

## National curriculum:

### Design

● design purposeful, functional, appealing products for themselves and other users based on design criteria  
generate, develop, model and communicate their ideas through talking, drawing, templates, mock-ups and, where appropriate, information and communication technology.

### Make

- 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.

### Evaluate

- explore and evaluate a range of existing products
- evaluate their ideas and products against design criteria

### Technical knowledge

- build structures, exploring how they can be made stronger, stiffer and more stable
- explore and use mechanisms [for example, levers, sliders, wheels and axles] in their products

## Vocabulary:

Fire, engines, wheels, design, drawing, cutting, shaping, joining, finishing, materials, axles. Wheel, axle, chassis, body, cab, wooden, plastic

## Prior Learning:

### Reception:

Designing, junk modelling, cut and stick, painting, evaluating.

### Year 1:

Designing, junk modelling, cut and stick, joining with different materials

## Snapshot overview

Technical knowledge:  
Looking at fire engines, fixing wheels, looking at mechanisms.  
Cutting  
Design criteria

Evaluate  
Exploring with real life.  
Communication.  
Evaluate against success criteria



Design  
Materials  
Drawing  
Joining  
Teamwork  
Functions  
Purpose  
Communication.



Make  
Tools  
Cutting, shaping, joining, finishing.  
Materials, construction.

**DT Medium Term Planning**

**Year Group:** 2

**Term:**

**Topic:** DT- Fire Engines

	<b>Learning Objective</b>	<b>Input (including key questions and vocabulary)</b>	<b>Task including scaffold and challenge</b>	<b>Key learning:</b>
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<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Technical Knowledge</p>	<p>I can talk about the different parts that make up a vehicle</p> <p>I can create a design criteria for a moving product</p>	<p>Introduce children to different vehicles by looking at powerpoint. –</p> <p>Using the following website, Ask children to identify different parts of a vehicle  wheel  axle  chassis  body  cab.  (<a href="http://resources.hwb.wales.gov.uk/VTC/wheels_axles/eng/Introduction/default.htm">http://resources.hwb.wales.gov.uk/VTC/wheels_axles/eng/Introduction/default.htm</a>)  You tube -Wheel and Axle - Simple Machines   Mocomi kids  <a href="http://www.mikids.com/SMachinesWheels.htm">http://www.mikids.com/SMachinesWheels.htm</a></p> <p>Look at models/toys e.g cars, trucks, vans fire engines etc.  Look at how toy wheel attach - Lego, duplo, mobile etc.  Discuss and outline with chn the role of chassis, wheels and axles as discussed earlier.  Can you find these parts on these cars? Take apart toy cars and observe the different components. Model putting them back together and working out how they come together to make the whole. Why are the individual bits important - what does each part do? What parts are the most important?</p> <p>Tell the children they are making a fire engine which will move using wheels and axles.  E.g. Look like a fire engine, right car shape for a fire engine, moving wheels, detail for doors and windows, wheels, axles, chassis, body and cab, shiny exterior. Make a design criteria together that we will follow. The fire engine must....</p> <ul style="list-style-type: none"> <li>- Move in a straight line, look like a fire engine, have a moving wheel and axle, have a shiny exterior etc.</li> </ul> <p>Display this criteria on the working wall for future use.</p>	<p>Chn to explore toy cars and their core components. Chn to take apart toy cars and work out how the wheels move and how the parts make the whole. Encourage chn to use key vocab - wheel, axle, chassis, body, cab</p>	<ul style="list-style-type: none"> <li>• To be able to discuss the features of moving vehicles using at least 2 technical words to describe.</li> <li>• To explore effective wheels and axels and explain what makes them effective for a moving vehicle.</li> <li>• Children to identify different parts of a car using the correct vocabulary.</li> </ul>
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	<p>I can experiment with different wheel and axle techniques</p>	<p>Explain to the children that they are going to attach wheels in different ways:</p> <p>A fixed axel and free axel</p> <p>Demonstrate the two methods of attaching wheels and axles to a model vehicle. See help sheets (either the wheel is attached tightly to the axle and the axle is free to rotate or the axle is fixed with the wheel free to rotate around it)</p> <p>What is important to do in order to make the axel and wheel move the vehicle in a straight line evenly?</p> <p>Prepare differently made axel and wheel combinations – some that are uneven wheel to wheel, some that are wonky, some that are too high or too low and one that is accurate and moves correctly. Model using these to discover what is important when making a wheel and axel combination. Children to look at sheet as a group and discuss which axel wheel combinations will make vehicles move in a straight line.</p> <p>(can use this worksheet or similar)</p> <p>Plenary: Feedback – which ones worked/didn't work and why? What is important to remember when making a wheel and axle? What do we need to do when making ours? Add this to the design criteria made yesterday</p>	<p>Chn to explore the different wheel axel combinations and to discuss each one. Which one is the worst one and why? What happened with this one? Was it effective and why? What needs to change to make this effective? What does this tell us about what we need to do when making a moving vehicle?</p>	<ul style="list-style-type: none"> <li>• To be able to discuss the features of moving vehicles using at least 2 technical words to describe.</li> <li>• To explore effective wheels and axels and explain what makes them effective for a moving vehicle.</li> <li>• Children to identify different parts of a car using the correct vocabulary.</li> </ul>
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Design	<p>I can design and label an effective and purposeful product using a design criteria</p>	<p>Explain to the children that they are going to design and make a model fire engine. Refer back to the previous toy car examples and the design criteria – what do we need to include to make this successful? Refer to yesterday’s learning – what do we need to remember when designing our wheels and axles? Refer to when we took the cars apart and put them back together – repeat this to remind them – what order will we have to do this in?</p> <p>Discuss with the children that the vehicle has to look attractive – look at cars etc that look shiny. Discuss with children the technique to achieve this and how paper can be made to look shiny using glue mixed with water. Show children some that were made earlier. Use this to inform the design</p> <p>Demonstrate how to draw a design, using the design criteria, with labels that show what wheels and axles, chassis they will use. Verbalise thought process – what order will this have to be done in? what things need to be considered? What materials will be needed? What equipment will help with this</p> <p>Plenary: share plans with partners and use the design criteria – has your partner got all of the things they need in order to tick off all of the design criteria? Have they missed anything? Does anything need to be added or changed?</p>	<p>Chn to draw and label a design a fire engine. Chn must include what sort of axle support and wheels they intend to use. Children must include key voab to help</p> <p>Support with the order and materials and key vocab – prompting chn for the key words. Scribe as required</p> <p>Extension: To write more detailed labels describing equipment needed to do this and order this will be completed in</p>	<ul style="list-style-type: none"> <li>• Children to design a fire engine matching the criteria.</li> <li>• Children to label their fire trunks with the correct vocabulary.</li> <li>• To be able to design an effective and purposeful product using a design criteria.</li> </ul>
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<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Make</p>	<p>I can follow a design and use tools safely to make an effective product</p> <p>Preferably a longer blocked session</p>	<p>Recap what we did yesterday, what we know about moving vehicles and what is in our plan and design criteria. Get children to look at their designs and plans.</p> <p>Model using the plan to begin making the fire engine – referring back to the plan and design criteria and verbalising thought process. E.g. I am doing this because... I need to remember to ...</p> <p>Shown chn how to measure a piece of dowel for the axle and how to cut it using the hack saw and clamp.</p> <p>Discuss health and safety – children to explain effects of not sawing as instructed. Ensure chn are supervised when they cut their piece of dowel. Refer back to previous session on which wheel and axle combination is the most effective and bear this in mind when making the holes for the wheel.</p> <p>Plenary: Teacher choose a good example of someone’s completed fire engine. As a class reflect on what makes this fire engine effective – referring back to the design criteria</p>	<p>Chn to follow their design and make their fire engine using design criteria. Children to use sketch book as a guide.</p> <p>Support for children who struggle with fine motor to manipulate the moving parts</p> <p>Challenge: can you make another moving part to your fire engine? E.g. windscreen wipers, moving doors, moving ladders? Refer back to year 1 moving pictures and split pins – can you apply this prior knowledge to the fire engine?</p>	
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Evaluate	I can evaluate my product against design criteria	<p>Recap what we have done and the journey we have gone on to get the final product</p> <p>Discuss the plenary yesterday - reflecting on the product against the design criteria</p> <p>Show the children the following table:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 33%;">Design criteria</th> <th style="width: 33%;">My product</th> <th style="width: 33%;">Next time I would...</th> </tr> </thead> <tbody> <tr> <td>List the agreed design criteria here</td> <td>Reflect on whether this aspect was successful in your own product here</td> <td>Decide whether it would need adapting or changing for next time and how or why here</td> </tr> </tbody> </table> <p>Model filling this out with your own design criteria and reflecting on the product and what would be done differently</p> <p>Plenary: feedback on the strengths and next steps from the evaluation</p>	Design criteria	My product	Next time I would...	List the agreed design criteria here	Reflect on whether this aspect was successful in your own product here	Decide whether it would need adapting or changing for next time and how or why here	<p>Chn to fill in own table about their own fire engine</p> <p>Support for writing and use of key vocab – could scribe if needed</p> <p>Extension – ensure all vocab has been used when discussing own product and next time...</p>	Evaluation sheet and peer and class discussion.
	Design criteria	My product	Next time I would...							
List the agreed design criteria here	Reflect on whether this aspect was successful in your own product here	Decide whether it would need adapting or changing for next time and how or why here								

This topic is expected to last approximately 4 sessions.

Impact:

- To be able to discuss the features of moving vehicles using at least 2 technical words to describe
- To explore effective wheels and axels and explain what makes them effective for a moving vehicle
- To be able to design an effective and purposeful product using a design criteria
- To be able to make an effective and purposeful product using a design criteria
- To be able to evaluate their own final product using a design criteria.