StarLogo Nova Blocks introduced in Module 1 Lesson 1

Event Handling

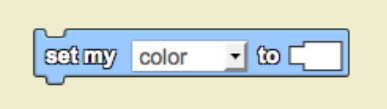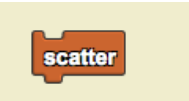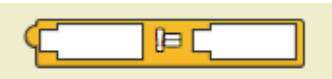|	
setup → when setup pushed	When "setup" (on the interface) is clicked, code blocks placed inside this block will run once.
forever → while forever toggled	When "forever" (on the interface) is clicked it runs code blocks inside this block until "forever" is clicked again.

StarLogo Nova Blocks introduced in Module 1 Lesson 2
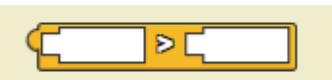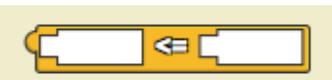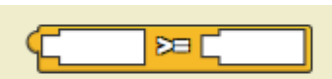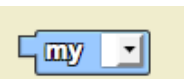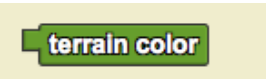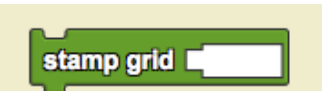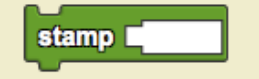
when setup pushed	Executes commands when the push button widget is pressed. Widgets can be created using the Edit Widgets feature.
while forever toggled	Executes commands when the toggle button widget is turned on. When the toggle button widget is turned off, nothing occurs. Widgets can be created using the *Edit Widgets* feature.
clear terrain	Removes all stamping or drawing modifications done to the terrain.
pen down	Adjusts the pen tool. If the pen is down, the agent stamps the terrain at each position as it moves along the terrain. If the pen is up, the agent does not stamp the terrain.
delete everyone	Deletes all agents.
create 5 Turtle (s) do	Creates a specific number of agents of the specific breed. Attach other blocks to specify traits and properties of these agents. Additional breeds are created in the interface.

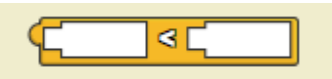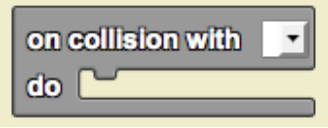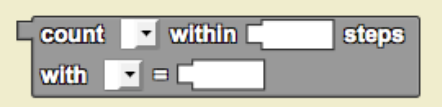|	
forward 2	Moves an agent forward by a certain number of steps.
backwards	Moves an agent backwards by a certain number of steps.
left by 15 degs	Rotates an agent left by a certain number of degrees.
right by degs	Rotates an agent right by a certain number of degrees.
color: random color	Sets the color of an agent by picking from a list of standard colors or by choosing a color at random.
set my color to	Sets an agent's trait to a particular value.
scatter	Places agents in random positions on the terrain.
random	Returns a random integer from 0 to the input but NOT including the number entered (non-inclusive).
left by random degs	Random can be used in place of a number anywhere a number would fit. In this example instead of having a constant turn angle, an agent following this command would turn different amounts each time this command was executed.

StarLogo Nova Blocks introduced in Module 1 Lesson 3

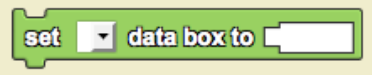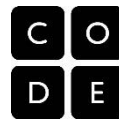|	
if	Carries out the specific procedures if the condition is true. This conditional block ONLY runs the main block IF the condition after the "if" is met.
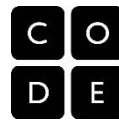
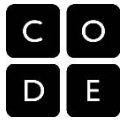|	
	Carries out the specific procedures if the condition is true. Otherwise (if the condition is false) carry out procedures in the second block.
	Determines whether the two inputs are equivalent and returns true or false. Usually used after an "if" in a conditional block.
	Determines whether the two inputs are unequal and returns true or false. Usually used after an "if" in a conditional block.
	Determines if the first input is less than the second input and returns true or false. Usually used after an "if" in a conditional block.
	Determines if the first input is greater than the second input and returns true or false. Usually used after an "if" in a conditional block.
	Determines if the first input is less than or equal to the second input and returns true or false. Usually used after an "if" in a conditional block.
	Determines if the second input is greater than or equal to the second input and returns true or false. Usually used after an "if" in a conditional block.
	Returns an agent's trait.
	Returns the color of the terrain the agent is currently on.
	Colors a grid square on the terrain in the agent's current position.
	Colors a circle on the terrain in the agent's current position.

StarLogo Nova Blocks introduced in Module 1 Lesson 4

on collision with ▾ **do**	Specifies a series of actions to be executed after a collision between two breeds. If the two breeds are the same, each agent in the collision must perform the same action after the collision. If the two breeds are different, each agent in the collision can be given different commands.
collidee	Specifies the other agent in the collision.
count ▾ **within** ☐ **steps with** ▾ **=** ☐	Counts the number of agents of a specific breed in a given radius with a specific trait.

StarLogo Nova Blocks introduced in Module 1 Lessons 5

Edit Widgets	Push this button to get access to the widgets. Widgets are user-input and output elements like buttons, data output, tables and graphs.
New Widget	This button appears AFTER clicking "Edit Widgets". Select the type of widget you'd like to add. Give the widget a name. "Push button" – a button that runs once or pops up after being pushed. "Toggle button" – a button that stays on until turned off. "Data Box" – a data display box "Label" – a place for the use to enter data? "Horizontal Slider" – a slider to control the value of a variable. "Table" – a configurable data table with rows and columns "Line Graph" – a configurable line graph with one or more lines "Bar Graph" – a configurable bar graph with one or more bars
set ▾ **data box to** ☐	After creating a data box, use this block to set its value to a number or a color.

Add data to line graph ▾ **for** ▾ **x-axis :** ☐ **y-axis :** ☐	After creating a line graph widget and naming a series (on the interface), this block adds data to the line graph. It will plot the point x, y based on the blocks that you provide. Usually these values are variables that you have defined.
▾ **slider value**	After setting up a slider widget, you can use the value of the slider in your code using this block.
clock	Returns the current value of the clock. This can be used when you plot data vs. time.
set clock to ☐	Changes the value of the clock. This block is particularly useful for resetting the clock on setup.
procedure: name ⊕ **add parameter** **return** nothing ▾	Creates a procedure with a name and a list of commands. Procedures are useful for organizing code into reusable modules. Some procedures just make changes to the agents and the world and return nothing. Other procedures, calculate values and return the result.
call: ▾	Calls the procedure selected.

CS Concepts introduced in Module 1 Lesson 1

CS Concept: Event Handling

What is an event?	An event is an action or occurrence detected by a computer program. Events can be user actions, such as clicking a mouse button or pressing a key.
What does it mean to handle an event?	To "handle" an event is to respond to an event. An event handler is typically a piece of computer code that process actions such as keystrokes and mouse movements. In StarLogo Nova, each breed can react to events independently. For example, when the "forever" button is pushed, the rabbits can eat, the grass can grow, and the wolves can hunt.

CS Concepts introduced in Module 1 Lesson 2

CS Concept: Instructions / Programs

What is an instruction?	A computer instruction is a simple command given to a computer in a computer language. Computer instructions are called "commands" in StarLogo Nova.
What is a computer program?	A computer program is a sequence of instructions that a computer runs or "executes".

CS Concept: Iteration / Looping

What is an iteration?	An iteration is a repetition of a process. Each iteration of a loop is a single time through the loop.
What is a loop?	A loop is a type of instruction that performs a set of enclosed instructions over and over again. There are different types of loop instructions such as conditional loops, iterated loops, and infinite loops.

## CS Concept: Public and Private repositories / galleries

What is a public gallery?	A public gallery is a space where others can view your projects.
What is a private gallery?	A private gallery is a space where you can store your projects and only you can see them.

CS Concept: Remixing

What does it mean to REMIX a project?	Remixing a project means that you are copying an existing project (either one you have created or one someone else created) and are saving a version of it as your own.
Is it cheating to REMIX a project?	No, if you acknowledge that you have remixed from another source and document what you added, changed or removed to make it your own, it is not cheating. The important thing is to learn from other projects.
Why remix?	We can learn and build off of each other's projects. Remix culture allows and encourages combining and/or editing existing materials to produce a new product. Remixing is a way to learn from others, improve upon, change, integrate or otherwise repurpose existing work.

CS Concept: Random numbers

What is a random number?	A random number is a number that appears to have been selected randomly from a set.
What are random numbers used for?	We generate and use random numbers any time we want to simulate a chance occurrence or chance behavior. For example, when two agents meet, there might be a chance that one passes a disease from one to the other. Say there is a 40 percent chance of transmission. Instead of rolling a 10-sided die, we might ask for a random number between 1 and 10. Then if we get a 1, 2, 3, or 4, which should happen 40 percent of the time, the disease would spread from one agent to the other.
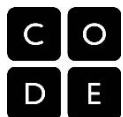
CS Concepts introduced in Module 1 Lessons 3

CS Concept: Conditional instruction

What is a conditional instruction?	A conditional instruction is a type of instruction that may, when executed by a computer, cause the computer to branch or begin execution of a different instruction sequence. Conditional instructions contain Boolean expressions. Depending on whether the Boolean expressions evaluates to true or false, a different sequence of instructions is executed. IF/THEN and IF/THEN/ELSE are examples of conditional instructions.

CS Concept: Boolean expressions

What is a boolean expression?	A Boolean expression is a mathematical expression that evaluates to one of two values (usually true or false).

CS Concept: Nesting conditionals

What does it mean to nest conditionals?	When we layer conditionals within other conditionals we call that "nesting". Nesting of conditionals can be used to implement more complicated logical constructs.

CS Concept: Algorithms

What is an algorithm?	An algorithm is a step-by-step set of instructions for performing calculations or behaviors. Algorithms are used for problem solving, calculation, data procession, and automated reasoning,
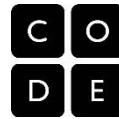
CS Concepts introduced in Module 1 Lessons 4

CS Concept: Collision Detection

What is collision detection?	Collision detection is the determination of whether or not virtual object are touching or overlapping.

CS Concept: Model

What is model?	A model is a representation of a system, process or object.

CS Concept: Simulation

What is simulation?	**Simulation** is the imitation of the operation of a real-world process or system over time. The act of simulating something first requires that a model be developed; this model represents the key characteristics or behaviors/functions of the selected physical or abstract system or process. The model represents the system itself, whereas the simulation represents the operation of the system over time.

CS Concepts introduced in Module 1 Lessons 5

CS Concept: Widgets

What is a widget?	A widget is a user interface element. Typically, a widget gets input from the user or displays output to the user. In StarLogo Nova, the user interface widgets include buttons, sliders, data boxes, graphs, and charts.
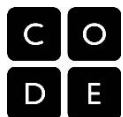
CS Concept: Variables

What is a variable?	A variable is a container for a value. The value held in the variable can be initially set and later changed. Agent variables can be created using edit breeds. Global variables are created using add widgets, specifically, adding data boxes and sliders.

CS Concepts introduced in other Modules

CS Concept: Abstraction and Decomposition

What is abstraction?	Abstraction is the process of making something easier to understand by ignoring some of the details that may be unimportant. This allows you to focus on what is important at this time to you. This doesn't mean that what you ignore is not important. It's just not important to what you're doing at that moment. Computer scientists talk about the levels or layers of Abstraction.
When do you use abstraction?	In modeling, we use abstraction when we decide what we want to include in our model and what can be left out.

CS Concept: Data

What are data?	Data, in modeling and simulation, usually refers to numbers that are generated by running our model. Data (plural) can be numbers such as the number of rabbits in a population over time.
How do we collect it?	We collect and visualize data using the graphs and tables in StarLogo Nova. We can see the changing values of different variables over time. Later, we will be able to output the data to a file.
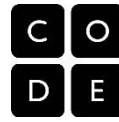
CS Concept: Data analysis
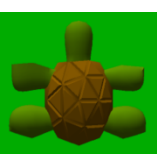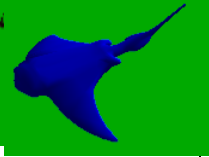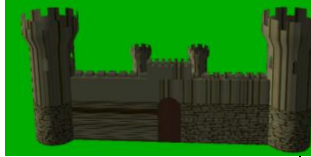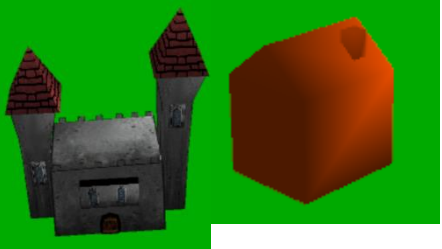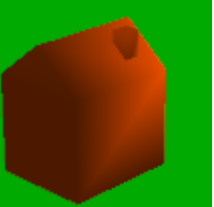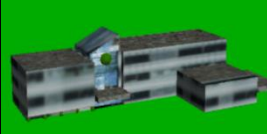
What is data analysis?	Data analysis is the process of examining data to find trends or patterns. We use mathematical descriptions such as mean, median and mode to describe characteristics of data sets. We can also use terms such as linear, non-linear, exponential and logistic to describe patterns of change in time series data.

CS Concept: Breeds, agents, and traits
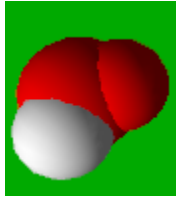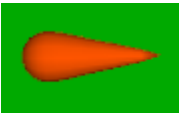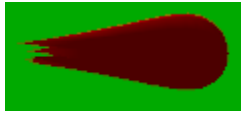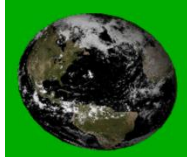
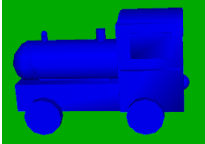| What is a breed?	A breed is a prototype for an agent. All agents inherit their type and traits from a breed. Breeds are defined using the "edit breeds" panel. After naming the breed, new traits can be added. When we create an agent, we must specify which breed or class of agent it is derived from.
What is an agent?	An agent is a virtual individual or object implemented in code. Agents have variables or traits that hold their characteristics or state. Agents also have behaviors, usually implemented as procedures.
What is a trait?	A trait is an agent variable. Agents have traits that they are created with by default such as color, breed, shape and size. New traits can be added using the edit breeds panel.
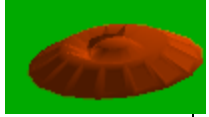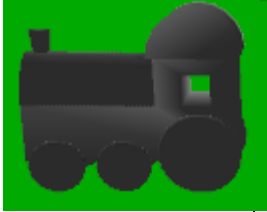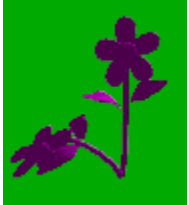
CS Concept: Decomposition and Procedures

What is decomposition?	Decomposition is the breaking down of a big problem into a set of smaller problems or breaking a process into different smaller steps.
What is a procedure?	Procedures are stacks of commands that perform a particular function and can be given a name. Procedures must be "called" or "invoked" to execute or run. When we decompose a problem into smaller problems, sometimes the solutions to the smaller problems are implemented in procedures.

Animals

Angel-fish	Bear	Clownfish	Dog	Elephant	Giraffe
Killer-whale	Lion	Lioness	Otter-float	Otter-stand	Penguin*
Raccoon	Sea-turtle	Seagull	Seahorse	Shark	Simple Turtle
Tuna	Turtle2*	Urchin	Dragon*	Mantaray	

Buildings

Castle*	Freecastle*	House	Hospital*		

People

fireman*				

Objects

Carrot (need to go up by 2)	Enzyme	Hydrant	Phospholipid	Water-molecule	Fireball1
Gem	Coin-silver	Coin2*	Fireball2	Fireball*	Earth*
Earth-Clouds*	Moon*	Starch			

Vehicles

Helicopter*	Lambo	Train	Truck*	Boat*	Spaceship1

Spaceship2	Train_wood				

Flower	Grass	Kelp	Rock	Tree*	

* set color trait to "white" for original texture in these shapes