



The Biology of Skin Color

OVERVIEW

In [The Biology of Skin Color](#), Penn State University anthropologist Dr. Nina Jablonski walks us through the evidence that the different shades of human skin color are evolutionary adaptations to the varying intensity of ultraviolet (UV) radiation in different parts of the world. Our modern human ancestors in Africa likely had dark skin, which is produced by an abundance of the pigment eumelanin in skin cells. In the high-UV environment of sub-Saharan (or equatorial) Africa, darker skin offers protection from the damaging effects of UV radiation. Dr. Jablonski explains that the variation in skin color that evolved since some human populations migrated out of Africa can be explained by the trade-off between protection from UV and the need for some UV absorption for the production of vitamin D.

KEY CONCEPTS

- Biological traits are not inherently good or bad. Some traits can provide an advantage to an organism in certain environments but be a disadvantage in other environments.
- Inherited traits that provide a survival and reproductive advantage in a particular environment are more likely to be passed on to the next generation and thus become more common over time.
- Different human populations living many generations in a particular part of the world may have different variations in certain traits. In spite of these differences, all humans are very closely related and share most traits.
- Evidence from different disciplines, such as anthropology, developmental biology, physiology, genetics, and cell biology, can inform what makes a human trait beneficial or harmful in a particular environment.
- Variations in genes can lead to differences in biological traits. By studying the DNA sequences of large numbers of people from different populations, scientists can estimate when and where those variations arose.
- Evolution involves trade-offs; a change in a gene that results in an adaptation to one aspect of the environment may be linked to a disadvantage with respect to another aspect of that same environment.
- Cells in multicellular organisms specialize to meet particular functions in an individual.
- Molecules in living organisms absorb or reflect certain wavelengths of light from the sun. When a molecule absorbs light, the energy is transformed into other forms of energy.

CURRICULUM CONNECTIONS

| Standards | Curriculum Connections |
|---|---|
| NGSS (2013) | LS3.A, LS3.B, LS4.A, LS4.C |
| AP Biology (2015) | 1.A.1, 1.A.2, 1.C.3, 3.A.1, 3.C.1, 4.C.1, 4.C.2 |
| AP Environmental Science (2013) | I.A, III.B |
| IB Biology (2016) | 1.2, 2.6, 3.4, 5.1, 10.2 |
| IB Environmental Systems and Societies (2017) | 8.1 |
| Common Core (2010) | ELA.RST.9-12.2, WHST.9-12.4 |
| Vision and Change (2009) | CC1, CC2 |

KEY REFERENCE

Jablonski, Nina G. *Living Color: The Biological and Social Meaning of Skin Color*. University of California Press, 2012.