Reading unit 6: Why are bird eggs in cold climates darker coloured?

Read the research article below on the change in colour of bird's eggs

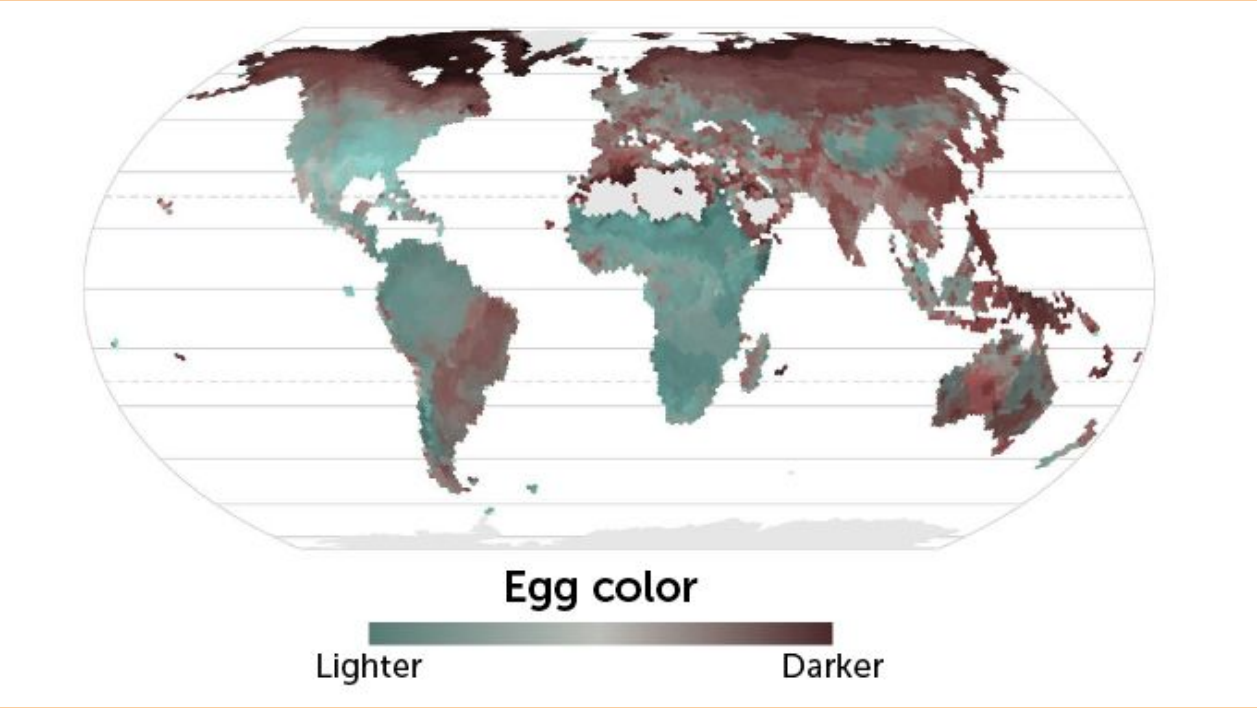
Bird eggs come in a dizzying array of colours. But from a global perspective, that diversity follows a simple pattern, new research shows. The colder the climate, the darker the egg.

Darker eggs absorb more heat than lighter ones. This could help developing chicks stay warm while their parents forage for food. That's the conclusion of the study. It appeared online October 28 in Nature Ecology and Evolution.

Biologists have long tried to understand why birds' eggs come in so many shapes and colours. There could be many reasons. Colour may help camouflage eggs from predators. Egg shape or colour might also somehow protect eggs against bacteria or signal their quality. Shape or colour might even help keep an egg warm. Scientists have turned up some evidence to support all of these hypotheses, says Phillip Wisocki. He worked on the research while studying biology at Long Island University Post in Brookville, N.Y. Adds Daniel Hanley, scientists were never sure whether any of these factors were important to egg diversity. This biologist advised Wisocki on his research.

Hanley, Wisocki and their colleagues turned to collections of birds' eggs in museums. They compiled data from 634 species. These represented all but four of the 40 living orders of birds. Then they plotted the data on a global map. The brightness and colour of eggshells closely correlated with a region's temperature, they showed. That was true even after considering that closely related species can have similarly coloured eggs.

Birds in "the far north — which tends to be colder — had darker, browner eggs," Hanley says. Eggs became lighter and slightly bluer for birds closer to the equator. Egg colours, however, tended to be more varied in the tropics.



Researchers created a global map of egg colour by averaging the brightness and colour of eggs from species nesting within an area. Each 23,322-square-kilometer (9,000-square-mile) area is marked by a hexagonal dot on the map. Eggs in northern regions tend to be darker. They get lighter and more blue toward the equator.

Darker eggs may be an adaptation to the cold, the researches now suggest. Like a dark car parked in the sun, a dark egg should absorb more heat from the sun than a lighter egg. To test this theory, Hanley's group exposed chicken eggs to direct sunlight and tracked how well they retained heat. Some were white. Others were brown or blue. Sure enough, brown eggs warmed faster and cooled more slowly than the lighter eggs.

"In the Arctic, parents have to go out to forage and get back to their eggs quickly," Hanley says. "If you can buy them five extra minutes, that can actually be really beneficial."

Source: https://www.sciencenewsforstudents.org/article/why-are-bird-eggs-cold-climates-darker-colored

Use the information given above to answer the following questions.

Questions

Q1. ' Eggs became lighter and slightly bluer for birds closer to the equator', why is it so?

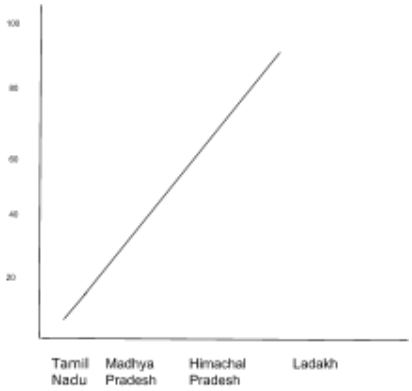
A. The temperature is mostly high due to the presence of sunlight, thus the bird's eggs do not need to absorb more sunlight.
B. There is a heavy fluctuation in temperature in the Equator and surrounding areas which makes the eggs appear blue.
C. Colour may help camouflage eggs from predators and other potential dangers.
D. Egg colours tend to be more varied in the tropical areas.

Q2: Tropical countries get more sunlight yet the colour of bird's eggs are darker in colder countries, why?

A. As tropical countries receive more sunlight thus the eggs stay warm naturally.
B. In cold countries, eggs need to absorb more sunlight to stay warm and therefore
C. Colour of eggs can vary due to various climatic conditions.
D. Sunlight has no relation to the colour of the eggs.

Q3: Identify the graph which aptly describes the colour intensity of the bird's eggs from the Indian context while we move from south to north?

a)



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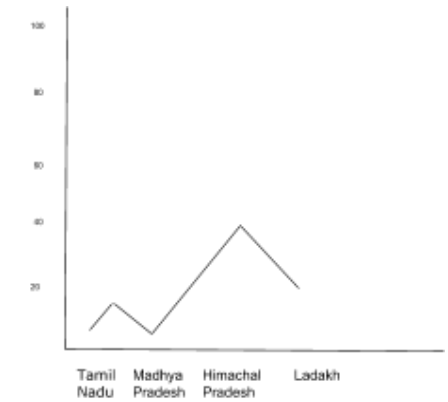

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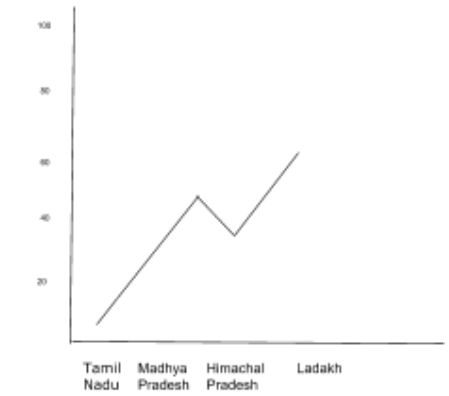

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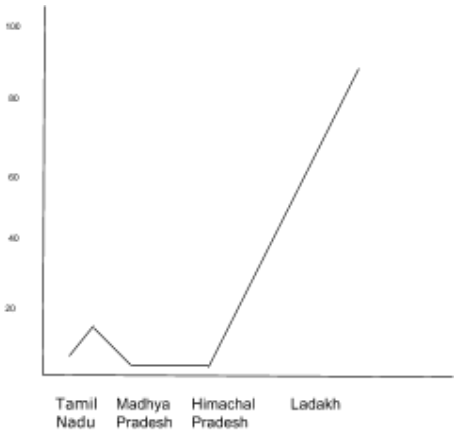

Answers

Question 1

Processes: Level 1 (b)
Proficiency: Integrate and Interpret
Coding and scoring:

- Full Credit: A
- Partial Credit: N.A
- No Credit: any option except A

Question 2

Processes: Level 2
Proficiency: Access and Retrieve
Coding and scoring:

- Full Credit: B
- Partial Credit: N.A
- No Credit: any option except B

Question 3

Processes: Level 3
Proficiency: Integrate and Interpret
Coding and scoring:

- Full Credit: A
- Partial Credit: N.A
- No Credit: any option except A

Reading Unit 7: Black hole (noun, "BLAAHK HOAL")

Read the article below on the black hole

This is a spot in space that has a powerful gravitational pull. A black hole's gravity is so strong that not even light can escape.
Black holes aren't actually holes. They are objects that contain a lot of mass packed into a tiny area. Most black holes form when giant stars die and collapse. As a star dies, the material it's made of gets squeezed into a smaller and smaller space. Eventually, it forms what's called a stellar-mass black hole. Astronomers estimate that one of these relatively small black holes is born every second. Supermassive black holes are much bigger, as their name suggests. Instead of containing the mass of one star, they can contain the mass of millions or billions of stars. Scientists aren't quite sure how those behemoths form.

Scientists first picked up hints about black holes in the late 1700s. But no one had actually seen one until recently. Because light can't leave a black hole, it's not possible to see one with a regular telescope. But many black holes are surrounded by a swirling ring of gas and other material. This ring called an accretion disk heats up and emits light. Scientists can study that light to learn about black holes.
In early 2019, scientists shared the first picture of a black hole. They made this image using a virtual telescope that combined the powers of eight observatories around the world. With this virtual telescope, the team of scientists zoomed in on the shadow the black hole cast on its glowing accretion disk.

Source: https://www.sciencenewsforstudents.org/article/explainer-what-are-black-holes

Use the information given above to answer the following questions.

Questions

Q1: Name and define phenomena which is central to both the black hole and the earth?

a) The force that attracts anything with mass, or bulk, toward any other thing with mass.
b) Both black holes and earth have accretion disk around them.
c) Presence of a large number of gases.
d) They both contain a lot of mass packed into a tiny area

Q2: How were scientists able to identify black holes when no light can pass through?

a) Scientists used a regular telescope to identify black holes.
b) Light from the accretion disk helped scientists to shadow cast by the black hole.
c) Black holes cast its shadow in space.
d) Black holes occasionally emit light.

Q3: Which property of the black holes does not allow the light to pass through?

a) Most black holes form when giant stars die, thus there is no light.
b) Black holes do not have any materials inside that can ignite to produce light.
c) A strong gravitational force inside black holes makes it impossible for anything to leave it.
d) Scientists are yet to find it the reason behind this phenomenon.

Answers

Question 1
Processes: Level 1 (b)
Proficiency: Access & Retrieve
Coding and scoring:

- Full Credit: A
- Partial Credit: N.A
- No Credit: any option except A

Question 2

Processes: Level 2

Proficiency: Access and Retrieve

Coding and scoring:

- Full Credit: B
- Partial Credit: N.A
- No Credit: any option except B

Question 3

Processes: Level 3

Proficiency: Integrate and Interpret

Coding and scoring:

- Full Credit: C
- Partial Credit: N.A
- No Credit: any option except C