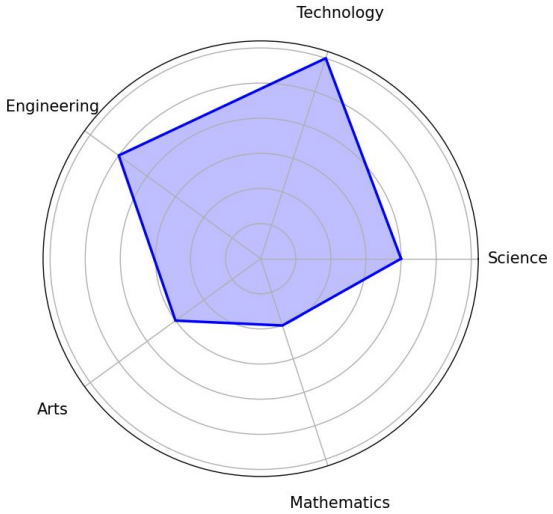

Curricular

Tech4All: Designing Solutions for Visual Accessibility

Duration	Age	Difficulty
45	17-18 y/o	Medium
#TECHNOLOGY#ENGINEERING		

DESCRIPTION

Have you ever tried using your phone with your eyes closed? What would it be like to navigate the world of technology without sight?

In this activity, students will explore a real-world challenge: improving digital accessibility for people with visual impairments. By examining common obstacles in everyday technology, they will brainstorm and design inclusive tech solutions, from apps and devices to tactile labels or sound-based tools.

They'll work in teams, and they will walk through a creative design process that includes ideation, prototyping, and storytelling. By the end, they'll present a creative and ethical response to one central question: **How can we make technology truly work for everyone?**

By the end, they'll present a concrete, empathetic, and creative response to one central question: How can we make technology truly work for everyone?

KEY COMPETENCES (EU)

- STEM competence
- Entrepreneurship competence
- Cultural awareness and expression competence

ACTIVITY OBJECTIVES

- Understand digital accessibility challenges by analyzing real-life barriers faced by people with visual impairments.
- Foster empathy and inclusive design thinking through the creation of user personas and analysis of accessibility case studies.
- Develop a functional tech-based solution using basic engineering and prototyping strategies.
- Apply artistic and visual storytelling tools (e.g., posters, storyboards) to present both technical and emotional aspects of the design.
- Represent data visually using simple metrics (e.g., usability ratings, contrast scoring, flow charts)
- Collaborate in diverse teams with rotating leadership roles to promote equity and inclusion.
- Connect their innovation to real-world impact, exploring how design can support underrepresented users in everyday tech interactions.
- Reflect on the role of diverse STEAM contributors, including female and gender-diverse innovators, and their impact on inclusive technology.

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MATERIALS

- Provided by students
- Provided by the teacher/institution
- Downloadable Elements


Rulers


Scissors


Glue/Glue sticks


A3-Size sketch paper


High-contrast color markers

Poster boards or Canva (if digital)


Sticky notes


Basic art and drawing tools


Computers (for videos and information)


Timer or phone stopwatch


Tactile and contrasting materials: foam sheets, string, sandpaper, velcro dots, black-and-white print cards

Worksheet of description of a person with visual impairment

STEAM Role models

Ethical reflection document

Environmental impact document

PREVIOUS PREPARATION

- Divide the class into groups of 3–4 students, ensuring diverse representation and promoting balanced participation. Assign or encourage rotating leadership roles (e.g., discussion leader, sketch artist, materials manager, presenter).
- Print and distribute the "Worksheet of the Description of a Person with Visual Impairment" for each team. This worksheet serves as the user persona students will design for. Ensure each group works with a different persona (age, impairment level, daily routine) to explore varied challenges and contexts.
- Print or prepare access to STEAM Role Models, each group should receive at least one inspiring story (e.g., Chieko Asakawa, Ayah Bdeir, Anne-Marie Imafidon) as a starter discussion for inclusive thinking and empowerment in design.
- Prepare a short presentation or slide deck that introduces:
  - Key concepts of digital accessibility
  - WCAG accessibility standards and examples of well- or poorly designed products
  - Real-life cases of exclusion in tech use (e.g., apps without screen reader compatibility)
- Set up group workstations, each equipped with:
  - A3 sketch paper, sticky notes, glue, scissors, rulers
  - High-contrast markers and tactile materials (foam sheets, string, sandpaper, etc.)
  - Poster board or access to Canva (for digital groups)

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CONTEXTUALIZATION AND ADAPTATION

Imagine this: You walk into a coffee shop. There's a touchscreen to place your order—but it has no voice function, no tactile buttons, and no screen reader support. Now imagine you're visually impaired. Could you still get your coffee?

This activity begins with a real-world design problem: most digital technology is still not accessible to people with visual impairments. Despite powerful tools like screen readers and haptic feedback, many everyday digital interactions—from online shopping to using ticket machines—exclude millions of users worldwide.

According to the World Health Organization, over 250 million people live with visual impairments—and many face daily barriers in interacting with technology. You are the new generation of STEAM thinkers. What if you could design a solution to make technology inclusive and empowering for everyone?

Different cultures have historically used tactile or sensory systems to navigate and communicate—for example, did you know that tactile symbols used by ancient cultures—like carved walking sticks or marked stones—are early forms of accessible design? You have an example in the box for complementary tools.

Imagine that you've just been hired as part of a tech innovation team focused on one big mission: designing a creative, accessible, and inclusive technology solution for a person with visual impairment. Just like Chieko Asakawa—a blind computer scientist who helped pioneer screen-reading software at IBM—you'll prototype something that could make the world fairer and more accessible.

Using the materials provided—and working with the persona assigned to your group—you'll need to analyze your user's needs, brainstorm ideas, and prototype a solution that could help them navigate the digital world more easily.

This could be:

- A tactile interface for a public service
- An app with voice-guided interaction
- A wearable tool to enhance navigation
- A redesigned version of something we all use—made fully accessible

But here's the twist: no two users are the same.
Each team will design for a different person with unique goals, abilities, and routines.
To succeed, your team will need to:

- Combine creativity, engineering, and empathy
- Apply inclusive design principles like WCAG
- Use sketching, materials, and visual storytelling to explain your concept
- Reflect on how your idea could improve someone's real life

Just like designers in top tech companies, your task is to solve a real problem in a way that's smart, simple, and human-centered.

Are you ready to design technology that includes everyone?

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Box for complementary tools and exercises:

Watch video 📽️ - "How New Technology Helps Blind People Explore the World | Chieko Asakawa" + https://youtu.be/f-mQIWnO3Ag

Watch video 📽️ – "Inclusive Design Principles" + https://youtu.be/i9hKX_MPaek

Watch video 📽️ - "WCAG for beginners - What are the Web Content Accessibility Guidelines? - Web Accessibility" + https://youtu.be/5H1JGdqLrWo

Watch video 📽️ - "African talking drums explained." + https://youtu.be/12cQIJX96Tw

Note for the teacher 📝

- Remind students to focus on user needs, not just cool ideas: if students start designing something flashy but unrelated to their persona's real-life needs, gently redirect them. Ask: Would your user really be able to use this? Would it improve their experience?
- Highlight the real-world relevance: mention how companies like Apple, Microsoft, and Google invest in accessibility—and how inclusive design is a growing, high-impact field. Students may discover career paths they hadn't considered before.
- Encourage creativity in final presentations: students can draw, build tactile models, narrate, or even create a "demo" voice recording of their interface. Allowing different forms of expression supports inclusion and ownership of learning.
- Frame STEAM as a creative and human-centered process: show that technology isn't just code and circuits—it's about people, ethics, empathy, and communication. That's why all five STEAM areas are engaged in this project.

ACTIVITY

STEP 1: Investigate your persona

- **Materials used:**
  - Worksheet of the description of a person with visual impairment
  - Sticky notes, markers
  - STEAM Role Models(used as a starter inspiration)
- **Instructions:**
  - Each team receives a user persona worksheet, describing a person with visual impairment. (Different teams should work with different personas—e.g., a student, an older adult, a commuter, etc.)
  - Read the scenario, discuss the user's daily routine, challenges, and goals.
  - On sticky notes, write answers to:
    - ❏ What daily digital tasks does this user perform?
    - ❏ Where might they encounter difficulties?
    - ❏ What do they want to accomplish more easily?

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STEP 2: Learn from real innovators and real challenges

- **Materials used:**
  - Mini-bios of inclusive STEAM role models (e.g., Chieko Asakawa, Ayah Bdeir, Anne-Marie Imafidon)
  - Slides/infographics about accessibility standards (e.g., WCAG principles, accessible design examples)
  - Worksheet of the description of the person with visual impairment
  - Markers, sticky notes
- **Instructions:**
  - Get Inspired by real people: each team reads about at least one STEAM role model who has worked on accessibility or inclusive tech (bios provided by the teacher). Later, discuss as a group:
    - ❏ What problem did this person try to solve?
    - ❏ What made their approach innovative or inclusive?
    - ❏ What values or mindsets did they apply that you could use?
  - Understand the Rules of Accessible Design: teacher presents shorts videos highlighting:
    - ❏ Key WCAG principles (e.g., contrast, screen reader compatibility, alternative navigation)
    - ❏ Examples of accessible vs. inaccessible designs in everyday tech
  - You take notes or list features of good design on sticky notes.
  - Connect to your persona: review the assigned user´s worksheet again, and based on the notes taken write key insights around the worksheet or start a “needs board” using sticky notes:
    - ❏ What are this user's top 3 design needs?
    - ❏ What barriers have they likely encountered?
    - ❏ What makes their experience unique?

STEP 3: Brainstorm the solution

- **Materials used:**
  - A3-size sketch paper
  - Sticky notes
  - High-contrast color markers
  - Worksheet of the description of the person with visual impairment
- **Instructions:**
  - Begin by reviewing all insights gathered about your user’s needs and accessibility guidelines.
  - On sticky notes or sketch paper, start brainstorming possible solutions for your assigned persona:
    - ❏ Think of how the user interacts with digital tools
    - ❏ Identify points of frustration or exclusion
    - ❏ Imagine how a tool, app, or object could bridge the gap
  - Brainstorm freely—no idea is too big or small. The goal is divergent thinking. At this point, quantity is more important than polish.

    ***Suggested method: Use the “How Might We...” prompt format**:
    - ➔ “How might we help the user read digital menus independently?”
    - ➔ “How might we design a wearable that guides the user through an unfamiliar building?”
  - Once ideas are flowing, cluster or vote on the top 1

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STEP 4: Sketch and Build Your Prototype

- **Materials Used:**
  - Sketch paper
  - Poster board or Canva
  - Tactile materials: foam, velcro dots, sandpaper, string
  - Scissors, glue, rulers, markers
  - Choose at least one material in your prototype that could be reused or recycled.
- **Instructions:**
  - As a team select one solution and begins developing a visual and/or tactile prototype.
  - You will sketch the layout and build key parts using tactile materials to simulate interaction. For example:
    - ❏ A smartphone layout with textured buttons
    - ❏ A wearable device with color-coded feedback zones
    - ❏ A physical object with accessible labels or indicators
  - The prototype should include:
    - ❏ Name of the product
    - ❏ A drawing or mock-up
    - ❏ Key accessibility features
    - ❏ Optional creative additions: Brand or product logo, slogan...
  - You should be encouraged to justify every element: “Why did you choose this feature? How does it make the design more inclusive?”

STEP 5: Peer Feedback and Design Refinement

- **Materials Used:**
  - Timer
  - Sticky notes or verbal feedback
  - Prototype posters
  - User´s worksheet
- **Instructions:**
  - You will exchange posters/prototypes and act as design reviewers for each other.
  - Each team gives feedback to at least one other group using the following format:
    - ❏ What’s working well?
    - ❏ What could be clearer or more usable?
    - ❏ One idea to improve the accessibility of the design
  - Feedback will be returned to the original team, who then will discuss and apply improvements to their concept.

STEP 6: Reflect on Ethics and Environmental Impact

- **Materials Used:**
  - Ethical Reflection Table
  - Environmental Impact Table
- **Instructions:**
  - Now that you’ve built your prototype, it’s time to reflect on the broader implications of your design.

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- ❖ **Part A: Ethics in Design**
  - Designers have a responsibility to consider how their creations affect people. Each team will complete the Ethical Reflection Document.
- ❖ **Part B: Environmental Sustainability**
  - Sustainable design is part of inclusive and responsible innovation. Review the materials used and consider your prototype's environmental footprint. Fill in the Environmental Impact Document.
  - Then, brainstorm at least one improvement to make your solution more environmentally friendly.

CONCLUSION AND SHARING

Congratulations—you've just stepped into the shoes of real-world inclusive designers! You learned how to analyze user needs, apply STEAM principles, and create a solution with impact.

But this activity wasn't only about building a prototype. It was about understanding how technology can shape lives, and how your voice, creativity, and empathy can make that technology more inclusive. In fact, this activity has just been the beginning of your approach to society´s problems:

- Where in your everyday life do you see digital tools that might be hard to use for someone with visual impairment? Could you develop a solution? How could your design help that person in real life?
- What types of technologies already exist to support visually impaired users? Can you find an example of an app, wearable, or interface designed with accessibility in mind?
- How do design decisions (like font, color, layout) shape a person's ability to participate fully in digital spaces? And what design choices most improve inclusivity?
- How sustainable is your prototype?
- What are the ethical responsibilities of companies and developers when it comes to accessibility?
- Should accessibility be optional or required? Why?

You can share the project social media if any teachers want to share with us their results using the following sentence and template with the links:

Don't forget to take a photo of your experience and share it with us!

LinkedIn Instagram X

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