Engineering Design Process

Warm-Up

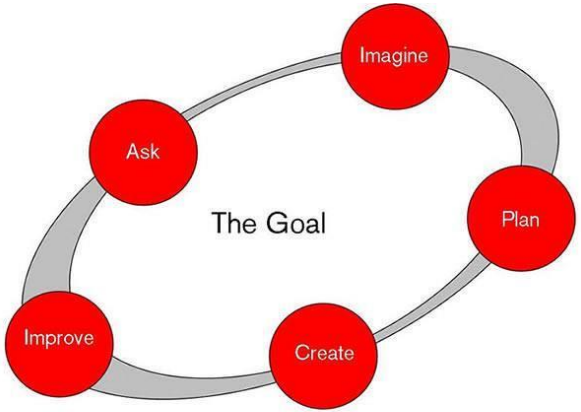
What do engineers do? Think about different types of engineers you know about and share your thoughts with a partner.



Engineering Design Process Overview

Engineers solve problems through a systematic approach

- They design, test, and improve solutions
- Focus on meeting specific criteria and constraints
- Consider environmental and social impacts
- Work collaboratively to achieve goals



Think about the Card Tower Project. Which phase of the Engineering Design Process was most fun for your team and why?

Activity

Build the tallest bridge or tower that can:

- Stand independently
- Hold multiple objects
- Be completed in 10 minutes
- Support objects without additional support



Materials per team:

- 12 straws
- 1 yard masking tape
- Small plastic balls to set at the top of the tower or the bridge
- Scissors

Rules and Expectations

1. Work in teams of 2-4 students
2. Structure must be self-supporting
3. No taping to the table
4. Objects must balance without hands/tape
5. Complete within 10 minutes
6. Follow safety guidelines with materials

Planning Phase

Take 2 minutes to:

- **Sketch your design**
- **Discuss with team members**
- **Consider material limitations**
- **Think about structural stability**
- **Plan your building strategy**



Building Phase

During construction:

- Follow your plan
- Monitor time
- Communicate with team
- Make adjustments as needed
- Test stability frequently



Testing and Evaluation

We will test:

- Height measurement
- Stability check
- Weight-bearing capacity
- Design effectiveness
- Team collaboration

Reflection Questions

1-How did you begin the challenge?

2-How did you decide what to build?

3-Who changed their design along the way? Why?

4-Did you make a plan before you began building?

5-Did anyone adjust their building strategy? What did you do differently?

6-Did anyone look at what other groups were doing? Did that impact your design?

7-How did the criteria and limitations affect your design?

Redesign Phase

Based on feedback:

- Plan improvements
- Consider peer suggestions
- Apply new insights
- Modify original design
- Implement changes

Exit Ticket

1-**Why do you think it is important for designers and engineers to use sustainable materials in their projects? What are the potential benefits?**

2-In what ways should community members be involved in local engineering and design projects? Why is their input valuable?

3-When creating a playground or recreational area, how would you balance safety and fun? Can you provide examples of how this balance might be achieved?

4-How should engineers consider the environmental impact of their designs? What specific factors should they focus on?

5-What aspects of engineering or design interest you the most? How do you see/

Kahoot