



Drexel-SDP GK-12 LESSON

- ***RF LED Communicators Exercise***
- *Wireless Communication*
- Subject Area (Unit): ***Engineering***
- Concept: Wireless Communication

Objectives This is the final lesson in the wireless communication sequence that should provide an opportunity to put what has been learned thus far into practice. The students use an RF LED module to send information to their group's members and once again guide them through a city to a specific location using the map provided.

Students will be able to....

- Understand practical limitations of wireless communication
 - Implement and explore the design and use of wireless communication in using a real RF transmitter and receiver
 - Tie together several previous lessons on waves and communications to see what they have learned in action
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- PA Academic Standards: *3.1.7AB, 3.2.7ABCD, 3.4.7AB, 3.7.7E*
 - Grade Level: **6**
 - Setting/Group Size: Classroom split into small groups or working as individuals.
 - Duration/Time Required: ***2 60 minute sessions***

Materials List: RF Communicators, Worksheet on Communication, Map

Context: So far the students have learned about protocols for wireless communication, how light behaves and Morse Code. In this lesson they use modules built to control LED lights of different color using a remote control. They first are asked to discover what signals can be sent using the modules, particularly what color combinations can be sent simultaneously.

They are then asked to again create a communications protocol based on the communicator provided and to provide directions for their friend to meet them in Tokyo using the previous map.

Initially the modules are all set to different channels, after the first round of exercises they are then encouraged to change that channel and to move about the room to discover what difficulties they run into. Can they send information through walls, at what distance do the modules work, what happens when another group is set to the same channel as them and tries to send information?

Methods and Procedure: Begin by demonstrating the RF modules. Begin a discussion on how they students think that they are working? It is often interesting to explain to them how the modules were constructed, particularly since they are made from RC Cars that can be purchased at the store for \$5 or \$10.

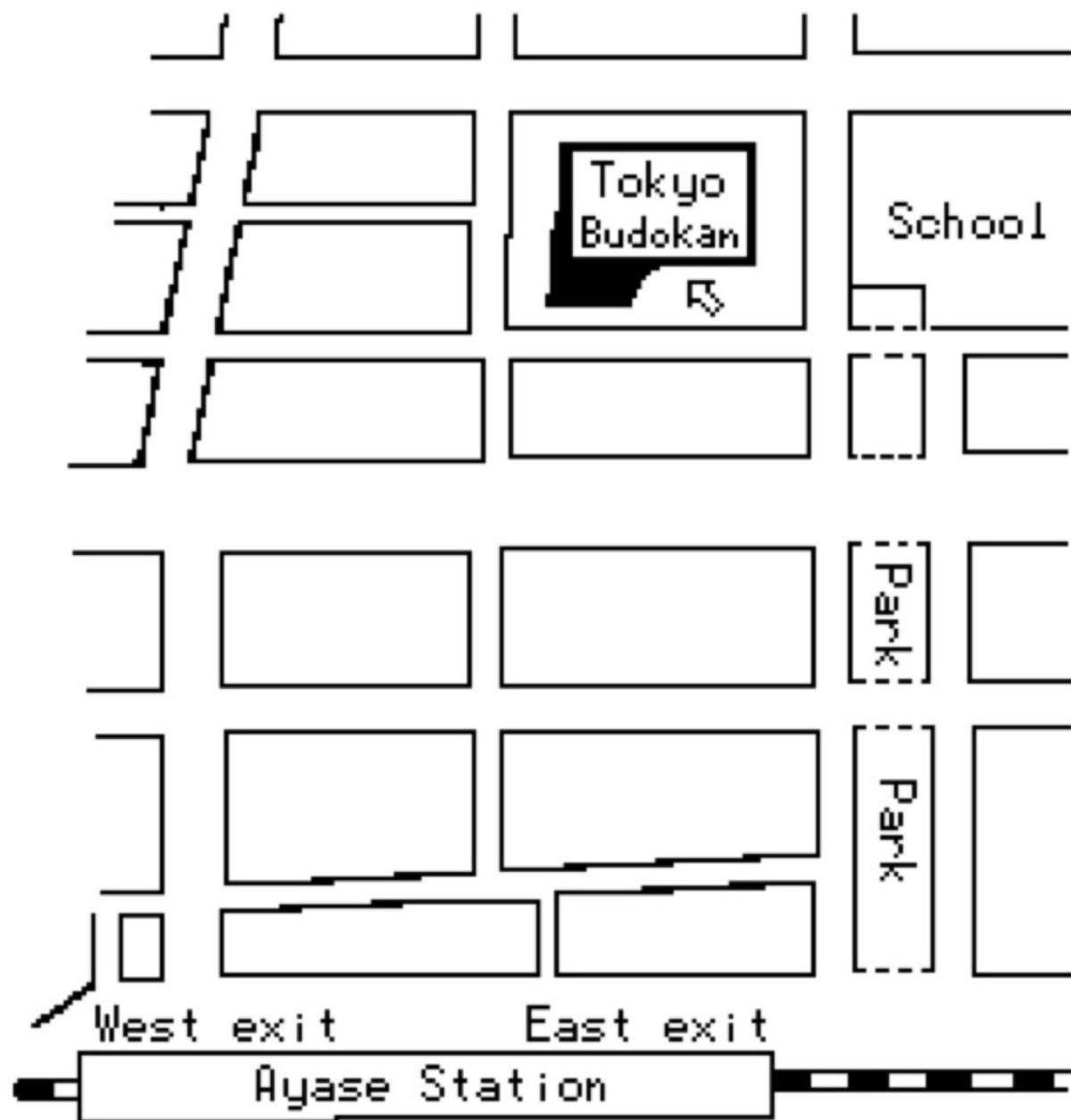
After the demonstration, distribute a module to each group and ask them to start by constructing a list of possible signals that can be sent. (Using the RC Car parts creates a unique set of possible color combinations due to the use of “forward” and “reverse”). Once they have created a complete list, ask them to once again write up a communications protocol of the map.

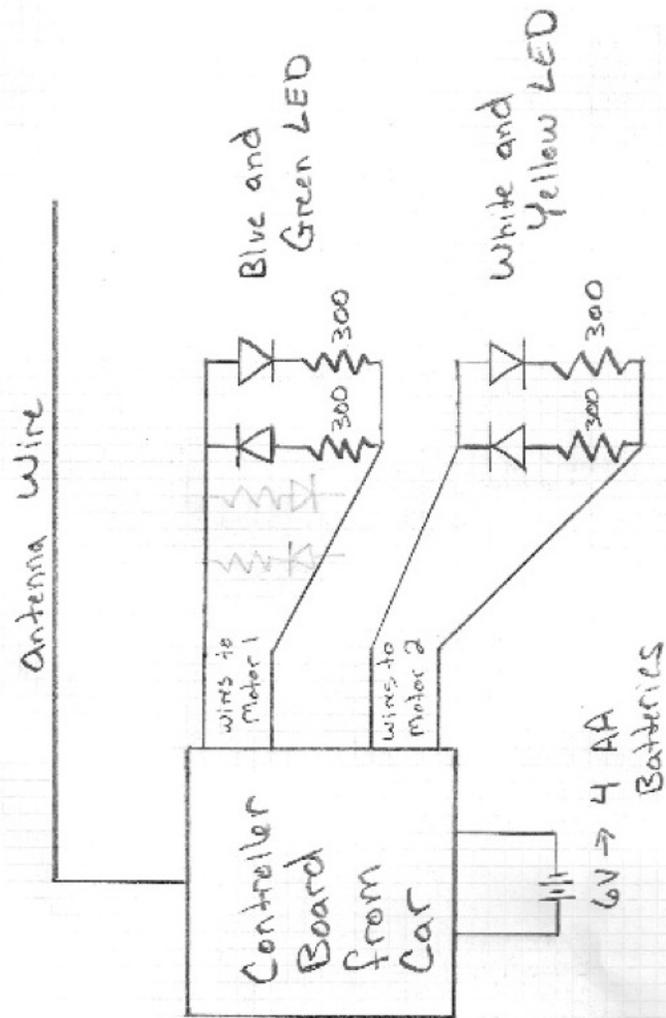
Once they have done this in their groups, provide one group member with a start point and a destination point and ask them to send the information to the rest of their group to see if they can accurately provide their team members with the correct information to arrive where they need to be. If possible repeat several times so that each team member can be the sender at least once.

After they have completed the basic exercises, ask them to discover the limitations that they think the modules might have based on what they know about waves and wireless communication from previous lessons. Also, show them how they can change the channels on the communicators to work with other teams to see what trying to use two communicators on one channel might do.

End the lesson with a discussion of what they have discovered about the RF LEDs. What works, what didn't work? How does the lesson today relate to the previous lessons? How might the modules be improved or specialized for use in specific applications?

- Assessment: *Communication Worksheet, Science Journal Entry*
- Keywords: Wireless Communication
- Author: Eric Gallo





RC Remote is not modified