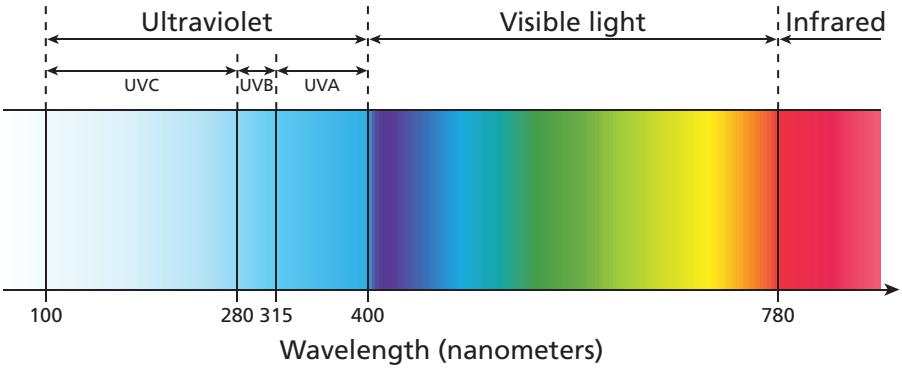
EXAMPLE 2 Analyzing UV Radiation

Sunlight consists of visible and invisible light. Ultraviolet (UV) light is invisible and is classified according to its wavelength, measured in nanometers (one-billionth of a meter). UV radiation is dangerous. It causes premature aging of the skin and can also cause various forms of skin cancer.



Mountain climbers need special protection for their skin and eyes. They should wear goggles and sunscreen that block both UVA and UVB rays.

UV radiation increases with elevation. It increases about 5% for every 1000 feet. Compare the UV radiation at the following elevations.

- Seattle, Washington (0 feet)
- Denver, Colorado (5000 feet)
- Mount McKinley, Alaska (20,000 feet)

SOLUTION

- For the sake of comparison, assume that the amount of UV radiation in Seattle is 1.
- Because Denver has an elevation of 5000 feet, the amount of UV radiation in Denver is

  $(1.05)^5 \approx 1.276$ 5000 feet elevation

  or about 28% more than the UV radiation in Seattle.
- The peak of Mount McKinley has an elevation of 20,000 feet. The amount of UV radiation near the peak is

  $(1.05)^{20} \approx 2.653$ 20,000 feet elevation

  or about 165% more than the UV radiation in Seattle.

Checkpoint

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Compare the UV radiation at the following elevations.

- Reno, Nevada (4000 feet)
- Mount Whitney, California (14,000 feet)
- Mount Everest, Nepal (29,000 feet)