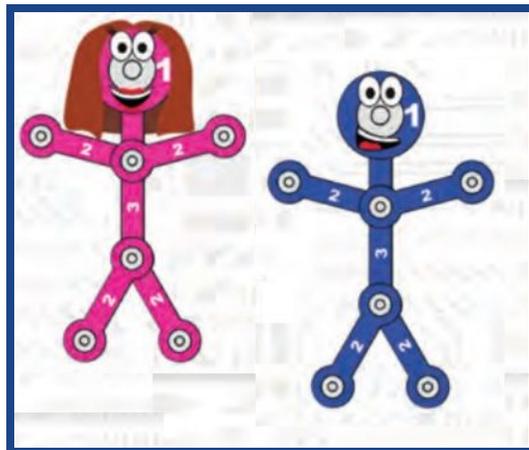


Snap Circuits

Exploration Curriculum



Curriculum and Activities

Created & Compiled by Mallory Riesberg

Objectives:

- Participants will demonstrate literacy and comprehension skills through creation and analysis of various circuit projects and challenges.
- Participants will demonstrate their understanding and problem-solving abilities through evaluation of various circuit projects and challenges.
- Participants will develop and practice 21st century skills including communication, collaboration, critical thinking, and creativity through completion of various activities.

Club Area: Academic (STEM)

Time Frame: 2 - 6 weeks

Age of Participants: Pre-K - 5th grade

Overall Program Description: Snap Circuits will offer students a unique and high interest, hands-on exploratory STEM experience that is designed to engage all levels of participants. While this unit is based in exploration and fun, there are academic aspects strategically incorporated throughout, such as STEM principles, literacy, and 21st century skill building. Each session focuses on a new set of Circuit Challenges that enhance the pre-designed projects in each of the Elenco Snap Circuits sets. Individually or as small groups, students will work through the projects and complete the accompanying challenges. Their analyses and evaluations of the projects are focused on their understanding of basic STEM practices and problem-solving. As a celebratory conclusion to the unit, each student or small group will have the opportunity to design their own circuit and create an accompanying project listing to add to the circuit manual.

Potential Measurements:

- Active participation and engagement of all participants
- Completion of Challenge Cards
- Completion of new project instruction sheet

Daily STEM Program

30 minute rotations

- Opening (2-5 minutes) - Participants get necessary materials, settle in with partner(s), review expectations as a whole group, general review / discussion about previous work or activities.
 - Doing STEM Activity (15-20 minutes) - Participants complete the designated STEM activity while staff monitors engagement by walking around and checking in with groups.
 - Reflection (Expert Time) (Discussion) (5-7 minutes) - Use open-ended questions to have participants reflect on activity and any conclusions or observations acquired during program. Staff should choose the reflection strategy and vary the strategies used as needed (Refer to “Recommended Discussion Activities and Strategies” for suggestions).
 - Clean Up (2-5 minutes) - Return all materials to staff, clean up and rearrange area as needed before transitioning.
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45 minute rotations

- Opening (5-7 minutes) - Participants get necessary materials, settle in with partner(s), review expectations as a whole group, general review / discussion about previous work or activities.
- Doing STEM Activity (15-20 minutes) - Participants complete the designated STEM activity while staff monitors engagement by walking around and checking in with groups.
- Reflection (Expert Time) (Discussion) (5-7 minutes) - Use open-ended questions to have participants reflect on activity and any conclusions or observations acquired during program. Staff should choose the reflection strategy and vary the strategies used as needed (Refer to “Recommended Discussion Activities and Strategies” for suggestions).
- Clean Up (2-5 minutes) -Return all materials to staff, clean up and rearrange area as needed before transitioning.

Snap Circuits® Beginner

Pre-



DAILY LESSON PLANS

SNAP CIRCUITS BEGINNER CHALLENGE CARDS

Snap Circuits **Beginner** Exploration - Lesson - Generic Template

Objective: Participants will follow directions to explore and create electric circuits.

Materials (*per individual or small group*):

- Snap Circuit Kit
- Laminated Snap Circuit **Beginner** Challenge Cards
- Skinny white board markers

<h1>A</h1>	<h2>All Aboard</h2> <ul style="list-style-type: none">• Engage - excited them about what they will learn<ol style="list-style-type: none">1. “How many of you use electricity each day? What are some things you use electricity for or what are some of our electronics?” OR “Remember back to yesterday’s challenges, what were we working on?” [Share responses.]
<h1>B</h1>	<h2>Background Check</h2> <ul style="list-style-type: none">• Share the Goal and Make Connections - introduce the lesson and goal<ol style="list-style-type: none">1. Today we’re going to explore electricity a bit more. You are going to be electrical engineers and work on different experiments/challenges using electricity. [OR Today we’re going to continue experimenting and building circuits to be electrical engineers]2. [Explain vocabulary as necessary, pass out materials to groups, engage kids in discussions.]
<h1>C</h1>	<h2>Challenge or Choice</h2> <ul style="list-style-type: none">• Explain the activity - list the steps, model, example, where, and how<ol style="list-style-type: none">1. Today we’re going to explore electricity using our Snap Circuit kits. You and your partner will have the chance to work on creating different circuits and then making your own additions to complete the Challenges. [Model putting together a project on Day 1 or if needed as a refresher later]2. <i>Pass out Challenge Cards, whiteboard markers, and circuit kits to pairs. [Challenge Cards should be read aloud to groups including Challenge Questions; answers should be discussed as group too]</i>3. Remember to follow the pictures/directions step by step and look at the small details in the pictures!4. After you put together the project on your Challenge Card, look to see if you know what is happening when the circuit is complete (ex <i>What is the electricity in the circuit causing to move or light?</i>). Then move on to the next Challenge Card and project.
<h1>D</h1>	<h2>Do It</h2> <ul style="list-style-type: none">• Work and Engage Together - encourage and guide as participants work<ol style="list-style-type: none">1. Walk around and help out partners as needed. Ask kids “Tell me about the project/challenge you are working on (or completed)”2. Allow 5 - 7 minutes of Expert Time (and clean up)
<h1>E</h1>	<h2>Expert Time</h2> <ul style="list-style-type: none">• Share and Expand - summarize or wrap up learning<ol style="list-style-type: none">1. Ask participants to share out their findings from the Challenge Cards. Potential reflection questions to choose from are on the following page.

Reflection Questions

1. Were you successful in the challenge? Why or why not?
2. What was the most difficult part of the challenge? Why?
3. What part(s) do you think you could have added/deleted? Why?
4. What did you learn about construction and engineering during the challenge?
5. Compare this challenge to a previous challenge. Which one was easier and why?
6. After completing this challenge, what are you curious about?
7. One thing that surprised me was....
8. I learned that.....
9. I wonder if...
10. _____ reminded me of...
11. _____ made me (feel/think/wonder/etc)...
12. Any other questions that may arise

Snap Circuits Challenge Card EXAMPLE

Build Project # 1

Explain each part of the building process:

- 1) finding the correct pieces
- 2) placing them correctly on the grid

Challenge Question:

What did this circuit do?

Snap Circuits Beginner Challenge Card #1

Build Project # 1 "Light Motor"

Challenge Question:

What did this circuit do? *Write or draw your answer below.*

Snap Circuits Beginner Challenge Card #2

Build Project # 2 "Fan"

Challenge Questions:

What did this circuit do? *Write or draw your answer below.*

What was different between Project #1 and Project #2?

Snap Circuits Beginner Challenge Card #3

Rebuild Project #1 or Project #2 but use the "Press Switch (S2)" instead of the "Slide Switch (S1)".

Challenge Questions:

Were you able to make the light or fan turn on?

Snap Circuits Beginner Challenge Card #4

Build Project # 4 "Red Light"

Challenge Question:

What did this circuit do? Write or draw your answer below.

Snap Circuits Beginner Challenge Card #5

Build Project # 5 "Yellow Light"

Challenge Question:

What change did you make from the circuit in

Challenge Card #4?

Bonus Challenge: Change the "Slide Switch (S1)" to the "Push Switch (S2)".

Snap Circuits Beginner Challenge Card #6

Build Project # 7 "Light & Sound"

Challenge Question:

What did this circuit do? Write or draw your answer below.

Snap Circuits Beginner Challenge Card #7

Rebuild Project # 7 "Light & Sound" turn off Slide Switch S1, and turn on Press Switch S2.

Challenge Questions:

What happened? Write or draw your answer below.

Snap Circuits Beginner Challenge Card #8

Rebuild Project # 7 "Light & Sound" turn off Press Switch S2, and turn on Slide Switch S1.

Challenge Questions:

What happened? Write or draw your answer below.

Snap Circuits Beginner Challenge Card #9

Choose a project to build.

Challenge Question:

What happened? Write or draw your answer below.

Snap Circuits Beginner Challenge Card #10

Build Project # 11 "Dim Lights"

Challenge Question:

What did this circuit do? Write or draw your answer below.

Snap Circuits Beginner Challenge Card #11

Build Project # 12 "Super Dim Lights"

Challenge Questions:

What did this circuit do? Write or draw your answer below.

What change did you make from the circuit in Challenge Card #10?

Snap Circuits Beginner Challenge Card #12

Create your own Project! Build it.

Challenge Questions:

What happened? *Write or draw your answer below.*

Snap Circuits Beginner Challenge Card #13

Create step by step picture instructions for your project from Challenge #12.

Challenge Question:

What was the hardest part of making your instructions?
Write or draw your answer below.

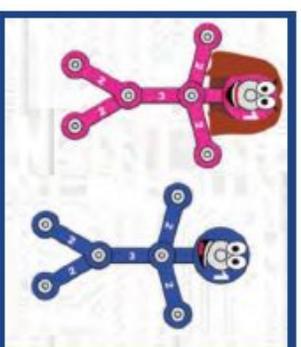
Snap Circuits Beginner Challenge Card #14

Swap pages with a partner and use their step by step picture instructions to build the project.

Challenge Questions:

What happened? *Write or draw your answer below.*

Snap Circuits® Beginner

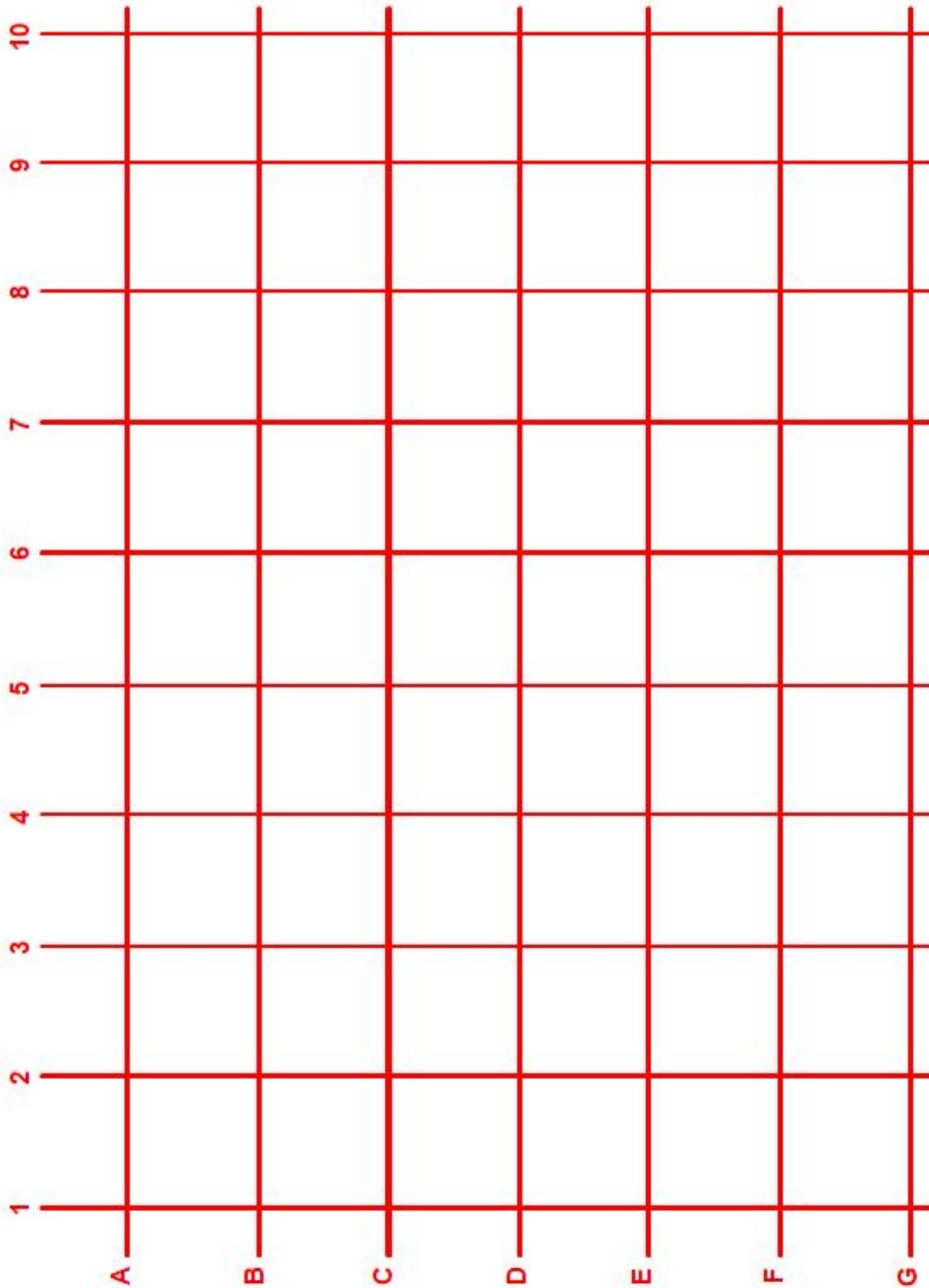


Challenge Cards

Name: _____

Snap Circuit Project Title: _____

Snap Circuit Project Number: # _____



ELECTRONIC SNAP CIRCUITS®



DAILY LESSON PLANS

SNAP CIRCUITS JUNIOR CHALLENGE CARDS

Snap Circuits **Junior** Exploration - Lesson - Generic Template

Objective: Participants will follow directions to create different circuits as well as design their own circuit.

Materials (per individual or small group):

- Snap Circuit Kits
- Skinny white board markers
- Laminated Snap Circuit **Junior** Challenge Cards

A	All Aboard <ul style="list-style-type: none">• Engage - excited them about what they will learn<ol style="list-style-type: none">1. “How many of you use electricity each day? What are some things you use electricity for or what are some of our electronics?” OR “Remember back to yesterday’s challenges, what were we working on?” [Share responses.]
B	Background Check <ul style="list-style-type: none">• Share the Goal and Make Connections - introduce the lesson and goal<ol style="list-style-type: none">1. Today we’re going to explore electricity a bit more. You are going to be electrical engineers and work on different experiments/challenges using electricity. [OR Today we’re going to continue experimenting and building circuits to be electrical engineers]2. [Explain vocabulary as necessary, pass out materials to groups, engage kids in discussions.]
C	Challenge or Choice <ul style="list-style-type: none">• Explain the activity - list the steps, model, example, where, and how<ol style="list-style-type: none">1. Today we’re going to explore electricity using our Snap Circuit kits. You and your partner will have the chance to work on creating different circuits and then making your own additions to complete the Challenges. [Day 1 - Model putting together a project, enough to go over the #1 pieces and #2 pieces and so on]2. <i>Pass out Challenge Cards, whiteboard markers, and circuit kits to pairs.</i>3. Remember to read the directions to find out what the pictures and details are telling you (example: what pieces to connect first, second, so on).4. After you put together the project on the Challenge card, answer the Challenge Question (write answer on card using whiteboard marker) and move on to the next Challenge card.
D	Do It <ul style="list-style-type: none">• Work and Engage Together - encourage and guide as participants work<ol style="list-style-type: none">1. Walk around and help out partners as needed. Ask kids “Tell me about the project/challenge you are working on (or completed)”2. Allow 5 - 7 minutes of Expert Time (and clean up)
E	Expert Time <ul style="list-style-type: none">• Share and Expand - summarize or wrap up learning<ol style="list-style-type: none">1. Ask participants to share out their findings from the Challenge Cards. Potential reflection questions to choose from are on the following page.

Reflection Questions

1. Were you successful in the challenge? Why or why not?
2. What was the most difficult part of the challenge? Why?
3. What part(s) do you think you could have added/deleted? Why?
4. What did you learn about construction and engineering during the challenge?
5. Compare this challenge to a previous challenge. Which one was easier and why?
6. After completing this challenge, what are you curious about?
7. One thing that surprised me was....
8. I learned that.....
9. I wonder if...
10. _____ reminded me of...
11. _____ made me (feel/think/wonder/etc)...
12. Any other questions that may arise

Snap Circuits Challenge Card EXAMPLE

Build Project # 1

Explain each part of the building process:

- 1) finding the correct pieces (includes the white labels on each piece)
- 2) how to determine the order for attaching pieces to circuit board (also in directions)

Challenge Question:

How can you tell if you were successful in creating the project?

Snap Circuits Junior Challenge Card #1

Build Project # 1

Challenge Question:

How can you tell you were successful in this challenge?

Snap Circuits Junior Challenge Card #2

Build Project # 2

Challenge Questions:

How can you tell you were successful in this challenge?

What is the difference between Project #1 and Project #2?

Snap Circuits Junior Challenge Card #3

Rebuild either Project #1 or Project #2. Then figure out how to add in "Slide Switch" (S1) to your circuit. You may need to add more pieces or wires, but should not take away any other parts of the circuit.

Challenge Questions:

Why did you choose this way to add in the switch?

How can you tell if it was successful?

Snap Circuits Junior Challenge Card #4

Build Project # 3

Challenge Question:

Does the music change depending on how you activate the whistle chip (WCI)?

How did you test it or figure this out?

Snap Circuits Junior Challenge Card #5

Rebuild Project # 3 using the "snap wires" instead of the "jumper cables".

Challenge Question:

What difference in the music did you notice from this challenge to the music from Challenge Card #4?

Bonus Challenge: Change the locations of where the wires connect on the circuit to get the music to play.

Snap Circuits Junior Challenge Card #6

Build Project # 4

Challenge Question:

What difference do you notice in the music from this circuit to the music from Project #3?

Snap Circuits Junior Challenge Card #7

Build Project # 5

Challenge Questions:

How can you tell you were successful in this challenge?

Snap Circuits Junior Challenge Card #8

Build Project # 6

Challenge Questions:

How can you tell you were successful in this challenge?

What is the difference between Project #5 and Project #6?

Snap Circuits Junior Challenge Card #9

Build Project # 7

Challenge Questions:

How can you tell you were successful in this challenge?

Snap Circuits Junior Challenge Card #10

Build Project # 8

Challenge Questions:

Were you successful in this challenge? How can you tell?

What is the difference between Project #7 and Project #8?

Snap Circuits Junior Challenge Card #11

Build Project # 9 (use a paperclip)

Challenge Questions:

How can you tell you were successful in this challenge using the paperclip?

Snap Circuits Junior Challenge Card #12

Rebuild Project # 9 using a rubber band instead of a paperclip. Repeat with other items (pencil, plastic silverware, etc).

Challenge Questions:

What effect did the object used in place of a paperclip make?

What does this tell you about the object and the circuit?

Snap Circuits Junior Challenge Card #13

Choose a project to build (#1-#19)

Challenge Questions:

How difficult was this project to build compared to previous projects?

How did you know you successfully built the circuit?

Snap Circuits Junior Challenge Card #14

Rebuild the same project that you used in Challenge Card #13, except this time build the circuit in reverse order. (Parts labeled with black 1 should be the last parts added to the circuit).

Challenge Questions:

Does the order of pieces in building the circuit matter?

Were you able to make a circuit successfully?

Snap Circuits Junior Challenge Card #15

Build Projects #22-26

Challenge Question:

How were you able to make all of the different sounds in each of the projects?

What does this tell you about the importance of placement for the pieces within the circuits?

Snap Circuits Junior Challenge Card #16

Build Projects #27-31

Challenge Question:

Were you able to clap or tap to trigger the sounds from the circuit? Why do you think this is?

How were you able to use the jumper wire to make all of the different sounds in each of the projects?

Snap Circuits Junior Challenge Card #17

Choose a project and build it.

Challenge Question:

What changes could you make to this circuit? *Example: Could you add or delete any pieces? Could you make substitutions for certain pieces?*

Snap Circuits Junior Challenge Card #18

Create your own Project! Build it.

Challenge Question:

Were you successful in creating a functional circuit?

Snap Circuits Junior Challenge Card #19

Create an instruction sheet for your own project from Challenge #18 and add it to the Instruction Manual.

Challenge Question:

What was most challenging about creating your own instructional diagram?

Snap Circuits Junior Challenge Card #20

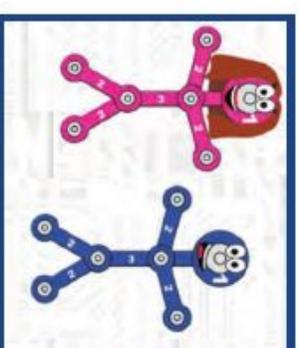
Swap projects with a partner and use their instructional sheet to build their unique project.

Challenge Question:

Were you successful in creating a functional circuit?

What changes need to be made to the instruction sheet?

ELECTRONIC SNAP CIRCUITS



Challenge Cards

Name: _____

Snap Circuit Project Title: _____

Snap Circuit Project Number: # _____

