About the Colors of Landsat Images

True color images show how the land would look if you were observing it from space with your own eyes.

But our eyes don't tell us everything there is to know. Sensors such as the one on Landsat give us extra insight into nature. The sensor on the Landsat satellite makes observations of light reflected from the Earth in both visible and **infrared** (invisible) wavelengths of the electromagnetic spectrum. So with Landsat, we can see more about nature than we can when we use our eyes alone.

The **false color** Landsat image your teacher will give you shows information in some infrared wavelengths of light. Normally infrared wavelengths are invisible to us. In order for you to be able to detect it, information about these infrared wavelengths have been colored in a special way in this "false color" pair.

Compare the true color and false color images. Do the true color images show you the most about difference in land cover, or do the false color images show you the most? Which would you choose to detect land cover change over time, true or false color?

We'd like to suggest you use the false color images for this activity!

Now you know that Landsat images are not photographs. They contain more information than photographs do. In fact, the Landsat 5 and 7 sensors observe seven distinct wavelength ranges of the electromagnetic spectrum. Those seven "bands" of data are powerful tools for studying the land and what's on it.

Here are some details about the false color images provided for this activity:
The pair of false color images provided for this activity show mid-infrared, near infrared, and visible green wavelengths, or Bands 7, 4, 2 in Landsat lingo.

Tones of red or pink in the 7, 4, 2 images represent the reflection of **mid-infrared** wavelengths reflected from the Earth's surface. They comprise Band 7, which measure wavelengths of 2.08 to 2.35 micrometers (µm). (A micrometer is one millionth of a meter.) Mid-infrared wavelengths are useful for distinguishing between kinds of minerals and rocks, and for observing the moisture content of vegetation.

Tones of green in the 7, 4, 2, images represent **near-infrared** wavelengths reflected from the Earth's surface. They comprise Band 4, which measures wavelengths of 0.76 to 0.9 µm. Near- infrared wavelengths are useful for observing soil moisture, distinguishing between kinds of vegetation, and seeing the boundaries of bodies of water.

Tones of blue in the 7, 4, 2 images represent **visible green** wavelengths reflected from the Earth's surface. They comprise Band 2, which measures wavelengths of 0.52 to 0.6 µm. Visible green wavelengths are useful for observing different kinds of vegetation and for monitoring vegetation health, as well as for identifying human-made features such as roads, buildings, and parking lots.

One more note: You may not be able to identify every kind of land cover in these images. **You are not alone.** Scientists don't make positive identifications using just the satellite images/data. They must check what they think they find in satellite images against what they find to be true from observations on the ground. (This process of checking their data with observations on the ground is termed "ground truthing".) Working with geographic areas already familiar to you makes the identification/checking process easier.