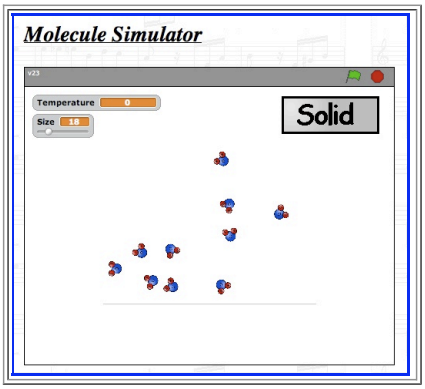
Molecule Simulator Step By Step Instructions:

Standards:
M5P4 Students will make connections among mathematical ideas and to other disciplines.
S5P2 Students will explain the difference between a physical change and a chemical change.
a. Investigate physical changes by separating mixtures and manipulating paper to demonstrate examples of physical change.
b. Recognize that the changes in state of water (water vapor/steam, liquid, ice) are due to temperature differences and are examples of physical changes.
c. Investigate the properties of a substance before, during, and after a chemical reaction to find evidence of change.

Requirements:
1. Has at least 10 molecule sprites
2. Each molecule moves and bounces off edge and each other
3. Each molecule moves faster and slower depending on the energy variable.

Extras:
1. Molecules "stick" closer together when energy is lower.
2. Molecules move farther apart when energy is higher.
3. Label sprites show the states of matter (solid, liquid, gas) at different energy levels.

Finished Sample:

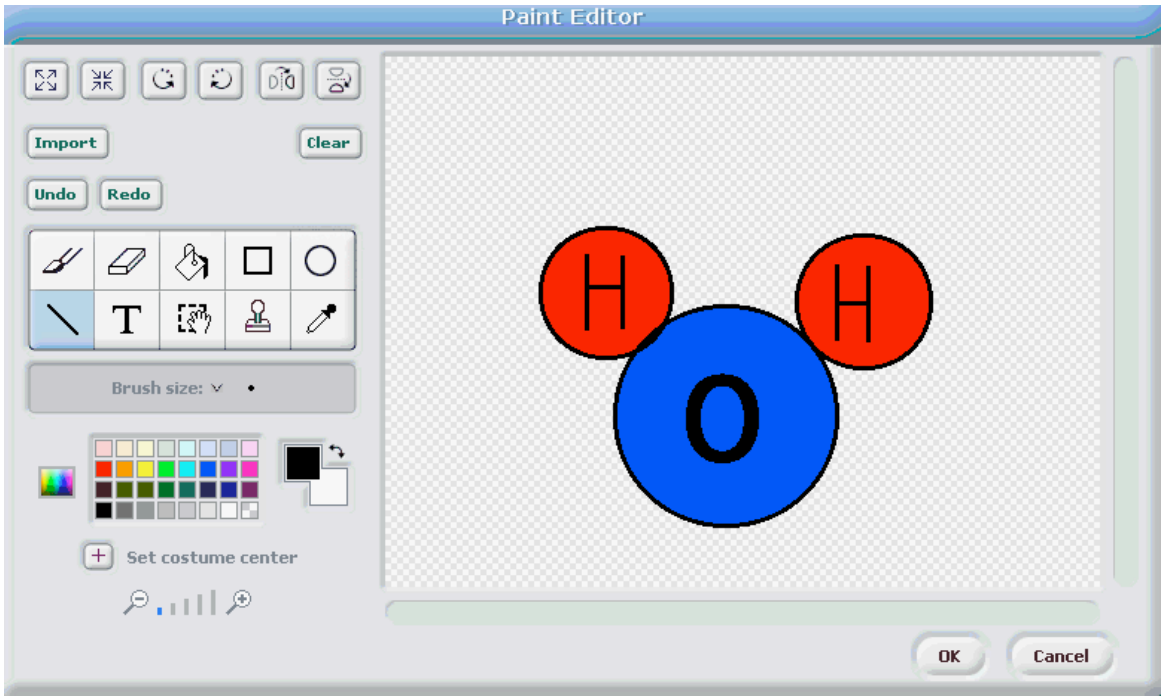


Step By Step Instructions:

Open Scratch and Draw Water Molecule:

1. Open Scratch
2. Delete the Cat
3. Draw a Water Molecule
   a. Click on "Draw a New Sprite"

   b. Draw Three Circles
   c. Use Flood Fill to fill the Circles
   d. Label with Text Tool (O, H, H)



4. Label the Water Molecule (You always have to name your sprites)

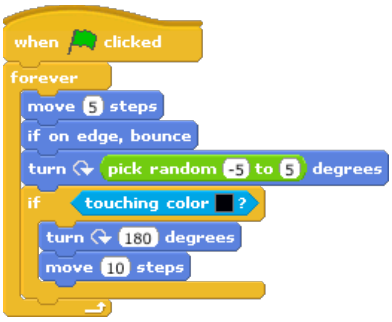
Add Scripts for Molecule to Move and Bounce:

5. Create the Scripts for the Water Molecule (Test, Run, Fix)
   a. Basic Movement Script:

   b. Simulate Molecule "Wiggle"

   c. Test and Run

   d. Bouncing off other Molecules



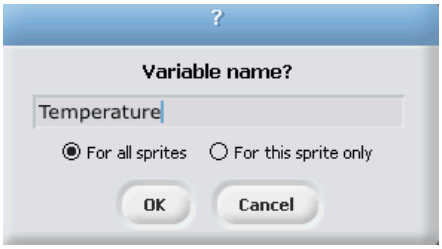
e. Run and Test

Add Variables for Speed and Size:

6. Create Variables for Speed and Size (What is a Variable?)
   a. Click on Variables

   b. Click "Make a variable"

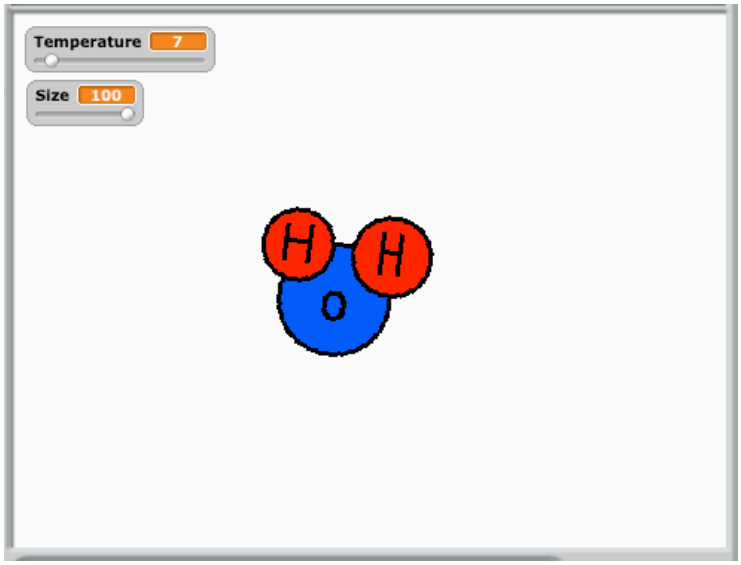
   c. Type "Temperature" -> Click "OK"



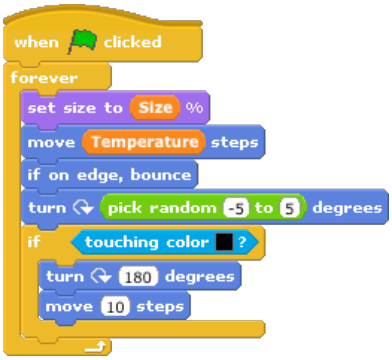
   d. Click "Make a variable"

   e. Type "Size" -> Click "OK"

7. Double Click on Sliders for Temperature and Speed



8. Put the Variable Blocks into the Scripts
   a. Put "Temperature" into the Move 5 steps block
   b. Add "set size to" Command
   c. Put "Size" variable block into "set size to" command



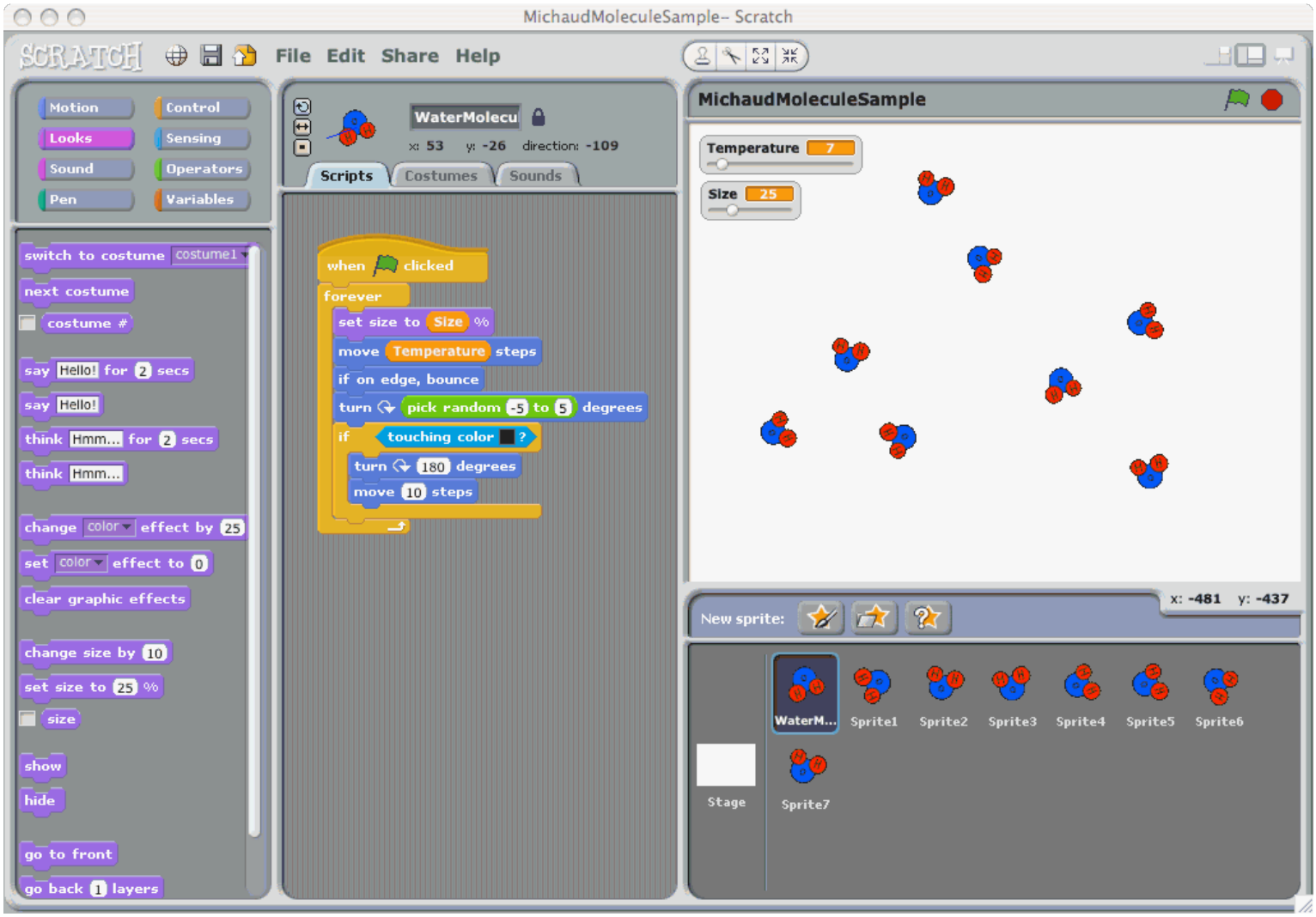
9. Run and Test

Make More Molecules:

10. Make more molecules!
    a. Use the stamp tool and make one more Molecule
    b. Run and Test
    c. Make lots of Molecules

11. Save Your Work. Click "File -> Save"
    (Scratch 1.4 automatically saves to a Folder it creates called "Scratch Projects" in your home directory.)

12. Finished Project:


MichaudMoleculeSample- Scratch
SCRATCH
File Edit Share Help
Motion
Control
Looks
Sensing
Sound
Operators
Pen
Variables
switch to costume costume1
next costume
costume #
say Hello! for 2 secs
say Hello!
think Hmm... for 2 secs
think Hmm...
change color effect by 25
set color effect to 0
clear graphic effects
change size by 10
set size to 25 %
size
show
hide
go to front
go back 1 layers
WaterMolecu
x: 53 y: -26 direction: -109
Scripts
Costumes
Sounds
when clicked
forever
set size to Size %
move Temperature steps
if on edge, bounce
turn pick random -5 to 5 degrees
if touching color ?
turn 180 degrees
move 10 steps
MichaudMoleculeSample
Temperature 7
Size 25
x: -481 y: -437
New sprite:
WaterM...
Sprite1
Sprite2
Sprite3
Sprite4
Sprite5
Sprite6
Sprite7
Stage