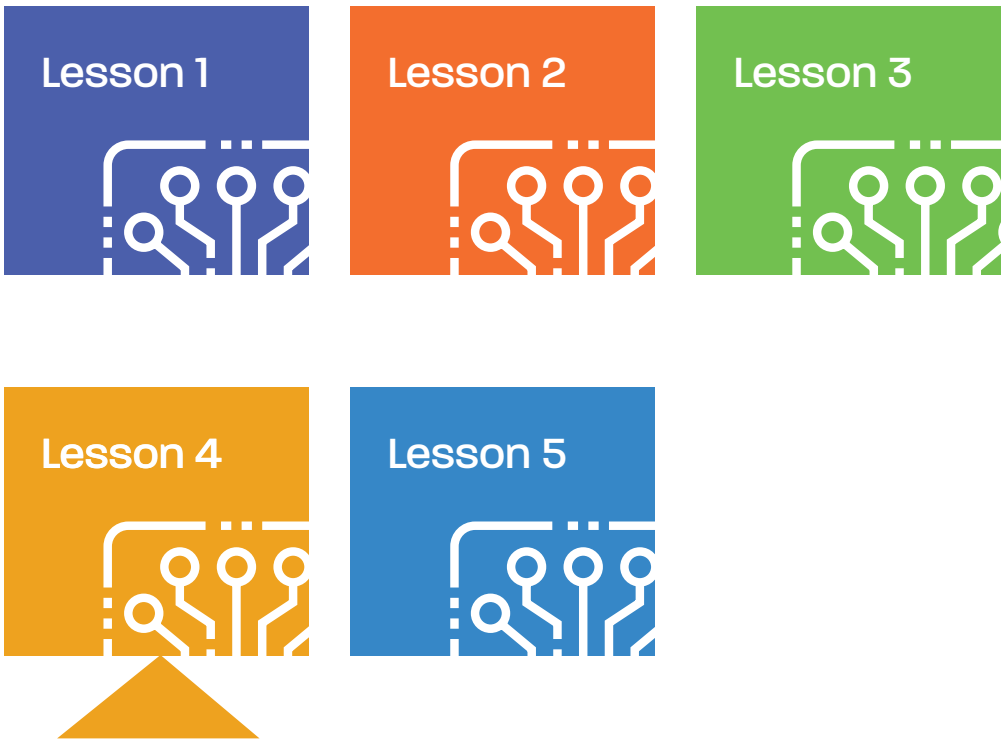
STEAM SNIPS™

# Lesson Plans




Hamilton Buhl®

# Lesson 4

STEAM SNIPS™

## Project Maker

**Creating an original project using STEAM SNIPS, materials, and tools.**

## Learning Objectives

- Strengthen higher order thinking skills
- Analysis, evaluation and development
- Logical reasoning
- Forward and creative thinking
- Problem Solving

## Class Activity

- Students will be split into groups to create their very own STEAM SNIPS projects.
- Using what they've learned about input, control and output logic, they will brainstorm inventions they can create using STEAM SNIPS and arts and crafts materials.
- After choosing what their groups wants to create, they will then need to record what materials, tools and STEAM SNIPS they will need to build their invention.
- Groups will then assemble their projects and present them to the class.
- The class will evaluate their peers' projects using the rubric included at the bottom of this Lesson Plan.

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## Activity Instructions

- Break the class into groups.
- Each group will need to brainstorm a creation they want to make. For examples of projects that can be created with STEAM SNIPS, take a look at the samples below.
- Have each group submit their project idea to the teacher for review.
- Once the projects have been reviewed, the students will begin recording which STEAM SNIPS, materials and tools they will need in order to build their creation.
- After recording and identifying the STEAM SNIPS, materials and tools they will use to create their invention, it's time to start building.

# STEAM SNIPS™ Project Examples

## Bubble Maker

| TOOLS | MATERIALS | STEAM SNIPS |
|---|---|---|
| Scissors | Fan | Power Module |
| | 9V Battery | Sound Sensor |
| | Cardboard | IF Block |
| | Plastic Cup | STEAM SNIPS DC Fan |
| | Scotch Tape | STEAM SNIPS Fan Block |

## Instructions

**Step 1** Cut a hole in the bottom of the cup, make sure it's large enough to fit the fan.

**Step 2** Cut out a piece of cardboard to make a handle for the bubble maker.

**Step 3** Secure the cup to the cardboard handle.

**Step 4** Secure the fan to the hole in the cup with tape, making sure it has enough space on the back end to pull air into the cup.

**Step 5** Tape the Sound Sensor and Power Module to the cardboard handle.

**Step 6** Dip the rim of the cup into bubble mix.

**Step 7** Make noise and watch the bubbles fly!

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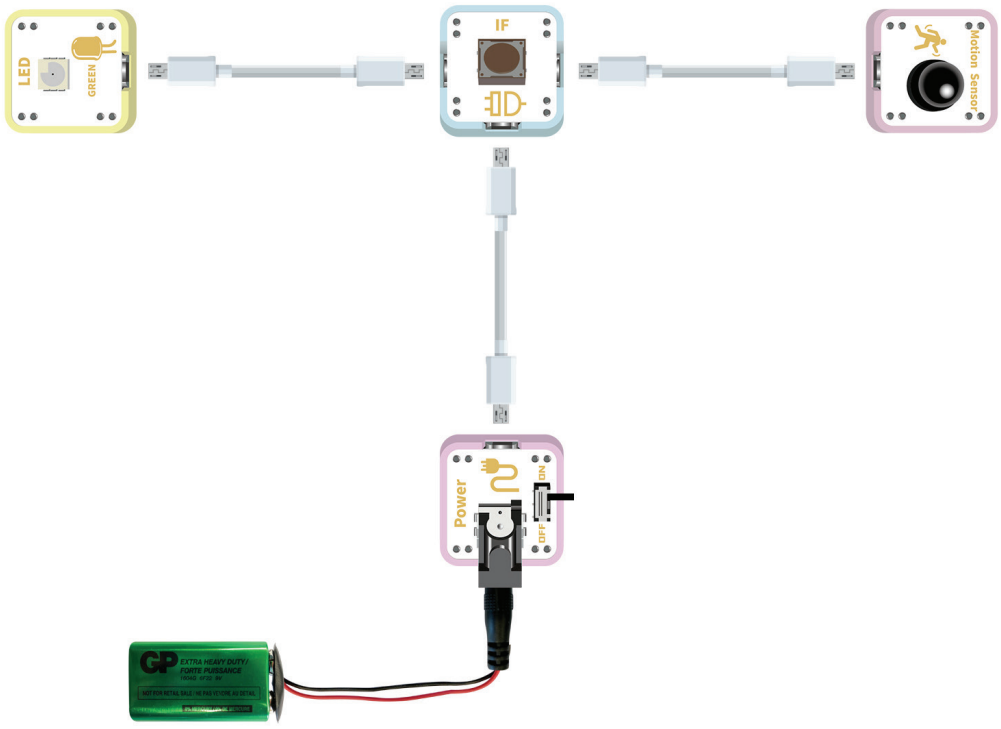
## Bubble Maker STEAM SNIPS Set Up



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## Motion Sensor "Smart" Fan

| TOOLS | MATERIALS | STEAM SNIPS |
|---|---|---|
| Hot Glue Gun | Popsicle Sticks | Power Block |
| | Glue | IF Block |
| | Paper Clip | Button Block |
| | Rubber Band | STEAM SNIPS Motor |
| | Tape | |

## Instructions

**Step 1** Place 3 Popsicle sticks in the shape of a triangle.

**Step 2** Glue each end to secure all three points. Let the glue dry.

**Step 3** Glue two more popsicle sticks to the first triangle to make two triangles that will share a side.
*Leave a gap in the center of the wheel.

**Step 4** Continue adding two popsicle sticks to make new triangles, each sharing a side, until they join and create a hexagon.

**Step 5** Repeat steps 1-4 so you have 2 popsicle stick hexagons.

**Step 6** Break 3 popsicle sticks in half and attach each of one end of the broken popsicle sticks to the thick edges of each side of one hexagon. These broken popsicle sticks will act as cross bars supporting each hexagon. Glue the second hexagon to the tip of each cross bar. You should have two hexagons on top of each other, supported and separated by the 6 broken popsicle sticks.

**Step 7** Take 6 popsicle sticks and create a triangle for the base. The top of the triangle should overlap, creating an "X" shape. Repeat so you have 2 larger triangles with an "X" at the top for the base.

**Step 8** Use 3 full popsicle sticks as support for the base. Lay the 3 popsicle sticks on the floor or table and glue the tips of each popsicle sticks to the bottom of the triangle bases. The "X" part of the base triangles should be facing up.

**Step 9** Straighten a paper clip and place it through the center of both wheels.

**Step 10** Hang a rubber band over one end of the paperclip.

**Step 11** Remove the yellow fan from the STEAM SNIPS Motor and stretch the other end of the rubber band hanging from the paper clip to the spoke on the STEAM SNIPS motor.

**Step 12** Take the Power Block and connect an IF block.

**Step 13** Connect the STEAM SNIPS motion sensor to the left side of the IF block.

**Step 14** Connect the STEAM SNIPS motor to the right side of the IF block.

**Step 15** Any movement will now make the fan blades spin!

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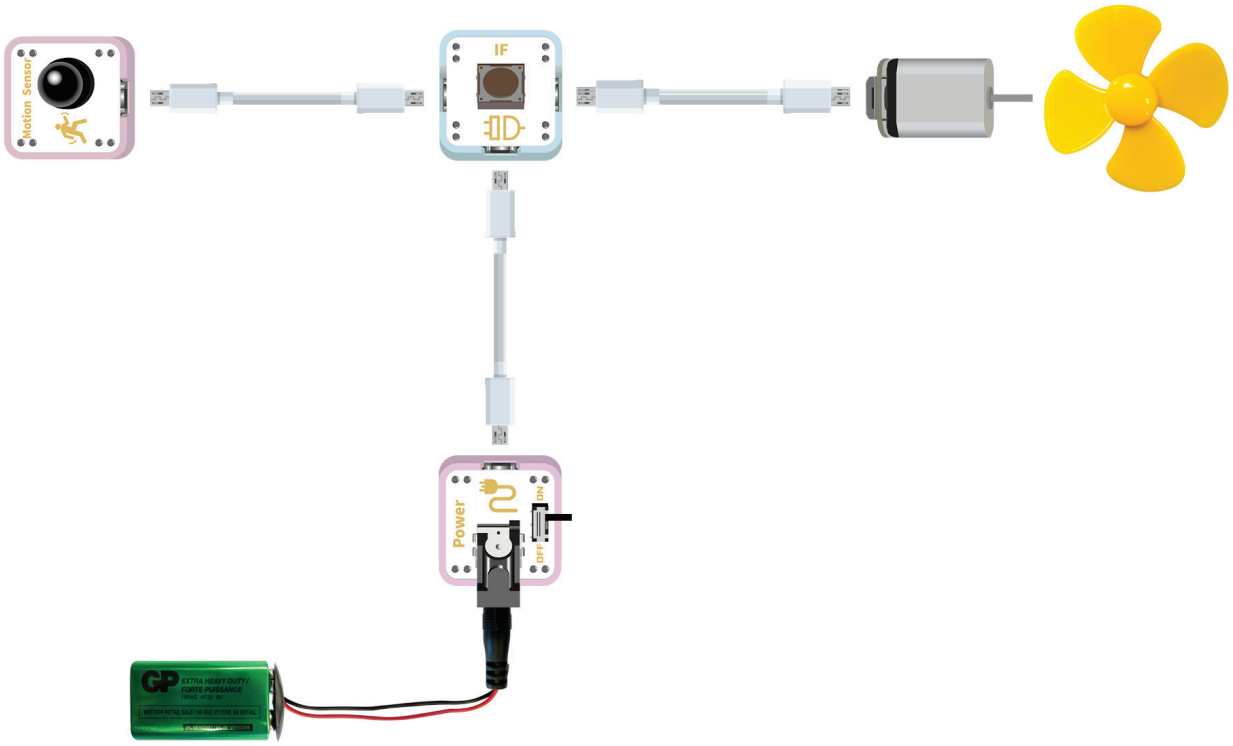
## Motion Sensor “Smart” Fan STEAM SNIPS Set Up



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## Brainstorming – DAY 1

Have the groups brainstorm designs using STEAM SNIPS and other materials that will be used to create their invention. Students should keep in mind the tools and amount of materials they will need to develop their working model.

**Record the brainstorming process with sketches and notes in the section below.**

After students brainstorm ideas for their inventions, teachers can either approve or suggest changes to their designs. Once approved, the next step is to create a list of the STEAM SNIPS, materials and tools they will need and record how each will be used.

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## Components/Tools/Function

Teachers can use the table below to have students fill in the STEAM SNIPS Blocks, Materials, and Tools they will need for their project.

## Main Concepts

1. Which STEAM SNIP Blocks, materials, and tools will be needed to make the creation function as designed?
2. How many materials and STEAM SNIPS Blocks will be needed throughout the construction of the project?
3. How each component will be used and what role they will play throughout the duration of the project?
4. Record what the creation will do and explain how it should function after construction.

| STEAM SNIPS CREATION | STEAM SNIPS Blocks | Materials | Tools |
|---|---|---|---|
| Identify Critical Components | | | |
| Amount Needed | | | |
| How It Will Be Used | | | |

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Each group should record exactly what they want their project to do and how it should function in the space below.

This can be used as reference throughout the project construction section.

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## Project Construction

After identifying the projects the groups want to make and the Components and Tools Table is filled out, the next step is to have students bring their creations to life. They should stick to their plans they laid out in the brainstorming and Components and Tools section.

If a group is moving through their build and realizes they need a tool or material that wasn't included in their plans, they should go back and update the Components and Tools Table in a different color pen.

In the section below, have students record challenges they came across throughout the build process and how they solved these problems.

They should also note any revisions they had to make on the Components and Tools Table and explain why these adjustments were needed.

Emphasize the importance of recording a project throughout development and adjusting the plan to meet the actual needs of a design. This will help others that want to recreate the project in the future and help assess which STEAM SNIPS, materials, and tools students will need if they create other projects.

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## Presentation and Peer Review

Each group now has a chance to present their creations to the class. Students should explain each step they had to take to create their project, from brainstorming to construction and everything in between. Have them review the challenges they faced and how they overcame these obstacles.

**Pass around the Peer Assessment Rubric below to the class to help the class assess each groups performance.**

| PEER ASSESSMENT RUBRIC | | | | |
|---|---|---|---|---|
| **Teacher** | | **Group** | | |
| **Standard Level** | **Brainstorming** | **Application** | **Creative** | • **Very Good**<br>• **Good**<br>• **Average**<br>• **Improving** |
| Electronics Setup | Use similar examples of STEAM SNIPS blocks from previous lesson | Apply and use STEAM SNIPS blocks in different scenario | Apply and use STEAM SNIPS blocks effectively in a real-life scenario | |
| Overall Presentation of Project | Function explanation presents the scenario simply | Function explanation presents the scenario clearly | Function explanation presents the scenario realistically | |
| Class Presentation | Presents the gist of main ideas to audience | Present the main ideas clearly | Present a functioning project that works as intended | |
| OVERALL | | | | |

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## Summary

**(5 minutes)**

# Standards-Aligned

**CCSS:**

| | |
|---|---|
| CSS.MATH.PRACTICE.MP1 | Make sense of problem and persevere in solving them. |
| CSS.MATH.PRACTICE.MP2 | Reason abstractly and quantitatively. |
| CCSS.MATH.PRACTICE.MP3 | Construct viable arguments and critique the reasoning of others. |
| CCSS.MATH.PRACTICE.MP5 | Use appropriate tools strategically. |

**ISTE:**

| | |
|---|---|
| ISTE Empowered Learner | 1c, 1d |
| ISTE Knowledge Constructor | 3d |
| ISTE Innovative Designer | 4a, 4b, 4c, 4d |
| ISTE Computational Thinker | 5a, 5b, 5c, 5d |
| ISTE Creative Communicator | 6a, 6b, 6c, 6d |
| ISTE Global Collaborator | 7b, 7c, 7d |

**NGSS:**

| | |
|---|---|
| NGSS MS-ETS1-2 | Engineering Design |
| MS_ETS1-3 | Engineering Design |
| NGSS MS-ETS1-4 | Engineering Design |
| NGSS HS-PS3-3 | Energy |
| HS-ETS1-2 | Engineering Design |

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