Design and Technology Medium Term Plan- Autumn Term 2 2023/2024

Mechanism – Vehicle with Wheels

End of Unit Goal: to design and make a purposeful, functional and appealing vehicle with wheels and axles.

Date	Learning Objective	Learning Outcome	Task/activity	Resources	Key Vocabulary
Lesson 1	I can understand how wheels move.	To explore and evaluate a range of moving vehicles. To generate, develop, model and communicate their ideas about moving vehicles through talking and drawing.	Main Teaching Put a selection of items with wheels around the room, for example, bicycles, tricycles, trundle wheels, toy cars, skateboards and trolleys. Ask the children to move around the room looking at each one in turn to try and figure out how it moves. Pick one of the wheeled objects from the Attention Grabber and model how to draw a diagram of it, using the appropriate vocabulary to label it ('wheel', 'axle' and 'axle holder'). Ask pupils to consider: - To what the wheels are attached – How the wheels are attached – Where the wheels are placed in relation to the shape of the body. Make sure to use the vocabulary 'wheel','axle' and 'axle holder' and keep these words visible for the remainder of the lesson. Differentiated Activities/Challenges Working in groups, the children now create their own diagrams of different objects, just as you modelled. Look at each of the diagrams in turn and ask children which parts they think are moving. Model how to show the movement, drawing an arrow with a coloured pen. These diagrams (with a picture of the object attached) should then be displayed on the wall for the next lesson. Give children straws, paper, scissors and glue or masking tape and ask them to see if they can replicate the way in which a moving part is attached to a nonmoving part (don't expect a finished product just let them experiment). Rather than give instructions, work on a table with a group and experiment yourself, making some silly mistakes, encouraging children to problem solve and collaborate. Finish by asking pupils: How do wheels work? Establish that wheels are circular discs attached	Wheels and axles images, Items with wheels such as bicycles, tricycles, trundle wheels, toy cars, skateboards, trolleys, Straws, Paper, Masking tape, Scissors	Wheel, axle, axle holder, mechanism, rotate, move, turn

			to an axle, which moves inside an axle holder. The axle holder is then attached to the body of the object. <u>Plenary</u> As a class, discuss how wheels are used in everyday life: - What items do you know that use wheels? – Where can we find wheels in our school? (You may want to go for a walk to see this.) – Why do we use wheels?		
Lesson 2	I can identify what stops wheels turning.		<u>Main Teaching</u> Show the children the video – https://www.youtube.com/watch?v=AHGQCLRLlUU Explain to the children that, just like Sid (from the video), they are going to be looking at some vehicles that are not working and trying to work out why they are not working. Remind the children that they will need to keep their explanations to themselves until the end of the session so that everyone has a chance to figure out what is not working. <u>Differentiated Activities/Challenges</u> Children to look at the 'Broken vehicles' images and have the 'Repair tickets', the children will write a repair ticket for each of the three 'broken' toy car images, explaining why the toy isn't working and what should be done to fix it. The images are designed to highlight any misconceptions the children may have, and by asking them to identify and suggest how to fix them, they will be less likely to make the same errors themselves later in the topic. – Vehicle A (Image): Vehicle with square/triangle wheels – Vehicle B (Image): Vehicle with no axle (wheels glued directly to car) – Vehicle C (Image): Vehicle with wheels on one side only. <u>Plenary</u> Explain that next week we will be designing a moving vehicle, ask them to discuss what they have learnt in this lesson that will help them in their designs, drawing out the following points: - The vehicle should have round wheels that balance the body. – The wheels need to be attached to an axle. – The axle needs to fit inside an axle holder but not be attached to the axle holder	Youtube, Broken Vehicle images, repair tickets	Vehicle, repair, broken, axle, wheel,

Lesson 3	I can design a moving vehicle.	To design a purposeful, functional and appealing moving vehicle based on design criteria. To select from a range of tools and equipment to make a moving vehicle. To select from a range of materials according to their components to make their moving vehicle.	Main Teaching Model planning the vehicle design by measuring the body and drawing on a copy of the Vehicle design sheet. Remind pupils to label their design, including the body of the vehicle, and introduce the word 'chassis'. In a different colour, add in the axle holder, axle and wheels, labelling them and including their length. Don't forget to discuss where and how each item will be attached. Differentiated Activities/Challenges Hand out to each child a copy of the Activity: Vehicle design sheets and give children time to complete them. Make available materials for making the vehicles. There is no need for glue or scissors at this stage. The children are not making their vehicles yet, only deciding which objects or materials they will use, and making sure that they have allocated an item for each of their vehicle components: wheel, axle, axle holder, body/chassis. Ask the children to leave their plans on their tables and move around the room looking at everyone's plans. Once they've done this, they can revisit their own plans and make any amendments, based on ideas they've seen. Plenary As a class, make a set of instructions for the next lesson, when the children will be making their vehicles. Explain that the instructions must include: - What they have to do – In what order they have to do things – What tools they will need. (Children's designs and whole class instructions to go in books)	Design sheets, materials to use to make vehicles.	Mechanism, vehicle, wheel, axle, chassis
Lesson 4	I can build a moving vehicle	To design a purposeful, functional and appealing moving vehicle based on design criteria.	Main Teaching https://www.youtube.com/watch?v=k1cnit1irjY – hook for the lesson. Recap the design criteria for a moving vehicle. Recap the instructions you made as a class. Ask the children if they have any questions and point out where they can find the relevant materials and equipment for making their vehicles. T to	Children's vehicle design sheets, 20cm pre-cut lengths of dowel for the	

		To select from and use a range of tools and equipment to make a moving vehicle. To select from and use a range of materials according to their components to make their moving vehicle. To explore and use wheels and axles.	model making a vehicle. <u>Differentiated Activities/Challenges</u> Hand out to each child their vehicle design sheet from Lesson 3 and two pre-cut lengths of dowel (or other suitable materials) for the axle. Ask pupils to refer to their design sheets and gather all the materials they will need. Re-cap and demonstrate how to attach the axle holders to the chassis, using card pieces. Depending on your agreed design criteria and time available, you may want to give children time to decorate their vehicles, using paint, tissue paper glitter, etc.	axles, or alternative suitable materials (two lengths per pupil), Materials for making vehicles, such as card boxes, cotton reels, straws, pipe cleaners,, Optional – materials for decorating vehicles, such as tissue paper, glitter, googly eyes	
Lesson 5	I can evaluate my vehicle	To evaluate their ideas and products against design criteria. To explore and use wheels and axles.	<u>Main Teaching</u> Children to sit in a circle with their vehicles. Children to have their turn describing their vehicle and what they like about it. Encourage the children to use technical vocabulary. T to model completing self-assessment sheet. <u>Differentiated Activities/Challenges</u> Allow the children time to finish their vehicles from last week. Children to go to tables and look carefully at their vehicles. Children to complete widget self-assessment sheets. <u>Plenary</u> Children to explore a partner's vehicle and say something they have done well.	Vehicles, widget self-assessment sheets.	Evaluate, mechanism, rotate, wheel, axle