STEAM SNIPS™

Lesson Plans

Lesson 1

Lesson 2

Lesson 3

Lesson 4

Lesson 5

HB Hamilton Buhl®
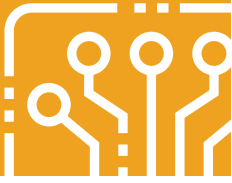
STEAM SNIPS™

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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- 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

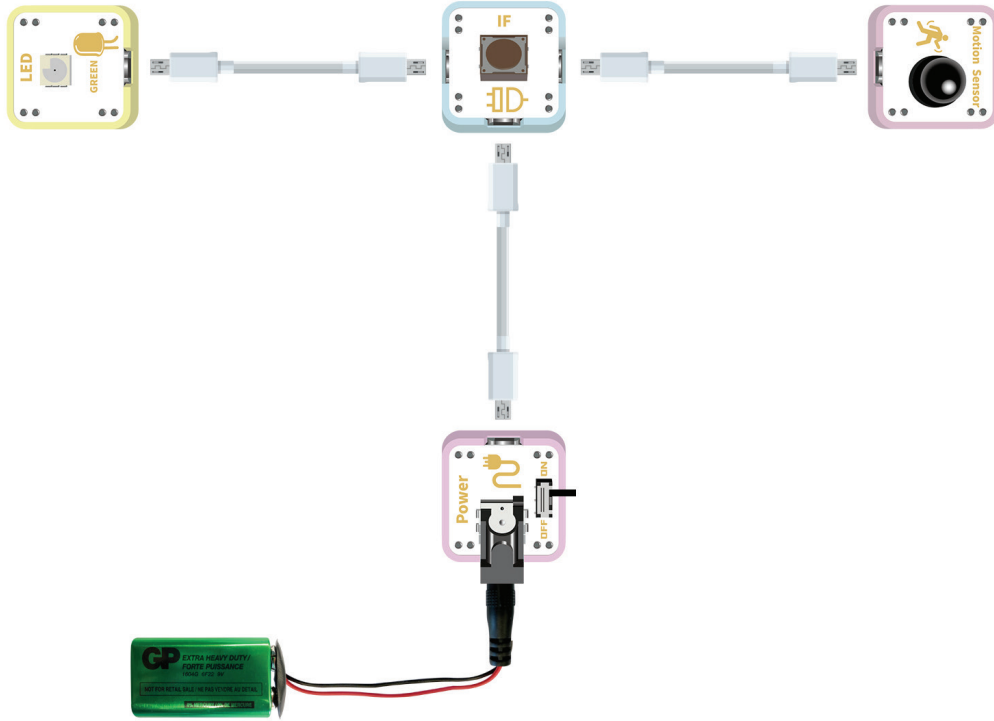| TOOLS	MATERIALS	STEAM SNIPS
Scissors	Fan	Power Module
	9V Battery	Sound Sensor
	Cardboard	IF Block
	Plastic Cup	STEAM SNIPS DC Fan
	Scotch Tape	STEAM SNIPS Fan Block

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!

Bubble Maker STEAM SNIPS Set Up

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Motion Sensor "Smart" Fan

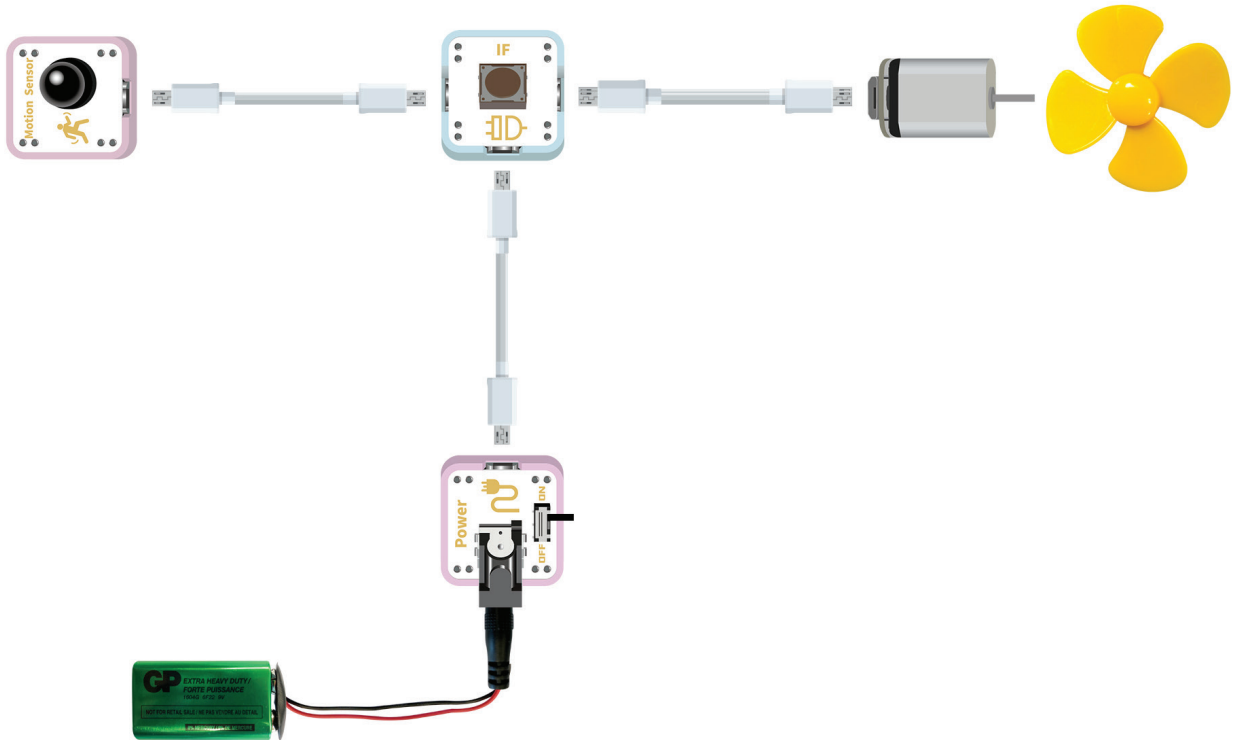| TOOLS	MATERIALS	STEAM SNIPS
Hot Glue Gun	Popsicle Sticks	Power Block
	Glue	IF Block
	Paper Clip	Button Block
	Rubber Band	STEAM SNIPS Motor
	Tape	

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!
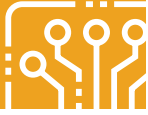
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Motion Sensor "Smart" Fan STEAM SNIPS Set Up

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.

Lesson 4

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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			

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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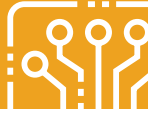
Project Construction

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 • Good • Average • 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				

Lesson 4

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