

D&T MTP

Year 1 Autumn 2

Context							
Unit		Mechanisms: Wheels and Axles Linked to Topic: Where I Live (local transport)					
Assessment		Evaluation of product at end of unit.					
Concepts - How does this unit fit in?		Significant Designers / Products Henry Ford, Chris Boardman		Noteworthy Products in our Daily Lives Petrol and Electric motor vehicles, cycles, skates, <i>more to be added by class teacher</i>		Purpose and Use To roll items smoothly by allowing a wheel to spin freely on an axel.	
Kapow Lesson		Learning Intention	DT Skills Skills Progression	Knowledge Concepts	Diversity	Local Art	Curriculum Links
1	L1 How do wheels move?	To form an idea about how wheels move after exploring existing products.	D1, D3, D4, M2, E1				
2	L2 Fixing broken wheels	To explain , using appropriate vocabulary, why a moving part in a mechanism is not working and how to fix this issue.	D1				
3	L3 Designing a Vehicle	To apply my knowledge to create a design that communicates my technical understanding of a wheel mechanism.	D1, D2, M1				
4 & 5	L4 Wacky Races	To apply my knowledge of wheel mechanisms to construct a moving product.	M1, M2, M3, M4, E1				
6	L4 Wacky Races	I can analyse my product and explain what went well and what design adjustments are needed.	M4, E1, E2, E3				

Lesson 1

Kapow Lesson	L1 How do wheels move?
Learning Intention	To form an idea about how wheels move after exploring existing products.
SOLO SC: Uni- Structural <i>Bronze</i>	I can name famous car manufacturers.
SOLO SC: Multi- Structural <i>Silver</i>	I can describe and label a diagram, to identify what mechanism makes a vehicle roll forwards
SOLO SC: Relational <i>Gold</i>	I can form an idea about how wheels move after exploring existing products.
SOLO SC: Extended Abstract <i>Platinum</i>	I can evaluate a range of existing products.
Activity (What will the children do to demonstrate their understanding of the LI?)	<p>Children will be introduced to notable automotive designers in history. They will explore how wheels move and the parts of a wheel mechanism, through tactile, self-led experimentation after which, they will draw labelled diagrams of a wheel mechanism. Children will be given their design brief.</p> <p>Before moving to the Kapow lesson, show children images of Henry Ford, Carl Friedrich Benz, Chris Boardman. Can the children guess what these people designed and made? Show images of a Ford car, a Mercedes Benz car and a Boardman bike. Provide chn with some basic key information about these people. Can the children recognise these vehicles or name the manufacturer? Chn to understand that these people designed these vehicles.</p> <p>What do these vehicles have in common? All common around the places that we live and are used as transport. All roll forwards / backwards using wheels.</p> <p>These designers all faced the same key questions - ‘How do wheels move?’, ‘How are the wheels fixed on?’ ‘How many wheels should my product have?’ ‘Should the wheels be round?’</p> <p>Follow Kapow lesson, introducing more products and questions.</p>

	<p>Download and use the resources provided. Provide physical objects that have wheels, and allow chn to explore these in groups, while being posed the previous key questions.</p> <p>Use the objects and the photos objects, to model how to draw a simple diagram showing how the wheels attach and move. Model how to label the diagram - ruler and pencil to draw straight lines and to write the label in neat handwriting.</p> <p>Chn to then to draw diagrams in their sketchbooks: Date, LI and SOLO Chn may find it easier to draw on a separate piece of paper, which can then be stuck neatly into sketchbooks. Do not mark drawn work but do correct incorrect spellings of mechanism parts. Encourage the use of neat handwriting and presentation.</p> <p>Once the children have explored how to try and attach a moving part to a non-moving part, open Kapow L3 and play 'Mission Impossible Music' and give the children their design brief: "Karl Benz and Henry Ford have heard that Year 1 are master product designers and they would like the Year 1 Car Design Teams to design and make a car that rolls forward on 4 wheels!"</p> <p>Empower the children to feel that they have been chosen by great historical figures. You may wish to mock-up a letter (an actual piece of paper in an envelope) have pictures of the designers on a Google slide with speech bubbles or, even ask a member of staff to dress up as Henry Ford or Karl Benz - bring the project to life! Ensure the design brief is displayed somewhere visible in the classroom, other than the whiteboard.</p> <p>Next lesson children can choose which designer they wish to create a design.</p> <p>Preparation for L3 - children to begin collecting and bringing in small containers / boxes to make the body of their car. (Tiny cereal boxes, yoghurt pots, take away plastic pots, etc)</p>
Key Vocabulary for the lesson	Axle, Axle holder, diagram, mechanism, wheel, Karl Benz, Henry Ford, Chris Boardman, design brief
Curriculum Links	Topic, History
Resources	Kapow resources printed (and laminated), straws, paper, glue/masking tape, scissors

Lesson 2

Kapow Lesson	L2 Fixing broken wheels
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Learning Intention	To explain , using appropriate vocabulary, why a moving part in a mechanism is not working and how to fix this issue.
SOLO SC: Uni- Structural <i>Bronze</i>	I can identify parts of a wheel mechanism
SOLO SC: Multi- Structural <i>Silver</i>	I can describe how to solve a wheel mechanism problem.
SOLO SC: Relational <i>Gold</i>	I can explain , using appropriate vocabulary, why a moving part in a mechanism is not working and how to fix this issue.
SOLO SC: Extended Abstract <i>Platinum</i>	I can justify my ideas further, using technical vocabulary.
Activity (What will the children do to demonstrate their understanding of the LI?)	<p>Children will identify and fix wheel mechanisms problems - where the wheel is not moving. This pre-learning will aid the children when they begin to build their cars, in Lesson 4.</p> <p>Before starting the Kapow lesson, recap the design brief and ensure that this is somewhere prominent in the classroom, as well as on the whiteboard. Have children decided which designer they wish to work for? Explain that to be exceptional car designers, while building their cars for Henry Ford or for Karl Benz, that they will need to be able to fix mechanical problems, so that their cars will work smoothly. Bring the lesson to life.</p> <p>Follow Kapow lesson.</p> <p>Ensure maximum modelled use of technical language throughout the lesson and keep encouraging children to also verbally use this vocabulary when describing, explaining and justifying their method when identifying and fixing mechanical problems and of the mechanism components.</p> <p>Open Kapow L3 and play 'Mission Impossible Music' and recap the design brief: "Karl Benz and Henry Ford have heard that Year 1 are master product designers and they would like the Year 1 Car Design Teams to design and make a car that rolls forward on 4 wheels!" While the music is playing, inform the children they will begin designing next lesson!</p> <p>Stick sheets into sketchbooks. Do not mark drawn work but do correct incorrect spellings of mechanism parts. Encourage the use of neat handwriting and presentation.</p>
Key Vocabulary for the lesson	Axle, Axle holder, equipment, mechanism, wheel, Karl Benz, Henry Ford, design brief
Curriculum Links	Topic, History
Resources	Sketchbooks, Printed Kapow sheets (diagrams and repair tickets)

Lesson 3

Kapow Lesson	L3 Designing a Vehicle
Learning Intention	To design a moving vehicle .
SOLO SC: Uni- Structural <i>Bronze</i>	I can say who my product is for.
SOLO SC: Multi- Structural <i>Silver</i>	I can explain the purpose of each part of my wheel mechanism, on my diagram.
SOLO SC: Relational <i>Gold</i>	I can apply my knowledge to create a design that shows my understanding of a wheel mechanism.
SOLO SC: Extended Abstract <i>Platinum</i>	I can evaluate and edit my car design.
Activity (What will the children do to demonstrate their understanding of the LI?)	<p>Children will decide upon their target audience - who will use their product once designed. Understand that all products look and perform differently, depending on who is going to use it. Children will be shown a number of different vehicles which have different purposes and be inspired by how car design has changed over the decades. The children will design their vehicles, label their designs and will use CAD to create a team flag.</p> <p>Open Kapow L3 and play 'Mission Impossible Music' and recap the design brief: "Karl Benz and Henry Ford have heard that Year 1 are master product designers and they would like the Year 1 Car Design Teams to design and make a car that rolls forward on 4 wheels!"</p> <p>Ford and Mercedes Benz cars are driven by millions of people around the world. Some are for everyday use and some are luxury and sports cars. Show a range of car designs to inspire the children. Discuss the changing design of the cars over the years; discover the car designers who created the vehicles that broke the world land speed records - see the Redbull Website - discuss how the shape of the cars changed. These designs might inform the children's design ideas. Chn can note down their favourite and may wish to name their design, inspired by these outstanding automotive designs.</p> <p>Chn should make links between design through history and how contemporary designs are influenced by the past. Remind the children that product and car design are lucrative career paths and all the cars that they see in their local area have been designed by car designers.</p> <p>Have the children chosen which car designer they wish to design for? It is important that in product design, children have in mind a target audience as this will influence their final design (shape, colour, etc) Who would they like to buy their car? Families who will go on day trips and shopping; racing drivers; celebrities; people who want an environmentally friendly car; elderly people who want to feel safe when driving? Encourage children to discuss in teams and to note all ideas on their design sheet (blank version is downloadable from the Kapow website)</p> <p>Follow Kapow lesson.</p>

	<p>Class teacher to model high expectations of what the design should look like when labelling.</p> <ul style="list-style-type: none"> ● Pencil drawing - ALWAYS USE A RULER WHEN DRAWING STRAIGHT LINES. ● Label lines to be drawn with a ruler. ● Label the parts clearly, with neat handwriting. ● Include measurements on the diagrams. ● Encourage children to explain what each part does or explain other aesthetic design ideas, by using brackets next to the label and writing an explanation. <p>During the lesson, insist children correct work which does not meet the high expectations.</p> <p>Do not use the pre-drawn diagram template, as this does not model a high standard of drawn diagram.</p> <p>EXT: If time, use the extension 'flag drawing' activity. CAD (Computer Aided Design) is a key skill to be learned. Class teacher to investigate the Kapow-recommended CAD drawing tool well in advance of this lesson. If this does not work, please alert the WDA's Digital Lead (currently A Gaughan 2022-23) who will be able to assist. Do not ask the children to make pencil-drawn flags.</p> <p>Stick sheets into sketchbooks neatly. Do not mark drawn work but do correct incorrect spellings of mechanism parts. Encourage the use of neat handwriting and presentation.</p>
Key Vocabulary for the lesson	Axel, axel holder, chassis, mechanism, wheel, CAD (Computer Aided Design)
Curriculum Links	Topic, History, STEM
Resources	

Lesson 4 & 5

Kapow Lesson	L4 Wacky Races
Learning Intention	To apply my knowledge of wheel mechanisms to construct a moving product.
SOLO SC: Uni- Structural	I can identify tools and materials that I will use to make my product.

<i>Bronze</i>	
SOLO SC: Multi- Structural <i>Silver</i>	I can combine materials to make a product.
SOLO SC: Relational <i>Gold</i>	I can apply my knowledge of wheel mechanisms to construct a moving product.
SOLO SC: Extended Abstract <i>Platinum</i>	I can evaluate my product during construction and justify my changes.
Activity (What will the children do to demonstrate their understanding of the LI?)	<p>Chn will construct their vehicles during the next 2 lessons. Ensure dowel has been pre-cut (according to the needs of the children’s design specifications)</p> <p>Follow Kapow Lesson</p> <p>The videos demonstrate how to assemble the axles and how to attach these to the chassis.</p> <p>Throughout the lesson, encourage children to use the technical vocabulary that has been taught during this unit. Encourage resilience during the assembly process - children MUST TRY and RE-try before adult intervention. Children should rely on peer help and peer discussion to resolve construction problems, especially the ‘fiddly bits’. The adult can demonstrate but the child must try and complete the task themselves. The children will have two sessions to create a moving wheel and axle. The aim is not to create a decorated toy car that does not roll.</p> <p>Remind the children of the design brief: ‘Design and make a car which must roll forwards on four wheels.’ and of the design criteria.</p> <p>If a product design team successfully attaches working wheels and axles, encourage them to discuss with you design changes they needed to make so as to solve build problems. The children must then note these changes on their design sheet, in their sketchbook.</p> <p>The team may now begin creating an aesthetically pleasing product and decorate their vehicle. Have tissue paper, colouring pens, glitter, glue, etc, ready to use.</p> <p>Assembly and decoration will continue into the next lesson.</p> <p>At the end of Lesson 5 take photos of the finished vehicles, print and stick these in sketchbooks, ready for Evaluation, next lesson.</p>
Key Vocabulary for the lesson	Axel, axel holder, chassis, dowel, mechanism, wheel, design brief, design criteria
Curriculum Links	Topic, STEM
Resources	Recycled resources supplied by children (small boxes, yoghurt pots, etc),plastic straws, cardboard wheels, masking tape, Sellotape, pre-cut card for axel holders, sketchbooks, decorating resources (tissue paper, coloured paper, glitter, etc.)

Lesson 6

Kapow Lesson	L4 Wacky Races
Learning Intention	To respectfully analyse product design and give critical feedback.
SOLO SC: Uni- Structural <i>Bronze</i>	I can identify what went well with my design.
SOLO SC: Multi- Structural <i>Silver</i>	I can outline what I must improve.
SOLO SC: Relational <i>Gold</i>	I can analyse my product and explain what went well and what design adjustments are needed.
SOLO SC: Extended Abstract <i>Platinum</i>	I can reflect upon the design process and discuss what designers must consider when creating a product.
Activity (What will the children do to demonstrate their understanding of the LI?)	<p>Chn will finalise their constructions and then test the final product and evaluate if it meets the design criteria: ‘Design and make a car which must roll forwards on four wheels.’</p> <p>Once the children have made final adjustments (allow 5 minutes to re-stick anything that may have come loose), remind the children of the design brief: “Karl Benz and Henry Ford have heard that Year 1 are master product designers and they would like the Year 1 Car Design Teams to design and make a car that rolls forward on 4 wheels!”</p> <p>Allow design teams the opportunity to present their designs (e.g. model name, the names of the children in the design team and explain their design choices and what difficulties they faced. The team should explain how they solved these problems as a team.)</p> <p>Use the suggested ‘Wrapping Up’ by Kapow and model how respectful feedback should be given.</p> <p>The class may decide to text the models on a ramp and measure the distance travelled akin to the land speed records.</p> <p>Model on the whiteboard, stem sentences the children can write in their sketchbooks, to evaluate their designs.</p> <p>Was the design successful? Did it meet the design brief? Did it meet the design criteria? What improvements could be made? Avoid the use of close sentences. Provide the children with vocabulary taught in the unit. These should already be displayed prominently in the classroom. Children may wish to discuss Henry Ford and Karl Benz or other designers introduced during this unit.</p> <p>Sentences can be written neatly in sketchbooks, next to the photos of their products. Do not mark drawn work but do correct incorrect spellings of mechanism parts. Encourage the use of neat handwriting and presentation.</p> <p>Display finished products - the actual products or photographs. The products would look great displayed along with photocopies of the product design drawings, showing the design process.</p>

Key Vocabulary for the lesson	Axel, axel holder, chassis, dowel, mechanism, wheel, design criteria, design brief, Henry Ford, Karl Benz
Curriculum Links	Topic, STEM, British Values: respect
Resources	Recycled resources supplied by children (small boxes, yoghurt pots, etc), plastic straws, cardboard wheels, masking tape, Sellotape, pre-cut card for axel holders, sketchbooks, decorating resources (tissue paper, coloured paper, glitter, etc.), Think! question

Lesson 6

Assessment Think! Question	'The only important factor that a car designer must think about, is to make sure the wheels turn.'
Tasks	<p>Chn to consider the statement and discuss. What else must a designer think about when designing?</p> <ul style="list-style-type: none"> ● Audience ● Purpose ● Design - will it look good? ● Colour / decoration ● Price <p>Do the chn agree with the statement? Write their thoughts neatly in their sketchbook.</p>
Key Vocabulary for the lesson	See above
Curriculum Links	See above
Resources	See above