Lesson 4: Problem-Solving Design Challenge

3D Printing Center - Village School

v1

2025

Welcome Problem Solvers!

What We've Learned So Far

- **What** 3D printing is
- **How** to use Tinkercad
- **How** printing works
- **How** to make containers

Today: Use your skills to solve real problems!

Today's Big Challenge

Design Something to Solve a Problem

Your Mission: Think of a problem at school or home and design something to solve it!

What Makes a Good Problem?

Think About These

- Something that **bothers** you
- Something that could **work better**
- Something people need **help with**
- Something you **can actually print**

Problem Examples

Get Your Brain Thinking

- **Pencil holder** that doesn't tip over
- **Pencil topper**
- **Pencilcase**
- **Hook** for backpack
- **Bookmark** that stays in place
- **Cord organizer** for headphones
- **Organizer** for small toys or supplies

The Design Process

How Real Designers Work

1. **Think** - What problem will you solve? (5 min)
2. **Sketch** - Draw your idea on paper (5 min)
3. **Build** - Create in Tinkercad (20 min)

Follow this process like a real designer!

Step 1: Think (5 minutes)

Problem Identification

Ask yourself:

- What **frustrates** me at school or home?
- What **falls over** or gets lost?
- What would make my life **easier**?
- What would help my **family** or **friends**?

Write down your problem on paper

Step 2: Sketch (5 minutes)

Draw Your Solution

On paper, sketch:

- **What** your solution looks like
- **How** it solves the problem
- **Where** the important parts are
- **How big** it should be

Don't worry about perfect drawing!

Step 3: Build (20 minutes)

Bring Your Idea to Life

In Tinkercad:

- **Start simple** - basic shapes first
- **Add details** as you go
- **Test** if it makes sense
- **Adjust** if needed

Design Guidelines

Keep It Printable

- **Size** - fits on printer bed
- **Walls** - at least 2mm thick
- **Overhangs** - avoid if possible
- **Holes** - at least 3mm diameter

Teacher Support Available

Get Help When Needed

- **Stuck on a problem?** Ask for brainstorming help
- **Tinkercad trouble?** Raise your hand
- **Not sure if it will print?** Check with teacher
- **Want to try something new?** Go for it!

Problem-Solving Tips

Think Like an Engineer

- **Start simple** - you can always add more
- **Think about the user** - who will use this?
- **Consider materials** - will plastic work?
- **Test your logic** - does the solution make sense?

Real-World Inspiration

How 3D Printing Helps

- **Prosthetics** help people walk and grab things
- **Tools** make work easier
- **Organizers** keep things tidy
- **Replacement parts** fix broken items
- **Custom solutions** for unique problems

Halfway Check-In

How's It Going?

After 15 minutes of building

- **Share** your problem with a neighbor
- **Show** your progress
- **Get** a fresh perspective
- **Help** each other if stuck

Advanced Challenges

For Fast Finishers

- **Add moving parts** (if you know how)
- **Create multiple versions** of your solution
- **Think about manufacturing** - could this be mass-produced?
- **Design for different users** - kids vs adults

Testing Your Design

Does It Solve the Problem?

Ask yourself:

- **Would this actually work?**
- **Is it the right size?**
- **Would people want to use it?**
- **What could make it better?**

Save and Document

Preserve Your Work

1. **Save** your Tinkercad design
2. **Write down** your problem statement
3. **Note** how your design solves it
4. **Think** about what you'd change

Sharing Circle

Present Your Solution

Quick 30-second shares:

- **“My problem is...”**
- **“My solution is...”**
- **“It works because...”**

No formal presentations - just quick sharing!

What We Learned

Design Thinking Process

- **Identify** real problems
- **Sketch** before building
- **Iterate** and improve
- **Think** about users
- **Create** practical solutions

Coming Up Next

Lesson 5 Preview

“Improve Your Design + Print Prep”

- See your containers printed
- Make your problem-solver even better
- Prepare files for final printing

Cleanup Time!

5 Minutes to Pack Up

- **Save** your problem-solving design
- **Put away** sketching materials
- **Close** Tinkercad properly
- **Clean** your workspace

Excellent problem-solving work today!