Disclaimer: This packet is intended ONLY for the use of students enrolled in Leon County Schools.

Complete the assignments below.

6th Grade

Week 1:
☐ Life Science (SL.6.L.14; SL.6.L.15) ☐ Content Area Reading: The Wolf Within (LAFS.RI.1.1;SL.6.L.14) ☐ Skill Activity: Scientific vocabulary and textual support (RI.1.2; RI.4.10)

Week 2:
☐ Physical Science (SC.6.P.11; SC.6.P.12; SC.6.P.13) ☐ Content Area Reading: How are Rainbows Formed? (RI.1.1;SC.6.P.11) ☐ Skill Activity: Scientific vocabulary and textual support (RI.1.2; RI.4.10)

Week 3:
☐ Technology and Science: (SC.6.N.1; SC.6.N.2; SC.6.N.3) ☐ Content Area Reading: Safe at Any Speed (RI.1.1;SC.6.N.3) ☐ Skill Activity: Scientific vocabulary and textual support (RI.1.2; RI.4.10)

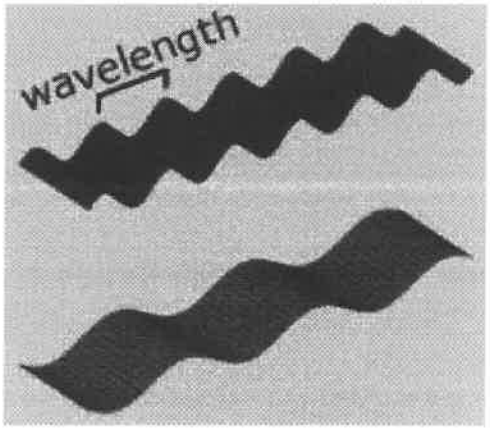
Week 4:
☐ Technology and Science: (SC.6.N.1; SC.6.N.2; SC.6.N.3) ☐ Content Area Reading: Blue Lightning (RI.1.1;SC.6.N.3) ☐ Skill Activity: Scientific vocabulary and textual support (RI.1.2; RI.4.10)

How Are Rainbows Formed?

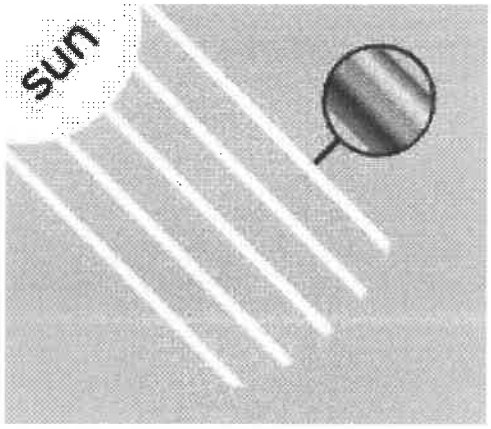
by Dr. Hany Farid

Sunlight is composed of light of varying wavelengths. Short wavelength light appears blue, violet and indigo, and long wavelength light appears red, orange and yellow. When sunlight enters a raindrop in the air, the light splits into a multitude of colors. This light then reflects off the back of the raindrop and re-emerges in the direction in which the light first entered. The light emerging from many raindrops creates a rainbow. Read on for a more detailed explanation.

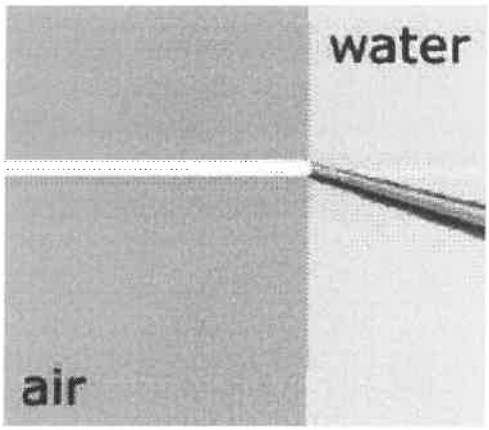
Fact 1. Light travels in waves. The light's wavelength determines its perceived color. Short wavelength light, for example, appears blue, and long wavelength light appears red.



Fact 2. Sunlight is composed of light of many wavelengths. In the range that we can see, this includes the colors of the rainbow.

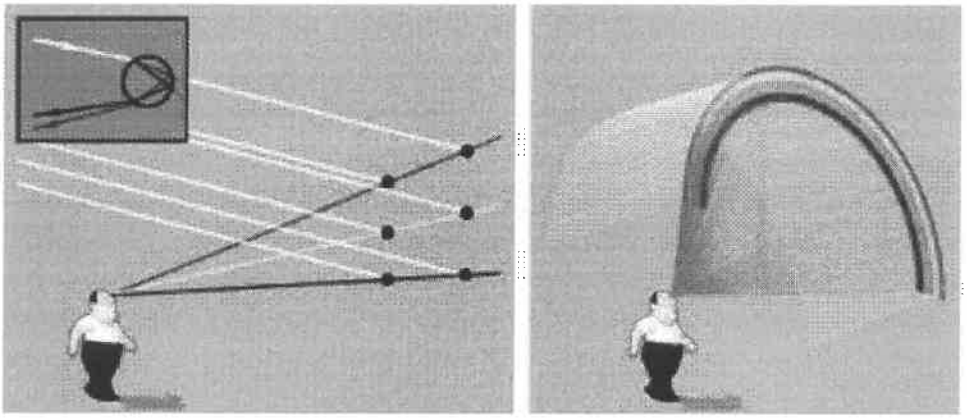


Fact 3. When light enters water it bends (refracts). The amount of bending depends on the wavelength of light. As a result, the light splits into its component colors.



When a ray of sunlight enters a raindrop it bends (refracts). The light then strikes the back of the raindrop, where some of the light passes through and some is reflected. As the light exits the raindrop, it is refracted again. The angle at which the light emerges depends on the wavelength of light. This path is illustrated in the small box below, where only the bending of two wavelengths (blue and red) are shown.

Consider now the diagram on the left. The sun is behind you (white rays) and there is rain in front of you (black dots). As the sunlight enters each raindrop, the light is refracted and reflected as described above. Because the sun is so far away, the rays of sunlight are nearly parallel to one another. As a result, the angle between the red line and each ray of sunlight striking a raindrop on that line will be the same. So, the light that reaches your eye along this ray will be of the same wavelength (color). The same is true for the yellow, blue and intermediate lines corresponding to each color of the rainbow.



Consider now the diagram on the right which explains why the colors of a rainbow form an arc. The angle between the incoming rays of sunlight (white) and all of the red lines, forming a circular cone, have the same angle. As a result, the light that reaches your eye along these lines have the same wavelength (color). The same is true for each band of the rainbow.

The reason that rainbows are somewhat rare is that you will only see them when there is rain in front of you and somewhat in the distance, and the sun is behind you and fairly low on the horizon.

angle an · gle

Definition

noun

1. the figure made by two lines coming from a single point.

   Every triangle has three angles.

Advanced Definition

noun

1. the geometric figure made by two lines extending out from a single point.

   Every triangle has three angles.

2. the space between the lines of such a figure as measured in degrees, the number of which reflects the amount of turning that would be required to move one of the lines so that it meets and overlaps the other.

   Each angle in a square measures 90 degrees.

3. the degree to which a line or plane slants with respect to a horizontal or vertical plane.

   The angle of their driveway is so steep that they cannot drive up safely in the winter.

4. a corner that projects outward or inward.

5. the standpoint from which something is considered; point of view.

   The Christmas tree looks beautiful from this angle.

   Why don't we look at the problem from another angle?

   Your proposal doesn't seem very advantageous from our angle.

6. in journalism, the particular way in which an article is slanted, as for a specific audience.

   Make sure you give it a strong Hollywood angle.

7. a side or aspect of something.

   The editor likes a story with a lot of angles.

transitive verb

1. to move, bend, or adjust at an angle.

   I need to angle that outside mirror so that I can see better behind me.

2. to write in a manner that will appeal to a specific audience.

   He angled his speech at the young voters.

intransitive verb

1. to move at an angle.

These are some examples of how the word or forms of the word are used:

1. Now she was dancing around the living room with the handle of the dust mop in her hand, held at an **angle** like a rock star's microphone, singing.
2. Your eyes look at the same scene from slightly different**angles**. The brain compares the different image from each eye and combines the images to create a sense of depth-of three dimensions.
3. Ideally, the ball should not hit the pocket straight on, but from the side, at an**angle**. How can you get a bowling ball to arrive at the pocket at an angle? Hook it.
4. Its right wing was twisted at an odd **angle**, away from its small round body. Jamie's best friend Mike had thrown a rock at it, as it tried to take flight only ten minutes earlier.
5. They probably cruised just below the ocean surface, swinging their long necks to **angle** their heads beneath unsuspecting fish and snap them up. Another group of plesiosaurs, the pliosaurs, evolved in a whole different direction.
6. The sextant was used to measure the **angles** between the horizon and celestial objects in order to determine the ship's latitude. Longitude was nearly impossible to calculate until the invention of the chronometer, an accurate timekeeping device.
7. Then he held the other one at an **angle**, so that the two sticks formed a "V." Then, he pinched a bite of the kimchi between the two points of the V and popped it into his mouth.
8. In 2000, the tower's tilt was reduced by half a degree, to the same **angle** as in the early 1800s. "You can't see the difference, but forces on the masonry are reduced by roughly 10 percent," says Burland.
9. The variables included the bus's velocity (the rate at which it moved in a specific direction), the **angle** of the ramp, and the length of the gap. Gravity was also a factor, of course, but not a variable.
10. The**angle** between the incoming rays of sunlight (white) and all of the red lines, forming a circular cone, have the same angle. As a result, the light that reaches your eye along these lines have the same wavelength (color).

compose com · pose

Definition

verb

1. to form or be the parts of.

   These twenty people compose the class.

   The class is composed of people from many different countries.

2. to write a new piece of music.

   She has composed several songs.

Advanced Definition

transitive verb

1. to form or combine into a whole.

   The director composed the choir of the best singers from each of the churches.

   The chef composed the salad of grapefruit wedges, avocado slices, and fresh greens.

2. to be the parts or elements of; make up.

   These twenty people compose the class.

3. to create (music or written works).

   Beethoven composed nine complete symphonies.

   I need some time to compose my speech for tomorrow.

   She's composing a letter of complaint to the school board.

4. to bring or return (oneself) to a state of calm or readiness.

   The violinist was nervous but composed himself before making his entrance.

   You must stop crying now and compose yourself.

5. to bring to a state of stillness or quiet.

The master of ceremonies did his best to compose the hysterical crowd.

intransitive verb

1. to create music or written works.

I need silence while I'm composing.

Spanish cognate

componer: The Spanish word *componer* means compose.

These are some examples of how the word or forms of the word are used:

1. Beethoven's last symphony took six years to **compose**.
2. There are about one hundred elements, and together those elements **compose** everything in the known physical universe.
3. But standing there, sandwiched between a stroller and a reeling businessman, I couldn't even get my journal out of my backpack, let alone **compose** my thoughts on its pages.
4. Devon had never heard the term before, but he wondered if it was related to what he typically did in his garage - mixing strange sounds together to **compose** an entire track.
5. When he saw the flag waving above the fort in the morning, he knew it had not surrendered, and he was inspired to **compose** a poem about the victory, titled "The Defence of Fort McHenry."

Name: _____ **Date:** _____

1. What is sunlight composed of?

A. light of varying intensity

B. light of varying wavelengths

C. light traveling at different speeds

D. light of a single color

2. What does the author explain in the first paragraph of the text?

A. why rain causes light to split into separate colors

B. how a rainbow is formed

C. how light travels

D. why rainbows are shaped like an arc

3. Please read these sentences from the text.

"Sunlight is composed of light of varying wavelengths. [...] When light enters water, it bends (refracts). The amount of bending depends on the wavelength of light. As a result, the light splits into its component colors."

What can you conclude based on this evidence?

A. Each wavelength of light bends the same amount when it enters water.

B. When light enters water, its wavelength is altered.

C. Each component color of light has a different wavelength.

D. The component colors of light all have the same wavelength.

4. When would you be most likely to see a rainbow?

A. in the evening on a cloudy, rainy day

B. at noon on a partly cloudy day

C. in the morning on a bright, sunny day

D. in the evening on a partly rainy, partly sunny day

5. What is the main idea of this text?

A. The colors of a rainbow form an arc because of the angles at which light of different wavelengths reaches your eye.

B. Rainbows form when sunlight enters raindrops, splits into different color components, and then re-emerges from the raindrops.

C. You will only see rainbows when there is rain in front of you and somewhat in the distance, and the sun is behind you and fairly low on the horizon.

D. Sunlight is composed of light of varying wavelengths. Short wavelength light appears blue, and long wavelength light appears red.

6. Why might the author have chosen to list Facts 1, 2, and 3 separately instead of describing them in one paragraph?

A. to make the explanation of how rainbows form seem more complicated

B. to indicate that these facts do not affect the way rainbows form

C. to show that these facts are not related to each other in any way

D. to emphasize the importance of these facts to the way rainbows form

7. Choose the answer that best completes the sentence below.

Light's wavelength determines its perceived color; _____, short wavelength light appears blue.

A. however

B. similarly

C. initially

D. for instance

8. When light enters water, it bends. What does the amount of bending depend on?

9. For a rainbow to form, sunlight needs to enter and then re-emerge from raindrops. Describe what happens to the light between when it first enters a raindrop and when it comes out of the raindrop. Support your answer with evidence from the text.

10. Why might you only see a rainbow when rain is in front of you? Support your answer with evidence from the text and images.