TECHstyle TALES

Make. Learn. Share.

DAY 1: CLOSING THE LOOP

What Do Circuits Have to Do with Me?

Families will fully engage in community-building, playful learning, and playful exploration of e-textiles materials.

badges

materials

- Workshop helper
- Light meal
- Projector and slides
- Name tags, lanyards
- Backpack checkout forms
- Backpacks + E-textile Kits
- Point-and-shoot cameras
- Markers/Crayons
- "About Me, About Us" Cards
- Badges
- Printed out copies of pages from ***Zoom***, by Istvan Banyai
- Energy Stick

1. WELCOME & SHARING

Welcome and introduce everyone.
Dinner and ice breakers.
Introduce the program.

2. STORYTELLING

Zoom activity
Adult meeting & youth meeting
Story walk

3. EXPLORING

Circuit blocks

4. ACKNOWLEDGING

Badges
Backpack checkout & clean up

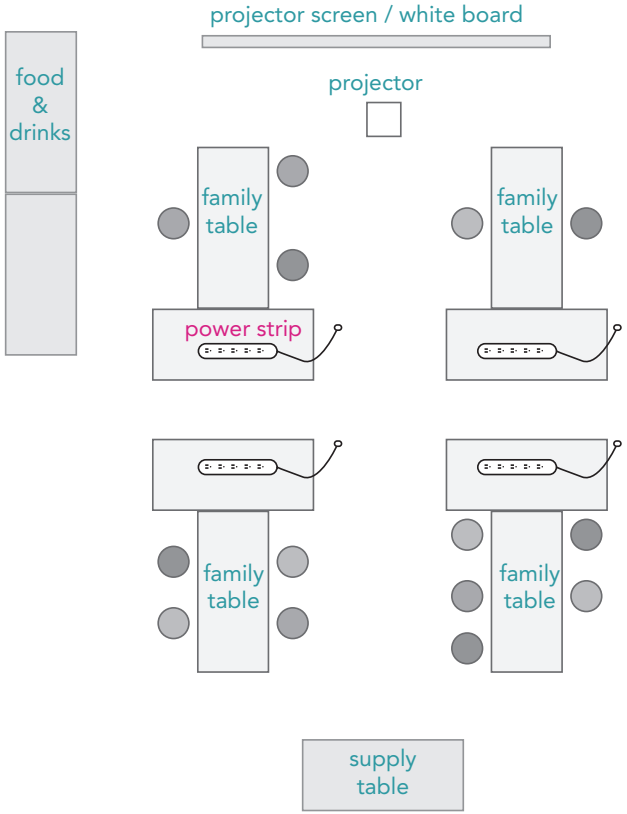
EATING & SET-UP

25 minutes

Welcome families as they arrive. They will pick up their name tags and take plates of food to their tables. Sharing a meal together is an important part of building community. As they eat and wait for everyone to arrive, family members will fill out their "About Me" cards with words or pictures.

Post a schedule of the day prominently in the room, on a white board, paper, or projected on the wall.

Sample room set up



materials

Light meal, disposable cutlery, drinks with lids

Name tags, lanyards

"About Us, About Me" cards

Markers/crayons

background info

Remember that families may not be able to arrive exactly on time.

Each day follows the same structure, so feel free to reuse the daily schedule for other sessions. You may also want to write the dates of the workshops on the schedule.

Take this time to ask about dietary needs of families, if you haven't already done so. You may also want to finish gathering registration information.

set up

Set up food and paper goods on a table.
Lay out name tags and "About us, About me" cards on family tables with markers.
Arrange any books or supplemental items on a table.

badges

Badges can be awarded at the end of each activity or saved for the end of the workshop.

INTRODUCTIONS

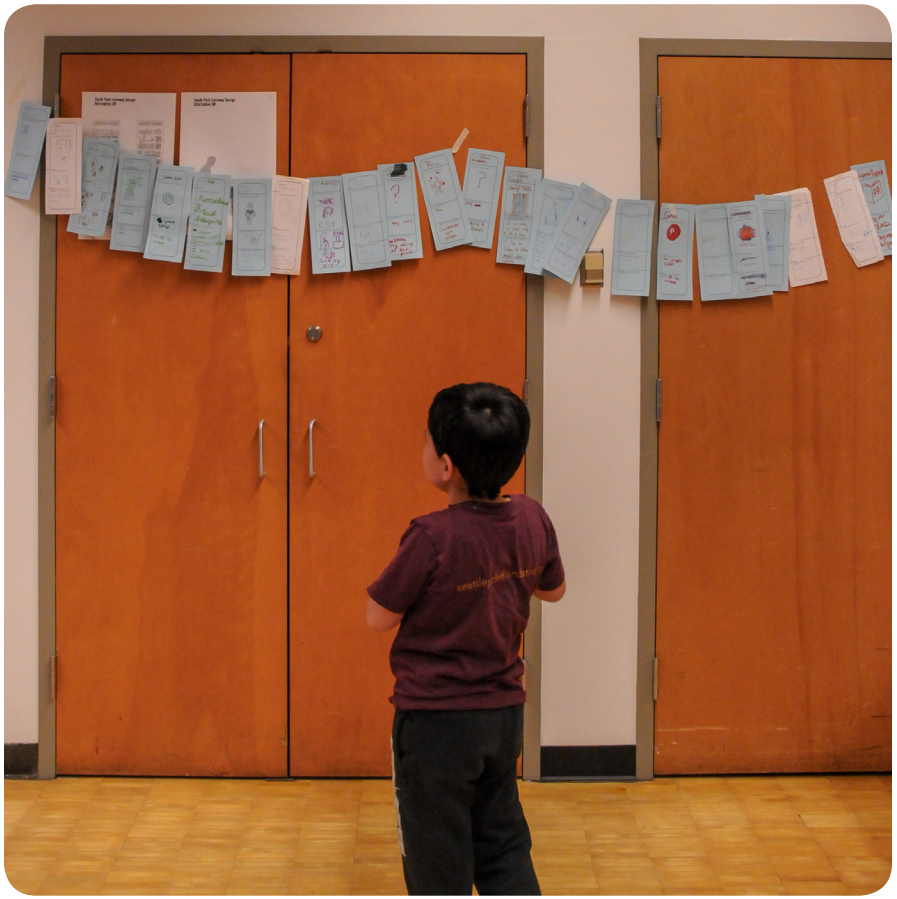
15 minutes

Welcome participating families and introduce everyone.
"Welcome! We are so excited that you have decided to join us for TechStyle Tales! In this workshop, we hope that you learn something new, have fun, and use e-textiles to share your family's experiences. Everyone in your family is welcome, and we ask that you work together as a family throughout the series."

INTRODUCTIONS

Introduce yourself to the group, and feel free to use any ways you feel comfortable to open the session. We have included "About Us, About Me" cards to get the ball rolling.

Have family members trade their "About Me" cards with each other. They will introduce each other to the whole group. Include your own example of the card filled out so they can get to know you too. At the end, you can collect the cards and post them on the wall for the rest of the workshop sessions.



background info

Asking family members to trade their cards and introduce someone other than themselves can help to ease shyness. Alternatively, you may also ask family members to introduce themselves.

Make sure to collect *About Me, About Us Cards* after intros & display them during the series. Tape the "About Me" cards to the family's "About Us" card.

OVERVIEW OF TECHSTYLE TALES

10 minutes

In TechStyle Tales we want families to have fun, learn a lot about e-textiles, and end up with a project that they're really proud of.

TechStyle Tales may be a little different than other workshops because it is designed for families to work and learn together. It's not just for kids or adults or teens; it is for all family members to learn together side-by-side.

This workshop series is made up of five sessions, meeting for 3 hours each time, taking breaks whenever needed. We encourage facilitators to make food available and welcome families to it at any time. Each workshop follows a similar structure, with plenty of time for all to play, learn, and teach each other. Assure families that you as facilitators and helpers will also be there to help them with their projects.

SCHEDULE

- Open with a meal to build community
- Welcome and Sharing
- Storytelling
- Exploring: *Working together to design your project. Things might not always go as planned, but we'll learn from it and then try again!*
- Acknowledging: *Recognizing the work that you all have done. At the end of the sessions, we'll have time for sharing. We want to know how things are going for you and to learn from each other. We also award badges (in the form of buttons) at the end. You may earn all of the badges or some of them–you get to decide which roles you practice. You may also award badges to others!*

materials

Session 1 slide deck
Daily schedule
Sample backpack

background info

- When going over the daily schedule, make sure to cover the dates of the workshops.
- Always leave time for any questions about the schedule.
- Be sure to convey that adults must attend with their children.
- During this workshop series, "Waterfall" is a useful attention-getting action. The facilitator calls out "Waterfall" and everyone stops what they are doing to make a whooshing sound while wiggling fingers downward like a waterfall.

BACKPACKS:

At the end of today's workshop, participants will check out a backpack with all of the equipment that they will need for the workshops. Encourage families to play in between workshops at home, connecting what they do at the workshop with things that are important to their lives.

ASK

What questions do you have?

WHAT IS AN E-TEXTILE?

10 minutes

Engage families in a short open discussion about e-textiles.

ASK

- What do you think about when you hear the word "e-textiles"? When have you heard the word textiles?
- Do you think you've ever worn a circuit? (Possible answers may include: light-up shoes, smart watches, etc.)
- What are some electronics that you use in your life? (Possible answers: Phones, computers, TVs, smart watches, cars, etc. Be prepared to think through some answers together: e.g., is a clock electric? Do all clocks need to be electric?)

EXPLAIN

The 'E' in e-textiles stands for electronic, and at the heart of all electronics is electricity. That's what provides the power and the logic to make the e-textile work. An Electronic Textile embeds circuitry into clothing or other fabric item. One of the exciting things about e-textiles is that they incorporate sewing and other textile arts with electronics. You can incorporate circuitry into almost anything – a woven basket, for example, a bag or a bookmark.

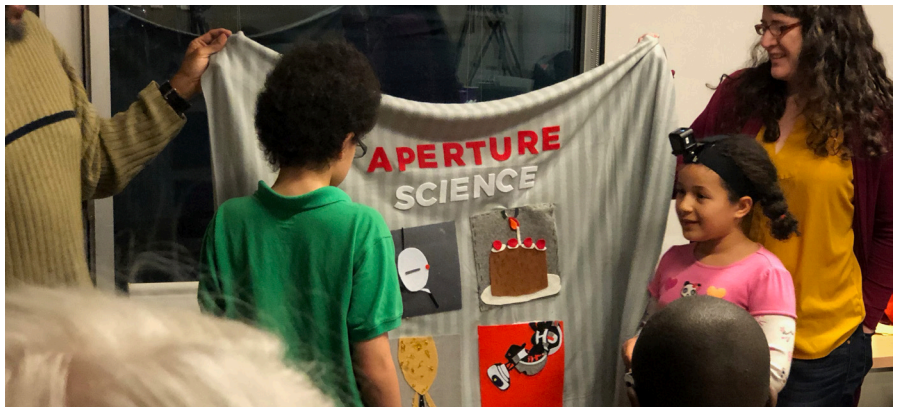
Show slides and/or pass around examples of simple e-textiles (bookmarks, plushies…)

Sewing and weaving are skills that people have used for centuries to make useful and beautiful things, and they are also used in areas like medicine and science (surgeons, NASA seamstresses, heart implants etc.)

background info

- **E-Textile:** "Electronic Textile." Fabrics that are embedded with electronic components, such as battery, lights, conductive thread, or circuit board. Also called smart textiles or smart fabrics.
- **Electricity:** a form of energy resulting from the existence of charged particles (such as electrons or protons), either statically as an accumulation of charge or dynamically as a current.
- **Electrical Circuit:** a closed path that allows electricity to flow from one point to another.
- **Power Source:** a source of electricity, such as the battery.
- **Load:** Makes use of the electricity in circuit (lights, motors, speakers, etc.).
- **Conductor:** a material that allows the flow of material (such as a wire, conductive thread, etc).

Did you know? *Computers contain hundreds of thousands of tiny electrical circuits.*



WELCOME & SHARING

What is an E-textile continued...

Suggested video: *2 minute video linked in the slide deck or describe: These Aymara Women Are Using Their Weaving Expertise to Make Heart Implants for Children*

PROJECT PROMPT

During this workshop, your families will be creating e-textiles projects based on places that are important to your families. Take some time this week to think about places you've been together, where you're from, or places you want to go. Consider special rooms, buildings, events, or geological features.

In this place, we feel connected to the land and peaceful.

SUGGESTED VIDEOS

How Yarn Bombing Grew into a Worldwide Movement
https://www.ted.com/talks/magda_sayeg_how_yarn_bombing_grew_into_a_worldwide_movement

These Aymara Women Are Using Their Weaving Expertise to Make Heart Implants for Children
http://remezcla.com/culture/aymara-women-weave-occluders/

ZOOM

15 minutes

ACTIVITY INSTRUCTIONS

Count how many people will be participating in this activity. There are a total of 32 images that can be used. Once you know the number of people, select that number of images from the collection. Make sure they are in sequential order before handing them out, but randomize the pictures when distributing them. Hand out one page to each participant at random. Participants will stand in line holding their pictures up or laying them down on the floor, rearranging themselves until the story is in order.

Gather the families together into a group. Make sure there is enough space in the room for families to move around freely. Instruct participants that the challenge is to work together to put the pictures in order to form a story.

AFTER THE ACTIVITY, ASK

- How do the images relate to one another? How could you tell what picture came next?
- All together, do these pictures tell a story? What story do you see here?
- What was difficult? What was surprising?

Each participant had an important part of this story. With any one missing, we would have missed a very important connection.

materials

Laminated, printed out pages of ***Zoom***, by Istvan Banyai

background info

- Facilitators can step in if necessary, but should allow for participants to direct the flow themselves as much as possible.
- For an added challenge, you can ask participants to do this activity without speaking at all.
- This activity exemplifies **systems thinking,** and also gets families to think about the stories behind the images they're seeing.

Systems Thinking: a way of understanding the world as a set of systems made up of many components, each of which has distinct behaviors that change & interact (***Soft Circuits***, p. 3)

ADULT MEETING

20 minutes

Facilitators and guardians discuss goals, how to be co-learners, how to be constructive, and ask to share questions or concerns.

INTRODUCTIONS

Ask everyone to introduce themselves to the group and to share why they are excited about this program. Re-introduce yourself first.

EXPLAIN

We are having a separate parent meeting:

- To help adults get to know each other
- To give us a chance to talk together about what roles we can take in the workshop

Explain to families that they will all be sharing stories, giving feedback and suggestions on each others' projects, acknowledging each others' learning, working with each other within and even across families.

ASK

- What do we all hope to get out of this workshop?
- Why is it important for you to do this with your family?

Write responses on board or large piece of paper to create a "Community Code"

- What are our ideas about how we should all work together during this workshop?
- How can we share an understanding of how we should treat each other in the next few weeks?

materials

White board or large piece of paper

Dry-erase or regular markers

background info

The purpose of the adult meeting is to give space for guardians to articulate their goals, and possibly worries, for participating in the workshops (both for themselves and for their families). It is also for facilitators to share the philosophy behind the workshops.

Ideally, all adults (facilitator and guardians) express their hopes for the workshop and come to a shared set of norms, or "Community Code," for learning during the workshops.

set up

Divide parents and children into separate rooms or areas of the room.

Be open to lots of ideas

- Possible responses include: respect each other, be honest, learn through failure, try out lots of ideas for the same solution, etc.

THINGS FOR ADULTS TO REMEMBER

- Everybody will participate and have hands on the materials (not just adults and not just kids).
- Things will break! And that's ok! We learn from those experiences.
- Things will get lost! And that's ok! Some small parts will get lost. We expect that and are not worried.
- Family histories are important and should be at the center of everything we're doing here.
- Cross-family sharing helps everybody learn.

ASK

- Any questions for us?

materials

White board or large piece of paper
Dry-erase or regular markers
Your bodies
Energy Stick or ball
Optional: Bowl of water, or various materials

KIDS' ACTIVITY

20 minutes (simultaneous with adult meeting)

COMMUNITY CODE DISCUSSION (5-10 MINUTES)

Tell youth and children that we will be writing down our ideas about how we should treat each other in the next few weeks. Write responses on board or large piece of paper, creating a "Community Code"

ASK

- What are some things you can do to respect each other and work well together?
- How would you like others to treat you?
  - » Possible responses include: respect each other's space, share materials, be honest, learn through failure, listen to each other's ideas, take breaks when you need to, take turns
  - » To encourage participation, it may help to ask each person to share an idea with the group. Asking follow up questions can also be helpful. For example, in response to broad ideas like "don't be mean," you may ask, what would being mean look like? What could you do instead?

"It is important that we understand that everyone is an expert at something, and we should ask questions when we need help. We should also be patient with ourselves and our family members as we learn."

STORYTELLING

Youth meeting continued...

ACTIVITY: ENERGY STICK (10–15 MINUTES)

Time for play! Experiment with conductivity using the Energy Stick as a "load." Gather everyone into a circle holding hands. Have one participant hold one silver end of the stick (or, electrode) and the person next to him or her hold the other end. If everyone in the circle is holding hands, the Energy Stick will light up and make noise. But as soon as someone breaks the circle it will stop.

Have the participants predict how many people the current can pass over and still light up the stick.

What's happening?

In a circuit, electricity flows along one path—made of a material that conducts electricity (a conductor), like wire—from the power source, through whatever 'load' or component needs to be powered, and then back to the source. Some examples of conductive materials are metal and water. Human bodies contain moisture and conduct electricity over their surfaces.

EXPLAIN

When the two of you stop holding hands, then hold hands again, you are controlling the flow of electricity. This is called a switch. It's just like a light switch. Did you know that you all are a little bit conductive? That's why we can control the energy stick this way.

ASK

- What else do you think is conductive?
  Youth can try holding other materials between hands to see if the circuit is completed (bowl of water, pieces of paper, chair leg, table, hair, stick, leaf, pizza, etc.)

STORY WALK

20 minutes

As the groups rejoin into one large group, encourage youth to show their parents what they learned about energy sticks for the first two or three minutes.

Families will take a short walk around the area and take some photos of things that they find interesting. Hand out point-and-shoot cameras. Families may instead use their own cameras if they prefer. Take a test photo before going on the walk.

- Instruct families to walk around--outside or inside--and take pictures along the way.
- Pick out the things that they find special, beautiful, weird, or interesting, and take a photo.
- Think about taking photos from different perspectives: as a tiny mouse, as a tall giraffe, sideways, close-ups, in motion, etc.
- Meet back in the room in ten minutes.

AFTER THE WALK

Pair up families to share their images. Instruct families:
Share the photos you've taken with the other family for a few minutes. Describe your answers to these questions:

- What did you see, smell, and hear on your walk?
- How did you feel?
- Why did you choose to take these photos?

After families have talked for a few minutes, ask if anyone would like to share about their photos with the whole group. Notice if there are any overlaps between families. Did anyone notice something they wouldn't have looked at before? Is this a familiar place to you? Did taking photos remind you of anything or help you remember something?

materials

Session 1 Slide Deck
Point and Shoot Cameras (test beforehand to be sure they are all functional) or families' own cameras (phones, etc)

background info

- Prepare for families to walk around the area (indoors or outdoors) for about ten minutes.
- This activity is designed for families to think about place in preparation for the family project.
- You may lead families on a walk as a large group, or encourage families to go on their own and return at a designated time.
- This walk is an opportunity to talk about what we think when we say "place."

CIRCUIT BLOCKS

15 minutes

This is a playful, free time for families to test out their working knowledge of electrical circuits.

Invite families to experiment more with electricity and circuits, thinking about what we practiced with the energy sticks. Encourage families to pair up with other families to make larger circuits with more than one light, or in alternative configurations.

EXPLAIN

First, we are going to use electricity light up a light bulb.
Hold up output (LED or motors) circuit block, a battery block, and a pair of alligator clips.

materials

Energy Sticks or balls (1 per family, if possible)
Circuit Blocks: (one of each per family, more if available)

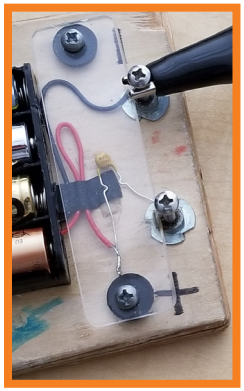
- Output (LED or motor) block
- Battery block
- Switch Block
- Alligator clip jumper wires (2-6 per family)

background info

- **Simple Circuit:** An example of a simple or basic circuit is connecting a battery to an LED light with two alligator clips connecting positive to positive and negative to negative
- **Parallel Circuit:** the electric current divides into two or more paths before recombining to complete the circuit. The current flows through two LEDs wired in parallel, and the electric current is split among the two of them equally.
- **Series Circuit:** Within a circuit, electric current flows sequentially through the multiple components in a continuous loop. As the current travels from the battery through each LED, it loses some of its original charge, or energy (also known as voltage). The amount of voltage for the next LED decreases with each one that it passes through.
  Notice that the lights in the series circuit are dimmer. Remember this while planning your projects. Lighting up multiple LEDS or other outputs with a series circuit may give you undesirable outcomes (i.e., dim or unlit lights).
- **Short circuit:** This is caused when a direct path is created for electrons to flow from the negative side to the positive side of a battery. A wire does not have sufficient electrical resistance and therefore a large amount of energy is delivered in a short time causing the wire to become hot.

SAFETY TIPS:

- Be careful not to pinch any skin or small fingers with the alligator clips. Demonstrate how to use alligator clips.
- Always make sure there is a bulb between the negative and positive sides of the battery pack. If the negative (-) side is connected directly with the positive (+) side,å a short circuit can be made and it can get dangerously hot. Disconnect immediately if you notice your wires or batteries getting warm.

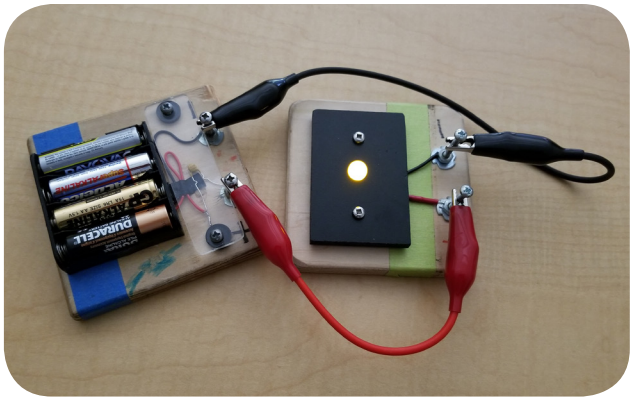


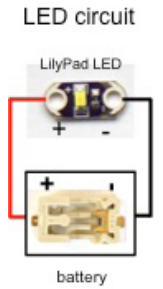
***Note**: the circuit blocks made by Pacific Science Center have a capacitor built in that will keep the batteries from dangerously overheating if a short circuit is created. If a short happens, disconnect the wires from the battery pack and let it cool down for a while. The capacitor will reset and you can use the circuit block again. Repeated or extended short circuits will cause the batteries to run down quickly.*

Hand out circuit blocks and alligator clips to each family. Provide time for everyone to explore on their own. You may want to talk through though processes with families with questions such as, why do you think it worked/didn't work? What if you switched the wires, does it matter which color you use? Suggest each family member take an alligator clip, etc, to involve all family members.

EXPLAIN

Trace the path from the positive side of the battery through the LED back to the other side of the battery with your finger.
Notice the loop, or circle shape of your circuit? The word circuit is related to word circle, and it may help you remember that





This circuit practice will be used directly in your sewn circuits

the *electricity* (the flow of negatively-charged particles called electrons), will flow through the circuit if it's *closed*–that is, if there are no breaks anywhere. This is an example of a *simple circuit*.

Extension: Provide each group with one more output block and two more jumper wires. How might you add this to your circuit so both LEDs light up? Can you connect them so one light turns on and off while the other stays on?

Extension: If time allows, add more output blocks, alligator clip wires, and switches for added challenge. Encourage participants to talk through or show their thinking by tracing the flow of electricity through the circuit.

WRAP UP

The exploration families did with circuit blocks will come in handy when they design their e-textiles.

Remind families that e-textiles are made up of electrical circuits, just like these. The materials they will be using will be smaller so they can be worn on clothes: conductive thread in place of alligator clips, and small sewable LEDs instead of big blocks.

BACKPACK CHECKOUT & BADGES

15 minutes

REFLECTION

Sewing is a very important skill in the world. It is a technology families will be using in this workshop series in addition to computer programming and other technologies.

ASK

Does anyone have experience sewing?

Encourage answers from quilting to sewing on buttons, embroidering, or weaving

EXPLAIN

We'll all practice sewing, but we may need some expertise from the sewists in the room.

Each family will be making a project based on a place that is important to them. Families are welcome to think about the project prompt between now and next session: (*see Sheet 1 in family guide*) **What is a place that is important to your family?**

materials

Session 1 Slide Deck
Projector and screen
Badges
Family Workbook

Backpacks for Checkout
Checkout Forms
Pens & Pencils

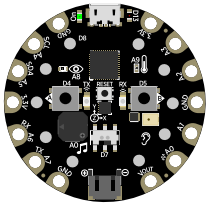
E-TEXTILES KIT

Conductive thread

Sewable LEDs

Coin Cell battery and holder

Sewing needles



Adafruit Circuit Playground Express

Alligator clips

Micro USB cord

AA Battery holder

For more information, go to
https://learn.sparkfun.com/tutorials/lilypad-basics-e-sewing
and
https://learn.adafruit.com/adafruit-circuit-playground-express/overview

BACKPACK CHECKOUT

- Each family gets a backpack with a camera, computer, Circuit Playground Express and sewing kit. Throughout the workshop, participants will be adding more supplies to their kits in the coming sessions.
- Share computer login information and any other technical details about connecting to the internet, etc. (*See page 4 in the family guide)*
- Have an adult from each family sign a check out form with the number on the equipment. Collect these forms to keep track of the materials.
- Encourage familes to practice their sewing skills and to open and play with their backpacks at home.
- Remind families to bring backpacks to eery session as they will be their tools for the workshop.

WEBSITE:

Load the website *www.techtales.online* using the projector.

The website can be used for technical help, project ideas, and contact information. Indicate where helpful videos are located. Refer families to the last page in their booklets for more resources they can look into at home.

BADGES:

Explain to participants that badges are awarded by facilitator, or by members of your family. To receive a badge you must show that you've completed the criteria to either a peer or facilitator. 45 minutes before the end of the session, talk with everyone in each family (depending on seating configuration and size of family).

For example, in a child-adult pair, you can talk with them both together, or with multiple children you can talk with them all at the same time and then speak to their adults separately. Families in our workshops have tended to sit close together so it has been easy to speak to the family all at once.

Recall activities that individuals completed or you saw them doing (like testing the conductivity of materials) to build connections between the activities they did in the workshop and the activities and characteristics typical of each of the roles.

badges

BADGES

facilitator background

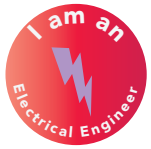
- Creative Maker
- Persistent
- Playful
- Systems Thinker

- Creative Problem-Solver
- Coder
- Persistent
- Logical

- Observant
- Creative
- Storyteller
- Expressive
- Maker

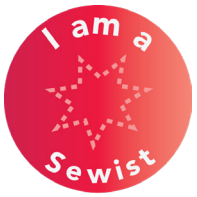
- Question-asker
- Photographer
- Curious

- Historian
- Interviewer
- Teacher
- Speaker



- Curious
- Problem-solver
- Diagrammer
- Careful
- Technician

page x in family booklet



MAKING ROLES VISIBLE

The purpose of the badges in Week 1 is to outline the different types of skills participants bring, skills they will develop and/or be exposed to through the course of the workshops and how those skills align with practices of six different roles:

- Badges demonstrate how interchangeable many of these skills are across roles.
  For example, both artists and sewists are *visionaries*—projecting what they believe are possibilities through the tinkering of materials. Storytellers and Computer Scientists are precise in their intention. What participants begin to take away is that these skills are highly *contextual* and *flexible*. Computer scientists can also benefit from exploring and trying new things (that's how new languages develop!).
- Near the end of the session you can speak to how they stood around in a circle, holding hands, experimenting with conductivity. That's what electrical engineers do! They test materials to see which materials conduct energy in a specific way. They were also researchers, observing and keeping track of what worked and why. They are also researchers for asking questions as to why something **did** or **did not** work.

MORE RESOURCES

Troubleshooter Etymology
https://www.etymonline.com/word/troubleshooter

Google Honors Grace Hopper…and a "bug"
https://www.wired.com/2013/12/googles-doodle-honors-grace-hopper-and-entomology/

Energy Sticks
https://www.stevespanglerscience.com/store/energy-stick.html

Fun and Engaging Activities using the Energy Stick
http://www.arborsci.com/cool/fun-and-engaging-activities-using-the-energy-stick