



Knowledge and Skills Mind Map (DT)

Year 4 Summer Term

Knowledge - 
Skill - 

 High
Performance
Learning
World Class School

Prior Learning:

Year 2 Summer Sliders and Levers (Lighthouse Keeper's Scene):

- Children used simple mechanisms such as understanding basic push and pull actions.
- Know that children have cut, shaped and joined card and paper using simple techniques, and are now developing this to create more accurate, controlled mechanisms using pivots and linkages.

Page 1

Mechanical Systems:

Levers and Linkages

'Can I design, make and evaluate a pop-up page using lever and linkage mechanisms?'

1. Can I investigate and analyse pages (in pop-up books) with lever and linkage mechanisms?

- **Vocab:** mechanism, lever, linkage, pivot, input, output, movement
- Know that a mechanism is a system of parts that work together to create movement.
- Know that a lever is a rigid strip (e.g. card) that moves around a fixed point (pivot) to make something move.
- Know that a linkage connects parts together to transfer movement from one place to another.
- Know that a pivot is the point where a lever or linkage turns (e.g. a paper fastener).
- Know that mechanisms have an input (what you do, e.g. push or pull) and an output (what moves as a result).
- Know that different mechanisms create different types of movement (e.g. up/down, side to side, opening/closing).

Task: Provide a range (or show images/videos) of pop-up books, or examples of moving pictures and model how to explore them (identifying levers, linkages and pivots and how the movement is created), then children investigate how the mechanisms work by opening and moving parts and discussing what moves and how. In books, children draw and label one example of a mechanism (lever, linkage and pivot) and write a short explanation e.g. "The lever moves when... This makes... move".

Investigating and Evaluating: Investigate, analyse and evaluate books and other products that use lever and linkage mechanisms.

Technical Knowledge and Understanding:

- Understand how simple lever and linkage mechanisms create movement.
- Know and use technical vocabulary relevant to mechanisms (e.g. lever, linkage, pivot, input, output).

2. Can I practise making lever and linkage mechanisms?

- **Vocab:** lever, linkage, pivot, fixed pivot, loose pivot, input, output, movement
- Know that a lever is a rigid strip that moves around a pivot to create movement.
- Know that a pivot is the point where a lever turns (e.g. a paper fastener), and it can be fixed (stays in one place) or loose (moves as part of the mechanism).
- Know that a linkage connects parts together to transfer movement from the input to the output.
- Know that the input is the action (e.g. pushing or pulling) and the output is the movement produced (e.g. lifting, sliding or opening).
- Know that accurate cutting, joining and positioning of pivots helps the mechanism move smoothly and effectively.

Task: Model how to create simple lever and linkage mechanisms using card strips and paper fasteners (e.g. a lever lifting a shape or a linkage making a part move when pushed), then children follow instructions to make one or two simple mechanisms and test how the movement works by changing pivot positions or lengths of card. In books, children draw and label one mechanism (lever, linkage, pivot, input, output) and note what happens when it moves e.g. "When I push this, it makes... move".

Making (Focused Tasks): Develop skills in measuring, marking out, cutting, joining and assembling mechanisms.

Technical Knowledge and Understanding:

- Understand how lever and linkage mechanisms create movement.
- Distinguish between fixed and loose pivots.





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3. Can I design a pop-up page for a user and purpose?

- **Vocab:** design, user, purpose, criteria, mechanism, lever, linkage, pivot, annotated
- Know that we must design a product for a specific user and purpose (e.g. a pop-up page for younger children to enjoy as part of a story book).
- Know that design criteria help us decide what our product should include (e.g. clear images, smooth movement, sturdy construction).
- Know that we must plan how the mechanism will work (e.g. where the lever will move and what part will be the moving output).
- Know that levers and linkages must be positioned carefully so the movement works effectively.
- Know that we can communicate our ideas through annotated sketches, showing both the appearance and how the mechanism will work.

Task:

Discuss possible audiences and purposes for a pop-up book (e.g. entertaining a younger child, telling a simple story) and model how to create simple design criteria (e.g. must include a moving part, must be easy to use, must be clearly presented), then children design a pop-up page showing the scene and how it will move using a lever or linkage. In books, children create an annotated design showing the picture, the moving part and how the mechanism will work, and include a short explanation using a sentence starter such as "My page will move when... because..."

Designing:

- Generate ideas and develop design criteria focusing on user and purpose.
- Use annotated sketches to develop and communicate ideas.

Technical Knowledge and Understanding:

- Understand how lever and linkage mechanisms can be used to create movement in a product.
- Know and use technical vocabulary relevant to mechanisms (e.g. lever, linkage, pivot, input, output).

4. Can I make a pop-up page using levers and linkages?

- **Vocab:** lever, linkage, pivot, slot, guide, assemble, mechanism
- Know that a lever moves around a pivot to create movement in a product.
- Know that a linkage connects parts together so movement can be transferred.
- Know that a pivot (e.g. paper fastener) must be positioned carefully so the mechanism moves smoothly.
- Know that accurate cutting, joining and positioning helps the mechanism work effectively.
- Know that we should test our mechanism during making to check it works as intended.

Task: Model how to construct a pop-up page using card, adding a lever or linkage with paper fasteners and testing the movement, then children follow their design to make their pop-up page, adjusting the position of pivots or card strips to improve how it moves. In books, children annotate their design to show how the mechanism was made, including any changes made during making (e.g. repositioning a pivot).

Making:

- Order the main stages of making.
- Select and use tools and materials to cut, shape and join with some accuracy.
- Apply mechanisms to create a functional product.

Technical Knowledge and Understanding: Understand how lever and linkage mechanisms are constructed and used within a product.

Page 2

Mechanical Systems:

Levers and Linkages

'Can I design, make and evaluate a pop-up page using lever and linkage mechanisms?'

5. Can I evaluate my pop-up page?

- **Vocab:** evaluate, criteria, user, purpose, mechanism, movement, improve
 - Know that we can evaluate our product by comparing it to our design criteria (e.g. movement, appearance, suitability for the user).
 - Know that a successful mechanism should move smoothly and in the intended way.
 - Know that we can identify problems (e.g. stiff movement, loose pivots, inaccurate positioning).
 - Know that we can suggest improvements to both the mechanism and the overall design.

Task: Model how to test a pop-up page (opening and closing it to check movement and how the mechanism works), then children test their own page and compare it to their design, discussing how well it meets the needs of the user. In books, children write a short evaluation including what worked well, how it meets the design criteria and one improvement using a sentence starter such as "My pop-up page works well because... Next time I would..."

- **Evaluating:** Evaluate their products against design criteria and user needs, identifying strengths and areas for improvement.
- **Technical Knowledge and Understanding:** Understand how mechanisms perform within a finished product and how changes can improve function.

