

# Level Two: Explorations



## Discovering Computer Science & Programming through Scratch

# Student Notebook

*Updated for Scratch 3.0*



# Discovering Computer Science: *Explorations (Level Two)*

## Student Notebook

This notebook provides a place to record and share your thinking and problem-solving as you explore, test, and evaluate computer programming with Scratch.

Use this notebook with the 4-H curriculum manual, ***Discovering Computer Science & Programming through Scratch Level Two: Explorations***. Make it a reference for yourself and use it to show others what you have learned!

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Scratch is a project of the Lifelong Kindergarten Group at the MIT Media Lab ([scratch.mit.edu](https://scratch.mit.edu)). Images of the Scratch cat are used with permission. All other screenshots and images used in this guide are licensed under the Creative Commons Attribution-ShareAlike License.

# Your Scratch Scrapbook

As you complete Scratch activities, document each in your Scratch Scrapbook.


The Scrapbook begins on **page 16** of this book. Directions for completing the Scrapbook are also on **page 16**.

**My Scratch Scrapbook**

On these pages create a Scrapbook documenting your Scratch activities.

- For each activity included in your Scratch Scrapbook be sure to:
  1. Take a **screenshot** or create a **drawing** showing the activity.
  2. Give the **title** you gave the activity.
  3. Share your activity and **give the link** to your Scratch activity.
  4. Give a **summary** telling how to start the activity and what the activity does.
  5. Tell about something you **learned** from this activity.

**Sample Entry**



**Title:** Lucky Number  
**Link:** <https://scratch.mit.edu/projects/93333252>  
**Summary:** Click the green flag. Your lucky number is revealed by stars. Each backdrop has a number on it which is written in a slightly different color. When clones find that color, they stamp then delete. After 600 stars have stamped, the only stars that remain are the ones stamped on the special color which forms a number. There are several different backdrops. Each with unique numbers.  
**Something I learned:** I learned how to use clones and a sensing block.

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# Using this Notebook

## How to Follow Along

Page numbers throughout this book, shown like the example to the right, refer to the page numbers in the *Discovering Computer Science & Programming through Scratch Level Two: Explorations* book.

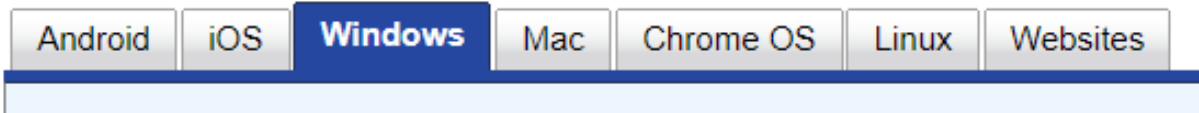


## How to Take a Screenshot

Throughout this notebook, you will be asked to take a screenshot of a script or activity you created to print and attach for others to see. If you are unsure how to take a screen shot on your computer, follow the directions at:

[www.take-a-screenshot.org/windows.html](http://www.take-a-screenshot.org/windows.html)

At this address you can click on directions for all of these operating systems:



- **Windows:** Use a built-in screenshot tool called **Snipping Tool**. Watch this YouTube video called, “How to Use Snipping Tool Beginners Guide” for instructions. [www.youtube.com/watch?v=2O932t8-k2A](http://www.youtube.com/watch?v=2O932t8-k2A)
- **Mac:** Follow these instructions found at this address from Apple support: [support.apple.com/en-us/HT201361](http://support.apple.com/en-us/HT201361)

Or watch this YouTube video called, “How to take a screenshot on your Mac — Apple Support” for instructions.

[www.youtube.com/watch?v=pHDDfng5yC8](http://www.youtube.com/watch?v=pHDDfng5yC8)



# Clones

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## Introduction to Clones

In Scratch a clone is a copy of a sprite. You can create and delete clones while a program is running or as a result of interaction with the user.

- Complete the table to the right.

Number of times the “c” key is pressed	Number of beetles
0	1
1	2
2	4
3	8
4	
5	
6	

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Notice that the clones delete as soon as they touch the frog. When a clone touches the frog, the **#beetles** decreases by 1, but when the original beetle touches the frog it is not deleted, and it remains touching the frog for a short while. This causes the **#beetles** to decrease repeatedly.

You cannot delete the original beetle, but you can hide it so that it stops touching the frog immediately after it first touches the frog.

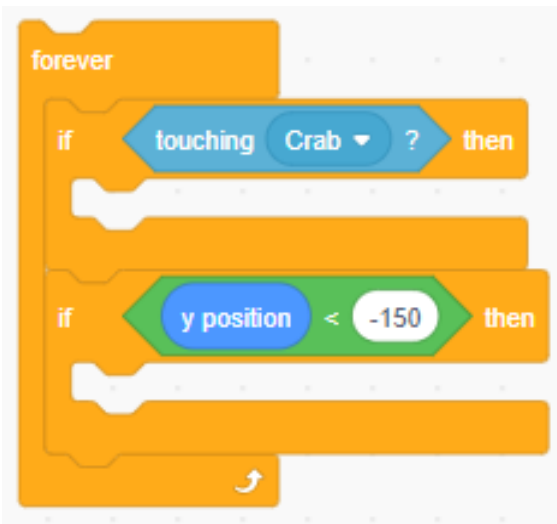
- Create a script to make the **#beetles** decrease by 1 when the original beetle touches the frog by using the hide tile.

**Include this activity in your Scratch Scrapbook!**

Take a screenshot of the script, print it, and attach it here.

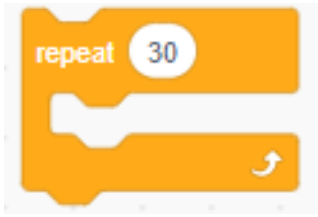
Being able to understand specifications and create programs that match the specification is a valuable skill.

- What is the overall idea for this game?
- What must the crab do in this game?
- What must the beach ball do in this game?



Look at the partial script, shown on the left, which might be used for the beach ball.

- Why are these **If \_\_ then** blocks inside a **forever** block?



- How might this **repeat** block be used in the script for the beach ball?

When your game is finished, take a picture of someone playing your game. Print the picture and attach it here. Ask that person to comment about your game on the lines below.

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Ask yourself one of the these questions about your game: What do you like? What would you change? What was hard? What did you learn? Write your answer here.

**Include this activity in your Scratch Scrapbook!**



- What is the overall idea for this game?
- What must the diver do in this game?
- What must the fish do in this game?

Take a screenshot of the **define swim** script, print it, and attach it here.

How do these blocks help in the **define cloneOrVanish** script?



**Include this activity in your Scratch Scrapbook!**



## Notes:

