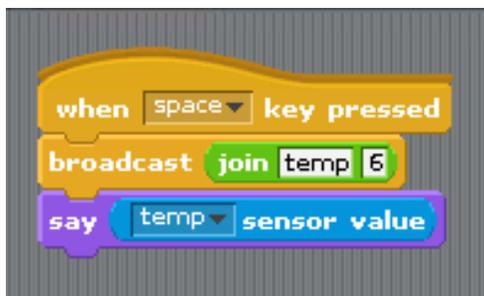


Activity 01: Check the Temperature

In this activity we are going to detect and report the room temperature.

- 1) Connect the Temp-Humidity module to port D6 on the GrovePi board.
- 2) Open up Scratch. We select GrovePi from the menu, and click on Start Programming. We are going to start with a new Program.
- 3) Now select a sprite (use the default one or create your own).
- 4) Select control then drag “when space key pressed” out to the script
- 5) Drag broadcast out and place it under the when block.
- 6) Select Operators and drag ‘join’ into broadcast then type ‘temp’ in the first column and 6 in the second.
- 7) Drag out a Say block.
- 8) Next drag out a sensor value block and put it into the say block. Select temp from the drop down box in the sensor value
- 9) Save the program with your initials and **Temp_Activity01**
- 10) Now let's run the program. Press the space bar.
- 11) Does the sprite display the temperature in a speech bubble?
- 12) The temperature is in Celsius. If you are not familiar with Celsius values, locate a Celsius to Fahrenheit chart on the Internet. Does the data seem accurate?

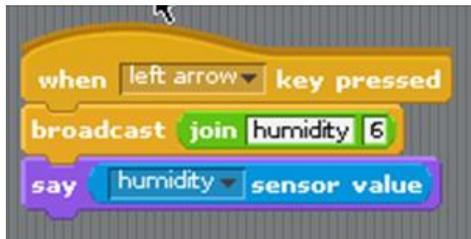


Activity 02: Check the Humidity

In this activity we detect and report the room humidity level.

- 1) Connect the Temp-Humidity module to port D6 on the GrovePi board.
- 2) Start with the program from our last activity for checking the temperature, open **Temp_Activity01**.
- 3) Now select the Sprite
- 4) Duplicate the temperature display code by right clicking “when space key pressed” and selecting duplicate
- 5) In the new block, change the hat command from “space key” to “down arrow”
- 6) Change the first join column from “temperature” to “humidity”

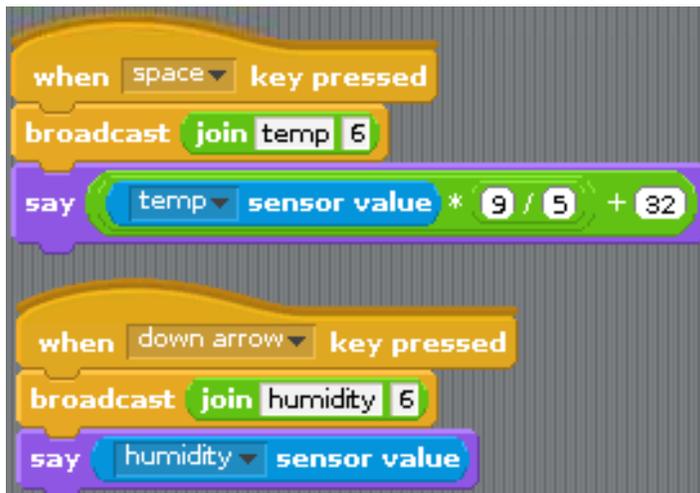
- 7) Then change the sensor value to “humidity”
- 8) Use the SAVE AS command and save the program with our initials followed by **Temp_Activity_02**
- 9) Run the program. Does it now display the Humidity when you press the down arrow and the Temperature when you press the space key?
- 10) If your program does not do this, go back and verify the code to see if you have any typing mistakes. Also check to see that the sensor is plugged into port D6. Make modifications and try again until it works.



Activity 03: Convert Temp to Fahrenheit

In this activity detect and report the temperature level and convert it from Celsius to Fahrenheit.

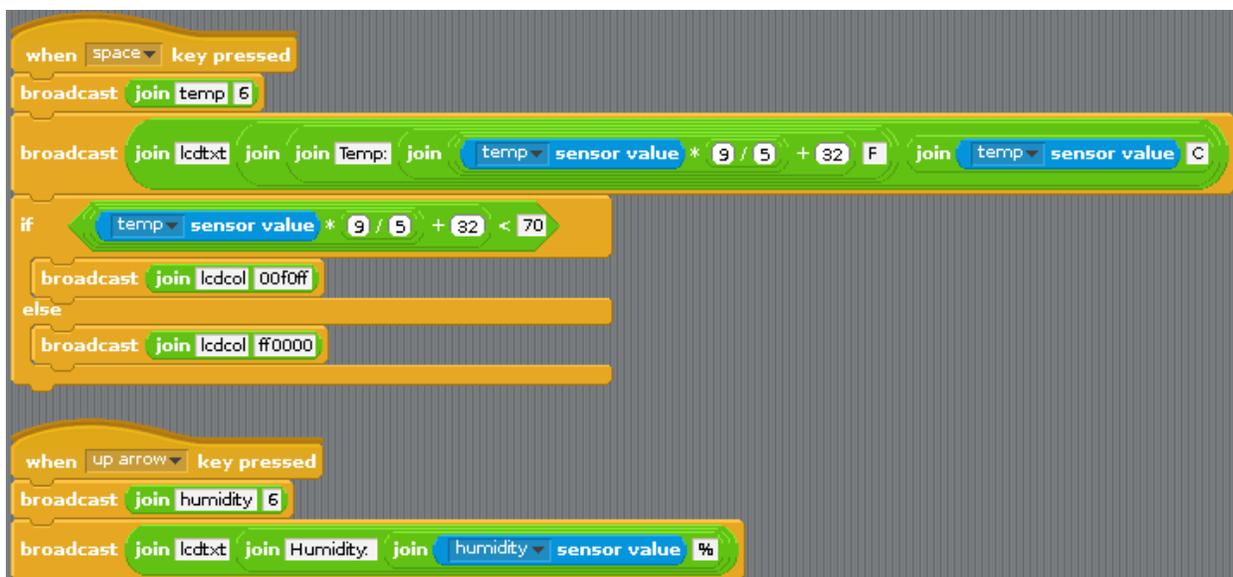
- 1) Connect the Temp-Humidity module to port D6 on the GrovePi board.
- 2) We will start with the program from Activity 2, so open **Listen_Activity02**.
- 3) This is your programming challenge. In the temperature section of the code, convert the temperature from Celsius to Fahrenheit.
- 4) Use the formula $\text{temp Celsius} \times 9/5 + 32 = \text{temperature Fahrenheit}$. To verify your values, search for and use an online program that converts Celsius to Fahrenheit.
- 5) Then find some clip art and create your own thermometer Sprite to display the Temperature in both Celsius and Fahrenheit.
- 6) Also find some clip art for a hygrometer and use it as a sprite to display the humidity.
- 7) Save the program with your initials followed by **temp_activity03**
- 8) Run the program. Does it now display the Humidity when you press the down arrow and the Temperature in both Celsius and Fahrenheit when you press the space key?
- 9) If your program does not do this, go back and verify the code to see if you have any typing mistakes. Also check to see that the sensor is plugged into port D6. Make modifications and try again until it works.



Activity 04: Temp on LCD Display

In this activity we detect and report the temperature level and convert it from Celsius to Fahrenheit, and then show it on the LCD display device.

- 1) Connect the Temp-Humidity module to port D6 on the GrovePi board.
- 2) Start with the program from Activity 3, so open **temp_activity03**
- 3) Here's another programming challenge for you. Go back and find the programs we used to display information onto the LCD display. Modify the **temp_activity03** program code so that it connects to the LCD display.
- 4) Then modify it to add a display of the temperature in both Celsius and Fahrenheit on the LCD display.
- 5) Also display the humidity on the LCD display.
- 6) As an extra bonus, try to create a single bar graph to display the temperature in Celsius on the LCD display.
- 7) After writing your program, select 'SAVE AS' in the File menu to save the program. Choose the folder on your USB device and name the program with your initials **temp_activity04**.
- 8) Prepare to demonstrate your program to your teacher and classmates.



Activity 05: Your Turn

It's your turn to create a program using the temp-humidity sensor.

- 1) Using the code blocks you learned in this lesson, kick it up by: (one of these)
 - a. Detect temperature and humidity and display it
 - b. Take action based on a change in temperature or humidity
 - c. Allow user to select a desired temperature and display difference between actual and desired
- 2) State the Problem that you will address.
- 3) What do you want the temp-humidity sensor to do? What happens when it reaches a particular level? Will you use Sprites or something else to display the action?
- 4) Use a separate document to write down your algorithmic problem solving to design solutions: problem statement and exploration, examination of sample instances, design, implementing a solution, testing, evaluation.
- 5) After writing your program, select 'SAVE AS' in the File menu to save the program. Choose the folder on your USB device and name the program with your initials **temp_activity05**.
- 6) Prepare to demonstrate your program to your teacher and classmates.