Activity 2

Passion for Pixels

SEND DIGITAL SIGNALS TO A FRIEND!

Did you know when you look at a photo of a planet in space, you're really looking at a set of numbers? Remote-sensing satellites take pictures and gather data that is transmitted to the ground as digital signals, or sets of numbers. Then computer software converts the numbers into color images.

You'll Need (per small group):

- pencils
- 2 pieces of grid paper
- optional: computer image to illustrate the concept of pixels

45 min.

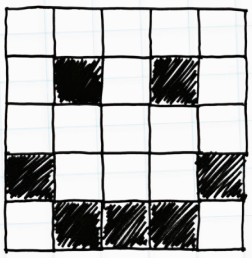
Here's how:

1. **Discuss digital images.** Explain that digital images are made up of hundreds of small squares called picture elements, or pixels. If you have a computer available, zoom in on an image to reveal the pixels.

POINTER: The more pixels per inch the higher the resolution and the better the image quality. Printed materials usually require 300 dpi (dots per inch), while online images are 72 dpi.

2. **Deliver the challenge.** Divide your group into pairs [1] and hand out the supplies. Introduce the **SciGirls Challenge:** "Transmit" an image digitally to your partner. Explain that they will create an image on the grid paper, and then use a code of zeroes and ones to transmit the image digitally, similar to the way satellites transfer images.

3. **Plan.** Ask each group to select one person to be the sender and the other to be the receiver. (The roles will be reversed later.) Have the girls decide on the size of their grid [3] (e.g., 5 squares x 5 squares or 6 squares x 8 squares), then have each girl draw an outline of the area on her paper. Next, have the sender draw a simple illustration on the grid by blacking out individual squares. (See below.) There should be no shaded or partially filled-in squares. And most important, the receiver should not see what the sender has drawn.



4. **Transmit data.** Direct the sender to "send" her picture to the receiver by reading her picture, square by square, as a digital code: 0 for a white (unfilled) square, 1 for a black (filled) square. As the sender reads the code, the receiver colors in the squares on her own grid. Be sure to have the girls agree upon a convention for the order of transmission (e.g., left to right, top to bottom).

5. **Compare the images.** Then have girls switch roles and do the activity again.

6. **Analyze.** How accurate were their image transfers? How could they send more complex images, such as images with color? How could they speed up the process of transmitting information? [6]