

## EXPLORATION IDEA PROFILE: Coding for Wifi Enabled Lighting

### EXPLORATION IDEA

This project will explore the use of a wifi enabled lighting system (i.e. Philips Hue Lighting) to visually respond to changes in selected NASA data. Using the coding language Python, we will test this idea by programming a small single-board computer (Raspberry Pi) to check and pull the latest Kp-index data from the Community Coordinated Modeling Center. Every three hours throughout the day, magnetic observatories around the world measure the largest magnetic field direction shift that their instruments recorded during this time. The result is averaged together with those of other observatories to produce an index that tells scientists how disturbed the Earth's magnetic field is on a 9-point color-coded scale. Green=Low, Yellow=Medium, Red=High.

The Raspberry Pi will be programmed to check the level of the Kp-index every 20 minutes and cause selected wifi enabled lights to flash with the proper color. The Kp-index indicates roughly the current global strength of aurora.

### TARGET AUDIENCE(S)

Based on the coding that is involved, the audience needs to have a solid understanding of the Python programming language, a skill often taught during high school and onward. This visual alert may be useful to aurora enthusiast audiences in a variety of informal education venues, particularly those in polar regions.

### POTENTIAL IMPACT

This project not only has the potential to help an audience better understand coding, but also how science can be integrated into the process.

[www.nasa.gov](http://www.nasa.gov)



*This is an image of the NASA STEAM Innovation Lab's wifi lighting.*

*Credit: NASA*

### RELATED IDEAS/INNOVATIONS

- Coding the lights to indicate when NASA is mentioned in a Tweet

### MATERIALS/EQUIPMENT

- Raspberry Pi
- Monitor, keyboard, and mouse
- Philips Hue Lighting
- Wifi Router
- Wifi

### EXPLORATION IDEA TEAM

- **Team Lead:** Lani Sasser (NASA)
- **Team Members:** Kaushal Patel (NASA), Abhishek Gorti (United States Naval Academy)
- **Affiliated Contributors:** CCMC (Community Coordinated Modeling Center)

# Coding for Wifi Enabled Lighting

## What's the NASA Connection?

Use these ideas to better understand how NASA uses light technology in electronic communications.

## STEAM Subject Matter Target:

### Science:

- Magnetic Fields
- Using Data
- The Earth

### Arts:

- Applied Art
- Creativity and Expression
- Highlights and Shadows, Physical Form

### Technology:

- Computer Programing and Coding
- WiFi

### Mathematics:

- Collecting and Using Data

### Engineering:

- Computer Engineering
- Coding
- Sensors

**Exploration Idea Profiles** provide a basic snapshot of an innovative NASA based idea. They are developed through a guided process involving a step-by-step guide/worksheet where participants are invited to consider additional topics that include:

- Connections to other technologies
- Connections to existing information/research
- Connections to educational standards
- Connections to existing activities/projects
- Universal design

Additional information is also included to assist with further exploration or expansion of the idea in an individualized way.

## HOW TO CONNECT

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