

**Slide 1:**

LEAFS Programming 2021

**Slide 2:**

Write your name or draw something that represents you!

**Slide 3:**

PB&J Activity

**Slide 4:**

Write a "Program" to Make a PB&J!

Take 5 minutes and write instructions to construct a Peanut Butter and Jelly sandwich.

We will come together as a group and attempt to execute your programs!

**Slide 5:**

PB&J Program. What's the point?

Computers-- much like J-- just can't do it all.

They have specific capabilities that can be used to solve more complex problems.

A programmer's job is to define instructions which make use of these capabilities to produce a greater result.

**Slide 6:**

Scratch Programming

**Slide 7:**

How to Create an Account.

You are not required to create an account to use Scratch.

But it makes it easy to save your games in case you want to work on them later!

Click "Join Scratch" to start the process.

Link: <https://scratch.mit.edu/>

Image: a screenshot of the "create an account" Scratch page.

**Slide 8:**

Sprites are programmable entities with appearances you can modify.

Image: a photo gallery of some sprites available in Scratch, such as a girl, a boy, an apple, a bell, a bug, and many more items.

**Slide 9:**

Sprites and Backgrounds Workspace.

Image: a screenshot of the bottom left corner of the Scratch website. There is a box that contains one active sprite and shows its x and y coordinates on the screen, the size of the sprite (100), a direction value (90), and a button to toggle whether the sprite is visible (currently set at visible). A smaller box to the right of this box is labeled "Stage" and says that it contains one backdrop (plain white background).

### **Slide 10:**

Working with Sprites and Backdrops.

These blocks allow you to change how a sprite looks on the screen.

You can also change the backgrounds for the sprites.

Image: seven purple Scratch blocks for working with sprites.

The first block reads "change size by 10" where 10 is a modifiable value.

The second block reads "set size to 100%" where 100 is a modifiable value.

The third block reads "change color effect by 25" and both color and 25 are modifiable values.

The fourth block reads "set color effect to 0" and both color and 0 are modifiable values.

The fifth block reads "clear graphic effects".

The sixth block reads "show".

The seventh block reads "hide".

Image: four purple Scratch blocks for working with sprite costumes and backdrops.

The first block in this image reads "switch costume to costume2" where costume2 is a modifiable value.

The second block reads "next costume".

The third block reads "switch backdrop to backdrop1" where backdrop1 is a modifiable value.

The fourth block reads "next backdrop".

### **Slide 11:**

Basic Scratch Blocks to Get You Started.

Events

Control

Motion

Variables

Operators

Others

Image: a small program coded using Scratch blocks. It reads:

When the green flag is clicked

If my variable is greater than 10,

then wait until key "space" pressed,

then say "Hello",

then move 10 steps.

### **Slide 12:**

Events.

Event blocks are handy for controlling a game or sprite's state. When their condition is met, they execute the code attached to them.

Image: three yellow Scratch blocks.

The first block reads "when the green flag is clicked".

The second block reads "when space key is pressed" where space is a modifiable value.

The third block reads "when this sprite is clicked".

### **Slide 13:**

Control.

Control blocks will make up the foundation of your code. They enable code to execute in different ways, or based on certain conditions.

Image: six light orange Scratch blocks.

The first block reads "forever" to represent a forever loop.

The second block reads "repeat until blank" where blank is an empty space you would fill in with an expression that can be evaluated as true or false.

The third block reads "repeat 10" to represent a for-loop that will loop 10 times.

The fourth block reads "wait 1 seconds" where 1 is a modifiable value.

The fifth block reads "if blank, then" where blank is an empty space you would fill in with an expression that can be evaluated as true or false.

The sixth block reads "if blank, then blank, else" where the first blank is where you would provide an expression that can be evaluated as true or false. If the expression or condition is true, then the program would execute the code that comes after "then", otherwise it will execute the code that comes after "else".

### **Slide 14:**

Motion.

Motion blocks move, rotate, and alter sprites. They can be used to make controllable characters, NPCs, and other elements of your game.

Image: five blue Scratch blocks.

The first block reads "change x by 10" where 10 is a modifiable value.

The second block reads "set x to 0" where 0 is a modifiable value.

The third block reads "change y by 10" where 10 is a modifiable value.

The fourth block reads "set y to 0" where 0 is a modifiable value.

The fifth block reads "if on edge, bounce".

Image: five more blue Scratch blocks.

The first block reads "move 10 steps" where 10 is a modifiable value.

The second block reads "turn right 15 degrees" where 15 is a modifiable value.

The third block reads "turn left 15 degrees" where 15 is a modifiable value.

The fourth block reads "go to random position" where random position is a modifiable value.

The fifth block reads “fo to x: 0 y: 0” where both zeros are modifiable values.

### **Slide 15:**

Variables.

Variables represent a number which can be set and changed using variable code blocks. They can be used to keep score or modify other blocks dynamically.

Image: six Scratch blocks, all orange except for the first one.

The first block is gray and reads “Make a Variable.”

The second block reads “my variable” and has a checkbox to its left.

The third block reads “set my variable to 0” where both my variable and 0 are modifiable values.

The fourth block reads “change my variable by 1” where both my variable and 1 are modifiable values.

The fifth block reads “show variable my variable” where my variable is a modifiable value.

The sixth block reads “hide variable my variable” where my variable is a modifiable value.

Slide 16:

Operators.

Operators fall into two categories:

- 1: Rounded operator blocks modify number values.
- 2: Hexagons evaluate the truth of a statement.

Image: seven green Scratch blocks.

The first block has two empty spaces to let you add two values.

The second block has two empty spaces to let you subtract two values.

The third block has two empty spaces to let you multiply two values.

The fourth block has two empty spaces to let you divide two values.

The fifth block has two empty spaces to let you perform the modulo operation.

The sixth block has one empty space for rounding a number.

The sixth block reads “abs of blank” where blank represents a value you put in, abs represents the absolute value function, and abs can be changed to be a different function.

Image: six more green Scratch blocks.

The first block has two empty spaces to let you perform the “greater than” operation.

The second block has two empty spaces to let you perform the “less than” operation.

The third block has two empty spaces to let you perform the “is equal” operation.

The fourth block has two empty spaces to let you perform the “and” operation.

The fifth block has two empty spaces to let you perform the “or” operation.

The sixth block has one empty space to let you perform the “not” operation.

### **Slide 17:**

Other useful blocks.

Image: three light orange Scratch blocks.

The first block reads “when I start as a clone”.

The second block reads “create clone of myself” where myself is a modifiable value.

The third block reads “delete this clone”.

**Slide 18:**

Templates You Can Use To Get Started

Catch Fruit:

<https://scratch.mit.edu/projects/472615821>

Jump on Bread:

<https://scratch.mit.edu/projects/472615960>

Bear Crossing:

<https://scratch.mit.edu/projects/465683323/>

**Slide 19:**

Showcase Your Creations!

**Slide 20:**

More resources for coding ideas.

How to make a platformer game in Scratch 3.0 | Part 1:

<https://www.youtube.com/watch?v=7gkSbtompXI>

How to make a jumping game in Scratch | Tutorial:

<https://www.youtube.com/watch?v=1jHvXakt1qw>

How to make a virtual pet in Scratch | Tutorial:

<https://www.youtube.com/watch?v=irhNLRWwhv0>

Snake game in Scratch 3.0:

<https://www.youtube.com/watch?v=g4UB8CV7AVU>