Lyppard Grange
DT Knowledge organiser

Year 2	Mechanisms- wheels and axels

Design, make and evaluate a _____ (product) for _____(user) for _____(purpose) – (to be completed by year group)

Examples of possible design and make tasks- push and pull toy- emergency services vehicle/ carnival float/ farm vehicle/ clowns car/ vehicle for story character.

Key Knowledge

- A mechanism is a device used to create movement in a product
- To know the difference between fixed and free moving axels
- To know the purpose of the product (that the finished product can be moved on wheels with ease)
- To know what components are needed to construct a moving vehicle and select materials which are most suitable

Skills

- To explore how moving objects work
- To investigate wheels and axels and their strengths and weaknesses
- Attach wheels to a chassis using an axel
- Use a range of materials to create models with wheels and axels e.g. tubes, dowel, cotton reels
- Generate ideas and design criteria

Vocabulary

Vehicle, wheel, axel, axle holder, chassis, fixed, moving, mechanism

IEAs-

- Explore and evaluate a range of wheeled products such as toys and everyday objects. Through questioning, direct children's observations e.g. the number, size, position and methods of fixing wheels and axles. How do you think the wheels move? How do you think the wheels are fixed on? Why do you think the product has this number of wheels? Why do you think the wheels are round?
- Draw an example of a wheeled product e.g. fire engine, stating the user and purpose, and labelling the main parts e.g. body, chassis, wheels, axles and axle holders.
- Explore a wheeled vehicle. Introduce relevant vocabulary and discus user and purpose.

Focused Tasks (FTs)

• Demonstrate to children how wheels and axles may be assembled as either fixed axles or free axles.

• Show different ways of making axle holders and stress the importance of making sure the axles run freely within the holders.

• Ensure that children are taught how to mark out, hold, cut and join materials and components correctly.

• Using samples of materials and components they will use when designing and making, ask the children to assemble some examples of wheel, axle, axle holder combinations. Display the work completed as a reference for their DMEA.

Design, Make and Evaluate Assignment (DMEA)

• Discuss with the children what they will be designing, making and evaluating within an authentic context.

• With the children identify a user and purpose for the product and generate simple criteria

• Ask children to generate, develop and communicate their ideas as appropriate e.g. through talk and drawing. Talk about, evaluate and share ideas with other children/adults.

• Make their wheel and axle product using their design ideas and criteria as an ongoing guide.

• Discuss how the children might add finishing techniques to their product with reference to their design ideas and criteria.

• Ask children to evaluate their finished product, communicating how it works and how it matches their design criteria, including any changes they made.

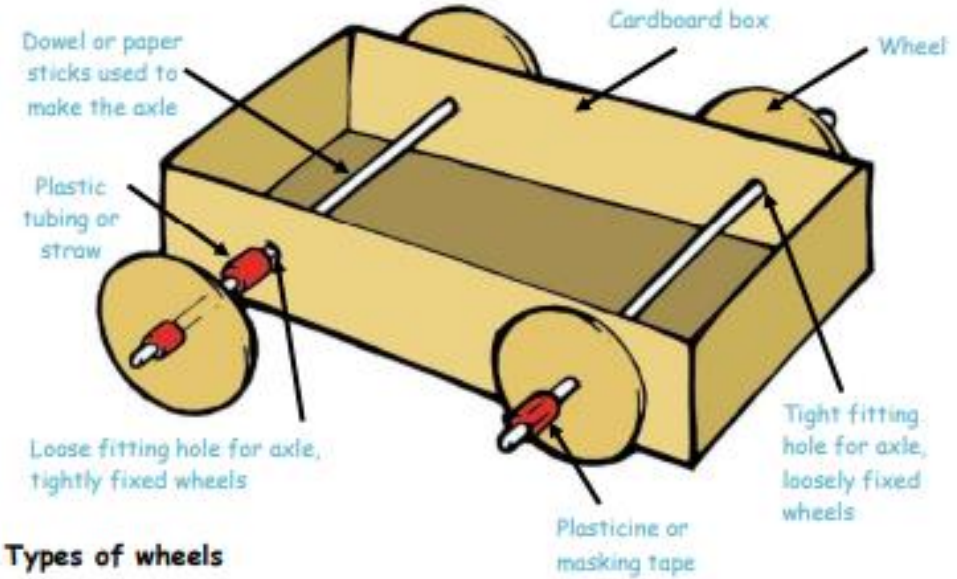
Ways to hold free moving axles

Use pairs of clothes pegs glued with PVA to the underside of a box.
Check the peg holes are large enough to allow axles to move freely.
Make sure they are aligned carefully so the vehicle moves in a straight line when the wheel and axle mechanism is added.

Use card triangles with holes for the axle.
Check the holes are large enough to allow the axle to move freely.
Make sure opposite triangles are aligned carefully so the vehicle moves in a straight line when the wheel and axle mechanism is added.

Use large paper/plastic straws fixed with masking tape to the underside of a box.
Check straws are positioned carefully so the vehicle will move in a straight line when the wheel and axle mechanisms are added.
Make sure the straw hole is large enough to allow the axle to move freely. The wheels must be fixed tightly to the axle.

Example of two different ways to fix wheels



Types of wheels

Top Tips-

- Ensure a range of shaped and sized boxes are available for children to select from
- Provide wheels with a range of thickness/ materials to explore and investigate
- A card disc glued onto a wooden wheel is easy to draw on/ add detail

Health and safety-

Pupils should be taught to work safely, using tools, equipment, materials, components and techniques appropriate to the task. Risk assessments should be carried out prior to undertaking this project

Designing, making and evaluating a fire engine.

THOUGHT	ACTION
Who am I making the vehicle for?	Talk about and explore a range of existing wheeled products.
How many wheels will it need?	Explore wheels with a range of diameters and thicknesses. Discuss and consider the best size and material from the wheels avaiable.
What type of wheels will be best?	
What is the purpose of the vehice?	Discuss what objects the fire engine needs to carry. E.g. ladders/ equipment
Should there be sections for different items?	Investiagte fire engines. Add details to design.
How can it be appealing as well as Functional?	Discuss colours/ design details/ Combine ideas to create designs
What tools, resources, materials Will we need?	Label designs, collect resources, Select appropraite tools.
How do I check the fire engine Is fit for purpose?	Test the movement and dseign. Do the wheels move freely?
What do I think about my final design?	Reflect and evaluate against design crieria.