The World of Chemistry

Episode 10 - Signals from Within

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1. Give a general definition of spectroscopy.

2. What are some examples of electromagnetic radiation mentioned in the video?

3. What is the relationship between the energy and the frequency of electromagnetic radiation?

4. What is the role of melanin in the skin?

5. What is meant by a “SPF” value? How can these values be interpreted?

6. What are some examples of molecular motion mentioned in the video?

7. What must happen for electromagnetic radiation to be absorbed by matter?

8. What are the three main components of any spectrophotometer?

9. How are IR spectra used to help identify a compound?

10. What is meant by “Signals from Within”?

Answer Key

1. Give a general definition of spectroscopy.

   The interaction of radiation with matter.

2. What are some examples of electromagnetic radiation mentioned in the video?

   Visible, ultraviolet, infrared, radio waves, x-rays, microwaves.

3. What is the relationship between the energy and the frequency of electromagnetic radiation?

   They are directly related. As the frequency increases, the energy increases.

4. What is the role of melanin in the skin?

   It absorbs ultraviolet radiation.

5. What is meant by a ``SPF'' value? How can these values be interpreted?

   Sunburn protection factor. A sunscreen with a SPF of 4 allows ¼ of the UV rays to strike the skin.

6. What are some examples of molecular motion mentioned in the video?

   Kinetic (translational), rotational, vibrational (bending, stretching).

7. What must happen for electromagnetic radiation to be absorbed by matter?

   The radiation must be of the correct energy.

8. What are the three main components of any spectrophotometer?

   Light source, sample, detector, analyzer.

9. How are IR spectra used to help identify a compound?

   The spectra serve as "fingerprints" for the chemical being studied.

10. What is meant by "Signals from Within"?

    Molecules can respond to a probe of EMR, modify it, and the modified EMR provides information from within about the substance.