QUESTION CARD

Question
Which has a higher frequency, Infrared or Ultraviolet?

Answer
Ultraviolet.

QUESTION CARD

Question
Why do infrared telescopes work better in space?

Answer
Because Earth's atmosphere absorbs that frequency.

QUESTION CARD

Question
Who took the first X-Ray photograph?

Answer
Wilhelm Röntgen, in 1895

QUESTION CARD

Question
Name at least two common uses of radio waves.

Answer
(Any two) AM Radio, FM Radio, Television, CB Radio, HAM Radio, Shortwave Radio, Radar.

QUESTION CARD

Question
What parts of the electromagnetic spectrum are commonly used in consumer remote controls? (Name one of the two)

Answer
Infrared or sometimes Radio waves.

ACTION CARD

Laser Beam!

A laser is a coherent form of light - typically with a very narrow spectrum that never wavers.

STAY ON THE SAME FREQUENCY NEXT TURN DO NOT ROLL

ACTION CARD

Gamma Rays!

Gamma radiation cannot be seen or heard - but can cause medical problems if you are exposed.

MOVE TO THE GAMMA RAY FREQUENCY AND STAY THERE NEXT TURN

ACTION CARD

X Rays!

X-rays are often used to "see inside" objects and reveal what is hidden to human sight.

**MOVE TO THE X RAY FREQUENCY AND STAY THERE NEXT TURN.
YOU MAY SEE THE ANSWER OF YOUR NEXT QUESTION CARD!**

ACTION CARD

Radar!

Radar bounces radio or microwaves off of objects and using the reflected energy to discern information.

**MOVE TO THE RADIO WAVE FREQUENCY AND STAY THERE NEXT TURN.
YOU MAY "BOUNCE" ONE QUESTION OFF YOUR NEXT QUESTION CARD FOR A HINT!**

ACTION CARD

Microwaves!

Microwave oven are known for cooing food more quickly than conventional ovens.

SINCE YOU ARE SO QUICK, YOU GET TO ROLL AGAIN THIS TURN!

QUESTION CARD

Question
What part of the electromagnetic spectrum is used to cook food quickly in special ovens?

Answer
Microwaves.

QUESTION CARD

Question
Which part of the electromagnetic spectrum is felt by us as heat?

Answer
Infrared radiation.

QUESTION CARD

Question
Which part of the electromagnetic spectrum is commonly called “black light?”

Answer
Ultraviolet radiation.

QUESTION CARD

Question
What part of the electromagnetic spectrum is used for walkie-talkies?

Answer
Radio waves.

QUESTION CARD

Question
What part of the electromagnetic spectrum can be used for cancer treatment?

Answer
Gamma rays.

ACTION CARD

Star Light!

Stars differ in their life cycles and visual, radio, and X-ray telescopes may be used to collect data that reveal those differences.

MOVE TO THE EITHER THE VISIBLE, RADIO OR X-RAY FREQUENCY AND STAY THERE NEXT TURN

ACTION CARD

Gamma Rays!

Gamma radiation cannot be seen or heard - but can cause medical problems if you are exposed.

MOVE TO THE GAMMA RAY FREQUENCY AND STAY THERE NEXT TURN

ACTION CARD

Hot Stars!

As the temperature of a star’s surface increases, the intensity of radiation produced also increases, and the spectrum of radiation shifts toward a shorter wavelength.

MOVE ONE FREQUENCY HIGHER AND STAY THERE NEXT TURN

ACTION CARD

Red Shift!

Redshift occurs when electromagnetic radiation emitted or reflected by an object is shifted towards red due to the Doppler effect, indicating that the object is moving away from the observer.

MOVE ONE FREQUENCY LOWER AND STAY THERE NEXT TURN

ACTION CARD

Incoming Radiation!

Earth’s atmosphere blocks most incoming electromagnetic radiation from space, except for most of the visible spectrum and radio waves.

MOVE TO EITHER THE VISIBLE OR RADIO FREQUENCY AND STAY THERE NEXT TURN

QUESTION CARD

Question
What part of the electromagnetic spectrum is used to sterilize surfaces and even food?

Answer
Ultraviolet or Gamma Rays.

QUESTION CARD

Question
Which part of the electromagnetic spectrum has the highest frequency?

Answer
Gamma rays.

QUESTION CARD

Question
When light from all the colors of the rainbow is combined, what color light results?

Answer
White light.

QUESTION CARD

Question
What is the name of the optical device that can split visible light into the colors of the rainbow?

Answer
A prism.

QUESTION CARD

Question
Which famous scientist described the visible spectrum and his experiments with prisms in his work *Opticks* in 1704?

Answer
Isaac Newton.

QUESTION CARD

Question
Who discovered infrared light in 1800?

Answer
William Herschel.

QUESTION CARD

Question
When William Herschel attempted to measure the temperature of different colors of light from a prism, he found that the hottest spot was in a place where there was no visible light. What part of the spectrum was this?

Answer
Infrared light.

QUESTION CARD

Question
What part of the spectrum did Johann Ritter discover in 1801?

Answer
Ultraviolet light.

QUESTION CARD

Question
What part of the spectrum is responsible for giving people tans?

Answer
Ultraviolet light.

QUESTION CARD

Question
Who discovered ultraviolet light in 1801?

Answer
Johann Ritter.

QUESTION CARD

Question
What parts of the electromagnetic spectrum have been used to discover what lies on the canvas beneath famous paintings?

Answer
X-rays and infrared.

QUESTION CARD

Question
Name at least two common uses of microwaves.

Answer
Microwave ovens, mobile phones, Bluetooth, GPS and Two-Way Radios such as FRS and GMRS Radios, WiFi, radar.

QUESTION CARD

Question
Who or what is Roy G. Biv?

Answer
An acronym for the colors of the visible spectrum - Red, Orange, Yellow, Green, Blue, Indigo, Violet.

QUESTION CARD

Question
What is the order of colors in the rainbow, from lowest energy to highest?

Answer
Red, Orange, Yellow, Green, Blue (Indigo), Violet

QUESTION CARD

Question
Isaac Newton described what in his work *Opticks* in 1704?

Answer
The visible spectrum and his experiments with prisms.

QUESTION CARD

Question
Which part of the electromagnetic spectrum has the lowest frequency?

Answer
Radio Waves.

QUESTION CARD

Question
Which part of the electromagnetic spectrum has the shortest wavelength?

Answer
Gamma Rays.

QUESTION CARD

Question
Which part of the electromagnetic spectrum has the longest wavelength?

Answer
Radio Waves.

QUESTION CARD

Question
Name at least two parts of the electromagnetic spectrum that are invisible to humans.

Answer
Radio Waves, Microwaves, Infrared, Ultraviolet, X-Rays, Gamma Rays.

QUESTION CARD

Question
Why is it sometimes possible to hear low power amateur radio stations from very far away?

Answer
The frequencies used by these radios bounce off the upper atmosphere and get reflected back to Earth a great distances from their place of origin.

QUESTION CARD

Question

True or false: Stars emit only visible light.

Answer

False - stars can emit many different forms of electromagnetic radiation.

QUESTION CARD

Question

True or False: Electromagnetic radiation moves at the speed of light in a vacuum.

Answer

True, which is approximately 3 × 108 m/s or 186,000 miles/ second.

QUESTION CARD

Question

True or False: In 1964, researchers working on improving phone technology discovered the electromagnetic radiation left over from the beginning of the universe.

Answer

True - Arlo Penzias and Robert Wilson discovered the Cosmic microwave background radiation while working for Bell Labs.

QUESTION CARD

Question

True or False: Ultrasound is a form of electromagnetic radiation.

Answer

False - ultrasound is a form of acoustic waves, beyond human hearing.

QUESTION CARD

Question

True or False: A photocopier uses electromagnetic radiation to make copies.

Answer

True - it uses visible light.

ACTION CARD

Full Spectra!

The electromagnetic (EM) spectrum is the range of all possible electromagnetic radiation frequencies

TAKE ONE COLOR FREQUENCY TILE FROM ANY PLAYER AND KEEP IT!

ACTION CARD

X-Rays!

X-ray crystallography was used to discover the double helix structure of the DNA molecule.

MOVE TO THE X-RAY FREQUENCY AND STAY THERE NEXT TURN

ACTION CARD

Blue Shift!

Blueshift occurs when electromagnetic radiation emitted or reflected by an object is shifted towards blue due to the Doppler effect, indicating that the object is moving towards the observer.

MOVE ONE FREQUENCY HIGHER AND STAY THERE NEXT TURN

ACTION CARD

False Color!

This image uses false color to display infrared frequencies that would be invisible to the human eye.

MOVE TO THE INFRARED FREQUENCY AND STAY THERE NEXT TURN

ACTION CARD

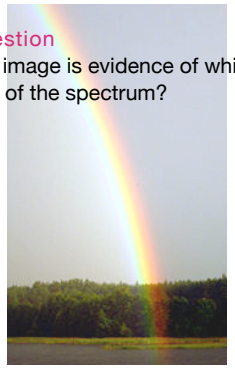
Quantum Jump!

MOVE TO ANY FREQUENCY AND STAY THERE NEXT TURN

QUESTION CARD

Question

The image is evidence of which part of the spectrum?



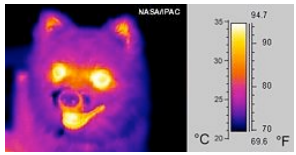
Answer

Visible Light.

QUESTION CARD

Question

This image has been taken in what part of the spectrum?



Answer

Infrared -measuring heat.

QUESTION CARD

Question

This image has been taken in what part of the spectrum?

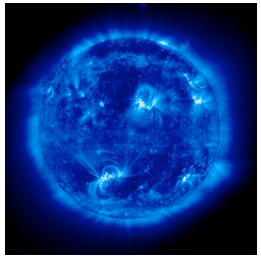
Answer

X-Rays.

QUESTION CARD

Question

This image of the Sun has been taken in what part of the spectrum?



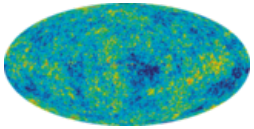
Answer

Ultraviolet.

QUESTION CARD

Question

This map of the the Cosmic Background Radiation has been taken in what part of the spectrum?



Answer

Microwave

QUESTION CARD

Question

Astronomers use an instrument called a spectrograph to study the spectrum of a star's light. What might that reveal about a star?

Answer

The spectrograph reveals the star's composition.

QUESTION CARD

Question

In the United States, what organization controls which frequencies are used by radio and television stations?

Answer

The FCC, or Federal Communications Commission.

QUESTION CARD

Question

This stealth plane has been designed to deflect radio and microwaves making it "invisible" to what technology?

Answer

Radar.

QUESTION CARD

Question

What is the speed of light in a vacuum?

Answer

Approximately 3 × 108 m/s or 186,000 miles/second.

QUESTION CARD

Question

This boat has been designed to deflect radio and microwaves making it "invisible" to what technology?

Answer

Radar.

QUESTION CARD

Question

True or false: The colors of the visible spectrum are described as red, orange, yellow, green, blue, indigo, and violet but are actually a continuous spectrum.

Answer

True.

QUESTION CARD

Question

True or False: Active infrared light sources used with special cameras can see what happens in the dark.

Answer

True, many security cameras use this "night vision" feature.

QUESTION CARD

Question

Which part of the spectrum helps night vision goggles see in the dark?

Answer

Infrared.

QUESTION CARD

Question

Overexposure to what part of the electromagnetic spectrum can lead to melanoma or skin cancer?

Answer

Ultraviolet.

QUESTION CARD

Question

Fill in the blank: As frequency increases, _____ decreases.

Answer

Wavelength.

QUESTION CARD

Question

Fill in the blank: As temperature of an object increases, the _____ of its most intense electromagnetic emissions increases.

Answer

Frequency.

QUESTION CARD

Question

Fill in the blank: As wavelength increases, _____ decreases.

Answer

Frequency.

ACTION CARD

Made in the Shade!

Shadows exists because objects are opaque to visible light and block it's transmission.

MOVE TO THE VISIBLE LIGHT FREQUENCY AND STAY THERE NEXT TURN

QUESTION CARD

Question

Sunglasses cut down on visible light, but many have been also treated to block which additional part of the electromagnetic spectrum?

Answer

Ultraviolet.

QUESTION CARD

Question

Astronauts have to protect themselves from exposure to deadly radiation when traveling in space. Why don't they have to worry back when on Earth?

Answer

Earth's atmosphere protects them by blocking those frequencies.