Patch Work Project Guide

intel FUTURE SKILLS

PROJECT OVERVIEW:

Design an Olympic-style patch out of felt, and then spark it up by adding LEDs created specifically for textiles.

Project Intro Video: Patch Work

Inspirational Video: Team USA Pins and Patches

PROJECT CATEGORY:
Skill-Up

DIFFICULTY LEVEL:
Intermediate

TIME RANGE:
90 - 180 minutes

ESSENTIAL SKILLS/ MINDSETS THAT YOU MAY LEARN:
Design Thinking
Circuitry
Sewing Skills
Perseverance
Embracing Failure
Collaboration

TOOLS AND MATERIALS:
- LilyPad E-Sewing Protosnap Kit (or self-made kit*)
- Markers (various colors and tip sizes)
- Fabric Scissors
- Felt Craft Squares
- Felt or Fabric Glue
- Locking Pins Backs Safety Clasp

AT HOME SUBSTITUTIONS:
- Don't have LEDs and conductive thread? Consider going low-tech on this sports-themed patch and just don't add lights. Or, you can make your own kit* by also replace conductive thread with copper tape, or scavenge a coin-cell battery and LEDs from an LED flicker candle.

MATERIAL PURCHASE LINK:
http://tiny.cc/Intelbuylist

Project Steps
Dream it!

1 Watch the Intro and Inspire-To videos to learn about Olympics Team USA pins and patches. [:10]

2 Jot down some notes as you watch the Inspire-To video. [:05]

Include which patches you like best. Describe why you selected your favorites: Color? Shape? Design?

2 Research a country, team, or sport you'd like to base your patch on.

Do an Internet search of the team that you want to represent. Your Olympic-style patch can represent any group you feel a connection to: school, family, local sports team, etc. Identify some symbols during your search.

Draw it!

4 Sketch multiple versions of your Olympic or sport-themed patch. [:10]

Complete rough sketches of all potential themes and symbols you might include.

5 Now, learn to use your e-textile kit by watching the videos below.

Introduction to the LilyPad Protosnap Kit: **http://tiny.cc/protosnap**

6 Label where you want to include the sewable LEDs. [:05]

Build it!

7 Create the felt patch by cutting out circles or other shapes. [:15]

- Felt circles can be 4" to 6" in diameter. Find circular objects to trace onto the felt piece.
- Cut out any shapes you need for the design. Use the tacky glue to fasten the pieces.
- You can also make your design with Sharpie markers.

8 Add LED lights to your patch. [:30]

Share It!

9 Share your Olympics-style patch. Discuss which "team" you selected and why. [:15]

Expand It!

- If you only used one LED, try making another patch with several.
- Consider other conductive e-textile materials such as buttons, fabric, yarn, paint, and Velcro.
- Have fun and experiment with different ways of using materials as switches and sensors: **learn.sparkfun.com/tutorials/e-textile-basics**
- With parent or teacher permission, post a picture or short video of your sport-themed patch on Twitter, Snapchat, Instagram, or TikTok. Use the tag **#intelfutureskills**.

THINK ABOUT IT:

What type of LED configuration are you using (see options below)?

- Attaching the Protosnap without unsnapping the components requires minimal sewing.
- A single LED is simplest to sew with the conductive thread.
- Multiple LEDs in a parallel circuit are most complicated to sew.

Will the LEDs be visible, or will you place the Olympic Patch on top so only the light shines through?

Will you attach the battery pack to the front or the back?

DESIGN DECISIONS:

- Decide where you want to use a single LED vs. multiple ones in a parallel circuit. Mark where you want to place your LEDs, including where you want the positive sides of the LEDs.

PRO-TIPS:

The following can be helpful when working with LilyPad components and e-textiles in general:

- Do not sew components with the battery installed. There is no risk of getting hurt, but you might drain the battery.
- Sketch out the LED circuit pattern with a pencil or light marker, and use the tacky glue to fasten them in place (without covering the holes in the sew tabs).
- Make loops through the connection hole each time you connect the component and the thread. The metal on the outside of the hole is where current will flow. If there is a short or break in your circuit, this is probably because the conductive thread isn't touching the component pad: **learn.sparkfun.com/tutorials/e-textile-basics**
- Check out this guide if your LEDs aren't working: **cdn.sparkfun.com/assets/learn_tutorials/5/8/1/Troubleshooting_LilyPadSewableElectronicsKit.pdf**

HELPFUL RESOURCES:

How to Sew Using Conductive Thread: learn.sparkfun.com/tutorials/lilypad-basics-e-sewing/sewing-with-conductive-thread

- Overview of the LilyPad Prototsnap Kit: **bit.ly/LilyPadProtosnap**
- Basic Sewing Tips for the LilyPad: **bit.ly/LilyPadsewing**
- LilyPad User Guide: Glowing Pin (Project 1) is similar to the Olympic Patch Project with one LED, and the Mask (Project 2) is similar to the patch with multiple LEDs: **bit.ly/LilyPadguide**

NEED MORE HELP AND INFORMATION?

Visit the website at **intel.com/futureskills** | Contact us at: **intelfutureskills@intel.com**