

Technological Design: *Designing Senior-Friendly Products*

Empathy Development

Creating products that cater to seniors' unique needs involves understanding their daily struggles and preferences. Students will learn to prioritize usability and comfort in their designs, developing empathy by considering how their innovations can positively impact seniors' lives. This activity reinforces the importance of user-centered design.

Course Codes

TMJ 3M/3C/3E TMJ 4M/4C/4E

Grade 7 & 8	Science - A1. STEM Investigation and Communication Skills Math - E2. Measurement
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Partners

- ❖ Local Engineering Firms
- ❖ Secondary School Tech Design Classes
- ❖ Local College Tech Design Classes

Sample Lesson Plan

Technological Design - Designing Senior-Friendly Products

Lesson Plan: Designing Senior-Friendly Products

Objective: Students will design and prototype innovative solutions to improve the quality of life for seniors, such as ergonomic furniture or smart home devices. Students will learn the principles of user-centered design. This will foster empathy by creating products tailored to seniors' needs. Students can collaborate on projects that involve redesigning spaces to be more senior-friendly.

Materials: Design software, prototyping materials, presentation tools, feedback forms.

Activities:

- **Introduction (1 class):**
 - Discuss user-centered design and the specific needs of seniors.
 - Introduce the process of designing products with specific user needs in mind.
- **Research Phase (1-2 classes):**
 - Conduct research and interview seniors to understand their preferences, needs and identify potential product ideas.
 - Students will research existing products and identify their shortcomings.
- **Design Phase (1-2 classes):**
 - Students will brainstorm and sketch ideas for new senior-friendly products.
 - Teacher will review designs for usability and effectiveness.
- **Prototyping Phase (1-2 classes):**
 - Students will create detailed designs and prototypes.
 - Students will test prototypes with seniors and gather feedback for improvements.
- **Presentation and Feedback (1-2 classes):**
 - Students will present their final designs and prototypes.
 - Students will conduct a reflection session on the design process and empathy development.

Assessment:

- **Product Evaluation:** Evaluate the usability and innovation of the products. 13.
- **Reflection Assessment:** Assess reflections on students' understanding and empathy.

Empathy Development:

- Creating senior-friendly products requires students to consider the specific needs and preferences of seniors, fostering empathy through user-centered design.

Worksheet

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1. Product Design Concept:

- Describe the problem your product solves for seniors. What inspired your design idea?
- Brainstorm ideas for a senior-friendly product. What features or functionalities would make it easy and enjoyable for seniors to use?
- Sketch a rough design of your product, including labels for key features and user interface elements.

2. User-Centered Design:

- List three considerations you would take into account when designing a product for seniors' needs and preferences.
- How will you gather feedback from seniors to ensure your design meets their expectations and usability requirements?

3. Prototyping and Testing:

- Describe the process of prototyping your product. What materials and tools will you use?
- Sketch your product design from different angles. Include labels to explain its key features and functionalities.
- Conduct a usability test with seniors. What feedback did you receive, and how will you incorporate it into your design?

4. Ethical Considerations:

- Discuss ethical considerations when designing products for seniors. How will you ensure safety, dignity, and user autonomy in your design?
- How do you see your product enhancing seniors' quality of life and independence? What future improvements would you explore?

Guide for Long-Term Care Home Residents

Technological Design - Designing Senior-Friendly Products

1. Understanding Product Design:

- Participate in discussions about the importance of user-centered design for seniors.
- Learn about the process of creating products that prioritize ease of use and accessibility.

2. Providing Feedback:

- Share your experiences and preferences related to everyday products used by seniors.
- Offer feedback on product concepts and prototypes developed by students.

3. Usability Testing:

- Participate in usability testing sessions to evaluate the functionality and comfort of prototypes.
- Provide constructive feedback to help refine and improve product designs.

4. Celebration of Innovation:

- Celebrate the development and potential impact of senior-friendly products created by students.
- Reflect on how these products can enhance independence and well-being for seniors.

Reflection - What, So What, Now What?

The [Reflection Choice Board](#) can be used at any time as an individual, small group, or whole class reflection strategy.

Additional routines that would work well for this project:

- [Journaling](#) throughout the project
- [Exit Tickets](#) for mid-way check-ins
- [Benefits to Society](#) as a final whole-group reflection and debrief

Reflection - Assessment AS Learning

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Reflection Worksheet

Name: _____

Date: _____

1. Describe the senior-friendly product you designed. What were its main features?

2. What were the main challenges in designing a product that caters to seniors?

3. How did you incorporate feedback from seniors into your design?

4. What new skills or knowledge did you gain through this project?

5. Reflect on how the product addresses the needs and preferences of seniors.

6. How did this project enhance your understanding of designing for accessibility?

7. What aspects of the product design were successful, and what could be improved?

8. Overall, how satisfied are you with the final product? Why?

Ideas for Next Steps

- **Share the designs on a public forum so others can benefit from their use**
- **Partner with a manufacturing or construction class to bring the idea to life**
- **Pathways Considerations:**
 - **Specialist High Skills Major (SHSM)** - Provide students with information on either a *Manufacturing* or *Information and Communications Technology* SHSM if applicable.
 - **Dual Credit** - Explore the possibility of related courses at a local post-secondary institution (e.g. basic welding and fabricating, powerline awareness and safety, intro to HVAC, etc.)
 - **Co-Operative Education** - If students enjoyed this process, encourage them to investigate a co-op in a long-term care home, a business that focuses on manufacturing, associated trades, or in a pathway/field they are considering pursuing post-secondary
 - **Field Trip** - Take the students that participated in this activity to visit a community partner to learn more about Manufacturing. One example of this may be a local engineering firm that creates designs for companies that use specific criteria.
 - **Online Career and Individual Pathways Plan (IPP) Tools** - Use the IPP software your school board has licensed (myBlueprint, Xello, etc.) to explore post-secondary options that suit your skills, interests and future plan that are a natural extension of this project.
 - **Skilled Trades** - Encourage career exploration of Skilled Trades that connect to the *Technological Design* BBT, such as:
 - Draftsperson - Mechanical
 - Draftsperson - Plastic Mould Design
 - Draftsperson - Tool and Die Design
- **[UN Sustainable Development Goals \(SDGs\)](#)** - Consider having students complete a parallel project to raise awareness around and promote the action for the SDG of their choice. For this project, [Goal 10: Reduced Inequalities](#) fits well.
- **[TMJ 3C/4C: Fire Piston Project](#)** (from octe.ca) - This project is designed as a grade 11 beginner project. The purpose of this practical assignment is to teach metal lathe basics such as end facing, parallel turning, drilling, threading, turning grooves, and turning angles on a manual metal lathe.
- **[TMJ3C/4C: Plug Weld](#)** (from octe.ca) - Students will develop knowledge and skills related to product design, fabrication, blueprint reading, and weld quality. Students will learn the fundamentals and process applications related to plug welding using the GMAW process and apply it manually.
- **[TMJ3M/4M: Injection Mould Manufacturing](#)** (from octe.ca) - This project will look at the automotive industries use of injection moulding to manufacture parts, with a focus on the electric vehicle manufacturing sector.
- **[STEM TakeTech Challenge Kit - Technological Design](#)** (Gr. 7 & 8)

Sample Rubric

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Rubric:

Criteria	Excellent (Level 4)	Good (Level 3)	Satisfactory (Level 2)	Needs Improvement (Level 1)
Needs Assessment	Thorough and insightful assessment of seniors' needs.	Good assessment of seniors' needs.	Basic assessment of seniors' needs.	Incomplete or inaccurate assessment of seniors' needs.
Design Quality	Designs are highly innovative, functional, and user-friendly.	Designs are functional and user-friendly.	Designs are somewhat functional but may lack user-friendliness.	Designs are poorly thought out and not user-friendly.
Prototyping Skills	Demonstrates excellent prototyping skills and attention to detail.	Demonstrates good prototyping skills and attention to detail.	Demonstrates basic prototyping skills with some errors.	Demonstrates poor prototyping skills with many errors.
Testing and Feedback	Tests prototypes thoroughly and incorporates feedback effectively.	Tests prototypes and incorporates feedback.	Tests prototypes with some feedback incorporation.	Poor testing of prototypes and little feedback incorporation.

Empathy and Understanding	Shows deep empathy and understanding of seniors' needs.	Shows good empathy and understanding of seniors' needs.	Shows some empathy and understanding of seniors' needs.	Lacks empathy and understanding of seniors' needs.
Reflection Quality	Reflection is insightful and deeply connected to the experience.	Reflection is thoughtful and connected to the experience.	Reflection shows some connection to the experience.	Reflection is shallow and disconnected from the experience.

Teacher Observation Checklist
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Teacher Observation Checklist
<ul style="list-style-type: none"> ● Needs Assessment <ul style="list-style-type: none"> <input type="checkbox"/> Students conduct thorough assessments of seniors' needs and challenges related to product usability. <input type="checkbox"/> Assessments reflect an understanding of seniors' physical, cognitive, and ergonomic requirements. <input type="checkbox"/> Students engage with seniors to gather relevant feedback and insights. ● Design Process <ul style="list-style-type: none"> <input type="checkbox"/> Students follow a clear and organized design process. <input type="checkbox"/> Brainstorming sessions are productive and generate practical design ideas. <input type="checkbox"/> Design plans are detailed and address the identified needs effectively. ● Prototyping Skills <ul style="list-style-type: none"> <input type="checkbox"/> Students create functional prototypes that accurately reflect the design concepts. <input type="checkbox"/> Prototypes demonstrate attention to detail and consideration of usability features. <input type="checkbox"/> Students use appropriate materials and techniques for constructing prototypes. ● Testing and Feedback <ul style="list-style-type: none"> <input type="checkbox"/> Prototypes are tested thoroughly to evaluate their effectiveness and usability. <input type="checkbox"/> Students collect and analyze feedback from seniors and incorporate it into design revisions. <input type="checkbox"/> Iterations of prototypes show clear improvements based on feedback.

- **Technical Skills**
 - Students demonstrate proficiency in using design software and tools.
 - Technical aspects of the product, such as functionality and durability, are well-executed.
 - Students address any technical issues identified during testing.
- **Empathy and Understanding**
 - Students show a deep understanding of seniors' challenges and needs.
 - Designs are tailored to enhance comfort, safety, and ease of use for seniors.
 - Students integrate feedback from seniors to improve product design.
- **Innovation and Creativity**
 - Students demonstrate creativity in designing solutions that address seniors' needs.
 - Designs reflect innovative approaches and unique solutions.
 - Students think outside the box to improve the functionality and appeal of the products.
- **Collaboration**
 - Students work effectively within their teams, showing good communication and coordination.
 - Roles and responsibilities are clearly defined and adhered to.
 - Teamwork enhances the quality and success of the design process.
- **Presentation Skills**
 - Students present their designs clearly and professionally.
 - Presentations include detailed explanations of the design process, challenges, and solutions.
 - Visual aids and prototypes are used effectively to support the presentation.
- **Reflection Quality**
 - Students provide thoughtful and insightful reflections on their design experience.
 - Reflections highlight the impact of the design process on their understanding of senior needs.
 - Students discuss how the experience influenced their approach to designing for accessibility and usability.

Teacher Comment Bank

- **Strengths:**
 - Your product designs effectively addressed seniors' needs and preferences with user-friendly features.
 - Prototypes demonstrated functionality and usability through testing and refinement.
 - You demonstrated a thorough understanding of user-centered design principles and applied them effectively.
- **Areas for Improvement:**
 - Consider conducting additional user testing with seniors to gather more comprehensive feedback for product improvement.
 - Continue to explore innovative design concepts that can further enhance usability and appeal among seniors.
 - Reflect on design challenges and identify strategies for overcoming them in future product development cycles.