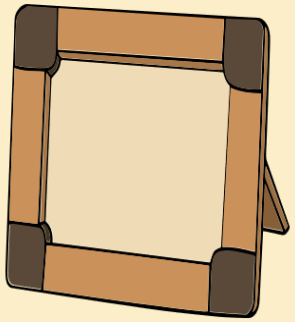
When evaluating the success of a product we can ask ourselves a series of questions. We can use the design brief to help us ask and answer these questions.



- Have you created a photo frame?
- Have you designed it for a specific purpose?

When evaluating the success of a product we can ask ourselves a series of questions. The design specifications are a list of the things the product must do to be successful.





- What is the theme of your photo frame?
- Is your photo frame free-standing?
- Can you explain how the frame protects the photo?

BIG QUESTIONS
Talk about to find out...

Evaluating Photograph Frames:

- Which do you prefer and why?
- What features make a good photograph frame?

Investigate Session

YOUR PRODUCT: WHAT DO OTHERS THINK?

A consumer survey allows people to comment upon a product – this is called feedback. It is used so that you can improve your product.

Give each product a star rating ★★★★★

YOUR PRODUCT: WHAT DO OTHERS THINK?

In a consumer survey people comment about what they like about a product. They can also be asked about how they might improve a product. These can be written on Post-it notes.

EVALUATE TO START AND TO FINISH

EVALUATION

Evaluating existing products – why do they work well

Looking at existing products linked to the product they are going to create

- What is the function and purpose?
- Who would use this product and why?

Better understand the design brief

- How are they made (materials, structures, skills)
- What do I like about them?
- What makes a good……

Better understand the design specifications

Evaluating products that they have designed and made

- Evaluating against the design brief and design specifications
- Evaluate the made product against the product design
- Evaluation and the views of others (peers, experts, user/client)
- Evaluation of the product (what works well, what to improve)
- Evaluation of the project (reflect on their experiences, likes and dislikes)
- Evaluation of the process (skills and techniques)

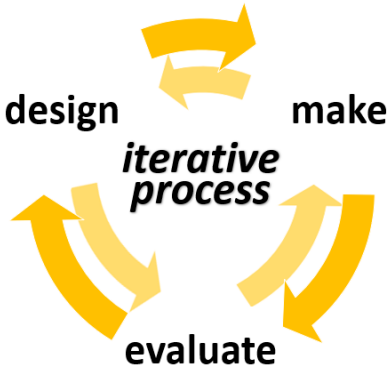
EVALUATION

THE ITERAIVE PROCESS: EVALUATION

Ongoing evaluation as part of the iterative process.

Children working like designers and makers.

- *Children need to be reminded of the iterative process.*
- *Teacher models the iterative process and celebrates re-designing and re-making.*
- *Opportunities built into the learning sequence – developed and embedded until it becomes an unconscious part of designing and making.*



Key Questions

- *Is this going to work? (Is the product doing what it is meant to? – function, purpose)*
- *Are the component parts doing what they are meant to? (materials, structures and systems)*
- *Is my design realistic/achievable – do I need to go back and re-design/improve?*
- *Am I using the right tools in the correct way?*
- *Can I make it better whilst I am making it?*
- *Can I learn from other people and their experiences?*
- *Do I need expert advice / technical support?*

IDEAS FOR EVALUATION

EVALUATION

EVALUATING YOUR PRODUCT

A product is something that is made to do a job or fulfil a need – it has a function

What did you design your product to do? – What was its function?

Is it doing it?

EVALUATION

EVALUATING YOUR PRODUCT

When evaluating the success of a product we can ask ourselves a series of questions. The design specifications are a list of the things the product must do to be successful.

Question: How did you design your product to match the design specifications?

Answer: Draw (or photograph) your product. Label and annotate it to explain how you achieved the design specifications.

EVALUATION

EVALUATING YOUR PRODUCT

When evaluating the success of a product we can ask ourselves a series of questions. We can use the design brief to help us ask and answer these questions.

Question: How did you design your product to make it 'hands-free'?

Answer: Draw (or photograph) your product. Label and annotate it to explain how you made it 'hands-free'

EVALUATION

EVALUATING YOUR PRODUCT

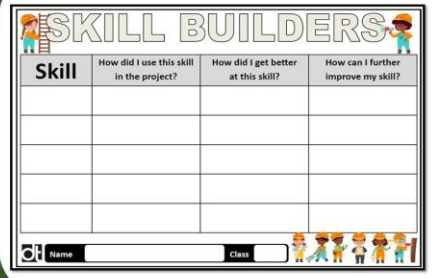
When evaluating the success of a product we can ask ourselves a series of questions.

- What do you think about the product you made?
- What are three things about the product that you really like?
- Is there one things about the product that you don't like?
- How would you improve your product?

We can also ask the same questions about the products that other people have made – remember – be honest and kind!

EVALUATION

THE PROCESS : SKILL BUILDERS



Think about all the different skills that you have used when designing and making your product.

- How did you use these skills in the project?
- How did you get better at these skills during the project?
- How could you further improve these skills?

EVALUATING

THE PROJECT : DOCUMENTARY

Your evaluation task is to create a short documentary film that shows the different designing and making stages that were undertaken to create your product. Edit together the short film clips and add explanations and subtitles to create the documentary

EVALUATION

Focaccia Taste Testing

PRIMARY DESIGN TECHNOLOGY

Evaluate

EVALUATION

Your task is to persuade a panel of potential clients to buy your product. You need to show them your product and promote your product to them.

PRIMARY DESIGN TECHNOLOGY

EVALUATION

THE PROJECT : EXHIBITION STAND

Your evaluation task to create an exhibit about your product. Include an explanation about how you designed and made it. You can also include drawings, diagrams and photographs.

IDEAS FOR EVALUATION

EVALUATING

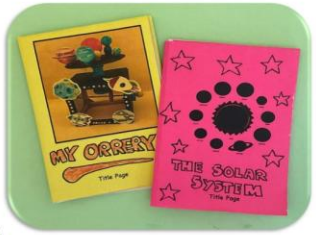
THE PROJECT : SHOW AND TELL

Your evaluation task is to present a short talk about your product. Talk and explain the design and make process. Talk about what went well and how you could improve the product.

At the end of the session the class will ask you some questions about the project.

EVALUATION

MAKING A ZINE

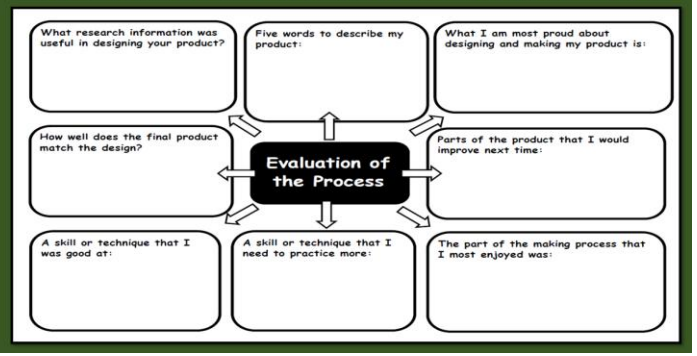


WHAT IS A ZINE?

A zine is a small magazine that you make yourself about your product. A zine contains both words and pictures. Zines are made from one sheet of paper, folded to create a small booklet.

EVALUATION

THE PROCESS: MIND MAPPING



EVALUATION

Mark II product refers to the second version of a product. It is an improved version of the product.

Designers think about how they can improve the clients experience of using the product.

Mobile phones have an upgrade regularly

EVALUATION

Mark II Products

Mark II product refers to the second version of a product. It is an improved version of the product.

- Take a photograph of your automaton toy and then write a short paragraph explaining how you would improve the product to create the Mark II version.
- Also, explain how you would improve the process of making the automaton toy – what would you do differently next time?

EVALUATION

WORLD OF WORK

How might the knowledge and skills that you have learnt in this project be useful in the world of work?

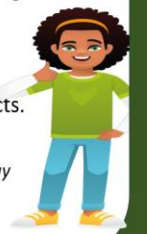
What kind of professions would use this knowledge and skills?

EVALUATION

MARKETING YOUR PRODUCT

Businesses need to tell potential clients and customers about the product they are selling – this is called promoting the product. Promotion is about:

- Telling the customers about the product.
- Telling the customers why they should buy the product.
- Telling the customers how it is better than other products.



Promotion is about persuading people to buy your products.

Can you think about ways in which businesses persuade people to buy their product?

EVALUATION

MARKETING YOUR PRODUCT

PROMOTION- *getting the message across!*

What is your message?

- What is the name of your pizza?
- Why should people buy your pizza?
- Why is your pizza special?
- Why is your pizza better than other makes of pizza?

Delivering your message

- Poster
- Handout Flyer
- Menu Card
- Radio advert
- TV / Online Commercial

EVALUATION

MARKETING:SELLING ONLINE

Products can also be sold by online shopping. To complete this project, design a shopping page for your Tamagotchi.

What is the name of your **Tamagotchi** product?
Who designed your **Tamagotchi**? – You did!

Write a brief description of your **Tamagotchi** and draw a picture of the **Tamagotchi** or add a photograph of your product.

How much will you sell your **Tamagotchi** for?
What age range is the **Tamagotchi** made for?
What materials have you used?

Think about the customers you have designed your **Tamagotchi** for – what other products are they likely to buy?

Ask two friends to write a short review of your product and to rate your product out of five stars.

ELECTRICAL AND PROGRAM SYSTEMS

KEY STAGE 2

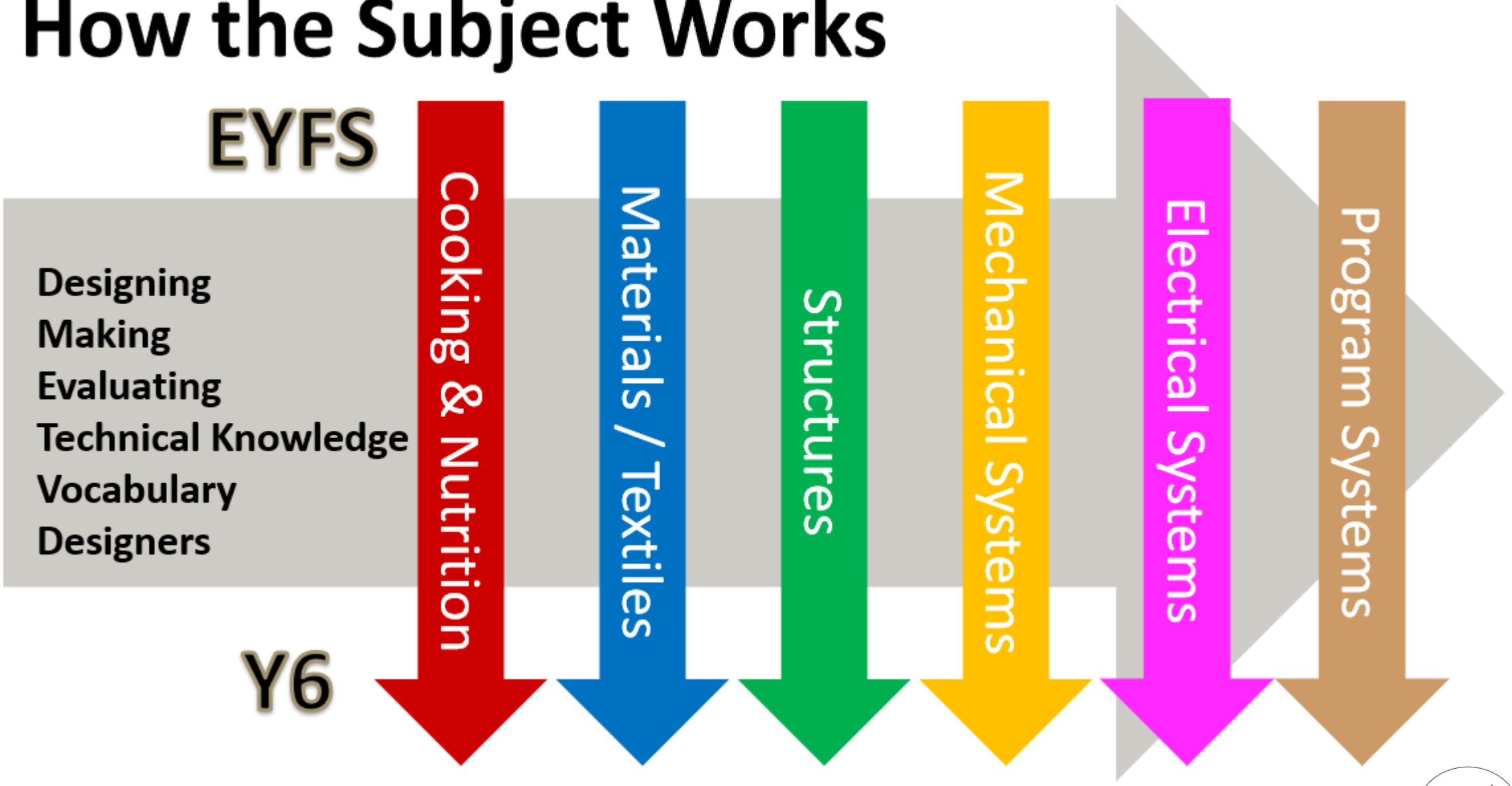
Flying High Partnership

TRAINING OBJECTIVES

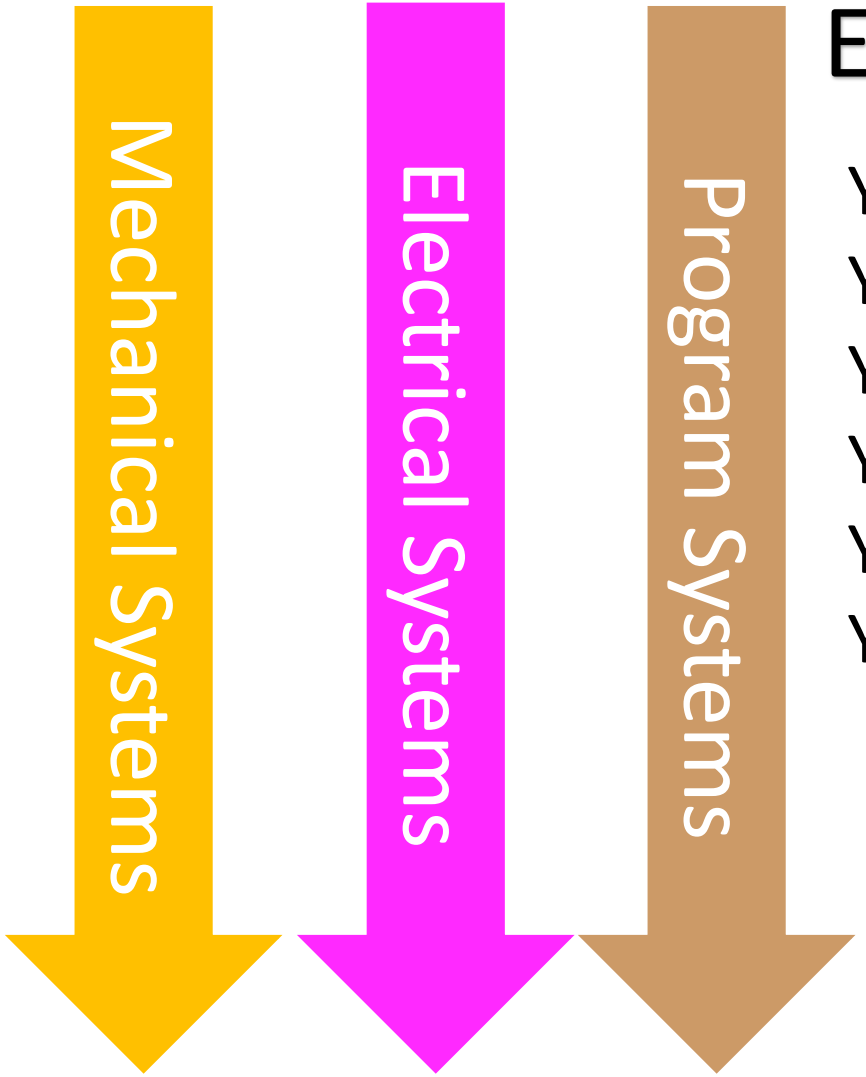
- To understand the curriculum requirements for teaching program systems as part of the systems strand of knowledge in design technology.
- To understand the technical knowledge for program systems and how this is taught through units of work in design technology.
- To use Crumble hardware when designing and making products in design technology.
- Understand that program systems can be made simple but used effectively and creatively as part of primary school design technology.

DESIGN TECHNOLOGY

How the Subject Works



Understanding Systems



Everyone has their part to play!

Year 1: Sliders and levers
Year 2: Wheels and axles
Year 3: Levers and Linkages / Pneumatics
Year 4: Electrical Systems
Year 5: Pulleys/Gears/Cams
Year 6: Program systems (control and sensing)

Building children's knowledge and understanding of how systems are used when designing and making products

Mechanical Systems

MECHANICAL SYSTEMS

Systems make a product work
All systems have an input and an output

MECHANICAL SYSTEMS PRODUCE MOVEMENT

KNOWING & UNDERSTANDING SPECIFC MECHANICAL SYSTEMS

- **Sliders**
- **Pop up mechanisms**
- **Levers and linkages**
- **Wheels and axles**
- **Pulley systems**
- **Cams**
- **Gears**

Pneumatics – not mentioned in the National Curriculum – good for practical models (syringes) Input and Output.

TYPES OF MOVEMENT

- **Linear movement**
- **Rotational movement**
- **Reciprocating movement**
- **Oscillating movement**

Knowing and identifying different types of movement in different mechanical systems

The National Curriculum

Key Stage 1
Pupils should be taught to:

- Explore and use mechanisms in their products.

Key Stage 2
Pupils should be taught to:

- Understand and use mechanical systems in their products

Progression

- **Systems make a product work**
- **Knowing inputs and outputs**

DESIGN TECHNOLOGY: SYSTEMS

Electrical Systems

ELECTRICAL SYSTEMS

Systems make a product work
All systems have an input and an output

UNDERSTANDING AND MAKING SIMPLE CIRCUITS USING A RANGE OF COMPONENTS
- **Batteries, Wires, Bulbs**
- **Buzzers, Motors, Switches**

USING ELECTRICAL CIRCUITS IN PRODUCTS

CONTROLLING ELECTRICAL SYSTEMS (INPUTS & OUTPUTS)

Switches – on or off (choosing the right switch)

Program Systems

PROGRAM SYSTEMS

Systems make a product work
All systems have an input and an output

UNDERSTANDING AND MAKING SIMPLE CIRCUITS USING A RANGE OF COMPONENTS
- **Batteries, Wires, Bulbs**
- **Buzzers, Motors, Switches**

USING ELECTRICAL CIRCUITS IN PRODUCTS

CONTROLLING ELECTRICAL SYSTEMS (INPUTS & OUTPUTS)
- **More complex inputs and outputs controlled by computing (Block Coding)**
- **Inputs and outputs controlled by using sensors in a system.**

The National Curriculum

Key Stage 2
Pupils should be taught to:
- Understand and use electrical systems in their products
- Apply their understanding of computing to program, monitor and control their products

Progression

- **More sophisticated method of controlling the system**
- **Wider range of inputs and outputs**

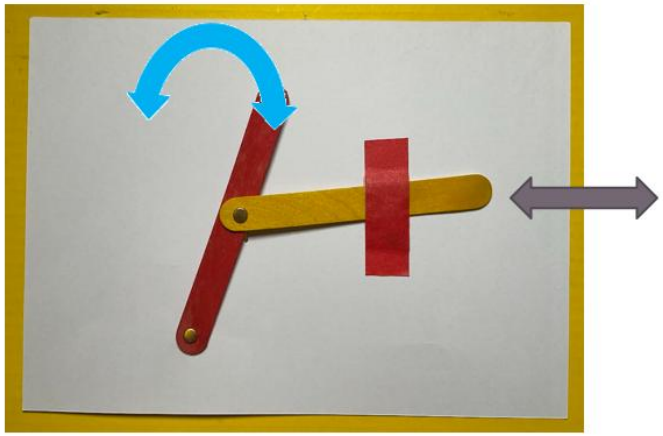
TEACHING SYSTEMS PEDAGOGICAL APPROACH

Design and Make a product with a system that makes it work

1. Investigate and understand the system and how it works.
2. How is the system used in real-life and existing products?
3. Design your product using the system that you understand
4. Make the product and incorporate the system to make it work

Y3 MECHANICAL SYSTEMS

Design and Make a product with a system that makes it work



Mechanical Book Page

- Investigate existing mechanical books – what levers and linkages do they use.
- Creating simple linkages – what movements do they cause (input and output). – Knowledge of levers and linkages
- Create a storybook page and identify where movement could be used.
- Apply knowledge of levers and linkages to create movement

Y4 ELECTRICAL SYSTEMS

Design and Make a product with a system that makes it work

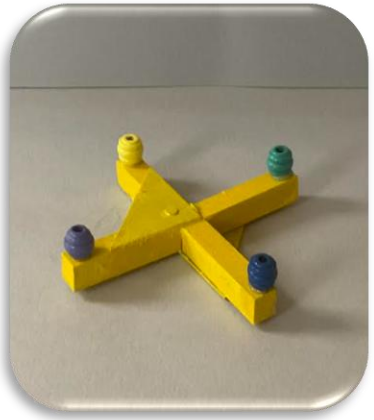
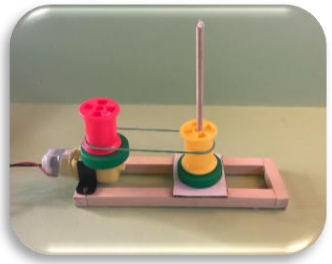


Table Lamp

- Investigating and understanding simple circuits
- System: Making the bulb light
- Input – switch
- Output – lights
- Examining existing table lamps – design choices
- Shell structures: Paper Mache
- Combining components to create a product.

Y5 PROGRAM SYSTEMS

Design and Make a product with a system that makes it work



Fairground Ride

- Investigating and understanding pulley systems – making models
- Adding a motor to drive the pulley system - – making models
- Making a framework for the system (strong, stiff and stable)
- Adding the mechanical system (Crumble kit)
- Controlling the system – block code

Y6 PROGRAM SYSTEMS

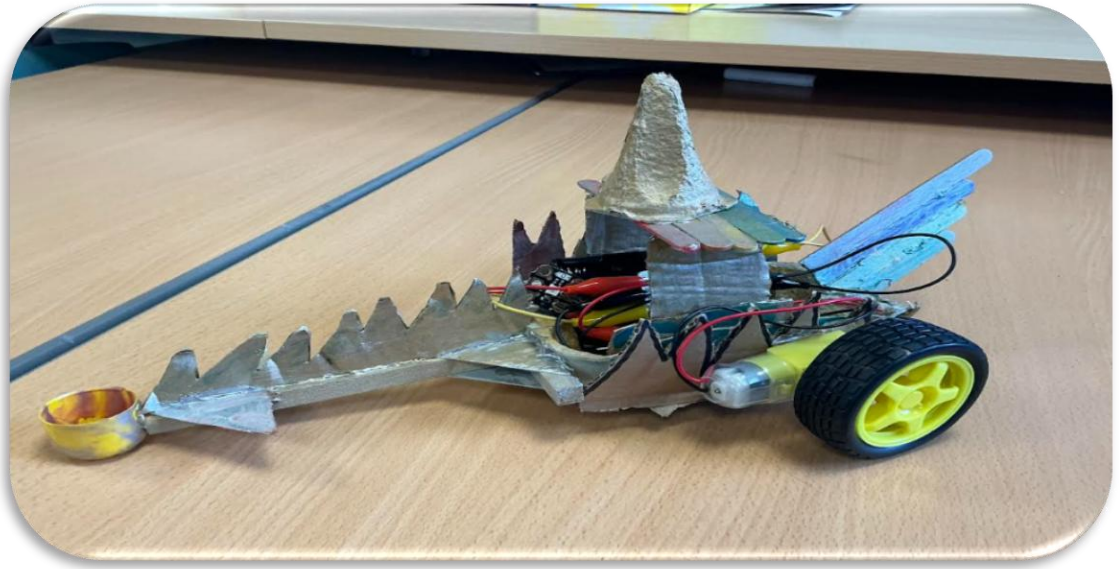
Design and Make a product with a system that makes it work

Soft Toy Tamagotchi

- Creating the soft toy / textile product for a specific purpose.
- Knowing and understanding how a Microbit functions (different inputs and outputs)
- Designing a soft toy / textile product to accommodate the Microbit (and battery pack)
- Programming the Microbit so that functions = purpose of the product.

Y6 PROGRAM SYSTEMS

Design and Make a product with a system that makes it work



RoboWars!

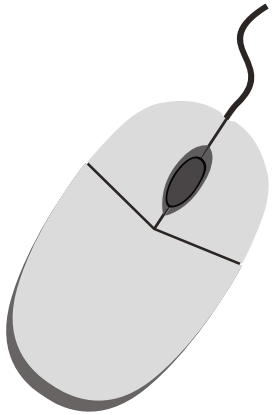
- Knowing about RoboWars!
- Knowing the different parts of an electric vehicle and linking them to the component parts of Crumble kit.
- Knowing how to connect component parts of Crumble kit
- Knowing how to program Crumble Kit to control the vehicle.

Curriculum Coherence

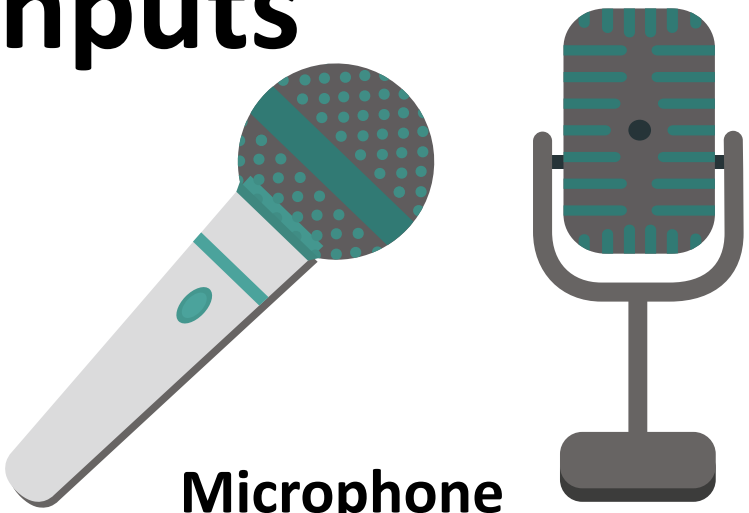
other subjects		design technology
Simple Circuits Science National Curriculum (Year 4 and Year 6)	Electrical Systems	Lights Sounds Action
Computer Coding Physical Computing Computing National Curriculum	Program Systems	Computer Control Computer Monitoring

Computer systems have inputs

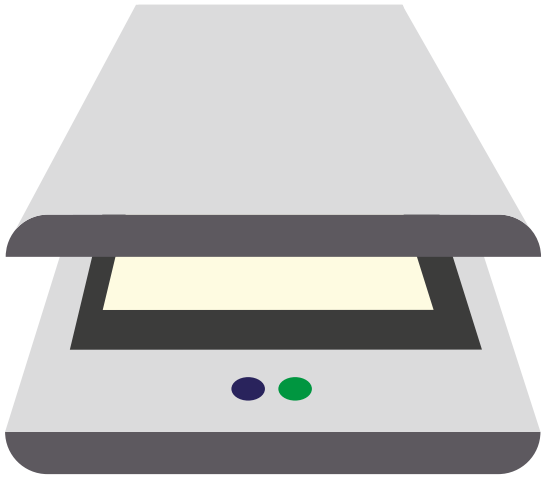
Keyboard



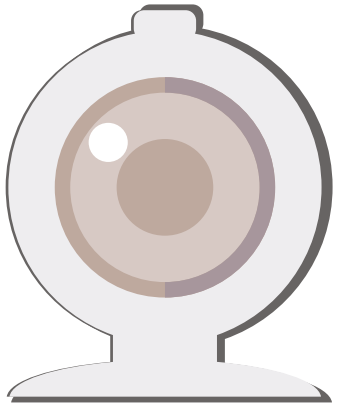
Mouse



Microphone



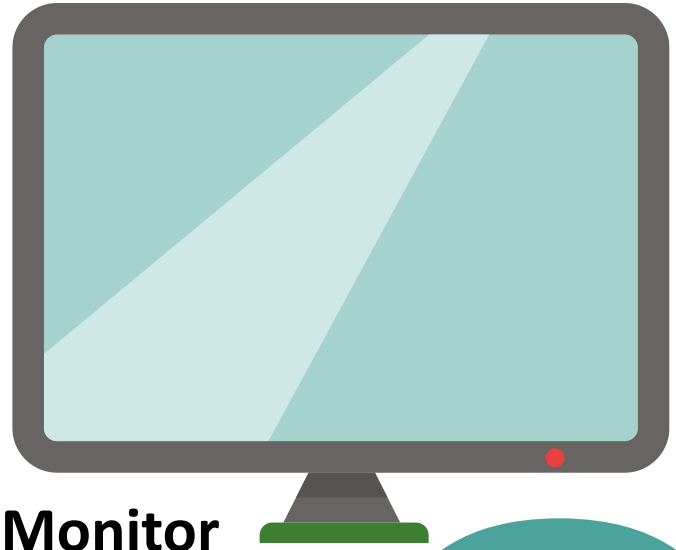
Scanner



Web Cam

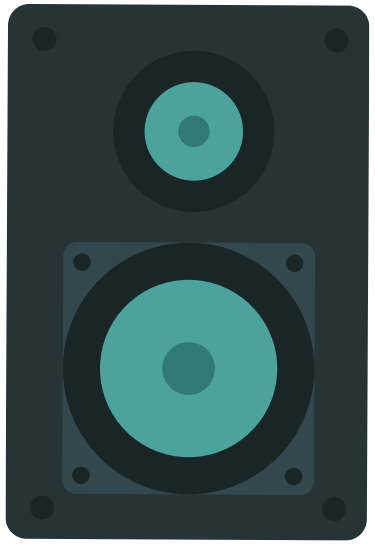
Joystick

Computer systems have outputs



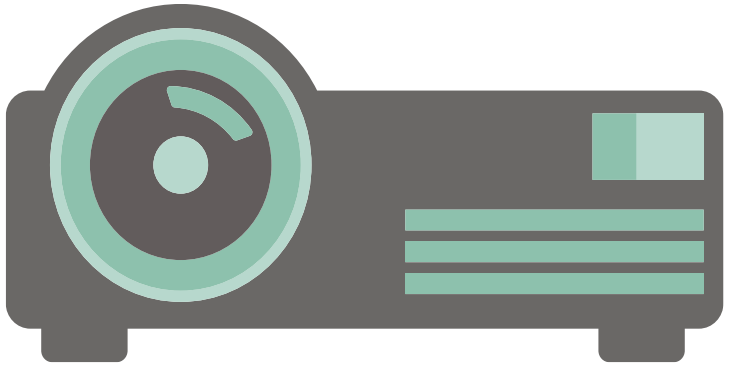
Monitor

Printer



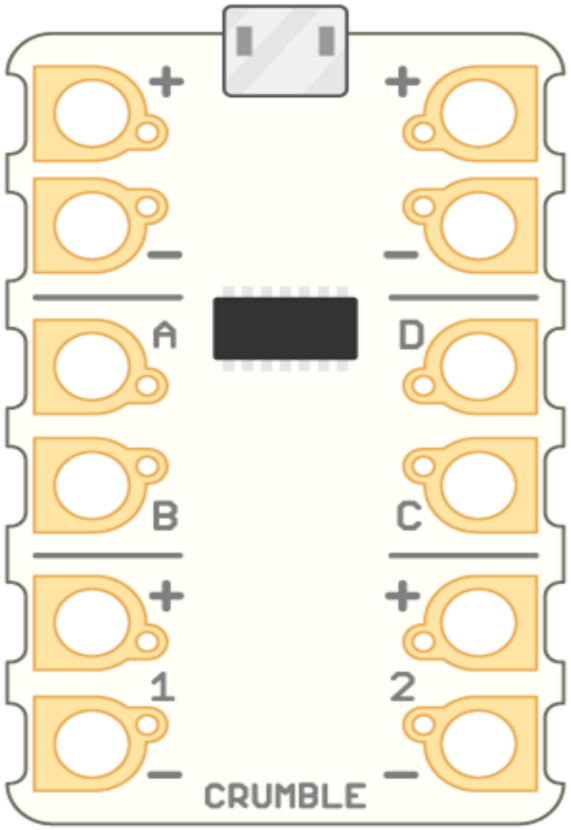
Speaker

Headphones



Projector

Program Systems: Components

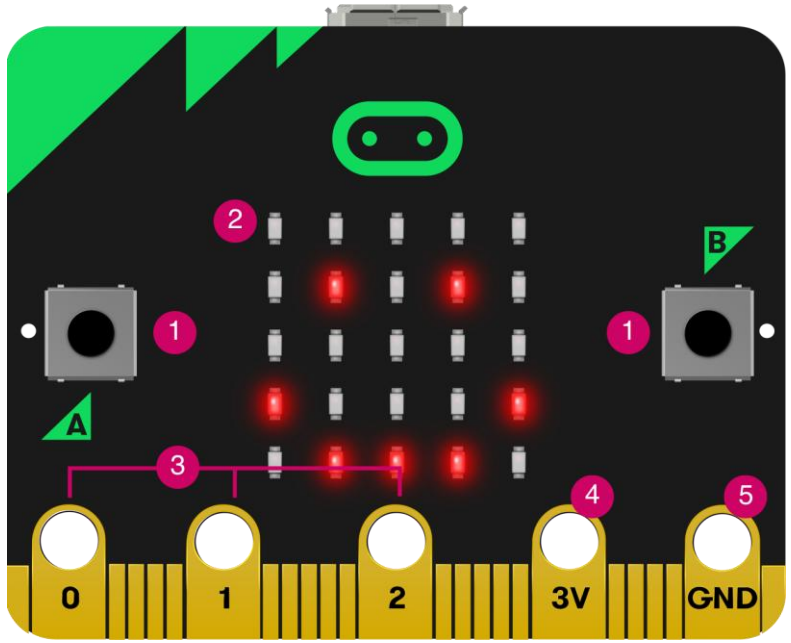


Crumble
microcontroller

SYSTEM PROCESS

A microcontroller is a small device that can be programmed to control components that are connected to it.

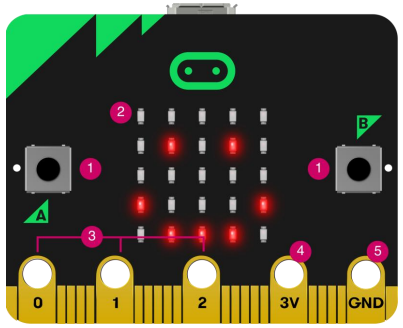
A microcontroller controls outputs and responds to inputs.



Micro:bit
microcontroller

Program Systems: Components

INPUT



Input components may be included as part of the microcontroller

Light sensor

Or as components that are attached to the microcontroller

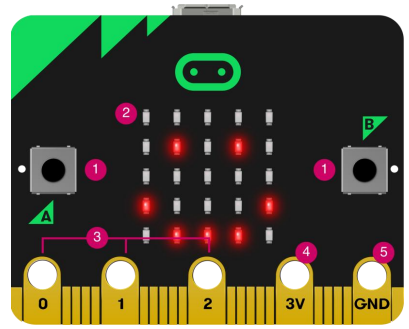
Switches

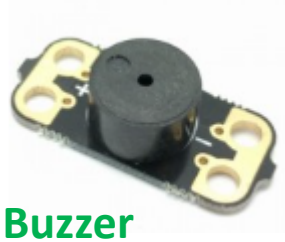
Light sensor
Sound sensor
Buttons and switches
Temperature sensor
Movement sensors

Ultrasonic Measuring Sensor

OUTPUT

Output components may be included as part of the microcontroller





Buzzer

Or as components that are attached to the microcontroller

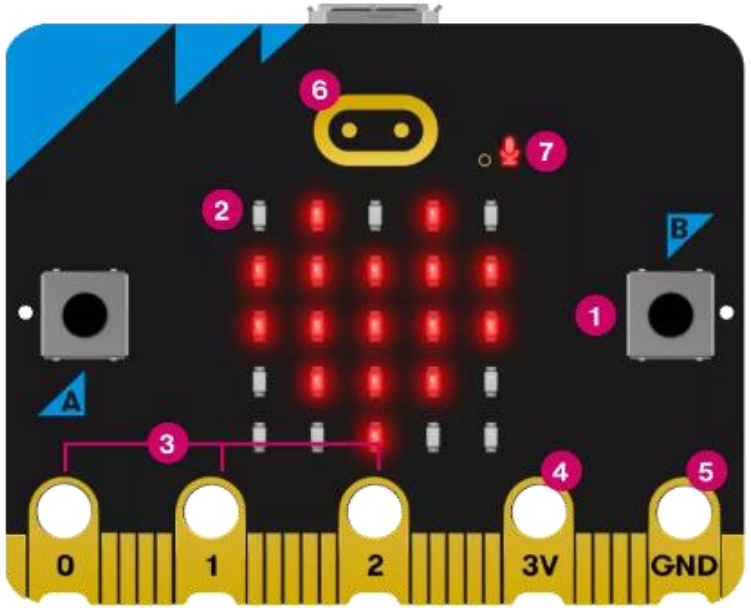
LED lights

Matrix Display

LED light displays
Buzzers and speakers
Motors

Motors

This is a BBC Micro:Bit microcontroller.



A microcontroller is a small device that controls outputs and responds to inputs.

It uses computer coding that tells it how to respond (outputs) to different inputs.

INPUT DEVICES


KEYBOARD


MOUSE


JOYSTICK


SCANNER


WEB CAMERA


MICROPHONE

OUTPUT DEVICES


MONITOR


PRINTER

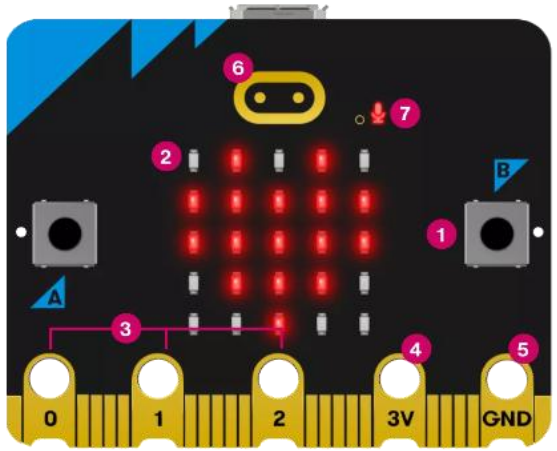

SPEAKER


HEADPHONE


PROJECTOR

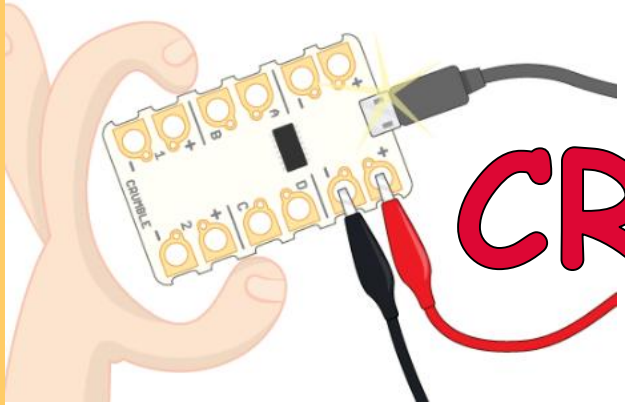
Micro:Bit Inputs

- On/off button
- Buttons (A & B)
- Microphone (Sound sensor)
- Touch Sensor
- Light Sensor
- Motion sensor

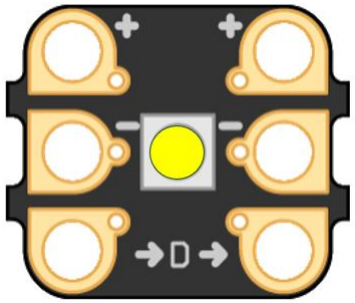


Micro:Bit Outputs

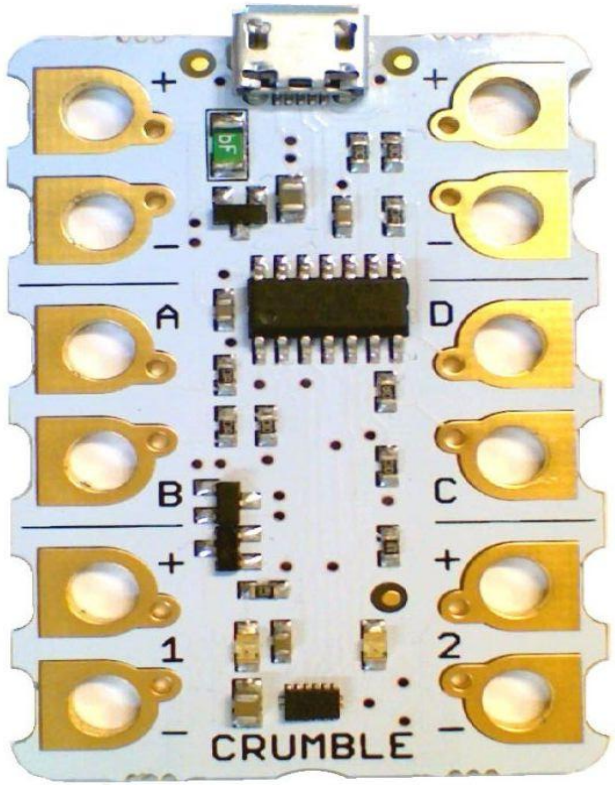
- LED Display
- Speaker
- Connectors for other components



CRUMBLE KITS



sparkle

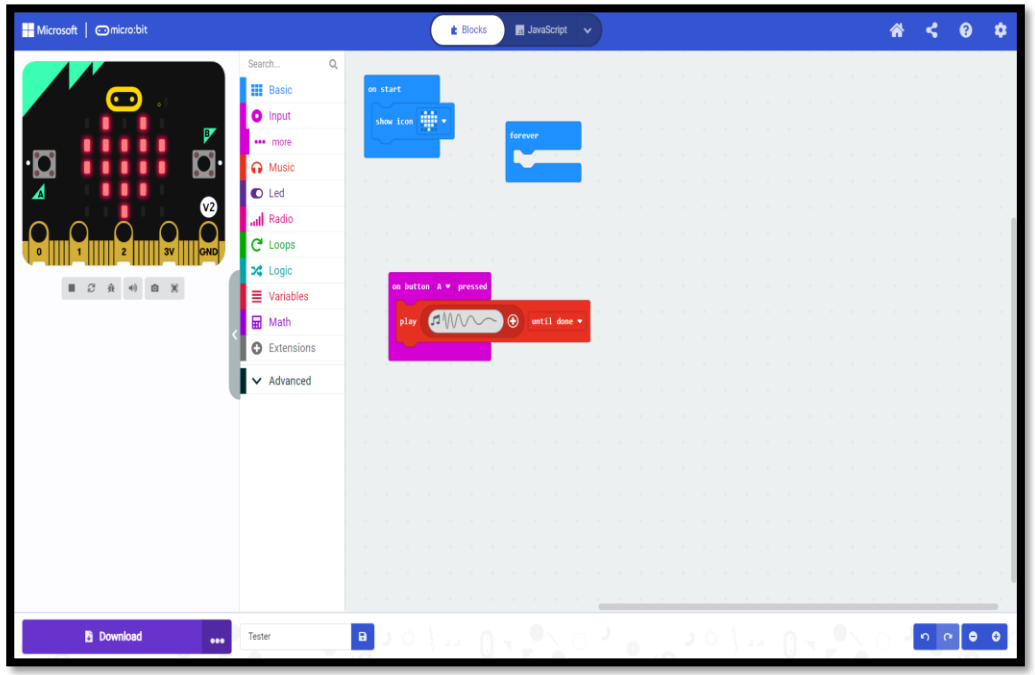


Crumble features

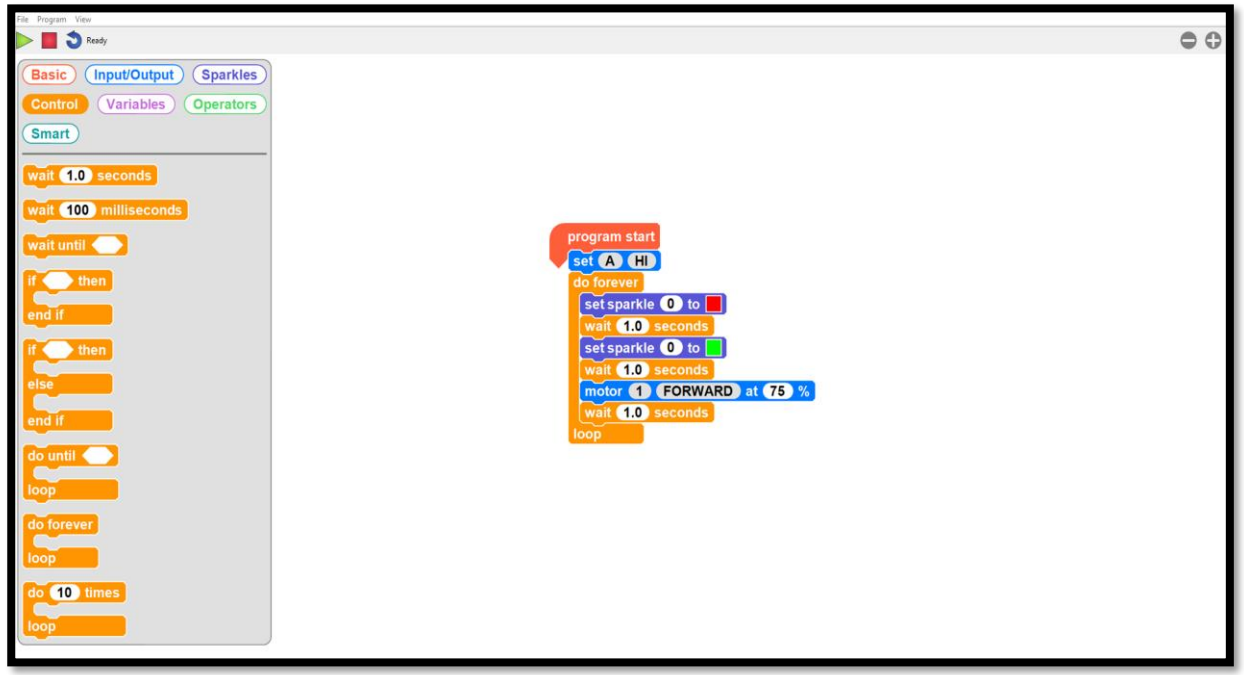
- Free downloadable software
- Programmable RGB lights
- Can attach LED lights
- Light sensor
- Buzzer
- Range of other components
- Connect and control motors
- Servo motors

https://redfernelectronics.co.uk

Program Systems: Language

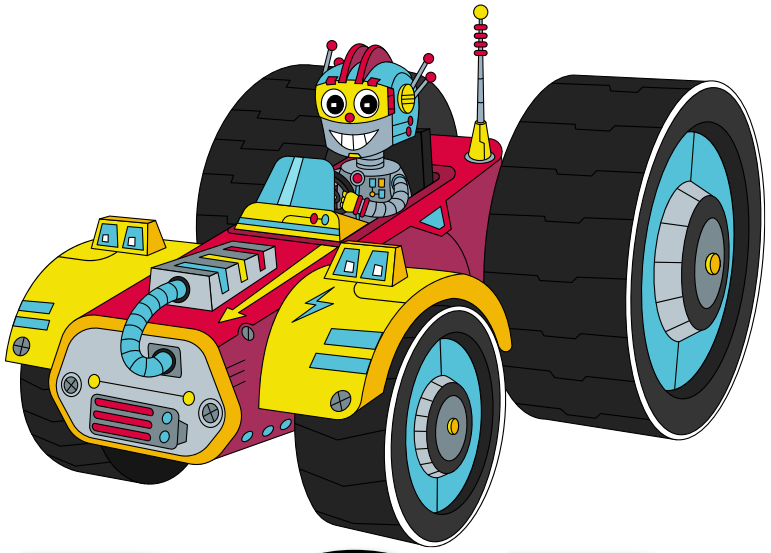


Microsoft Make Code



Crumble Software

Understand Block Code



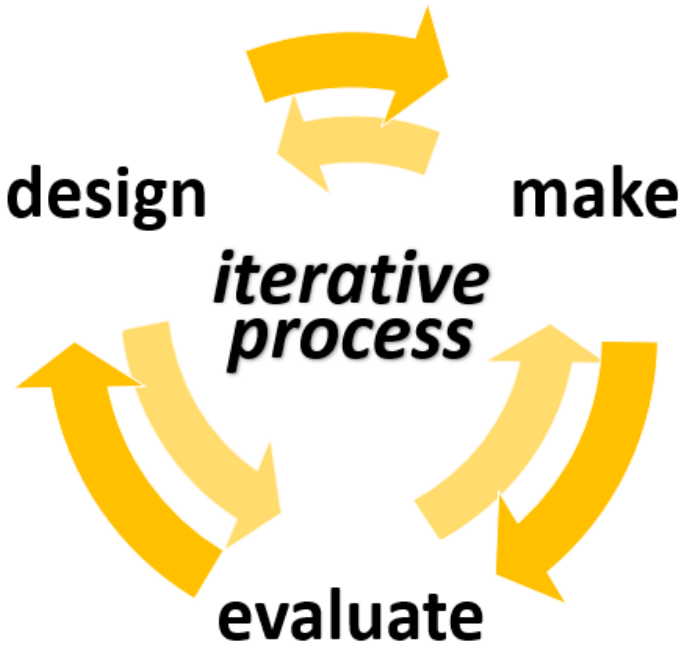
ROBOWARS!

KEY STAGE 2 PROGRAM SYSTEMS

Flying High Partnership

In addition to the curriculum requirements, reflect upon:

- Working as a team
- Leadership
- Discussions
- Making decisions
- Dealing with failure!



PROJECT OVERVIEW

DESIGNING

DEFINE
the problem or product

Design Brief:

Design and Make a Controllable Robot Buggy to take part in the Class Robo Wars.

PRIMARY DESIGN TECHNOLOGY

IDENTIFY

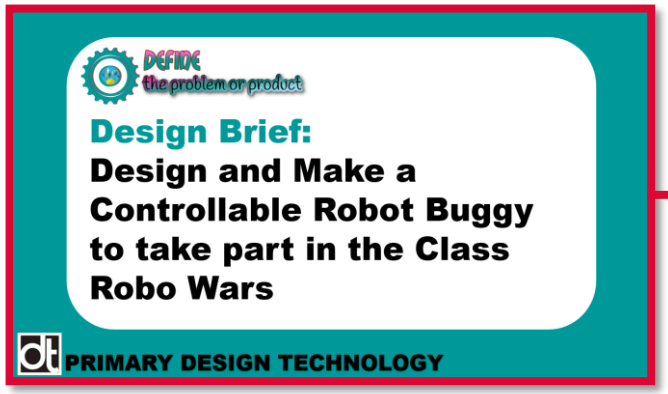
what will make it successful

Design Specifications:

1. The chassis should be the following dimensions: Length: 160mm, Width: 110mm
2. The chassis design should also include space for the Crumble microcontroller and the battery box.
3. The vehicle must have a flashing light that is capable of flashing red, amber and green.
4. The vehicle must have a push button that starts and stops the vehicle.
5. The vehicle must pass the Test Track tests before being allowed to enter Robo Wars.

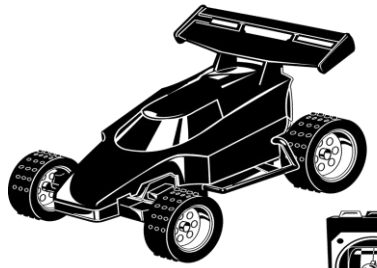
PROJECT OVERVIEW

INVESTIGATE



Deconstruct the Design Brief
Children fully understand what is required of them in the Design & make activity

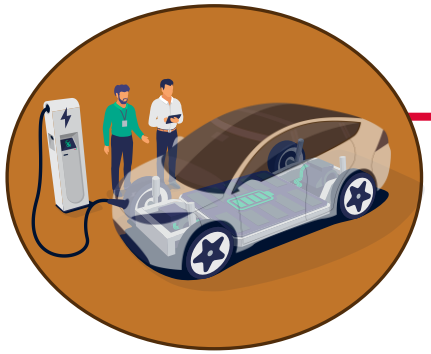
Investigate and evaluate similar products



Real Life & Relevant

There are five main components to an electric vehicle.

- Chassis
- Body
- Electric motor
- Battery
- Control System

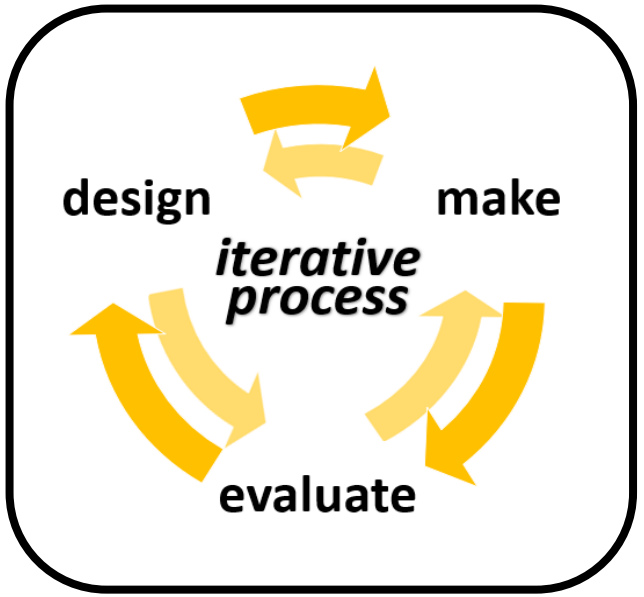


Elon Musk

Electric vehicles, knowing how they work and understanding the different components of an electric vehicle

Designing is being creative

- To solve a problem
- To find a solution
- To develop a product that fulfils a need
- To create a product that people can use



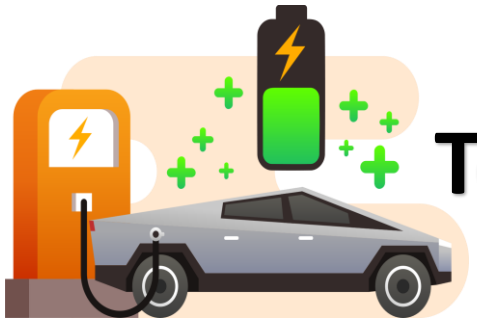
Why learn about designs and designers?

- Study people who are good at the subject.
- Puts the subject into context – real life and relevant.
- Helps children to understand what designers do.
- How design has affected the lives we live today.

DESIGNS & DESIGNERS

Space X

Starlink



Tesla EV

What was the problem?

What was the need?

What was the solution?

How will people use the product?

How will this design/product affect our lives?

What knowledge do the children need?

1. What is a RoboWar?
2. What are the component parts of an electrical vehicle?
3. How to join components together to create an electric system
4. The component parts of Crumbles and what they do?
5. How to program Crumbles using Block Code

TEACHING DESIGN TECHNOLOGY: 4 LESSON TYPES

KNOWLEDGE ACQUISITION

INVESTIGATE

FOCUS TASKS

Guide
Instructor

Teacher as guider
- Investigating
- Researching
- Playing / Testing
- Tasting (food)

Teacher as provider
- Subject
- Technical
- Practical (Skills and techniques)
- Disciplinary (Designing, making & evaluating)

KNOWLEDGE APPLICATION

DESIGN & MAKE

EVALUATE

Coach
Critical Friend

No new teaching of knowledge in these sessions - children should have all the knowledge needed

Knowledge more secure in some children – they will need support – use assessment information from the investigate sessions and focus tasks.

INVESTIGATE

INVESTIGATE

INVESTIGATE ELECTRIC VEHICLES

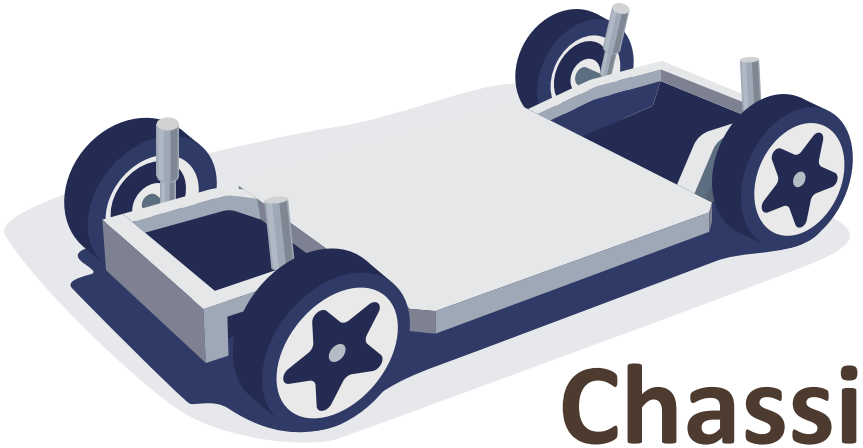
There are five main components to an electric vehicle.

- Chassis
- Body
- Electric motor
- Battery
- Control System

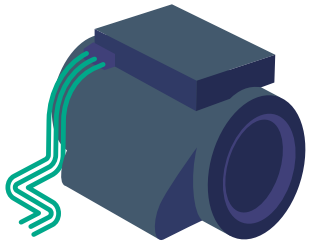
Opportunity to teach children about drawings and diagrams, particularly cut-away drawings when designing in DT

INVESTIGATE

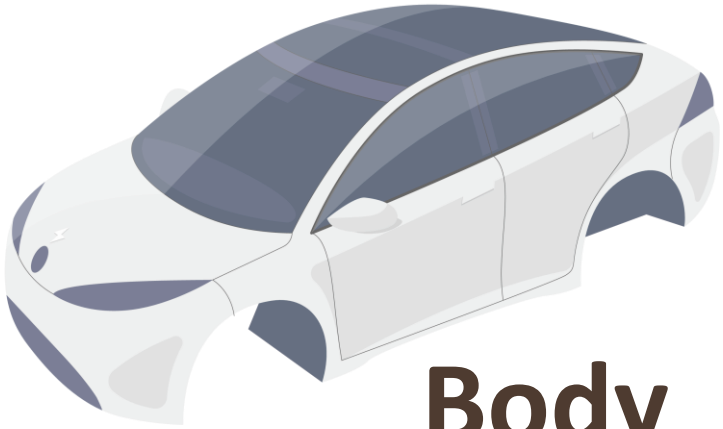
INVESTIGATE ELECTRIC VEHICLES



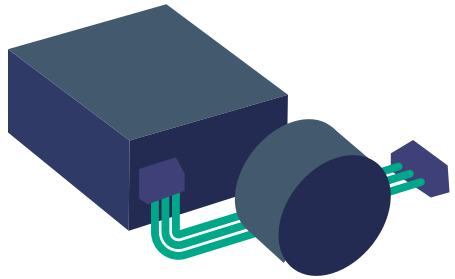
Chassis



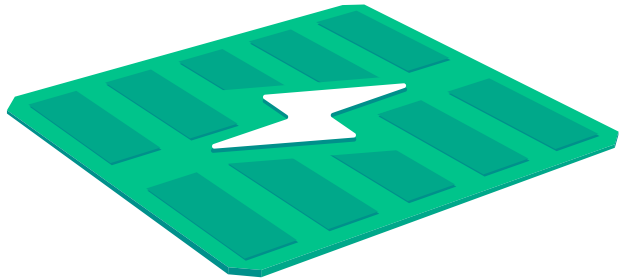
Electric motor



Body



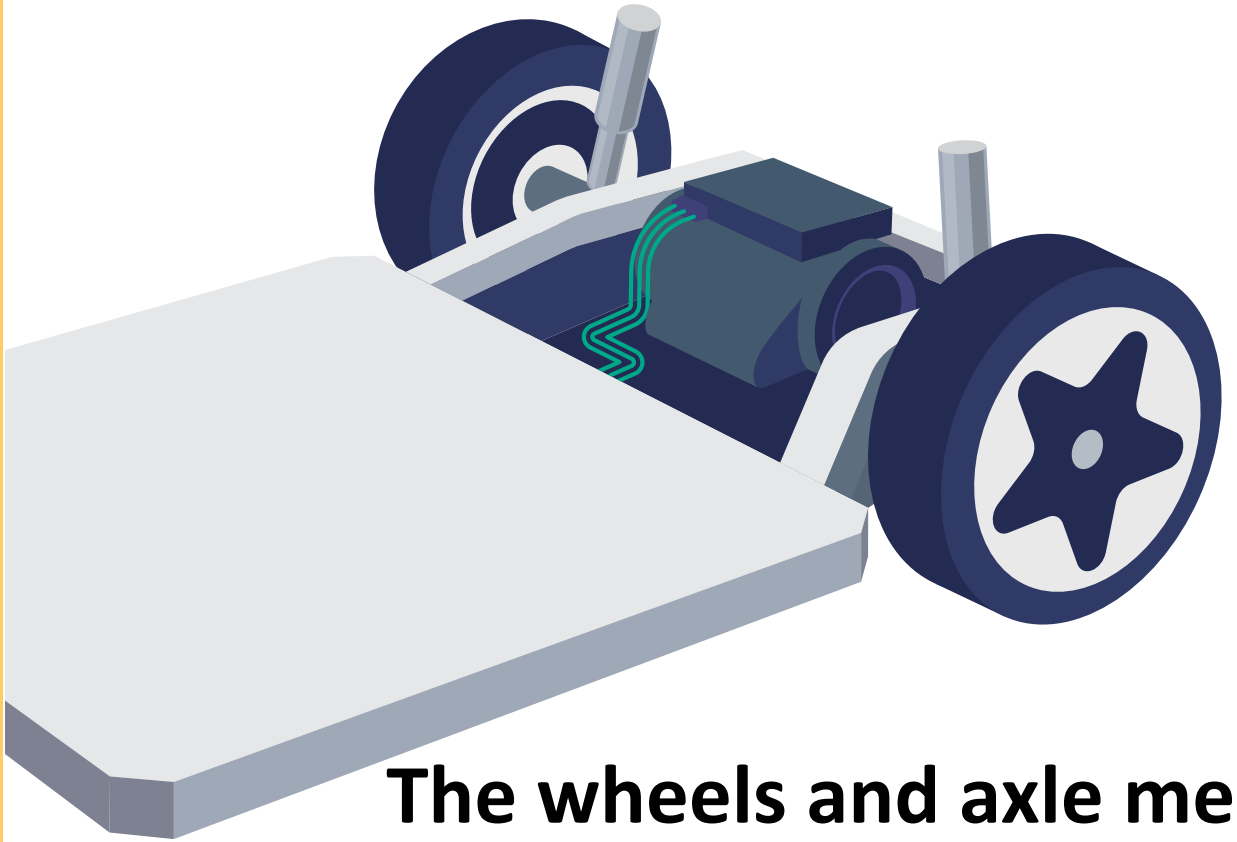
Control system

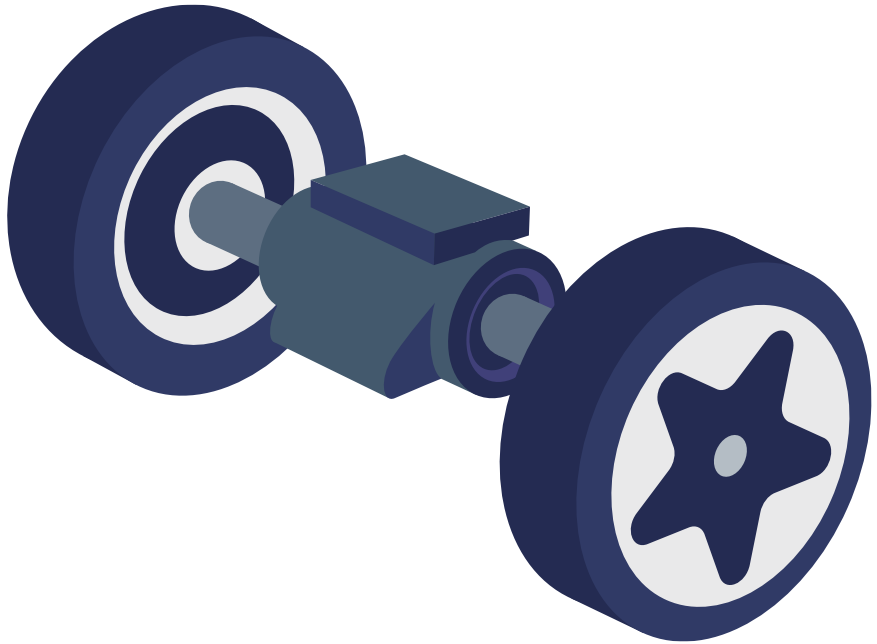


Battery

FOCUS TASKS

CREATING THE CHASSIS

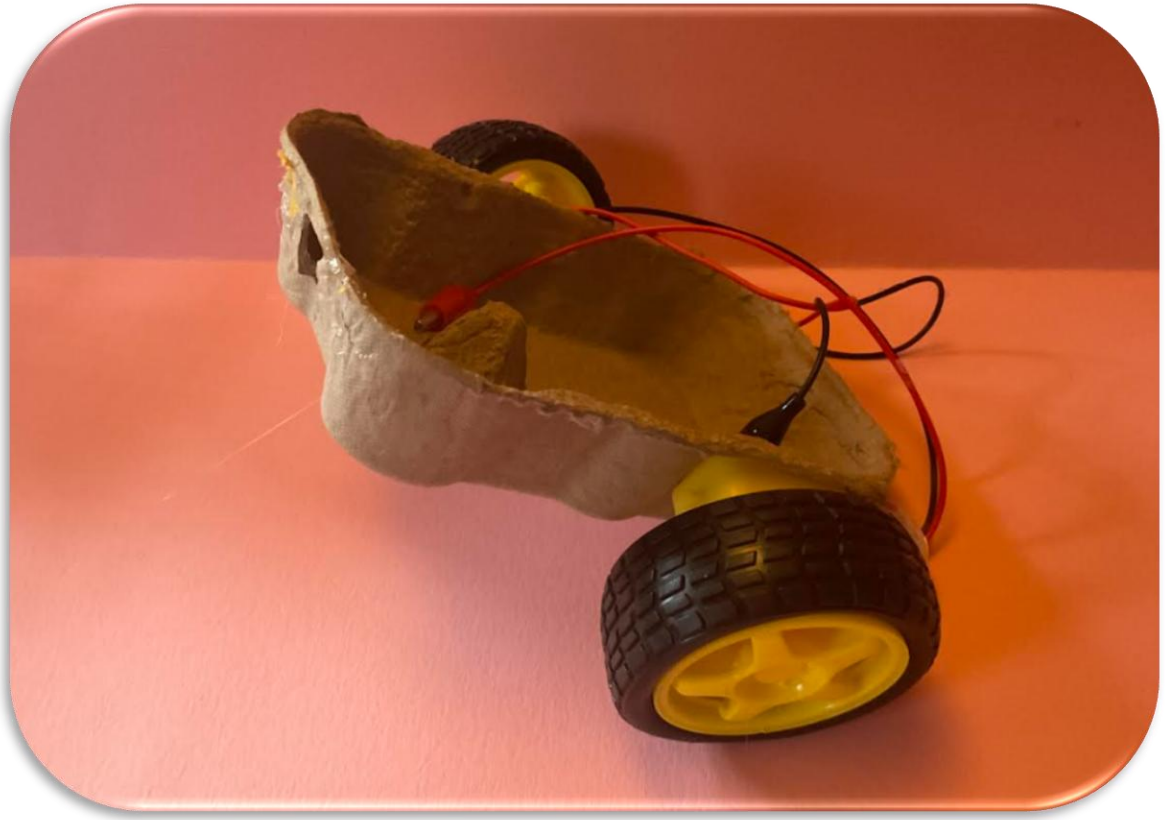




The wheels and axle mechanism is connected directly to the motor which is fixed to the vehicle chassis.

FOCUS TASKS

CREATING THE CHASSIS



IDENTIFY
what will make it successful

Design Specification 1:

The chassis should be the following dimensions:

Length: 160mm

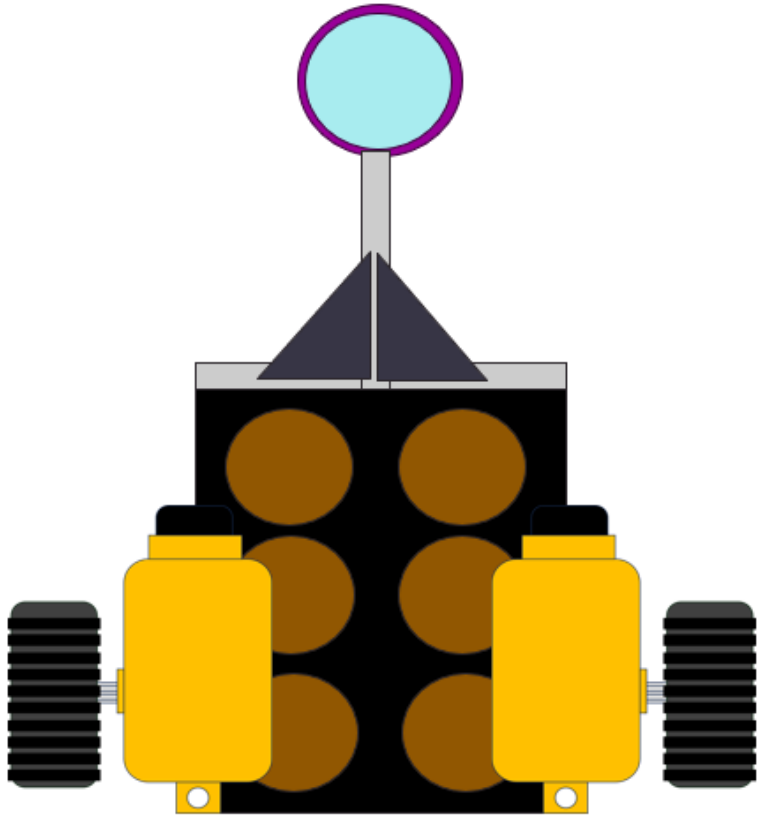
Width: 110mm

An egg box is the ideal size for creating the chassis.

Two electric motors with large wheels are attached to the chassis using the engine mounts.

FOCUS TASKS

CREATING THE CHASSIS

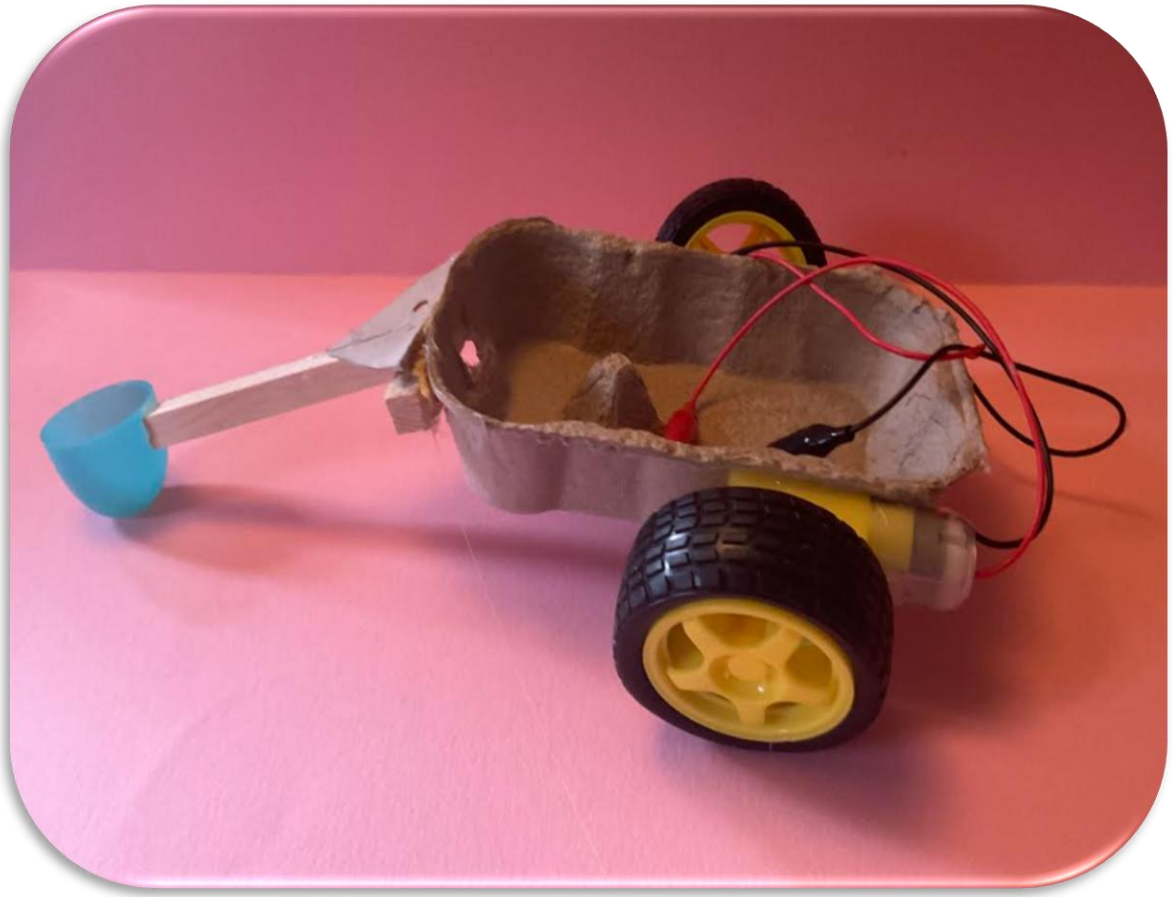


The motors and large wheels provide the movement and direction for the buggy.

To keep it stable, we can add a slider mechanism such as a deodorant lid, ping pong ball or plastic drinks lid.

FOCUS TASKS

CREATING THE CHASSIS

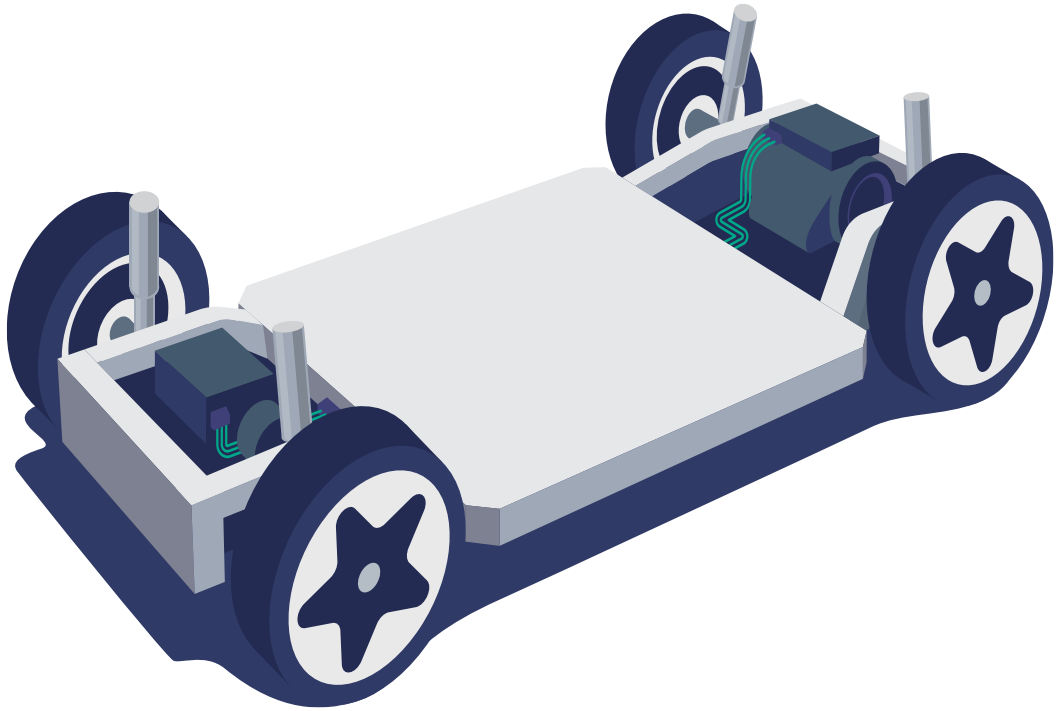


The slider mechanism provides stability but slides across the floor allowing the buggy to move in all directions.

A wooden framework is made to create the slider mechanism

FOCUS TASKS

ADDING THE CONTROLLER



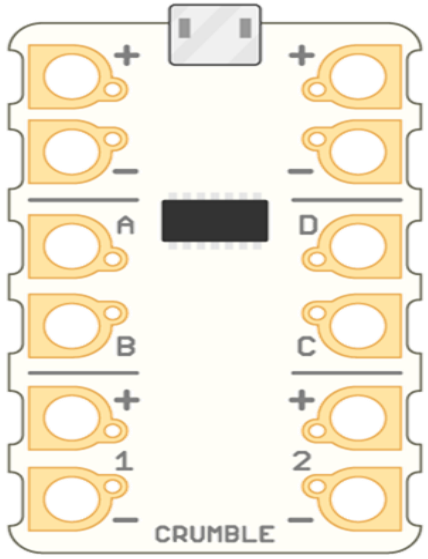
IDENTIFY
what will make it successful

Design Specification 2:
The chassis design should also include space for the Crumble microcontroller and the battery box.

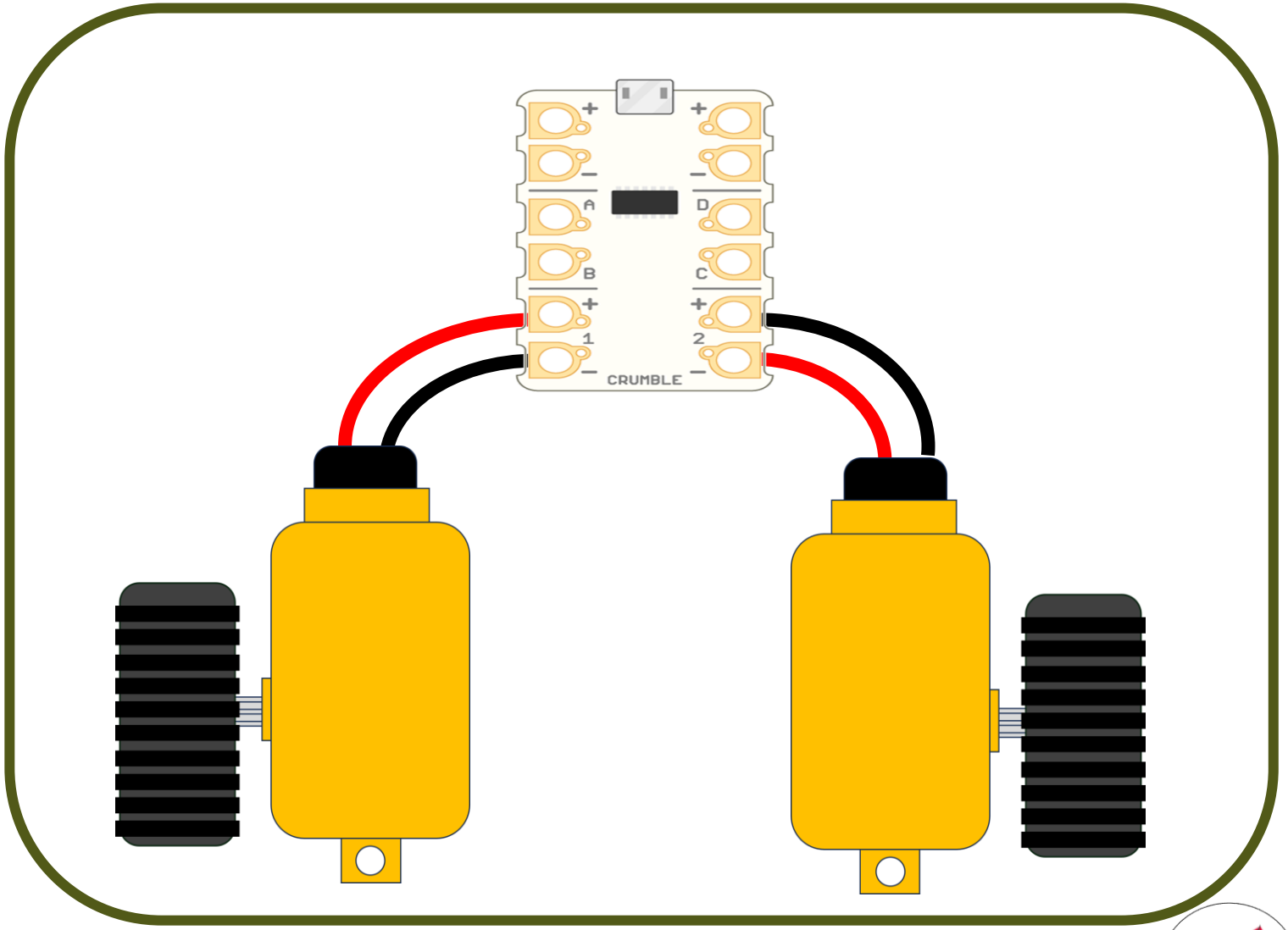
The controller is the computer system that allows the user to control the electric vehicle.

FOCUS TASKS

ADDING THE CONTROLLER

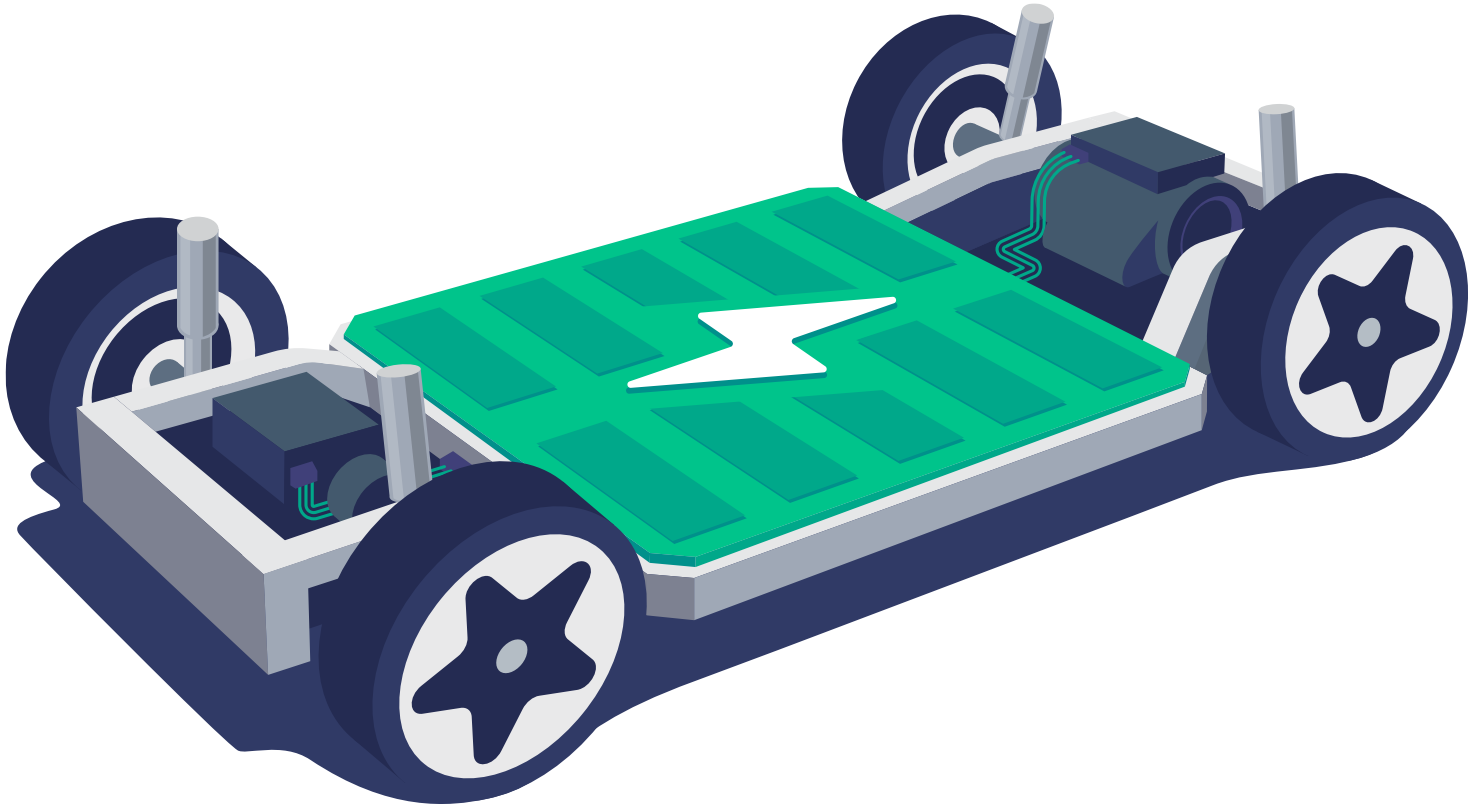


Crumble Controller



FOCUS TASKS

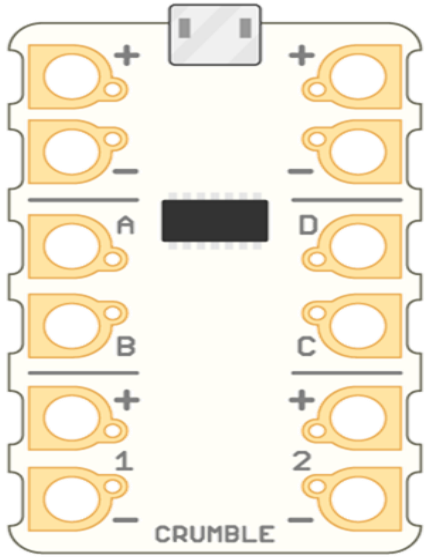
ADDING THE BATTERY



The battery provides power to the motor. The battery is connected to the motor by electric wires.

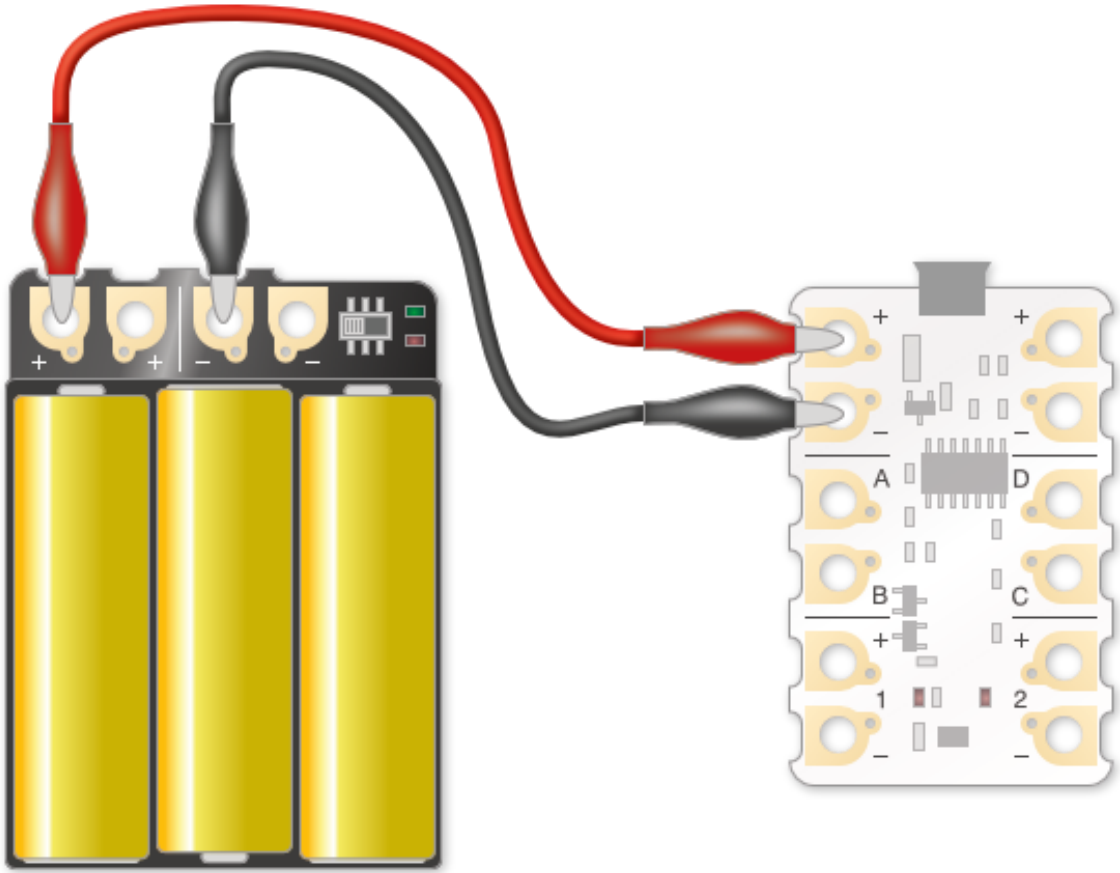
FOCUS TASKS

ADDING THE BATTERY



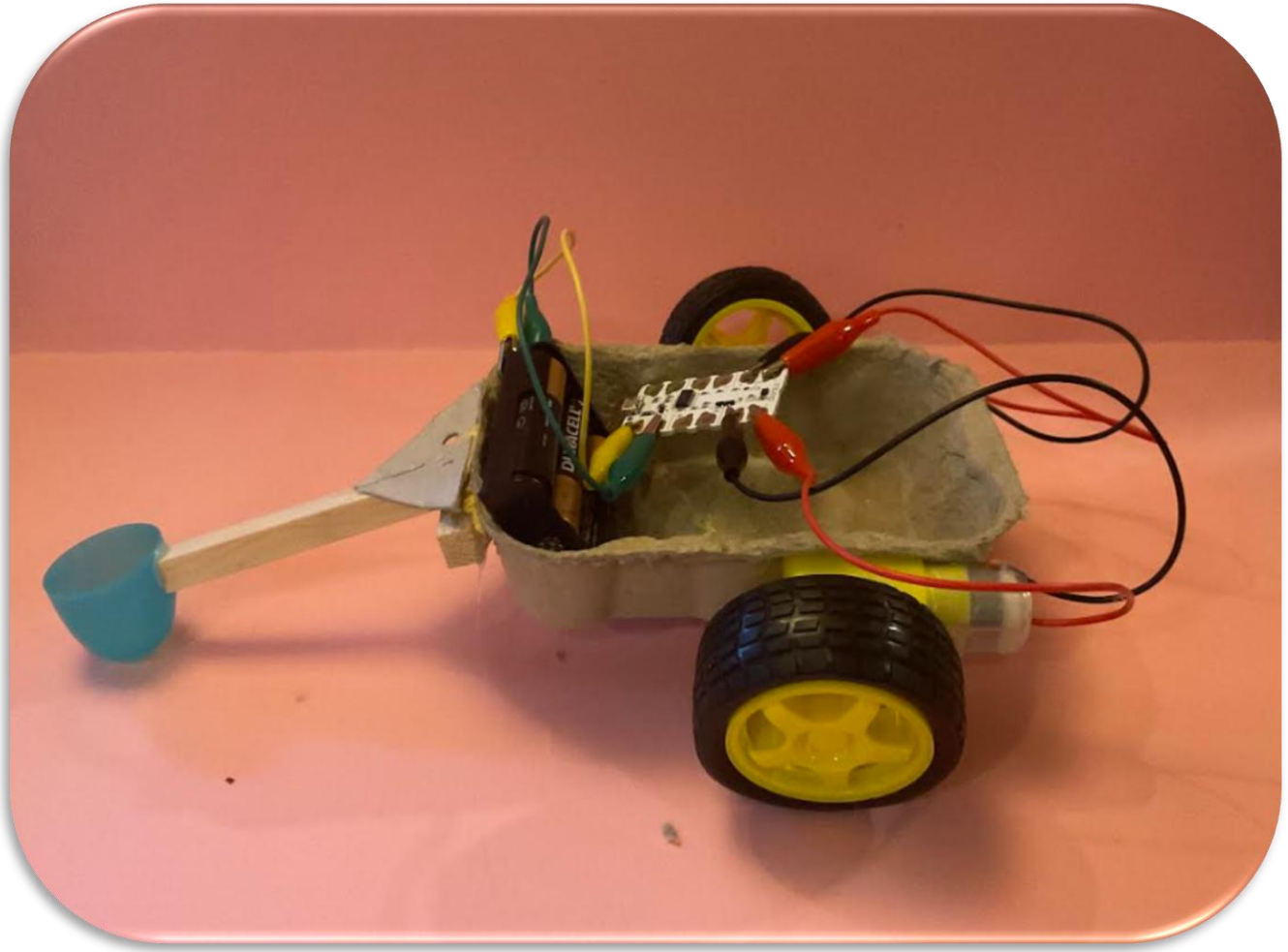
Crumble Controller

Test the battery pack
Check the connection



FOCUS TASKS

FOCUS TASKS



4 components of the electric vehicle are now assembled:

- Chassis
- Electric motor
- Battery
- Control system

FOCUS TASKS

ADDITIONAL COMPONENTS

FOCUS TASKS

IDENTIFY
what will make it successful

Design Specification 3

The vehicle must have a flashing light that is capable of flashing red, amber and green.

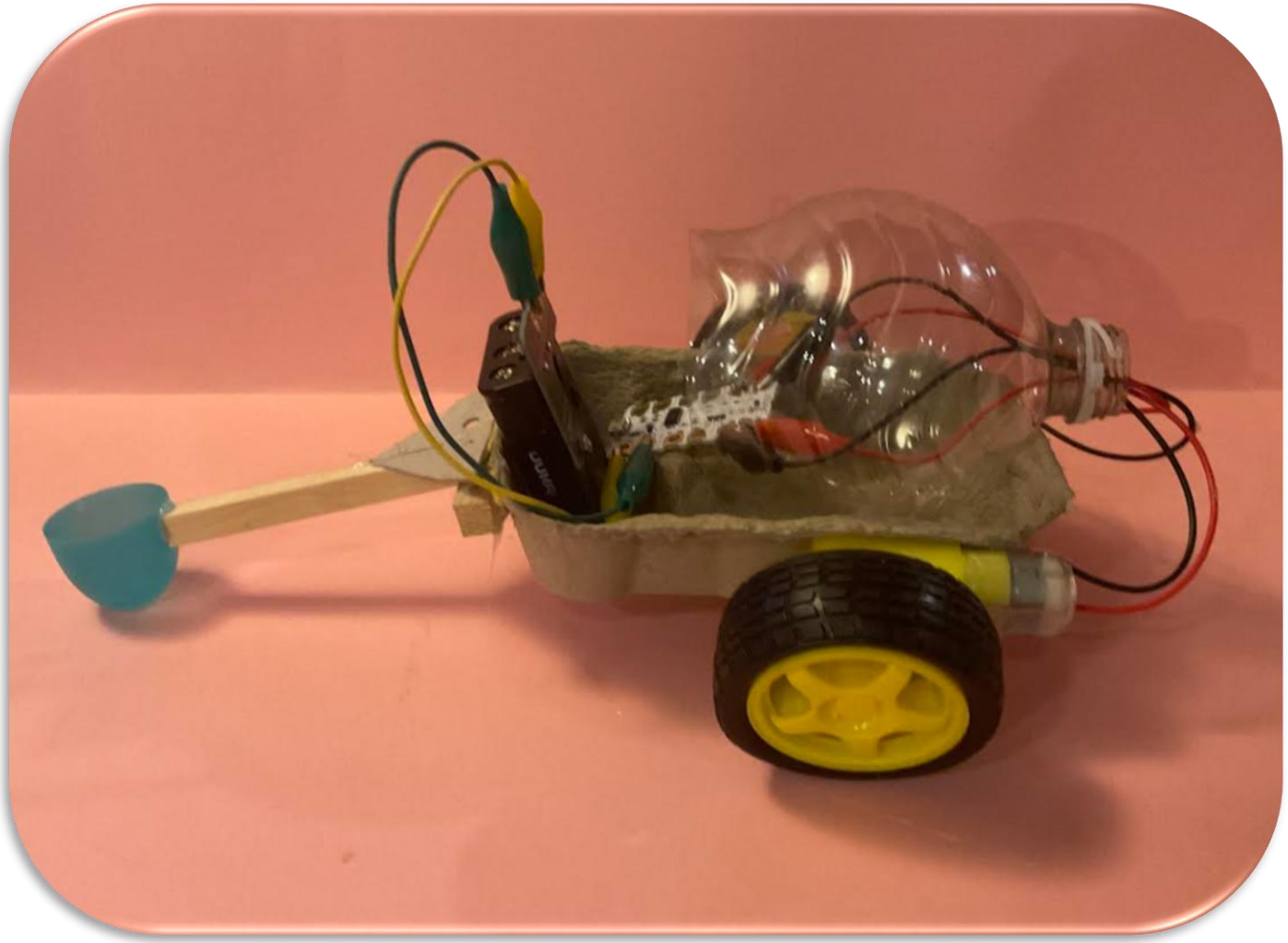
PRIMARY DESIGN TECHNOLOGY

IDENTIFY
what will make it successful

Design Specification 4

The vehicle must have a push button that starts and stops the vehicle.

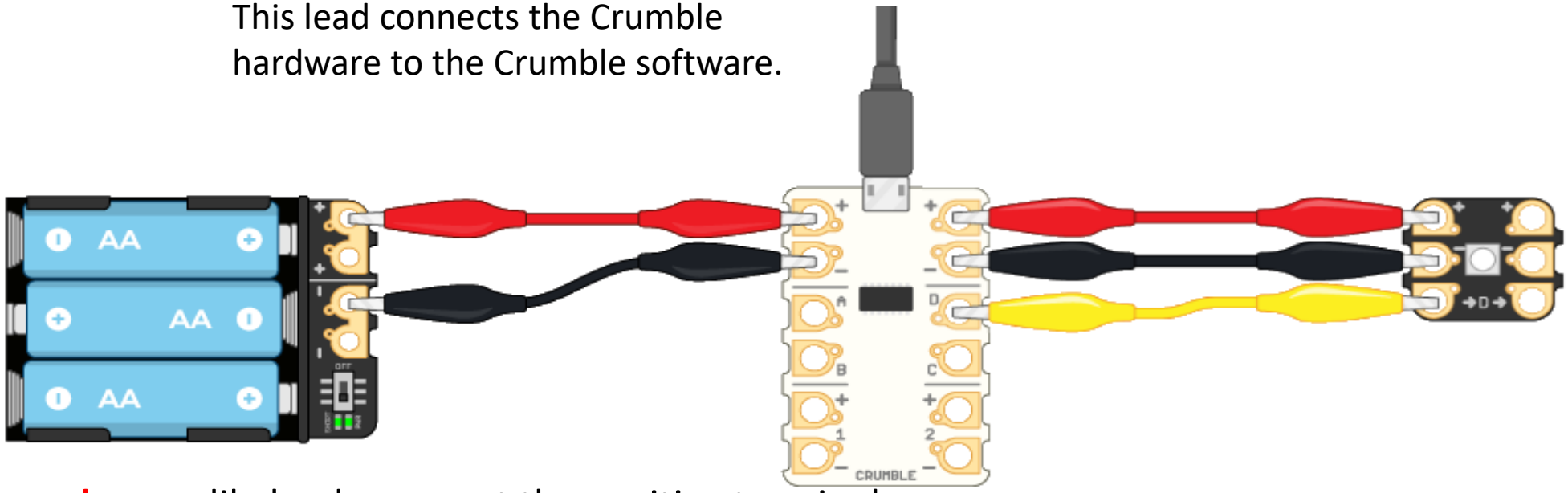
PRIMARY DESIGN TECHNOLOGY



FOCUS TASKS

CONNECTING A SPARKLE

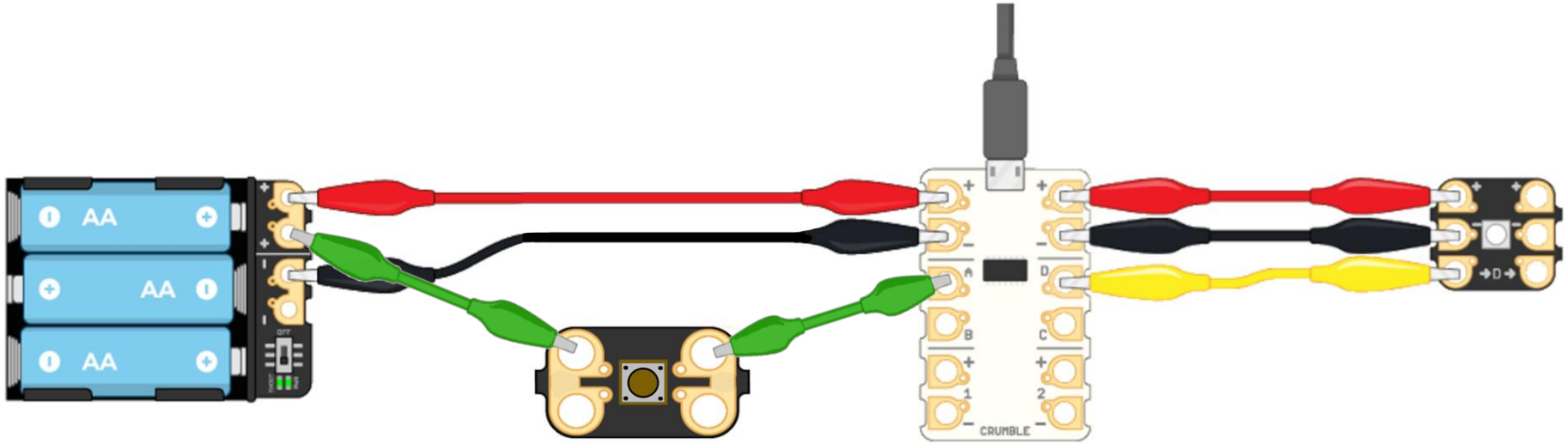
This lead connects the Crumble hardware to the Crumble software.



The **red** crocodile leads connect the positive terminals.
The **black** crocodile leads connect the negative terminals.
The **yellow** crocodile lead connects the D terminals – this allows the microcontroller to control the Sparkle.
Sparkles are always connected through the D terminal

FOCUS TASKS

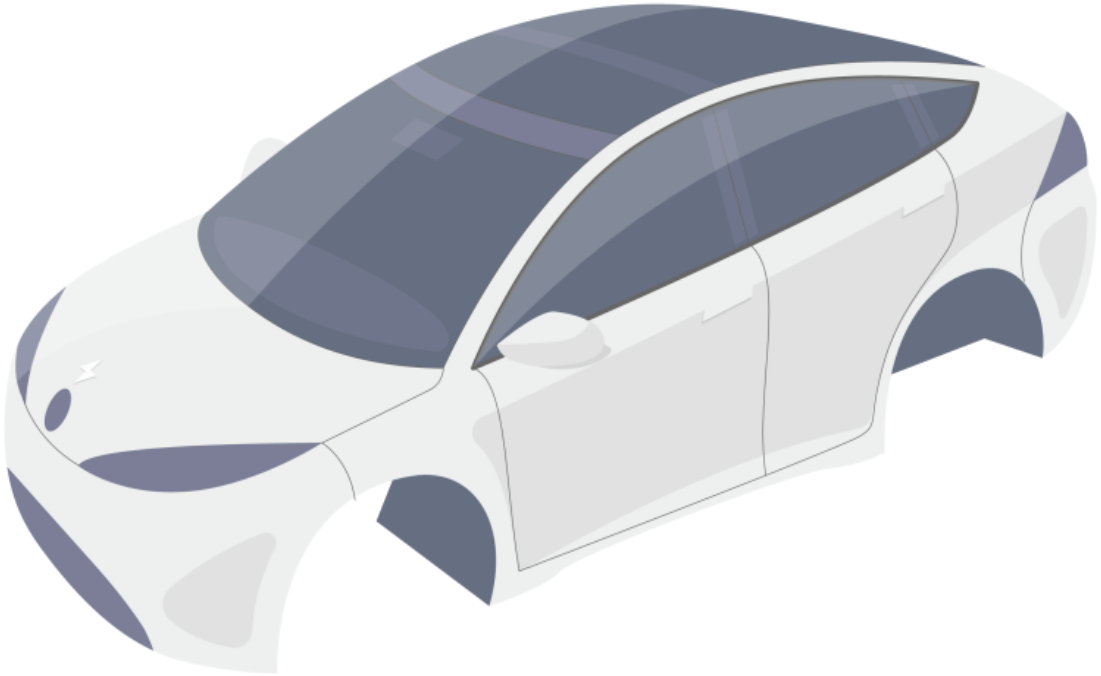
CONNECTING A SWITCH



The **red** crocodile leads connect the positive terminals.
The **black** crocodile leads connect the negative terminals.
The **yellow** crocodile lead connects the D terminals – this allows the microcontroller to control the Sparkle.
The **green** crocodile lead adds the switch to the system

DESIGN & MAKE

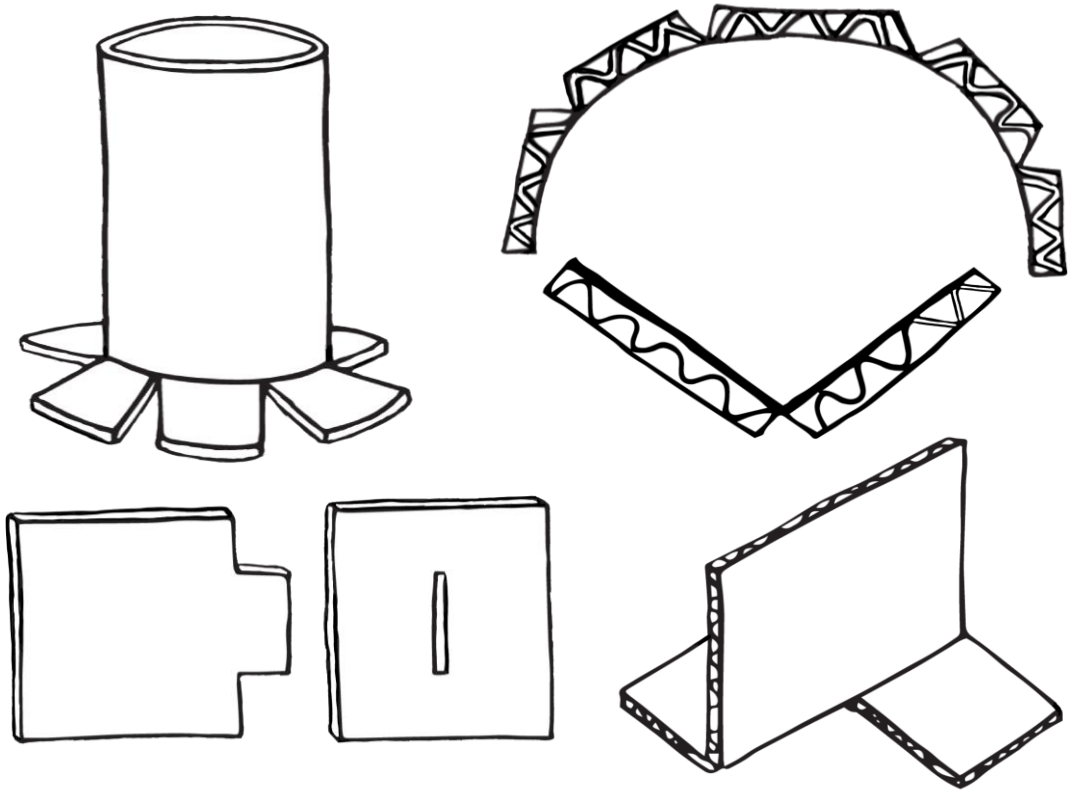
CREATING THE ROBOWAR VEHICLE



Design and make the vehicle body.
Children creating an authentic product designed by themselves
Children making design decisions.
Creating complex drawing and designs

DESIGN & MAKE

CREATING THE ROBOWAR VEHICLE

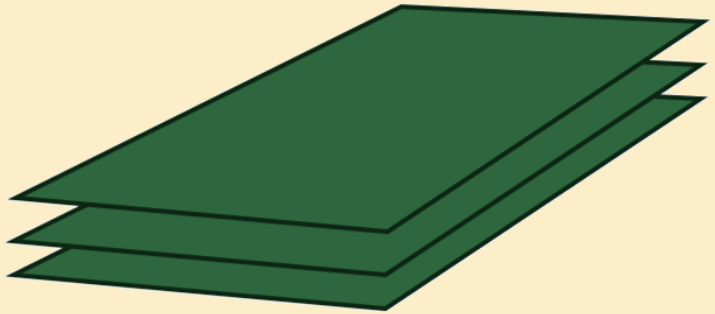


Knowledge retrieval – properties of materials
Knowledge retrieval – structures
Knowledge retrieval – cardboard engineering

KNOWLEDGE

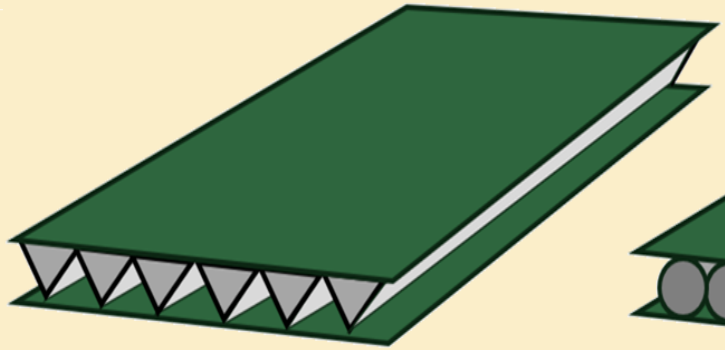
SHEET MATERIALS

Making materials stiffer and stronger will make the overall structure stiffer and stronger also. There are three types of technique to make sheet materials stronger and stiffer:



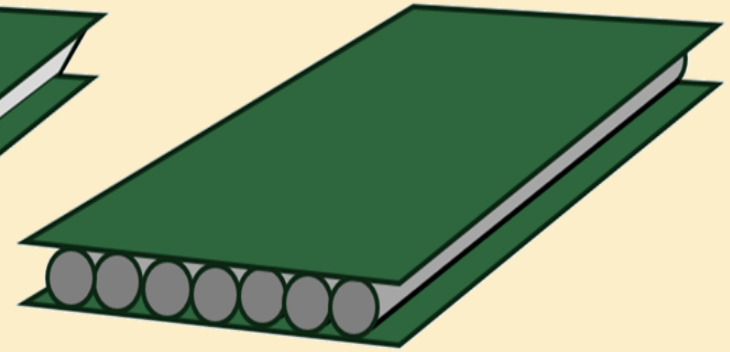
Laminating

Gluing together several layers of materials



Corrugating

Gluing a zig zag layer of material between two sheets of material

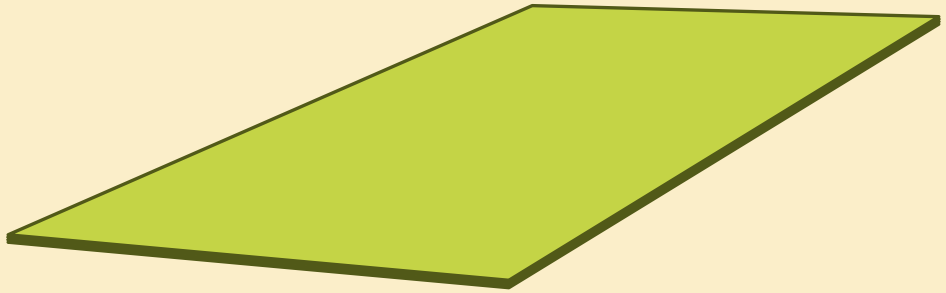


Ribbing

Gluing a layer of tubular material between two sheets of material

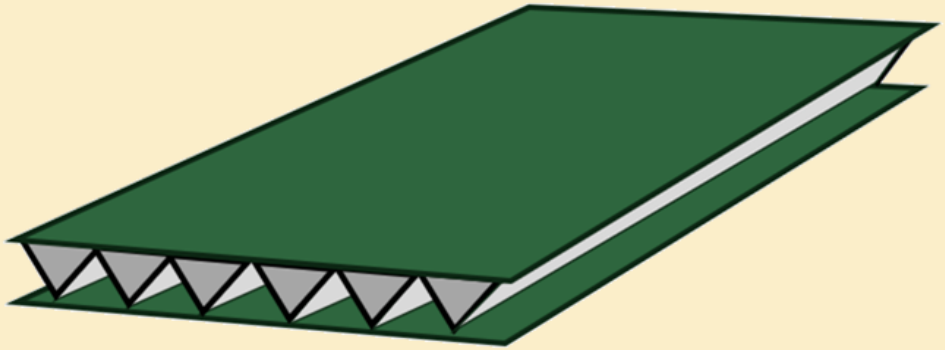
KNOWLEDGE

WHAT IS CARDBOARD



Card

Card is thick paper. Its thickness makes it stronger and stiffer than paper.



Cardboard

Cardboard is engineered card. Two sheets of card sandwich a layer of folded zig-zag card.

KNOWLEDGE

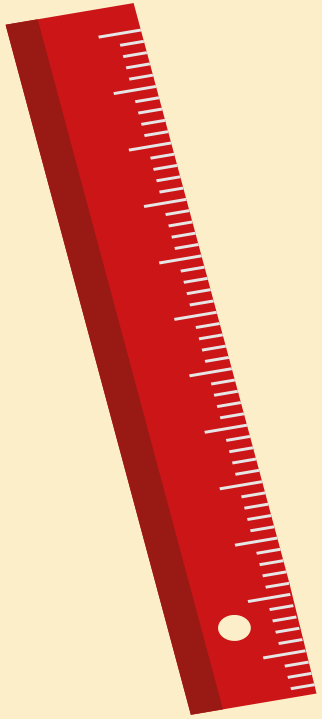
WHAT IS CARDBOARD ENGINEERING?

Cardboard engineering is a set of techniques that transforms flat sheets of card and cardboard into different structures. The techniques are used to:

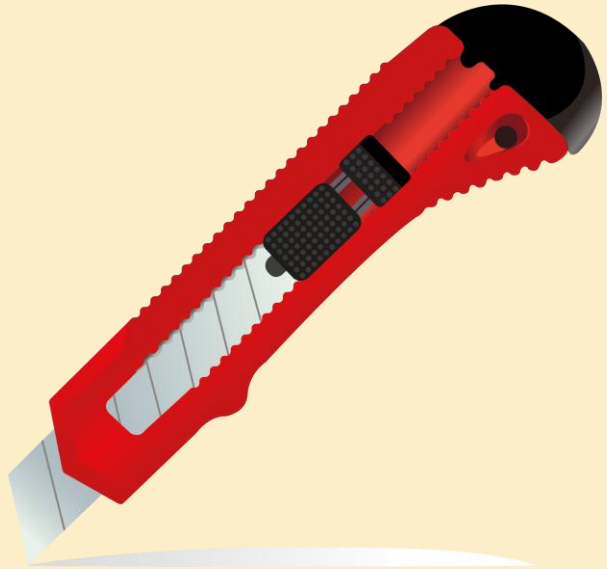
- Measure and cut cardboard
- Shape card and cardboard
- Join card and cardboard
- Support and strengthen existing structures

KEY SKILLS

MEASURING & CUTTING



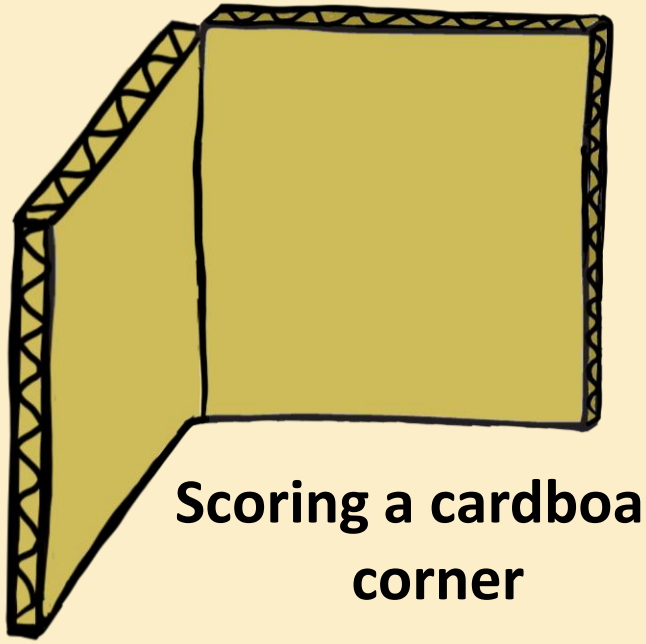
Measuring accurately to the nearest mm using a ruler.



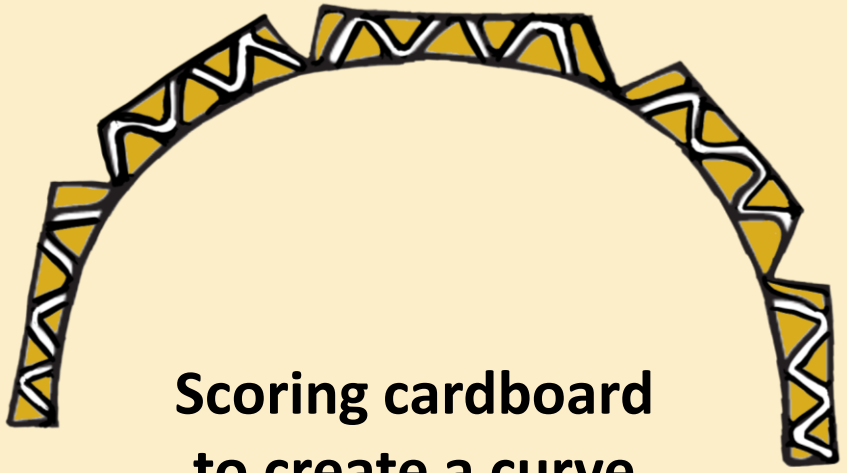
Cutting accurately following guidelines using scissors or a craft knife

TECHNIQUE

SCORING TECHNIQUES



Scoring a cardboard corner

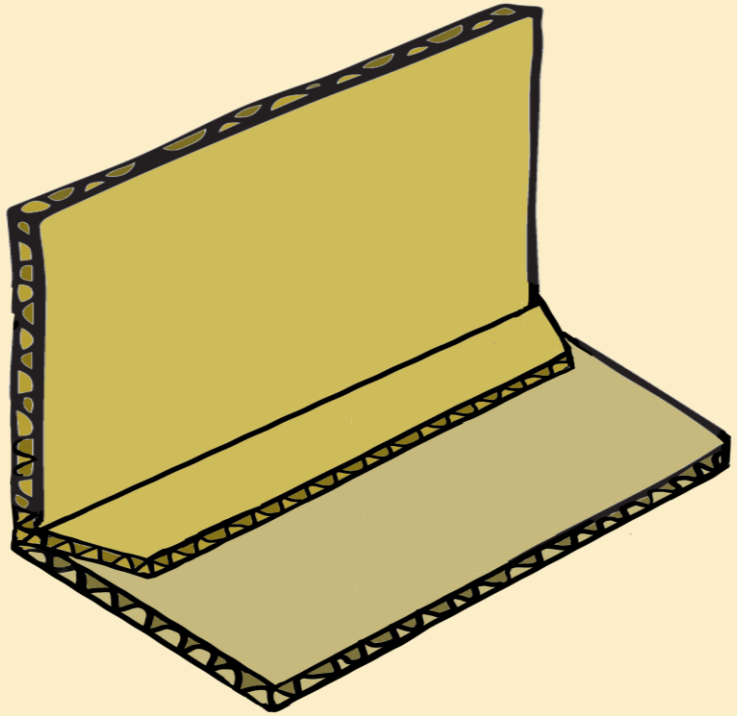


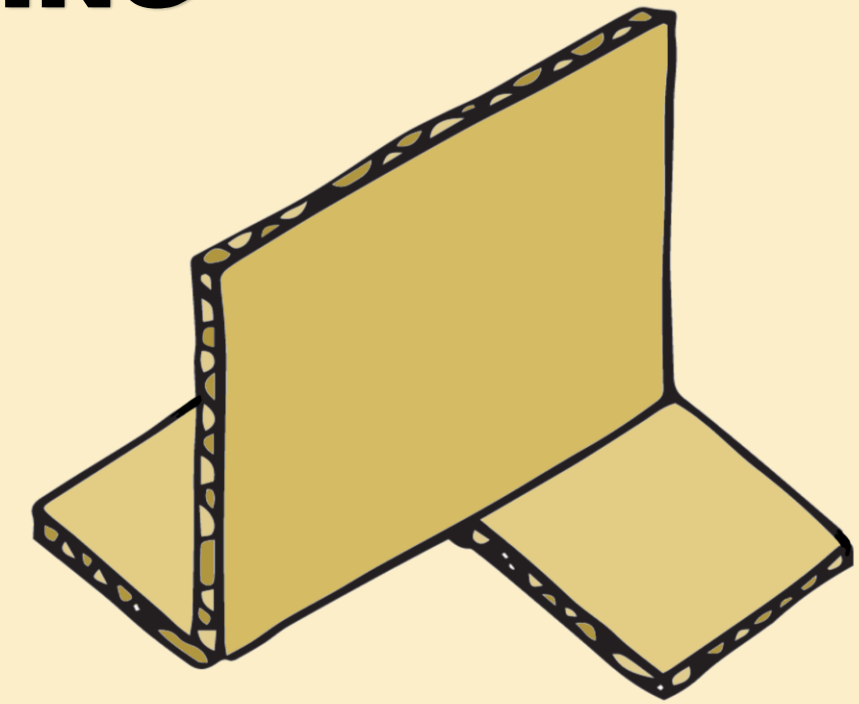
Scoring cardboard to create a curve

Scoring cardboard makes it easier to bend and fold. Scoring cardboard can made a fold more accurate and sharper. To score you need a scoring tool such as a biro pen or the blunt side of a scissor blade. You use the scoring tool to make an indent along the line that you wish to fold (without cutting it).

TECHNIQUE

USING TABS FOR JOINING

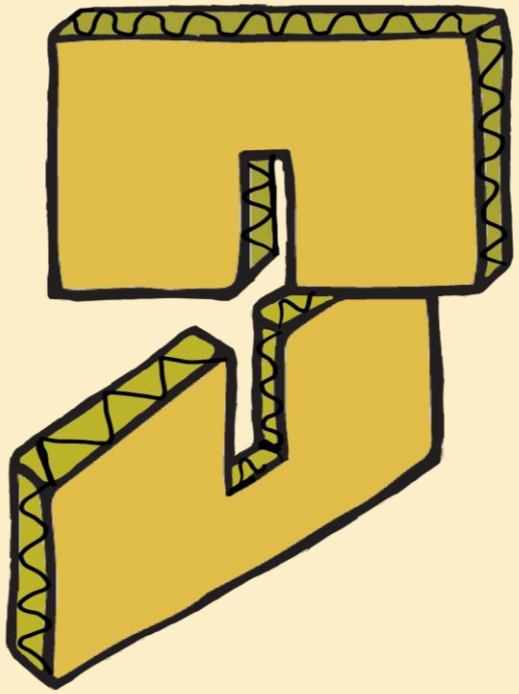




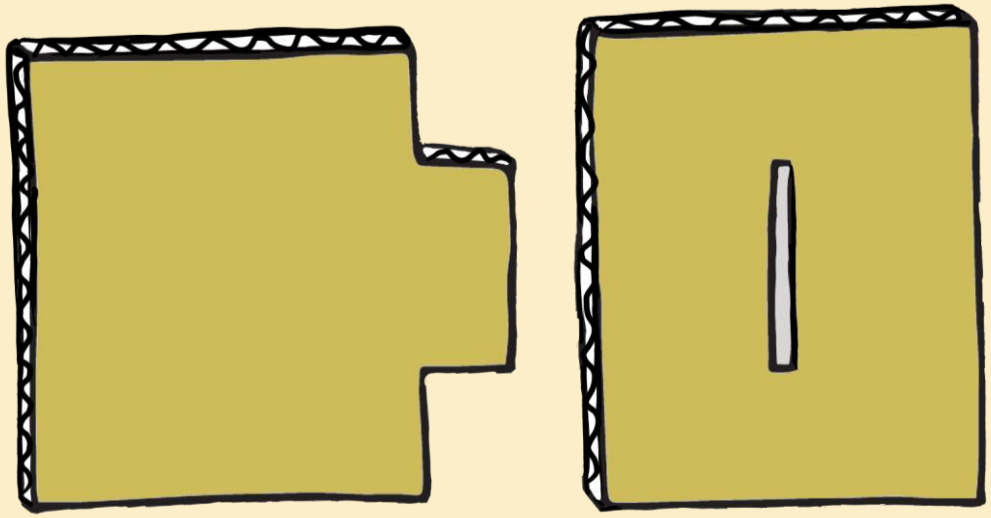
A cardboard tab is a technique used to join a piece of cardboard to another piece of cardboard using glue. It is often used to create 3D shapes from 2D nets. Tabs can also be used to make an upright wall.

TECHNIQUE

USING SLOTS FOR JOINING



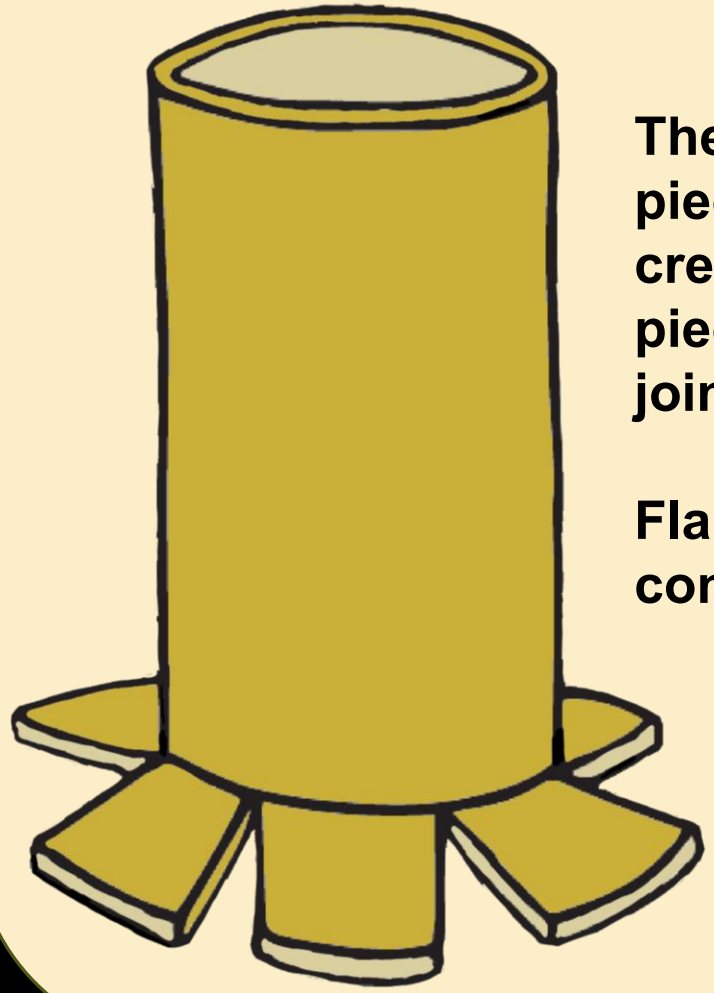
Slots can be used to connect two pieces of sheet materials to create a free-standing structure.



Combining a slot and a tab is also a way to create a free-standing structure.

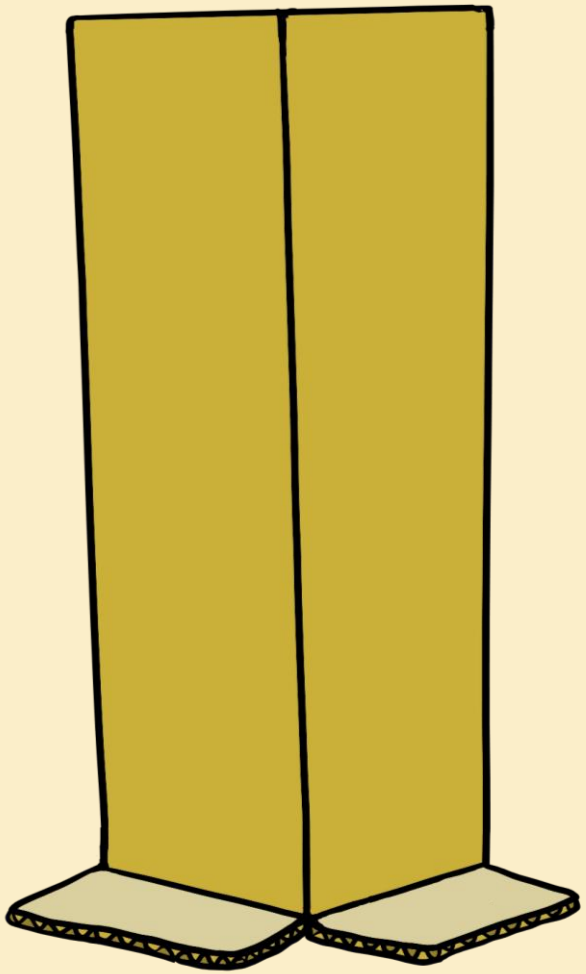
TECHNIQUE

FLANGE JOINT



The flange joint is used to join two pieces of material together by creating a ‘lip’ of tabs from one piece of material that are used to join to the other piece of material.

Flange joints are often used to connect pipes, columns and tubes.

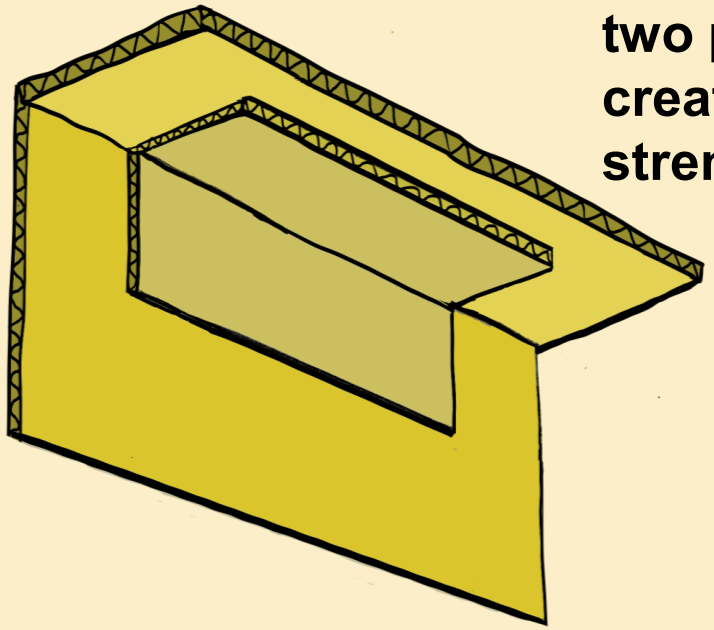


TECHNIQUE

SUPPORT STRUCTURES

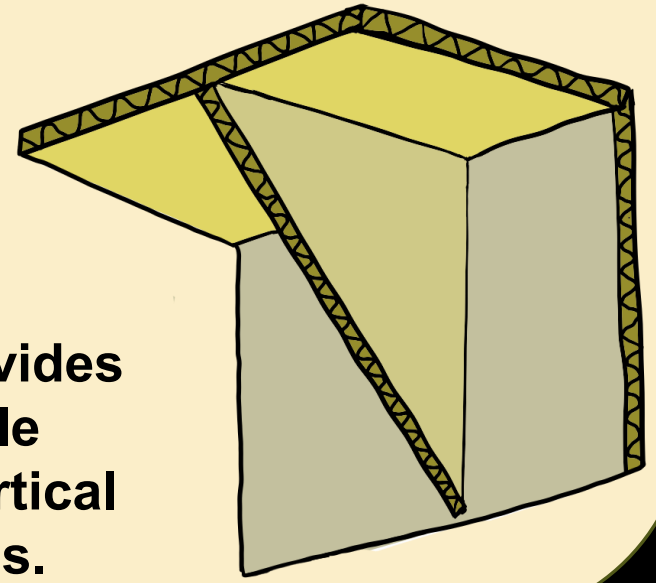
BRACE

An L shaped brace can be used to join two pieces of sheet materials together to create an L shape. It can also be used to strengthen a joint.



BRACKET

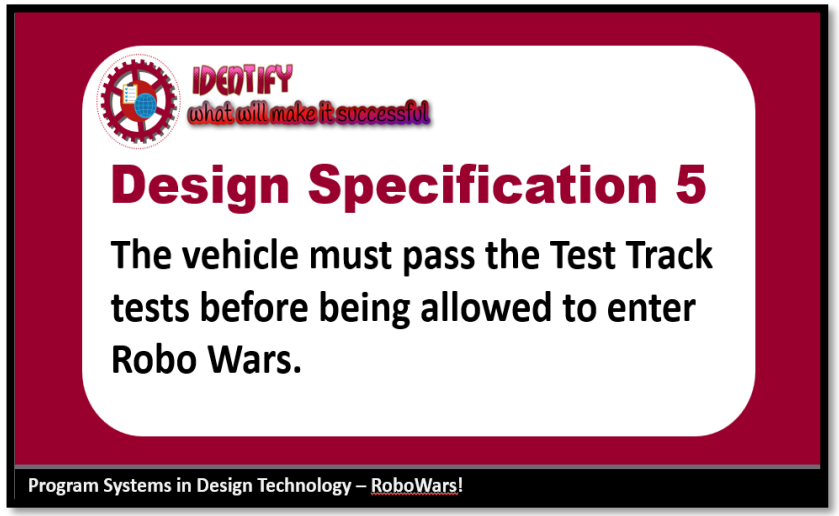
A bracket support provides support using a triangle support to connect vertical and horizontal surfaces.

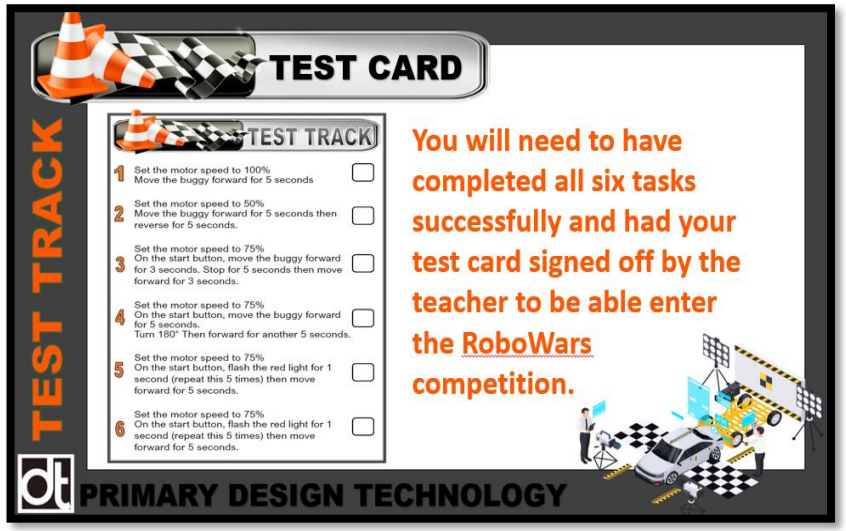


EVALUATE

EVALUATING THE PRODUCT

EVALUATE





Are children able to apply their understanding of computing to program, monitor and control their products? (National Curriculum)

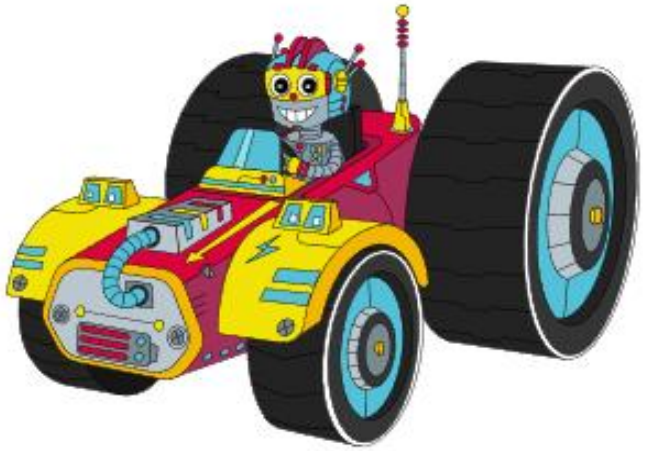
- Does the vehicle respond to the control commands?
- Do children understand block coding used to control their vehicle?

The iterative process

- Children test out their vehicle – can they modify, improve their product before the RoboWar battle?

EVALUATE

EVALUATE



LET BATTLE COMMENCE

EVALUATE CODING RANDOM MOVEMENT

EVALUATE

When the push button is pressed, this begins the countdown sequence of lights **red – green - amber**

Both motors will move forwards at a speed between 50% and 100% of normal speed. If the speeds are not equal, then the vehicle will turn to either the left or right.

The motors will run for a random time between 1 and 3seconds.

EVALUATE

IDENTIFY what will make it successful

Design Specifications:

1. The chassis should be the following dimensions: Length: 160mm, Width: 110mm
2. The chassis design should also include space for the Crumble microcontroller and the battery box.
3. The vehicle must have a flashing light that is capable of flashing red, amber and green.
4. The vehicle must have a push button that starts and stops the vehicle.
5. The vehicle must pass the Test Track tests before being allowed to enter Robo Wars.

EVALUATE

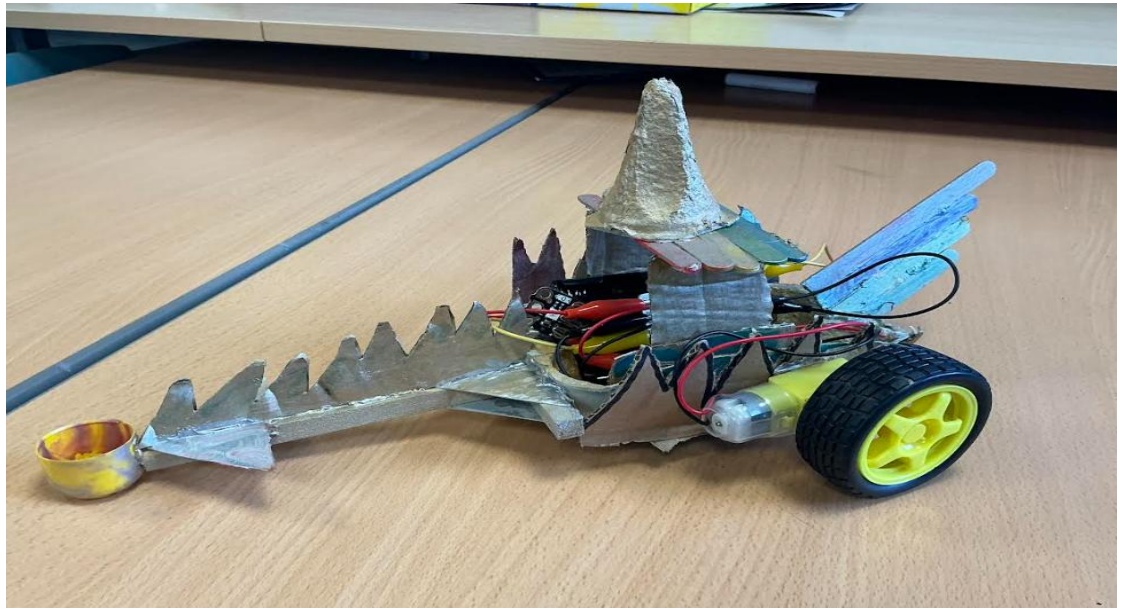
MARK II PROJECT

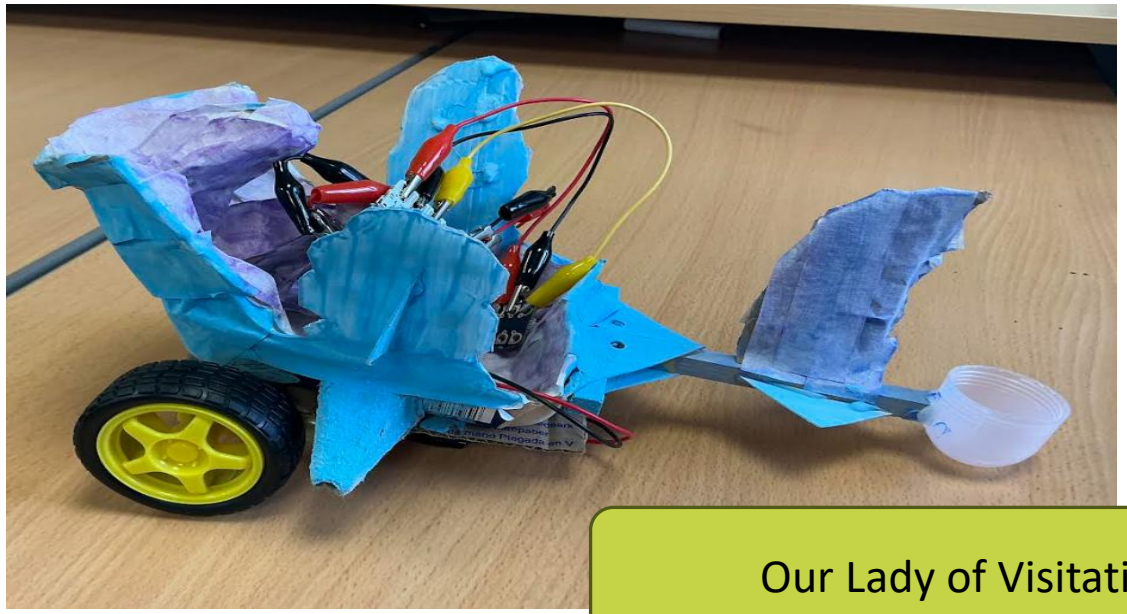
Having taken part in the RoboWars…..

- Re-design?
- Where are the weak points?
- Where needs strengthening?

Advanced: Develop own coding for the vehicle.

EXEMPLAR WORK





Our Lady of Visitation Primary School (Greenford, Middlesex)