

# STEAM Programme Session Plans

## Welcome

Welcome to the STEAM Programme Session Plans.

These training materials have been developed as part of the 'Digital Youth Work' project, a strategic partnership between 7 organisations across Europe, to build the capacity of the youth work sector to deliver high quality youth work in a digital age.

They are based on training needs for practitioners identified by the [EU expert group on digitalisation and youth's 2018 report](#).

The resources from all partners are available at [www.digitalyouthwork.eu](http://www.digitalyouthwork.eu). The project has been funded by Erasmus+.

## Introduction

The STEAM Programme Session Plans are designed to inspire and support youth workers to design and deliver a six week programme plan for young people. It details the aims, objectives, learning outcomes, materials and an overview of how to run each session based on the stages of the inquiry process introduced in the accompanying STEAM in Youth Work Toolkit.

- Pose Real Questions
- Exploration
- Investigation & Creation
- Reflection

The programme is based on the three Activity Guides that accompany this resource:

- DIY Soda Drinks Machine - Intermediate Level
- Light Up 3D Paper Worlds - Intermediate Level
- LED Shake Stick - Advanced Level

The session plans can be adapted to suit the needs of your programme. You may choose to use the above activities or to swap out for other STEAM or Maker activities to suit your young people.

We hope you enjoy this STEAM resource and wish you luck on your journey as you begin to incorporate or advance your digital youth work practice!



# Contents

- **Welcome and Introduction** ..... 1
  
- **Planning Your Maker Project** ..... 3
  - Sample Programme Plan
  - Session One: DIY Soda Machine (Part 1)
  - Session Two: DIY Soda Machine (Part 2)
  - Session Three: LED Shake Stick (Part 1)
  - Session Four: LED Shake Stick (Part 2)
  - Session Five: Light Up 3D Paper Worlds (Part 1)
  - Session Six: Light Up 3D Paper Worlds (Part 2)



# Planning Your Maker Project

## Sample Programme Plan - 6 Week STEAM Camp

**Project Title:** 6 Week STEAM Camp.

**Target Group:** Young people from disadvantaged areas in north Dublin.

**Demographic:** This group is of mixed gender aged between 14 - 17 years.

**Project Summary:** This project will involve a group of 4 young people of mixed gender, aged from 14 - 17 years old. These young people come from various backgrounds within disadvantaged areas. This project will focus on development of 21st century skills through a variety of circuitry, soldering and engineering based projects.

The 21st century skills to be developed will be communication, collaboration, critical thinking, problem solving and creativity.

### Planned Youth Outcomes:

Young people will:

- Design and create a fully functioning soda machine.
- Solder complex circuitry to create an LED Shake Stick.
- Create 3D Paper Worlds with integrated reactive street lighting.
- Consider skills needed and actively learn them in order to complete these projects.
- Become comfortable using soldering irons.
- Gain a better understanding of how electronics work.
- Become comfortable working as part of a team.

### Overview of Sessions:

Session One: DIY Soda Machine (Part 1)

Session Two: DIY Soda Machine (Part 2)

Session Three: LED Shake Stick (Part 1)

Session Four: LED Shake Stick (Part 2)

Session Five: Light Up 3D Paper Worlds (Part 1)

Session Six: Light Up 3D Paper Worlds (Part 2)



# Session One: DIY Soda Machine (Part 1)

**Staff & Volunteers Present:** Educator Name & Volunteer Name **Date:** Insert **Duration:** 120 mins

**Aim:** The group will familiarise themselves with the flow of electricity through research and become comfortable with project components by exploring a test circuit. The group will also create a prototype plan for their soda machine.

**Objectives:**

Young people will:

- Conduct online research the flow of electricity and report findings back to the group.
- Create test soda machine circuit, adopting a tinkering mindset using crocodile clips.
- Create a sketch and prototype plan for their soda dispensing machine.
- Reflect on learning from session one.

**Activity Guide:**

**Materials Prepped:**

No.	Component	No.	Component
6x	6V Water Pump	2x	Silicone Tube
6x	Arcade Machine Buttons	6x	2L Bottles of Soda
2x	PP3 Battery	30x	Crocodile Clips
2x	Spools of Wire; One Red, One Black	4x	Pencils, Ruler, Scissors & Sheets of Paper

**Session Plan:**

Time	Inquiry stage	Objective
5 mins	Introduction	Young people are introduced to the theme & goals of the project
20 mins	Posing Questions	Young people are given the opportunity to explore and research the flow of electricity and how to create this circuit.
30 mins	Exploration	Young people test their theories to create a working circuit. Adding in bottles of soda to see the water pump in action.
15 mins	-	Break
40 mins	Investigation & Creation	Young people create a sketch of their soda dispenser design including the circuit to be created inside, and rough measurements. This will inform the educator how much cardboard will be needed for session two.
5 mins	Reflection	Reflection of learning from session one and review of the plan for session two.

Inspired by 'How to Make Coca Cola Soda Fountain Machine with 3 Different Drinks at Home'  
Available at: <https://www.youtube.com/watch?v=k0FRioBt8Gk&t=325>



# Session Two: DIY Soda Machine (Part 2)

**Staff & Volunteers Present:** Educator Name & Volunteer Name **Date:** Insert **Duration:** 120 mins

**Aim:** The group will learn how to solder, create and finalize their soda dispenser machine as well as customize their machine with some arts and crafts.

**Objectives:**

Young people will:

- Create the final functioning circuit in a temporary form using alligator clips.
- Learn how to solder a circuit.
- Create the structure of the soda machine
- Integrate the circuit with the new structure.
- Create visual design of the soda machine.

**Activity Guide:** [Link](#)

**Materials Prepped:**

No.	Component	No.	Component
6x	6V Water Pump	2x	Silicone Tube
6x	Arcade Machine Buttons	6x	2L Bottles of Soda
2x	PP3 Battery	30x	Crocodile Clips
2x	Spools of Wire; One Red, One Black	4x	Cardboard Pencils, Ruler, Scissors & Sheets of Paper
2x	Soldering Iron Kit	2x	Hot Glue Gun + Glue Sticks

**Session Plan:**

Time	Inquiry stage	Objective
5 mins	Introduction	Young people recap on machine designs from session one.
10 mins	Exploration	Young people create final functioning circuit layout in temporary form using alligator clips.
15 mins	Exploration	Young people learn how to solder.
20 mins	Investigation & Creation	Young people solder their final circuit together.
15 mins	-	Break
35 mins	Investigation & Creation	Young people create structure of the soda machine and place circuit inside.
20 mins	Investigation & Creation	Young people customize the style of their machine using arts and crafts and soda bottle labels.
5 mins	Reflection	Reflection and discussion of learning from this project.



# Session Three: LED Shake Stick (Part 1)

**Staff & Volunteers Present:** Educator Name & Volunteer Name **Date:** Insert **Duration:** 120 mins

**Aim:** The group will learn how to solder complex circuit boards.

**Objectives:**

Young people will:

- Create the final functioning circuit in a temporary form using alligator clips.
- Learn how to solder.
- Recreate the temporary circuit in a new permanent soldered circuit.
- Create the structure of the soda machine with the circuit placed inside.
- Combine their circuit and structure to create their finished machine.

**Activity Guide: Link**

**Materials Prepped:**

No.	Component	No.	Component
4x	LED Shake Stick Kits	4x	Helping Hands
4x	Soldering Irons + Stand	8x	AA Batteries
4x	Lead-free Solder	4x	Damp Soldering Sponges

**Session Plan:**

Time	Inquiry stage	Objective
5mins	Introduction	Young people are introduced to the new activity.
15mins	Exploration	Young people do online research on the names of the components to better understand their purpose.
35mins	Investigation & Creation	Young people begin to solder LED Shake Stick.
15mins	-	Break
35mins	Investigation & Creation	Young people continue to solder LED Shake Stick.
5mins	Reflection	Reflection and discussion of learning from this project.



# Session Four: LED Shake Stick (Part 2)

**Staff & Volunteers Present:** Educator Name & Volunteer Name **Date:** Insert **Duration:** 120 mins

**Aim:** Young people will use creativity to create cases for their LED Shake Stick

**Objectives:**

Young people will:

- Continue to solder LED Shake stick if needed.
- Create casing for their LED Shake Stick to keep it safe.
- Customise their casing with arts & crafts.

**Activity Guide:** [Link](#)

**Materials Prepped:**

No.	Component	No.	Component
4x	LED Shake Stick Kits	4x	Helping Hands
4x	Soldering Irons + Stand	8x	AA Batteries
4x	Lead-free Solder	4x	Damp Soldering Sponges
4x	Arts & Crafts Supplies	4x	Sheets of Cardboard
4x	Scissors		

**Session Plan:**

Time	Inquiry stage	Objective
5 mins	Introduction	Young people review last session and discuss what they did.
30 mins	Investigation & Creation	Young people finish soldering their LED Shake Stick.
15 mins	Investigation & Creation	Young people plan and sketch out their casing design.
15 mins	-	Break
40 mins	Investigation & Creation	Young people create their LED Shake Stick Case.
10 mins	Exploration	Young people are challenged to capture photos and videos of their LED Shake Sticks in action.
5 mins	Reflection	Reflection and discussion of learning from this project.





# Session Five: Light Up 3D Paper Worlds (Part 1)

**Staff & Volunteers Present:** Educator Name & Volunteer Name **Date:** Insert **Duration:** 120 mins

**Aim:** The group will design, plan and create their 3D Paper World structure, their temporary circuits, sketch their 3D world layout and solder permanent circuits together to be placed within their world in the next session.

**Objectives:**

Young people will:

- Brainstorm ideas for their paper world.
- Create a plan and sketch their paper world design.
- Create their 3D Paper World

**Activity Guide:** [Link](#)

**Materials Prepped:**

No.	Component/Materials	No.	Component/Materials
8x	BC5478 Transistor	4x	PP3 Battery
8x	47K Resistor	30x	15mm LED
4x	Soldering Iron + Stand	25x	Paper Straws
2x	Spool of Black Multi-Strand Wire	2x	Spool of Red Multi-Strand Wire
4x	Lead-free Solder	4x	Damp Soldering Sponges
4x	Glue Stick	4x	Packets of Coloured Card

**Session Plan:**

Time	Inquiry stage	Objective
5 mins	Introduction	Young people recap on the design they created in session four.
10 mins	Exploration	Young people brainstorm designs for their 3D Paper World
30 mins	Investigation & Creation	Young people create a plan & design of their world.
15 mins	-	Break
55 mins	Investigation & Creation	Young people create 3D World structure.
5 mins	Reflection	Reflection and discussion of learning from this project.







# Session Six: Light Up 3D Paper Worlds (Part 2)

**Staff & Volunteers Present:** Educator Name & Volunteer Name **Date:** Insert **Duration:** 120 mins

**Aim:** The group test their temporary circuits, sketch their 3D Paper World layout and solder permanent circuits together to be placed within their world in the next session.

### Objectives:

Young people will:

- Create the final functioning circuit in a temporary form using alligator clips.
- Solder their final circuit.
- Combine the circuit into their 3D Paper Worlds.
- Finalise their project.
- Feedback on the 6 weeks of sessions.

### Activity Guide: Link

### Materials Prepped:

No.	Component	No.	Component
8x	BC5478 Transistor	4x	PP3 Battery
8x	47K Resistor	30x	15mm LED
4x	Soldering Iron + Stand	25x	Paper Straws
2x	Spool of Black Multi-Strand Wire	2x	Spool of Red Multi-Strand Wire
4x	Lead-free Solder	4x	Damp Soldering Sponges
4x	Glue Stick	4x	Packets of Coloured Card

### Session Plan:

Time	Inquiry stage	Objective
5mins	Introduction	Young people recap on designs they created in session five.
20mins	Exploration	Young people create temporary circuits.
30mins	Investigation & Creation	Young people solder final circuit.
10mins	-	Break
40mins	Investigation & Creation	Young people combine circuitry and paper world.
10mins	Investigation & Creation	Young people finalise their world.
5mins	Reflection	Reflection and discussion of learning from this project.