Microsoft

DreamSpace

Post Video Resource Episode 6

Prototype development challenge

Curricular Alignment

Subject	Relevant Learning Outcomes	Key Skills
Design and Communication Graphics (DCG)	- Use the design process to develop a product or system concept. - Create visual representations of design solutions (e.g., sketches, CAD models).	- Being Creative (Developing an innovative and functional prototype) - Managing Information & Thinking (Applying problem-solving techniques in design)
Science	- Explore how scientific principles apply to product design and engineering. - Investigate material properties to select appropriate prototype materials.	- Being Numerate (Understanding scale, measurements, and material efficiency) - Working with Others (Collaborating on prototype development)
Computer Science	- Apply computational thinking to problem-solving. - Explore the role of digital tools (e.g., CAD, 3D printing) in prototyping.	- Managing Myself (Planning and iterating on a design concept) - Being Literate (Communicating the function and impact of a prototype)
Business Studies	- Understand product development and innovation in entrepreneurship. - Explore the role of sustainable design in business.	- Being Enterprising (Developing a marketable, real-world solution) - Communicating (Presenting the prototype effectively)

Learning Intentions

By the end of this activity, students will:

- Apply design thinking principles to develop a functional prototype.
- Understand the importance of iteration in the design process.
- Select appropriate materials and tools for building a prototype.
- Present their prototype concept and its real-world impact.

Success Criteria

Students will demonstrate success by:

- Identifying a clear problem and designing a relevant prototype.
- Creating a physical or digital prototype that illustrates their solution.
- Using the iterative design process to refine their concept.
- Effectively presenting their prototype, explaining its purpose, function, and potential impact.

Step 1: Problem Selection (15-20 minutes)

Class Brainstorming:

- Identify real-world challenges based on the episode’s content.
- Examples of possible problem areas:
  - Accessibility tools for people with disabilities
  - Sustainable packaging alternatives
  - Smart home technology for energy efficiency
  - Waste reduction solutions for schools
  - Personal organisation tools for students

Group Formation:

- Students form groups of 3-5.
- Each group selects a problem they want to solve.

Step 2: Concept Development (30-40 minutes)

💡 Guiding Questions for Concept Creation:

1. What problem does your prototype solve?
2. Who is the target user?
3. How will it work? (Mechanism, materials, digital tools)
4. How does it improve current solutions?

- Sketching & Planning:
  - Groups create initial sketches of their design.
  - Encourage multiple iterations before settling on a final idea.

📌 Tools for Sketching & Prototyping:

- Hand-drawn sketches (for quick brainstorming).
- CAD software (e.g., Tinkercad, SketchUp for 3D modelling).
- Mockups with simple materials (e.g., cardboard, paper, glue).

Step 3: Building the Prototype (1-2 Lessons)

Students begin construction using physical materials or digital design tools.

Types of Prototypes:

  - Physical Models – using cardboard, foam, 3D printing, or recycled materials.
  - Digital Mockups – using Figma, Adobe XD, or PowerPoint for app concepts.
  - Mechanical Prototypes – using basic circuits, motors, or Arduino (if applicable).

- Encourage an Iterative Approach:
  - Test different materials and refine designs based on feasibility.
  - Keep a design journal to document iterations and challenges.

Step 4: Testing & Refinement (20-30 minutes)

- Peer Review:
  - Groups exchange prototypes and give constructive feedback.
  - Use a feedback sheet to evaluate:
    - Functionality – Does it work as intended?
    - Usability – Is it user-friendly?
    - Innovation – How creative is the solution?
- Making Improvements:
  - Based on feedback, groups adjust their prototypes to improve design.

Step 5: Presentation & Showcase (30-40 minutes)

- Each group presents their prototype in a 5-minute pitch.
- Presentation Format:
  a. Problem Statement – Explain the issue being addressed.
  b. Design Process – Describe how the idea evolved.
  c. Prototype Demonstration – Show how it works.
  d. Future Improvements – Suggest possible refinements.

📌 Assessment Focus:

✔️ Clear and logical problem identification
✔️ A feasible and well-structured prototype
✔️ Effective use of materials or digital tools
✔️ Engaging and persuasive explanation of the design

Step 6: Reflection & Peer Feedback (10-15 minutes)

- Each student completes a short reflection:
  - What was the biggest challenge?
  - What did you learn about the design process?
  - How would you improve your prototype in the future?
- Students give feedback on at least one other project.

Extension Activities (Optional)

🚀 Prototype Exhibition

- The best prototypes can be showcased in a school-wide exhibition.

💡 Connecting with Industry

- Invite local engineers, designers, or entrepreneurs to give feedback.

🌍 Sustainable Design Challenge

- Students can redesign an existing product to be more eco-friendly.