

STEM *Sims*™

# Galaxy



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**Do you need an idea for a scientific study?  
Try out one of our ideas or make one of your own.**

**Start learning right now about how people study celestial objects from afar. Take the following brief quiz to see how much you already know about galaxies. See the bottom of page 4 to check your answers.**

1. Prior to digital television sets, turning the channel in between normally viewed television stations, some of the static on the set would be due to the residue of the Big Bang explosion that started our universe.
  - a. true
  - b. false
2. When looking at stars in the night sky, in some cases the light you are seeing now is showing the star as it looked millions of years ago.
  - a. true
  - b. false
3. The earth creates light in the same way that our sun and other stars do.
  - a. true
  - b. false
4. About how many Earths could fit inside the volume of our sun?
  - a. true
  - b. false
5. The mass of one teaspoon full of the matter that makes up a neutron star would have about the same mass as...
  - a. a typical car.
  - b. a typical house.
  - c. a typical 8-story hotel.
  - d. Mount Everest.


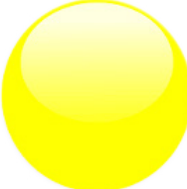




## What color is it really?

White light, or the normal light experienced during most people's daily life is a mixture of all of the colors of light in the visible electromagnetic spectrum. Most people can name the colors of the spectrum in order from longest wavelength to the shortest by using the mnemonic device:

ROYGBIV (red, orange, yellow, green, blue, indigo, and violet).

Knowing that white light is a mixture of all colors, can you determine what color each object when normally viewed with white light would look like when illuminated only in the light color specified? See the bottom of page 4 to check your answers.

	Object	Illuminated only with this color	Appearance color?
a.		Green	
b.		Blue	
c.		Red	
d.		Yellow	

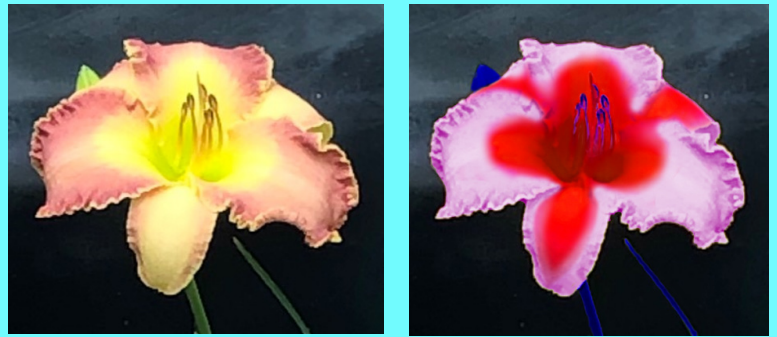
Hopefully, you see that an object's color is really a tough thing to determine. The color depends on what color of light illuminates the object. A blue-colored object absorbs all the colors of white light except blue. We say the object is blue because it reflects blue light. If any color light other than blue (or white that contains blue light) illuminates a blue object, the object appears dark-black without any color, since all the other colors of light are absorbed by the object and no colors of light are reflected to your eyes.

**One last question:** A green plant with a yellow flower is illuminated with only green light. What color will the plant and flower appear?

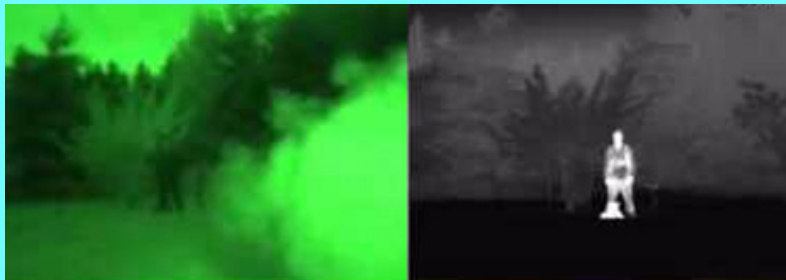
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## Can you see?

Have you ever heard the expression: “There’s more to life than meets the eye?” When walking through a garden, our eyes and brain see red roses and white daisies. Honey bees can’t process light the way that humans can, they only see the ultraviolet (UV) part of the electromagnetic (EM) spectrum and so their view of an object is much different compared to what humans observe. The left image shows how a yellow flower appears to the human eye, while the right image shows how a bee would see the same flower.



Humans have created devices that allow them to see parts of the EM spectrum outside of the visible light range. While bees see objects in the UV spectrum, people created infrared (IR) and UV glasses to view objects in low light settings, such as at night. Other vision-aiding tools, such as thermal night vision, use the heat emitted by living things to provide a view in very low to no light settings. However, the colors of the things viewed with thermal glasses do not show the true colors when viewed with white light. Instead, these glasses show temperature differences within the object being viewed. Note in the image to the right, the person viewed using thermal imaging is clearly seen, while the standard night vision on the left fails to highlight the person in the middle of the image.



Please visit the following webpages for more helpful information:

**[STEMsims.com](http://STEMsims.com)**

**Answers:** Page 2 Answers:(1) a, (2) a, (3) b, (4) c, (5) d. Page 3 Answers: What color is it really? (a) black, (b) black, (c) red, (d) yellow. One more question: The plant part would appear green, while the flower would appear black.

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