

Help the Salmon Find its Home

A salmon swims upriver and finds home again:

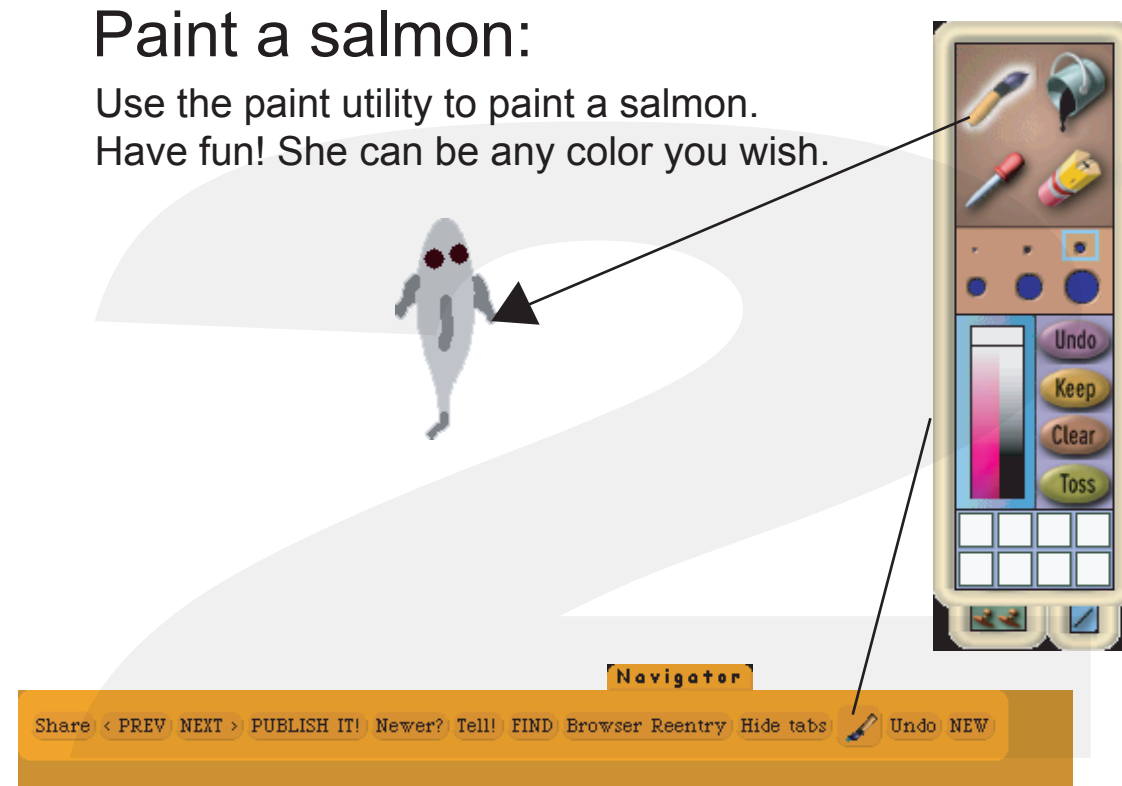
In this project we model a salmon in a river using scent to find it's way back home.

This project will be easier if you have some experience with:

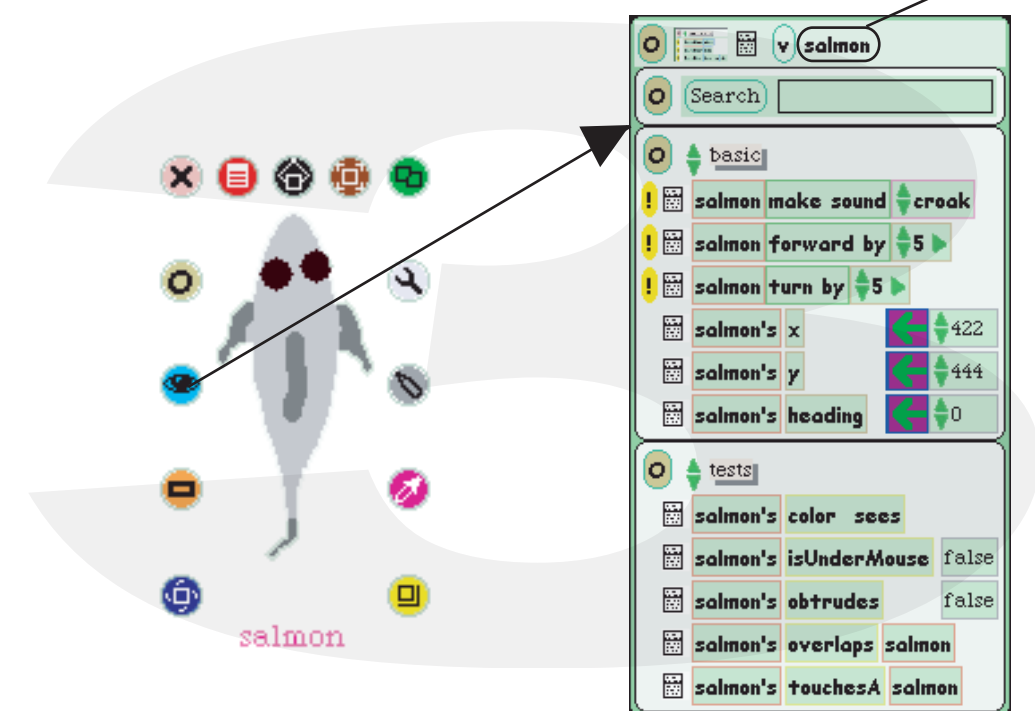
- Painting objects
- Naming objects
- Scripting
- Creating Instance Variables

Paint a salmon:

Use the paint utility to paint a salmon. Have fun! She can be any color you wish.

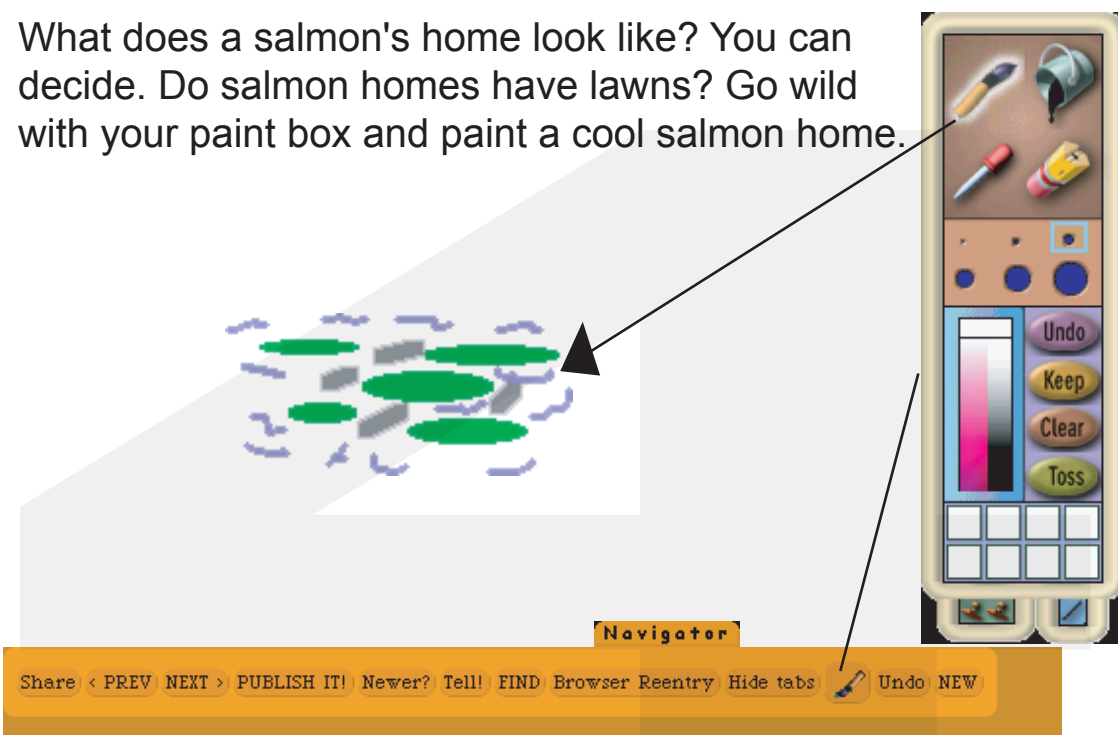


Use the salmon's "Halo of Handles" to open a viewer for your salmon. Give your salmon a name. We called ours "salmon".



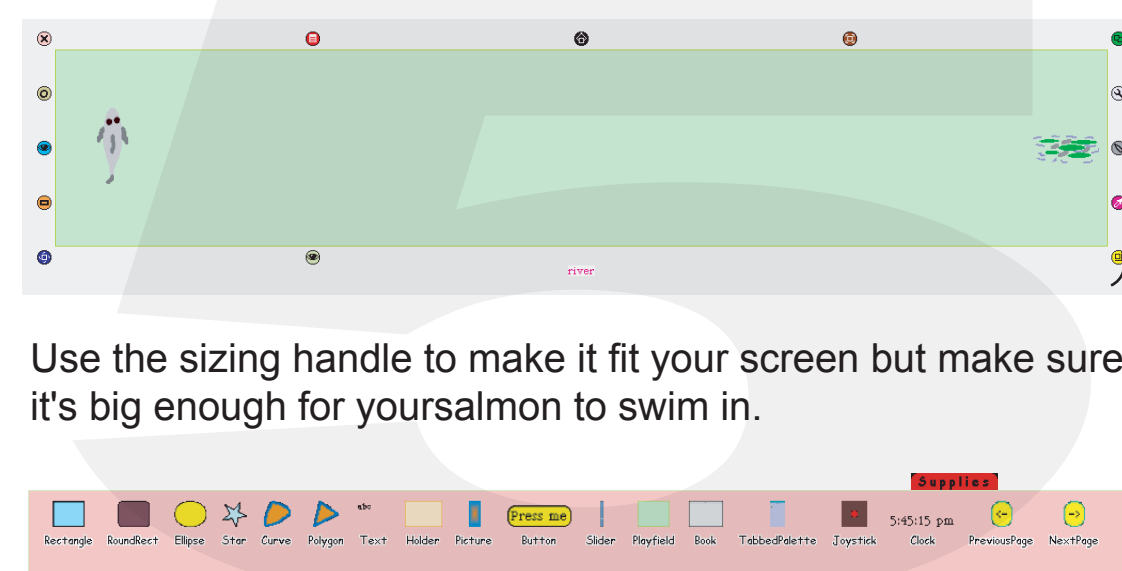
Paint the salmon's home:

What does a salmon's home look like? You can decide. Do salmon homes have lawns? Go wild with your paint box and paint a cool salmon home.



Make a river:

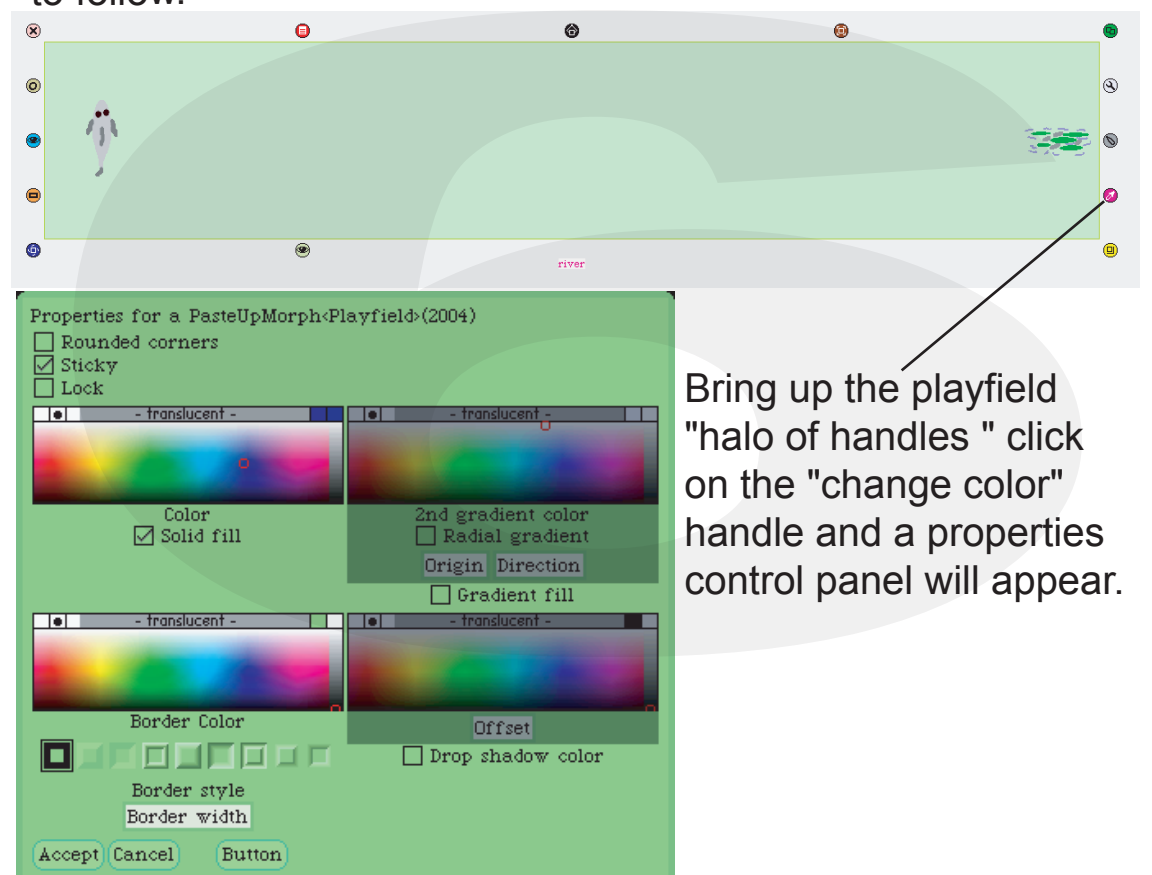
Go to the "supplies" tab and drag out a playfield. Pick up your salmon and drop her into one end of the playfield/river. Drop the salmon's home into the opposite corner.



Use the sizing handle to make it fit your screen but make sure it's big enough for your salmon to swim in.

The Scent of Home:

How will the salmon find her home? She'll use her sense of smell! Let's give the salmon home a scent for our salmon to follow.



Bring up the playfield "halo of handles" click on the "change color" handle and a properties control panel will appear.

Select "gradient fill", use the colorpickers to select white for the color far from home and a dark color for close to home. Use "origin" and "direction" controls to properly orient the gradient. When done click "Accept".



Follow the Scent:

Now the salmon and the salmon's home are in the river and the water is saturated with the scent of our salmon's home. How do we get the salmon to follow the scent? We must teach our salmon to compare where she is now with where she was before, and decide if the scent of home is stronger or weaker. Because the strength of the scent is equal to the intensity of the scent color we will use relative color saturation as a tool for guiding our salmon home.



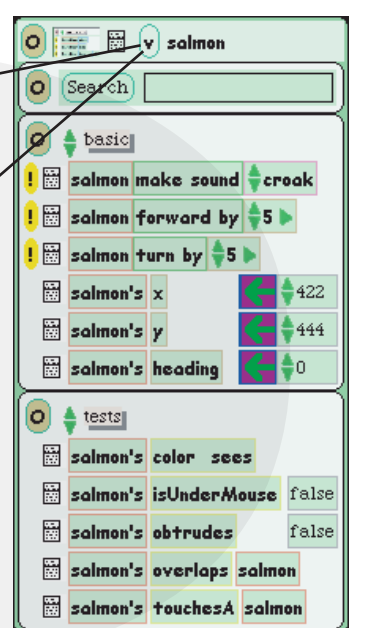
Set the Variables:

Open the "salmon" viewer. At the top of the viewer click the "v" button and create some instance variables.

Create a variable name it "oldscnt".

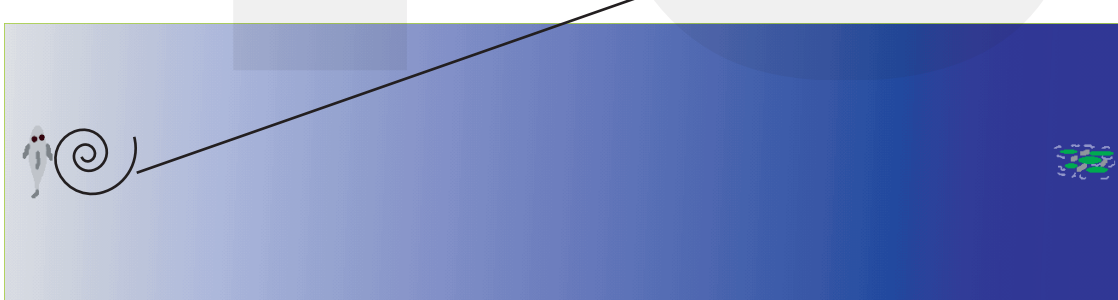
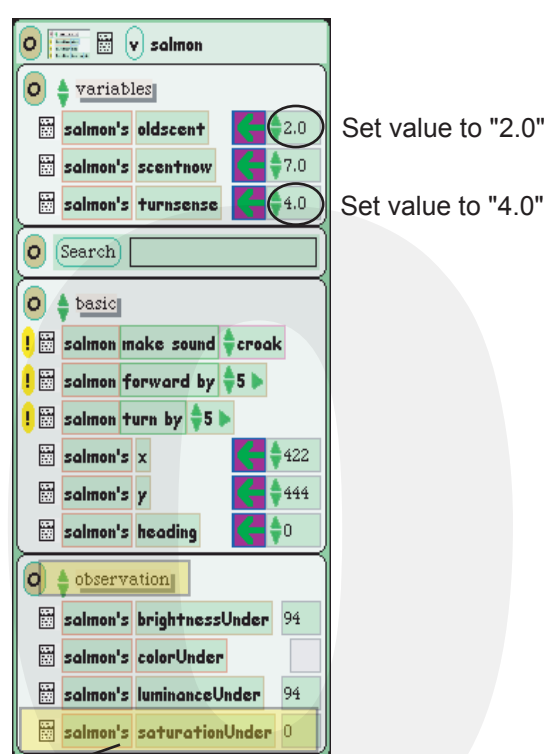
Create another name it "scentnow".

And a third name it "turnsense".



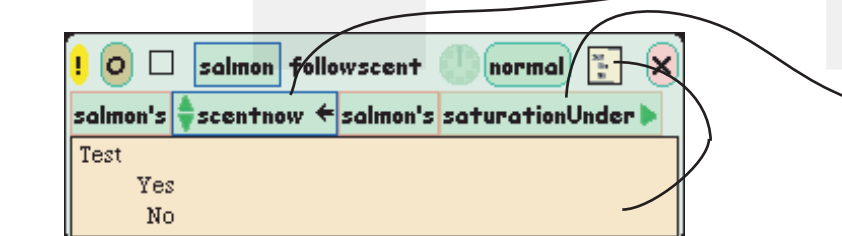
"Scentnow" and "oldscnt" are the two values that our salmon will compare in order to decide which way to go. "Turnsense" is crucial as our salmon must move and turn in order to seek a difference in the strength of the scent of home.

In the Observation category of the "salmon" viewer you will see a tile called "saturationUnder" with a value nearby. Note that the value changes as you pick up and move the salmon nearer and further from the salmon's home. This change in value is the key to the salmon's search for home.

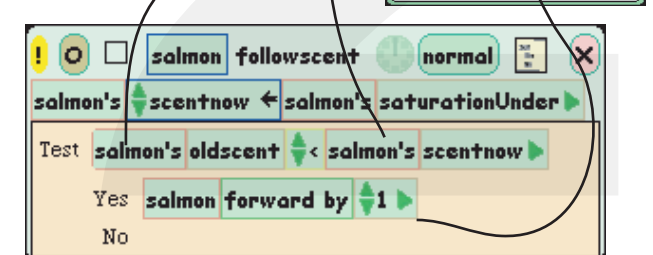


The "followscent" Script:

Drag an empty script from the salmon's viewer and name it "followscent". Using the assignment arrow, drag out the "scentnow" variable tile and drop it in the "followscent" script. Drag out the "saturationUnder" tile by its assignment arrow and drop it in place of the "scentnow" value. Now when you run this script "scentnow" will be less than or equal to "saturationUnder" at any given moment. Tear a test page off the top of the "followscent" script and drop it into the script.



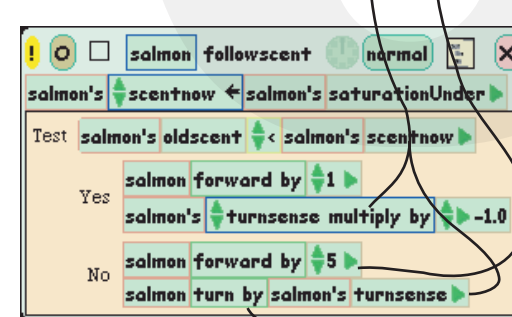
Drag the "salmon's oldscnt" tile to the test page and drop it on the "test" line. Use the green up/down arrows to bring up the "less than" (<) symbol on the right of the tile. Drag the "salmon's scentnow" tile to the test page and drop it on the value section of the salmon's "oldscnt" tile. The test line should read: "salmon's oldscnt < salmon's scentnow". From the motion category drag out the "salmon forward by" tile and drop it on the "Yes" line of the test page. Set the value to "1".



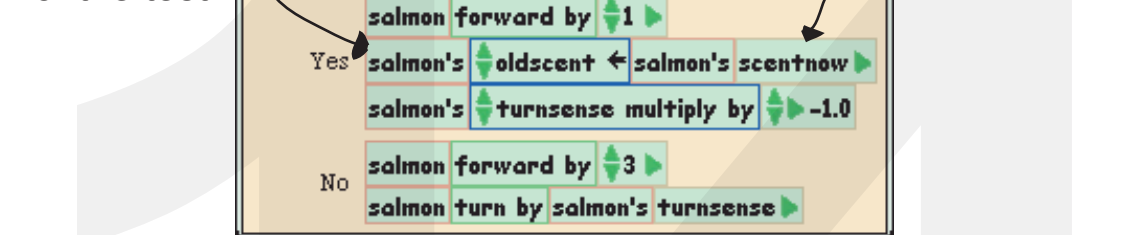
If the old scent is less than the scent now the salmon will swim forward.

Using the assignment arrow drag out the "salmon's turnsense" variable tile and drop on the "yes" line as well. Use the green up/down arrows to select the function: "multiply by" and set the value to "-1". This is a very easy way of reversing the salmon's direction of turn. Drag a "salmon forward by" tile and drop it onto the "no" line of the test page. Set the value to "3". Drag a "salmon turn by" tile onto the "no" line of the test page and then drag out a "salmon's turnsense" tile and drop it on the value of the "salmon turn by" tile. The resulting tile should read "salmon turn by salmon's turnsense".

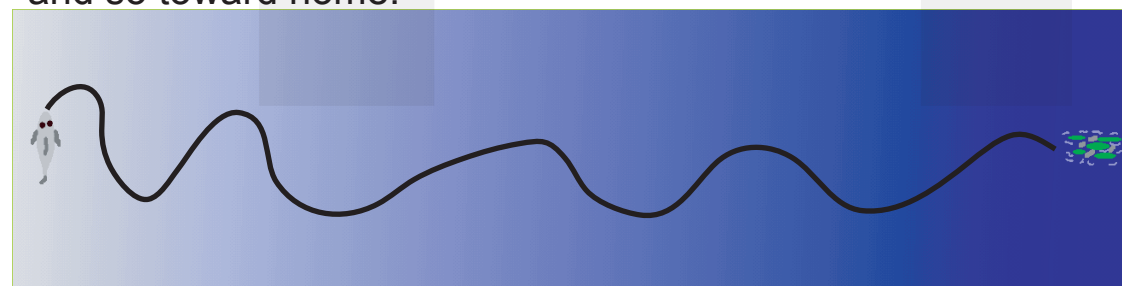
If the old scent is not less than the scent now then the salmon will turn a fast circle forward by 3 and around by either +4 or -4.



Drop the "salmon's oldscnt" variable onto the yes section of the test. Drop the "salmon's scentnow" variable onto the value of "salmon's oldscnt".

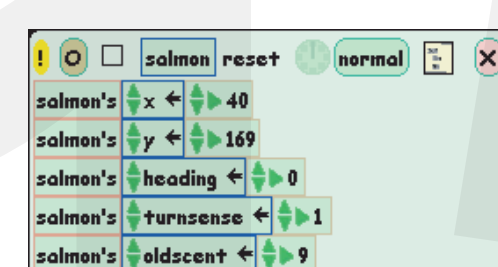


When you run this script the your salmon will begin by turning and moving and constantly comparing the saturation of salmon's home scent between where it was and where it is. Your salmon will always move toward the richer color saturation and so toward home.



Back to the Beginning

As your salmon swims upstream you may want her to start over from the beginning from time to time. A reset script is just the thing. From your salmon's viewer drag out an empty script. Name it "reset".



Make sure your salmon is in the proper position far away from the salmon's home, then go to the salmon's viewer and drag and drop the following tiles onto your reset script:

- salmon's x
- salmon's y
- salmon's heading (set value to -125)
- salmon's turnsense (set value to 2)
- salmon's oldscnt (set value to 2)