

## Knowledge Organiser

### Y2 Term 1 DT Mechanisms – wheels and axels Moving Vehicle)

#### Key Questions

Who am I making the trolley for?  
How many wheels will it need? What type of wheels will be best?  
What does it need to carry?  
Should there be sections for different items?  
How big does each section need to be?  
Do we want to pull or push it?  
Which way moves best?  
How could it be appealing as well as functional?  
What tools, resources and materials will we need?  
What will I do if something does not work as planned?  
How will I check the trolley is fit for the user and for its purpose as I make it?  
What do I think about my final product?

#### Design Brief:

Make a vehicle (cart) to be used by miners to transport coal from inside the mines to the surface.



#### Curriculum Drivers

**Key skills for life:** alternative ways of workings, adapting and perfecting products.

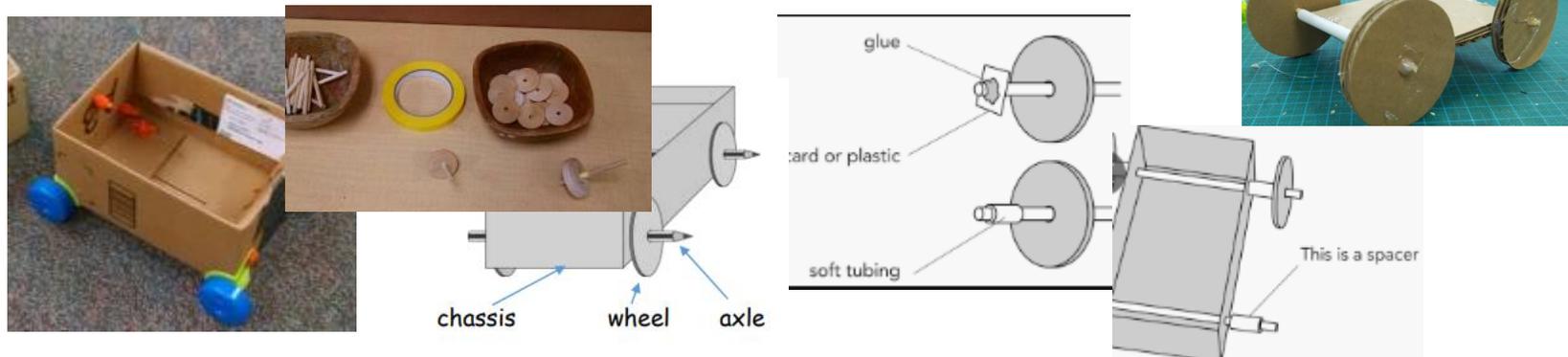
**Knowledge of the world:** Earliest wheels discovered in Middle East - Tepe Pardis, [Iran](#), and dated to 5200–4700 BC

#### Subject Themes

**Changes over time:** Past – no cushioning between the wheel and axel meant common breakages. Present – rubber commonly used for durability. Now a conveyor belt system used in mines – continuous movement. Originally pulled by men/animals. Later replaced by rope haulage systems.

#### Glossary

axle - a rod that enables a wheel to turn  
axel holder - the component through which an axle fits and rotates  
cab – where the driver sits to control the vehicle  
chassis – the base on which a vehicle is built  
dowel – wooden rod used for making the axles  
mechanism – part of a machine that has a particular function



## Teaching Structure

### Design:

1. Clearly understand the brief (product, user, purpose) for the project and use it to create class criteria (max 3).
2. Share photographs and moving vehicle toys *eg lorries, prams, cars, vans, ambulances, caravans, fire engines, tractors, buses, carnival floats*. Discuss with the children the different features of the vehicles, *eg Why do vehicles have wheels? Do they all have the same number and size of wheels? Why are vehicles different shapes? Which vehicles have parts that move, light up or make a noise?*
3. Teacher model a picture design (labelled) which meets most of the criteria.
4. Ask the children to identify the different parts of vehicles - wheel, axle, chassis, body, cab

### Focussed Task:

- Using construction kits with wheels and axles, ask children to make a product that moves.
- Demonstrate to children how wheels and axles may be assembled as either fixed axles or free axles. Discuss the advantages and disadvantages of both.
- Show different ways of making axle holders and stress the importance of making sure the axles run freely within the holders.
- Ask the children to assemble some examples of wheel, axle, axle holder combinations

5. Children work individually or in small groups to produce a labelled design and answer questions such as

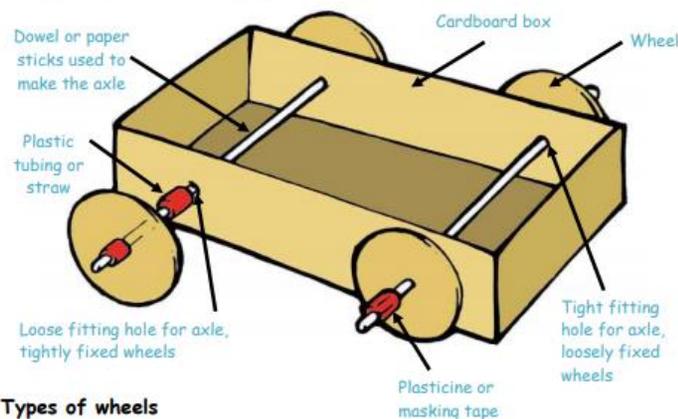
### Make:

1. Construct their wheel and axle product using their design ideas and criteria as an ongoing guide.
2. Discuss how the children might add finishing techniques to their product with reference to their design ideas and criteria e.g. how can the chassis be strengthened?
3. Challenge - Can the children design tracks? Link to slider guides in Y1 Sliders and levers.

### Evaluate:

1. Present their work to classmates.
2. Try out their product using lumps of coal.
3. Explain, how closely, finished products meet the class design criteria and say what they could do better in future.

### Example of two different ways to fix wheels

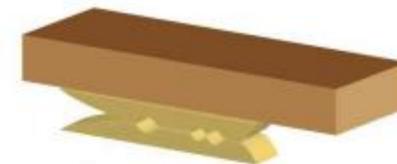


### Types of wheels

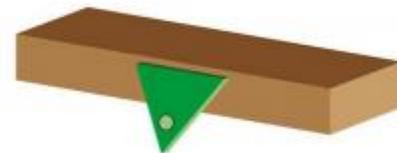


### Ways to hold free moving axles

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.

