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Day3

Green Loop



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What is Design-Based Learning (DBL)?

- Design-Based Learning (DBL) is an inquiry-driven pedagogical approach that integrates design thinking and the design process into education. It encourages students to solve real-world problems through hands-on design activities, fostering creativity, problem-solving, and collaboration across multiple disciplines.



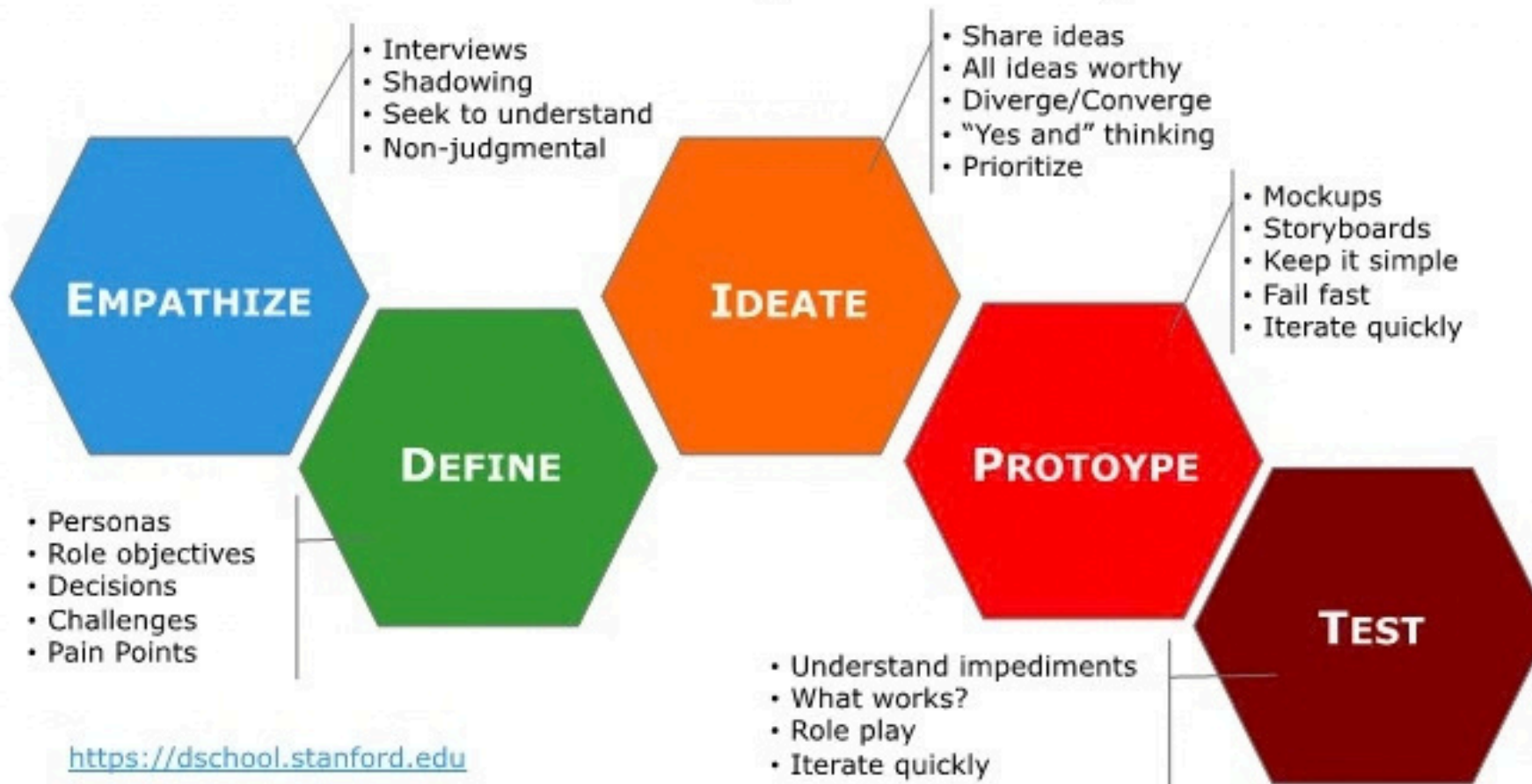
Why Use DBL?

- Encourages deeper learning–Students must understand and apply knowledge to create meaningful artifacts or prototypes.
- Promotes iteration & problem-solving–Students assess, test, and refine their work.
- Fosters collaboration & expertise–Teamwork allows students to specialize in different areas.
- Develops 21st-century skills–Communication, critical thinking, and innovation.



The Design Process in DBL

Stanford d.school Design Thinking Process





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DBL in Circular Economy Education

Example DBL Project: "Reimagine Waste Management in Schools" Problem:

How can we design a school with zero waste?

DBL Process:

1. Students research waste generation in schools.
2. They brainstorm innovative solutions (composting systems, reusable materials).
3. Design prototypes (digital models, physical displays).
4. Test and refine through school-wide implementation.
5. Present solutions to peers or school wide



◆ Example DBL Application:

If a teacher wanted to run a biodegradable packaging DBL project, they would:

1. Analyze students' knowledge of materials and waste.
2. Design a hands-on activity where students explore material properties.
3. Develop a lesson where students prototype compostable containers.
4. Implement the project and test materials in real conditions.
5. Evaluate how well students understood Circular Economy concepts.

A circular economy shifts from a 'throwaway culture' to a 'reuse culture'



The Doreen Nelson Method & Backwards Thinking™

Doreen Nelson, founder of DBL, introduced 6 ½ Steps of Backwards Thinking™, emphasizing spatial and hands-on learning.

How It Works:

- Students physically create mini-models (e.g., shelters, cities, systems) to solve real-world content-related problems.
- Encourages decision-making, adaptability, and creative reuse of concepts.
- Inclusive methodology – Effective for diverse learners (gifted, at-risk, ADD/ADHD, English Language Learners).



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The Doreen Nelson Method of Design-Based Learning Backwards Thinking Process

Backwards Thinking™

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THE 6½ STEPS OF BACKWARDS THINKING

• STEP 1: WHAT DO I NEED

TO TEACH? THEMES, CONCEPTS, STANDARDS

- Each Design Challenge is derived from an Essential Question organized around a topic or a theme that comes from the required Standards

MIGRATION



The Doreen Nelson Method of Design-Based Learning
Backwards Thinking Process

Backwards Thinking™



•STEP 2: IDENTIFY A “PROBLEM” FROM THE CURRICULUM

- Examples: Why do people migrate? How do natural resources define cultures? Why did cities come into being?



**The Doreen Nelson Method of Design-Based Learning
Backwards Thinking Process**

Backwards Thinking™



- **STEP 2 ½: STATE A “NEVER-BEFORE-SEEN” DESIGN CHALLENGE**
- **STEP 3: SET CRITERIA FOR ASSESSMENT**
- List “DON’T WANTS” and “NEEDS” based on curriculum, standards, and content.
- Plan evaluation



The Doreen Nelson Method of Design-Based Learning
Backwards Thinking Process
Backwards Thinking™



STEP 4: LET STUDENTS “GIVE IT A TRY” (DURATION: 45 MINUTES TO 2 HOURS)

Students:

- Build instant 3-D models
- Present and get feedback
- Learn to ask “how” and “why”
- Learn to self-assess according to pre-set criteria
- TALK, TALK, TALK, WRITE: Students learn to describe their designs
- through presentation and discussion as preparation for writing.



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• STEP 5:TEACH GUIDED LESSONS (DURATION: ONE WEEK TO A MONTH)

- Teach Guided Lessons in any subject using students' personal connection to their Never-Before-Seen artifacts as a tool for learning.

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- Examples: the mathematics of the artifact's size, shape, and volume, its scientific feasibility, the language and art skills of reading, speaking, writing, and drawing.

Students:

- Speak
- Write
- Compute
- Make comparisons
- Chart, diagram, and map results



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STEP 6: STUDENTS REVISE DESIGN

Students:

- Rebuild Models
- Apply lessons
- Assess
- Synthesize



The Doreen Nelson Method of Design-Based Learning Backwards Thinking Process

Backwards Thinking™



The 6 ½ Steps of Backwards Thinking™ (Doreen Nelson, DBL Founder)

- This DBL model emphasizes spatial problem-solving and hands-on learning.
- Steps in Backwards Thinking: ™
 1. Start with a creative constraint – Give students a content-related challenge.
 2. Identify a scenario – Have them build physical representations (miniature models, prototypes, cities, avatars, etc.).
 3. Problem-Solve Spatially – Make them physically design solutions rather than just write ideas.



1. Create a Backwards Plan – Ask, “What do we need to make this work?”
2. Prototype & Evaluate – Constant iteration and feedback loops.
3. Apply Across Disciplines – Connect design challenges to math, science, history, and more.
- 6 ½. Rethink the Original Idea – Step back, reassess, and improve.



ADDIE Model (Instructional Design Model for DBL Implementation)

- The ADDIE Model is an instructional framework often applied in DBL-based learning environments. It structures lesson planning with design principles in mind..

The model is built on *take, make, consume, and throw away* concept



Stages of ADDIE:

1. Analysis – Identify learning objectives and student needs.
2. Design – Plan the DBL experience, resources, and materials.
3. Development – Create or prototype learning activities.
4. Implementation – Conduct and facilitate the DBL lesson.
5. Evaluation – Assess student learning and improve the process.

Waste is a design flaw – if we design systems correctly, waste should not exist."