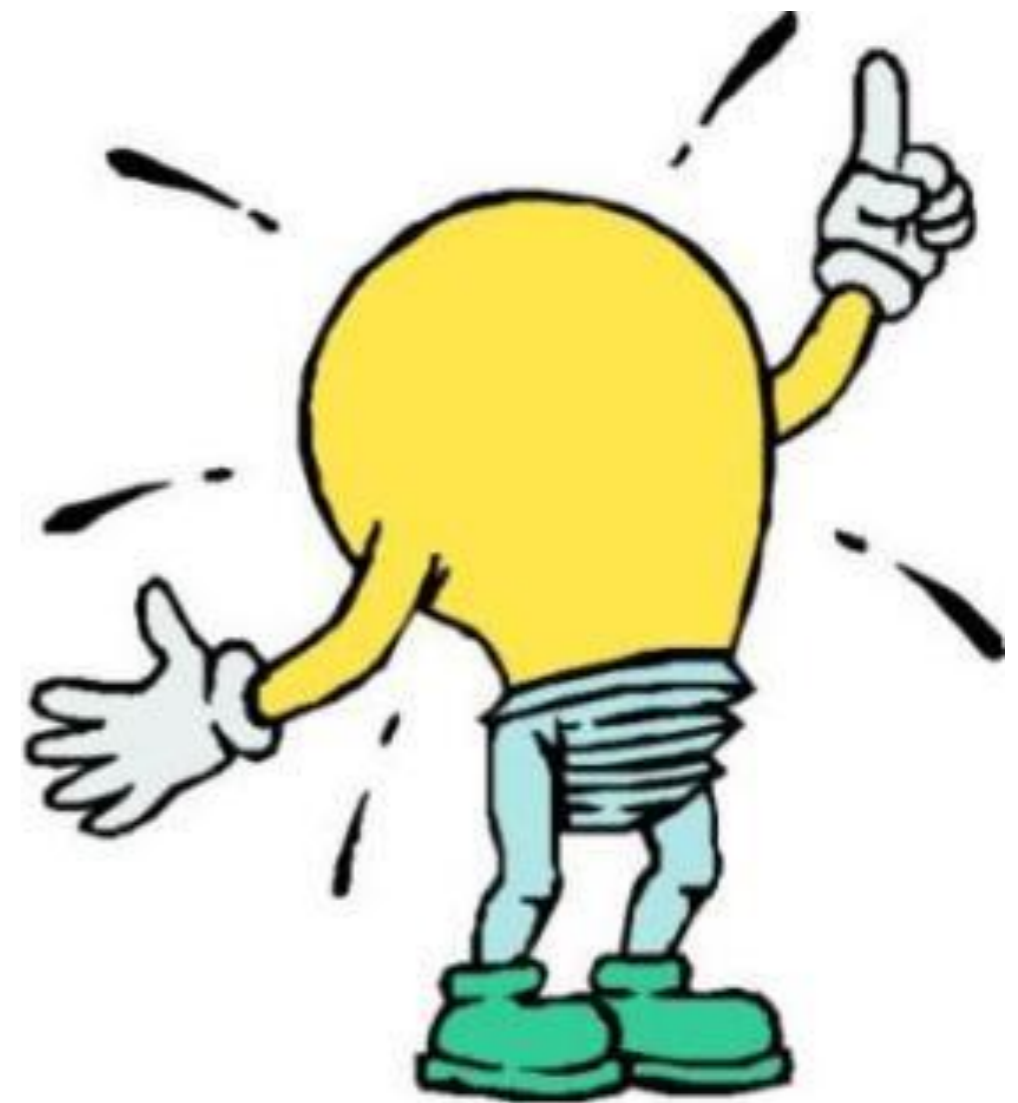


Learning Objectives

- To recognize the benefits of light
- To be introduced to the properties of light



But first...what do you already know?

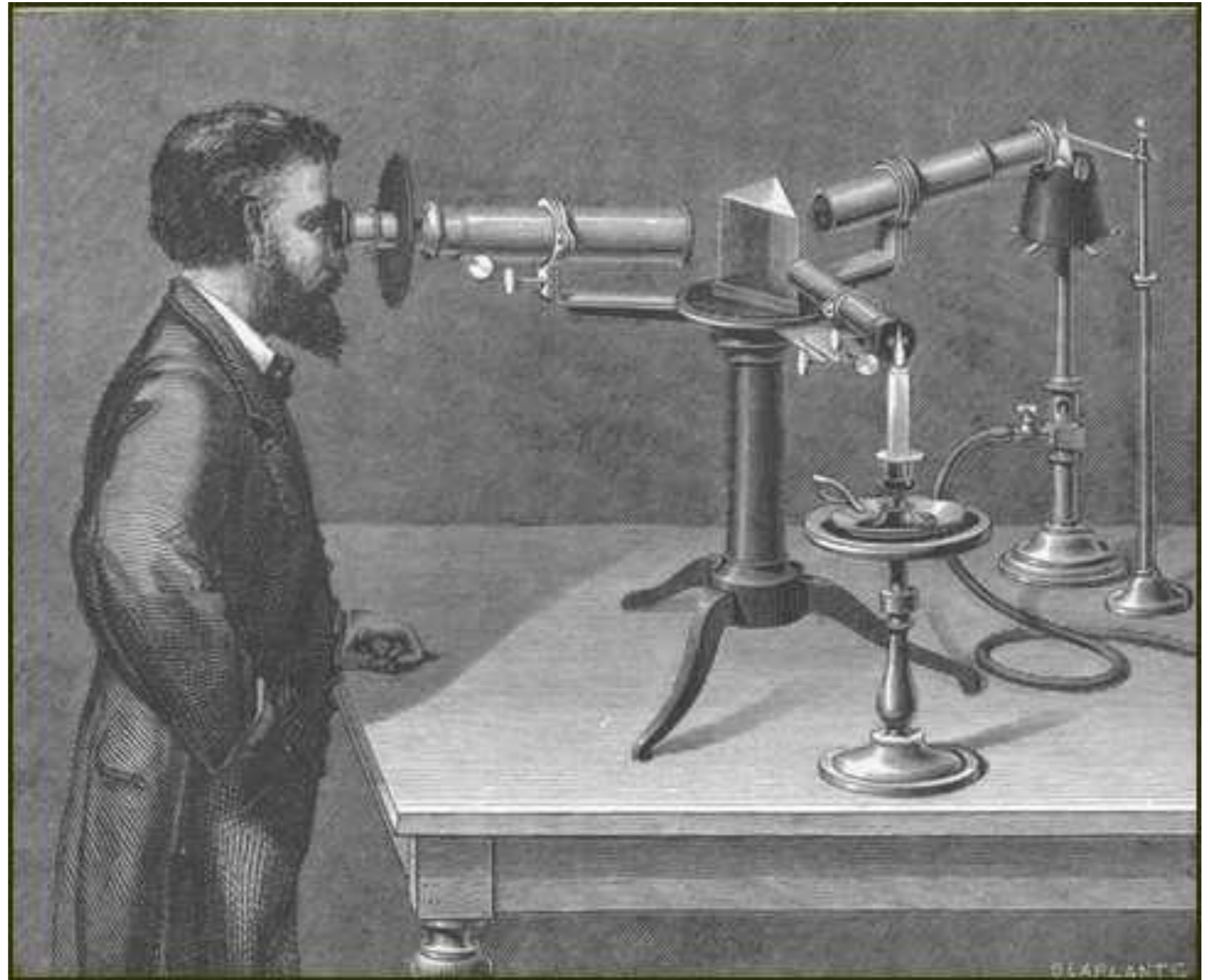
True or False

1. Light can be produced by both natural and artificial sources
2. Light travels faster than sound
3. Your image is the same in all mirrors
4. Microwaves travel at the speed of light
5. A full-length mirror is necessary for you to see your whole body in reflection
6. Light is radiated in all directions
7. Light is bent when it passes through eyeglasses
8. A swimming pool is always deeper than it appears
9. A rainbow is caused by sunshine
10. Depth Perception is impaired when one eye is covered
11. Standing in front of a microwave causes some forms of cancer

But first... what do you already know?

1. **F** Light can be produced by both natural and artificial sources
2. **T** Light travels faster than sound
3. **F** Your image is the same in all mirrors
4. **T** Microwaves travel at the speed of light
5. **F** A full-length mirror is necessary for you to see your whole body in reflection
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8. **F** A swimming pool is always deeper than it appears
9. **T** A rainbow is caused by sunshine
10. **T** Depth Perception is impaired when one eye is covered
11. **F** Standing in front of a microwave causes some forms of cancer

Light and Geometric Optics

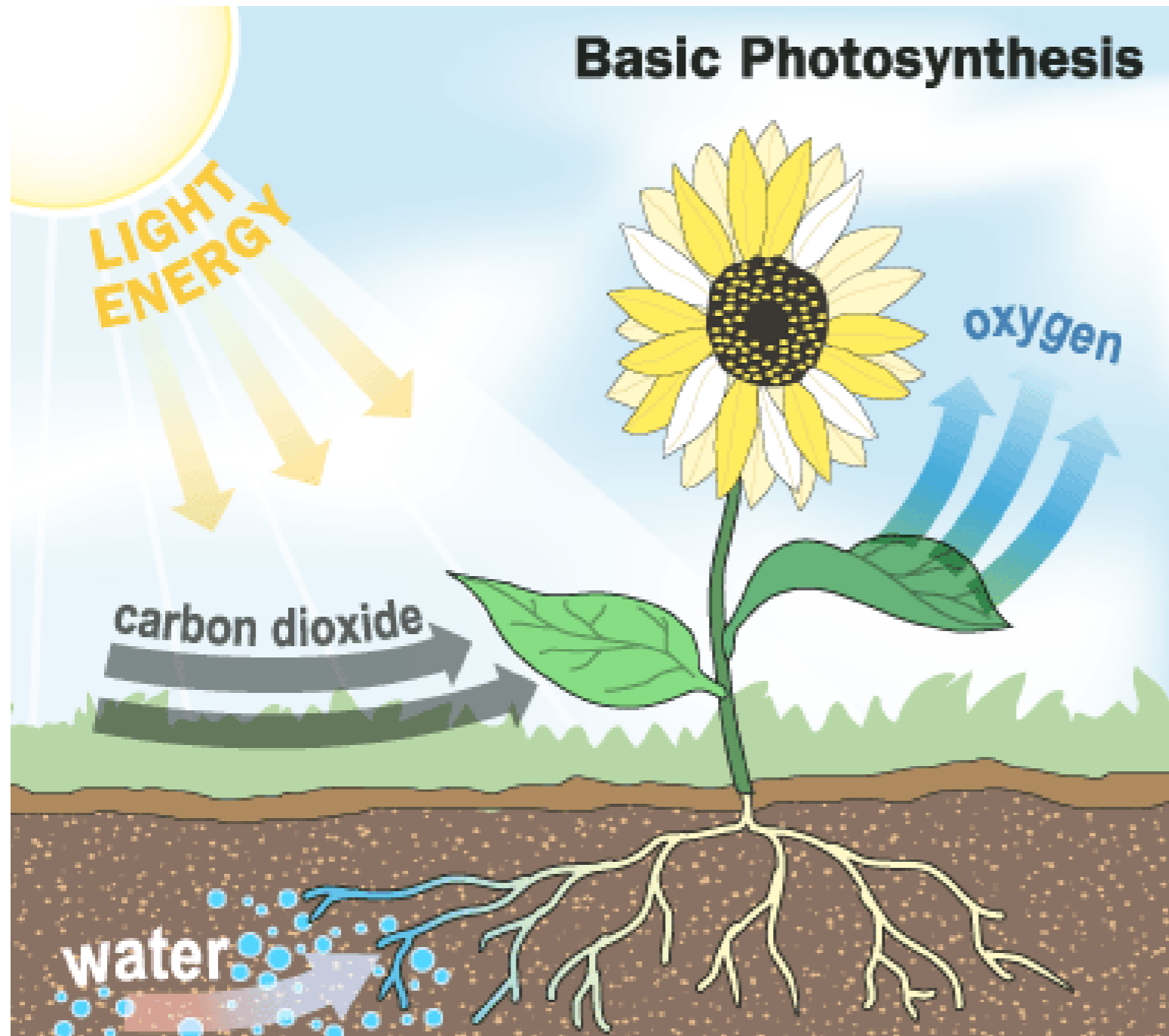


What are the benefits of light to life on earth?



Provides *heat*

What are the benefits of light to life on earth?



Allows life
to exist

What are the benefits of light to life on earth?



Allows us to ***see the objects around us***

Eight Properties of light



THE SPEED OF LIGHT

MATCHED ONLY BY THE SPEED AT WHICH
NEWS OF YOUR OWN MISFORTUNE TRAVELS.

motifake.com

Light
travels
faster
than any
known
entity:

300 000
km/s

Properties of light



It travels in waves

Properties of light



- It travels in straight lines

Properties of light



- Energy is transferred through radiation (no medium required)

Properties of light



- Light can be reflected

Properties of light



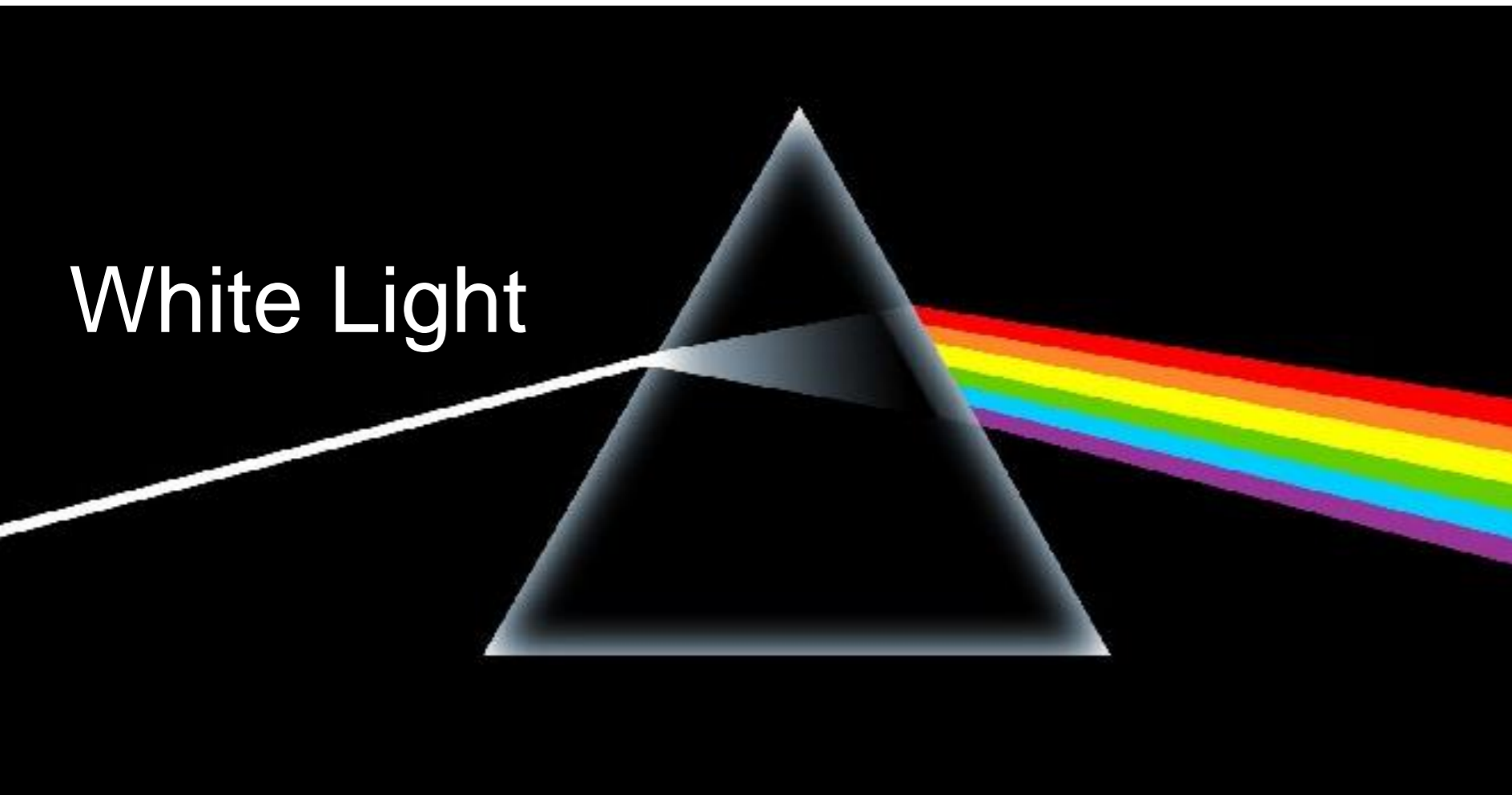
- Light can be refracted

Properties of Light



- Visible light can be split into a spectrum of colours

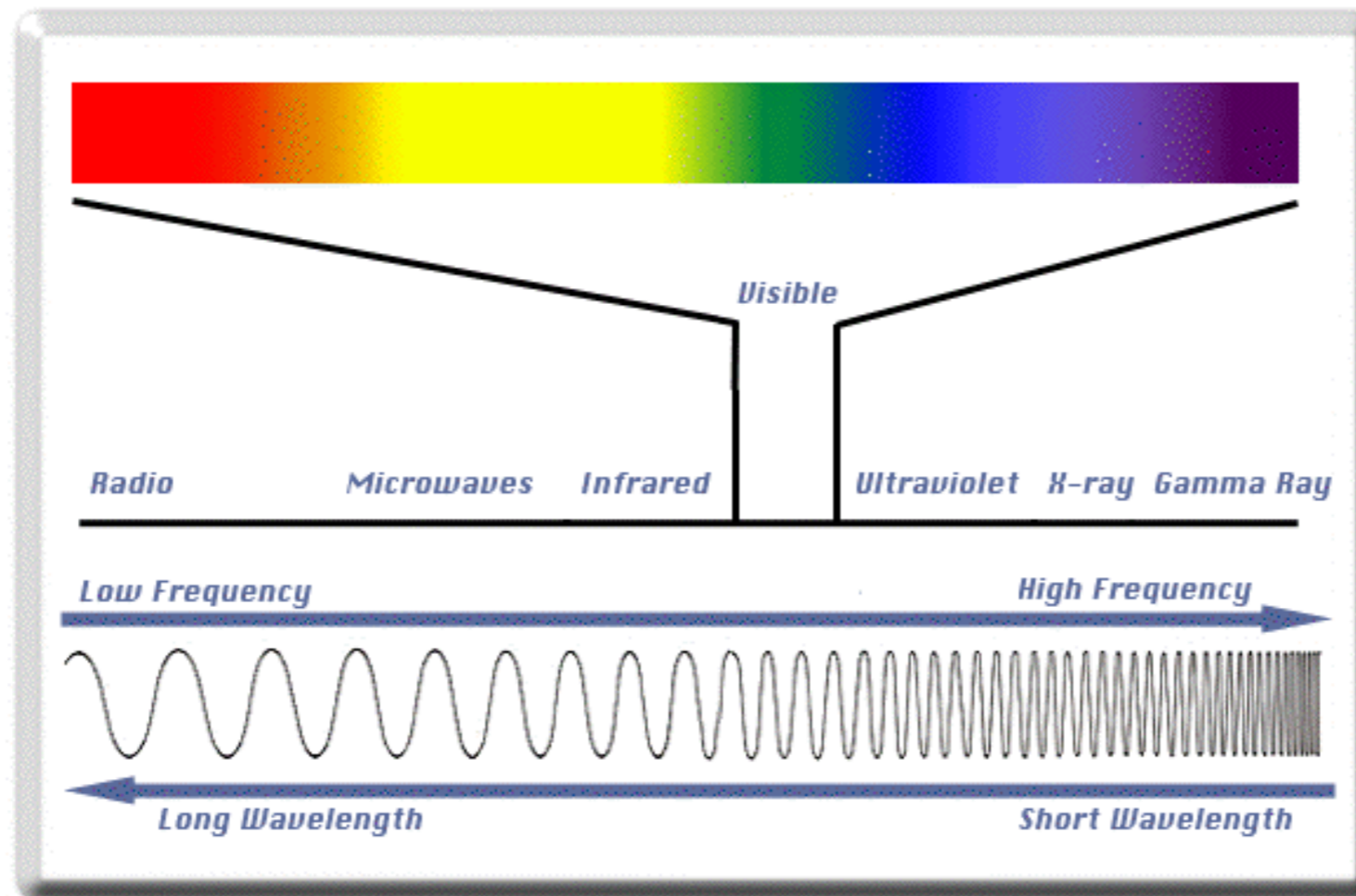
Prism



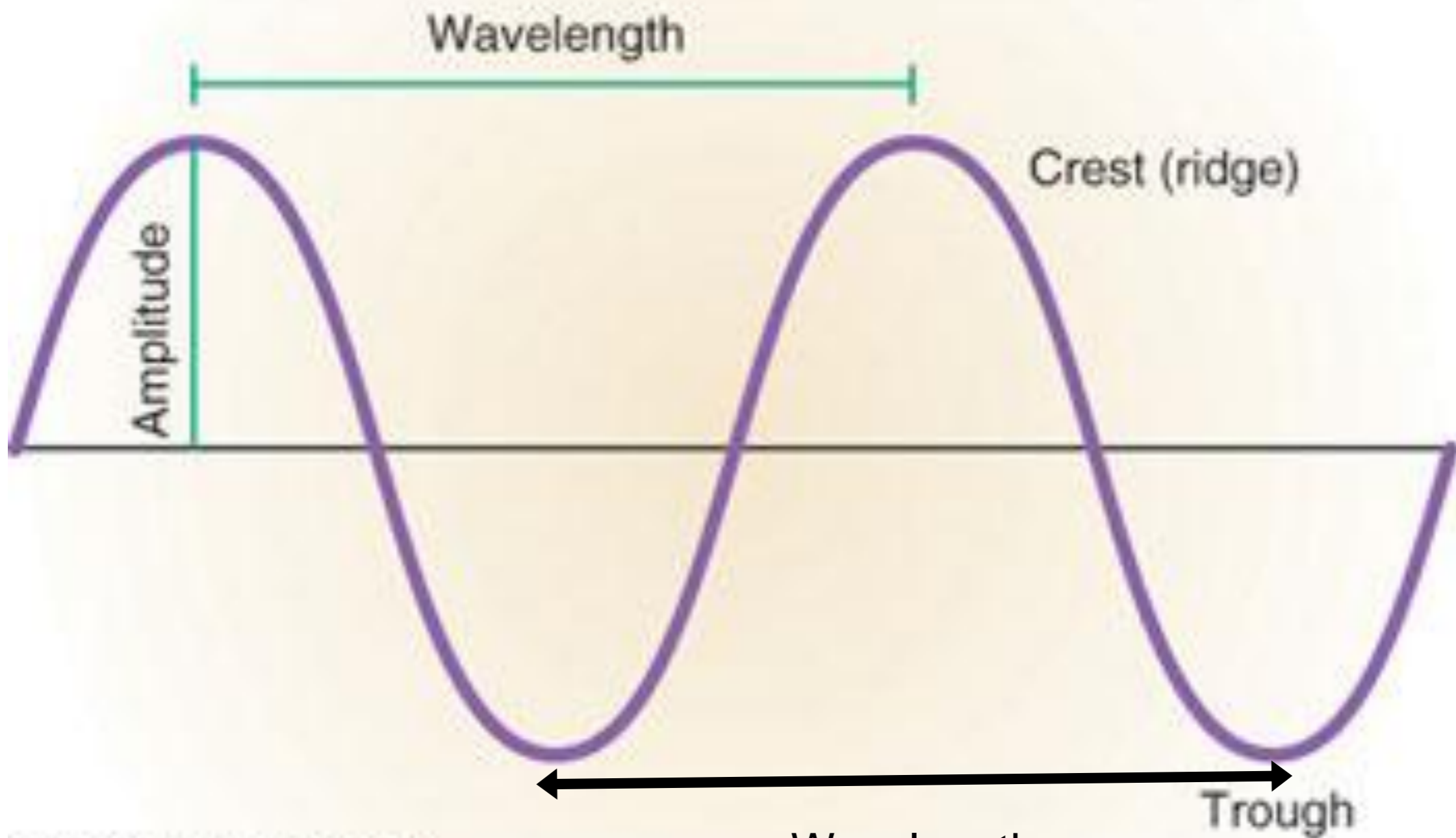
Increasing Energy
Slows down More

Time to explore.....

Properties of light



- Forms a spectrum of electromagnetic radiation



THE ELECTROMAGNETIC SPECTRUM

Penetrates
Earth
Atmosphere?



Wavelength
(meters)



10^3

10^{-2}

10^{-5}

$.5 \times 10^{-6}$

10^{-8}

10^{-10}

10^{-12}

About the size of...



Buildings



Humans



Honey Bee



Pinpoint



Protozoans



Molecules



Atoms



Atomic Nuclei

See Figure 5 on p. 465
See Table 1 on p. 466

THE ELECTRO MAGNETIC SPECTRUM

Wavelength
(metres)

Radio

Microwave

Infrared

Visible

Ultraviolet

X-Ray

Gamma Ray

10^3

10^{-2}

10^{-5}

10^{-6}

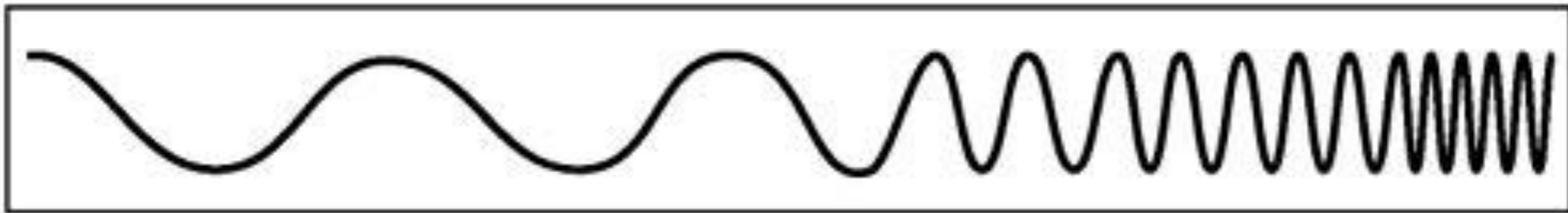
10^{-8}

10^{-10}

10^{-12}

Long

Short



Frequency
(Hz)

10^4

10^8

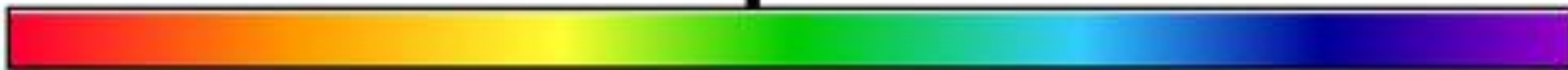
10^{12}

10^{15}

10^{16}

10^{18}

10^{20}



Energy



TV Signals



Cell Phones

Radio



***AM/FM Radio
ie. Satellite radio***

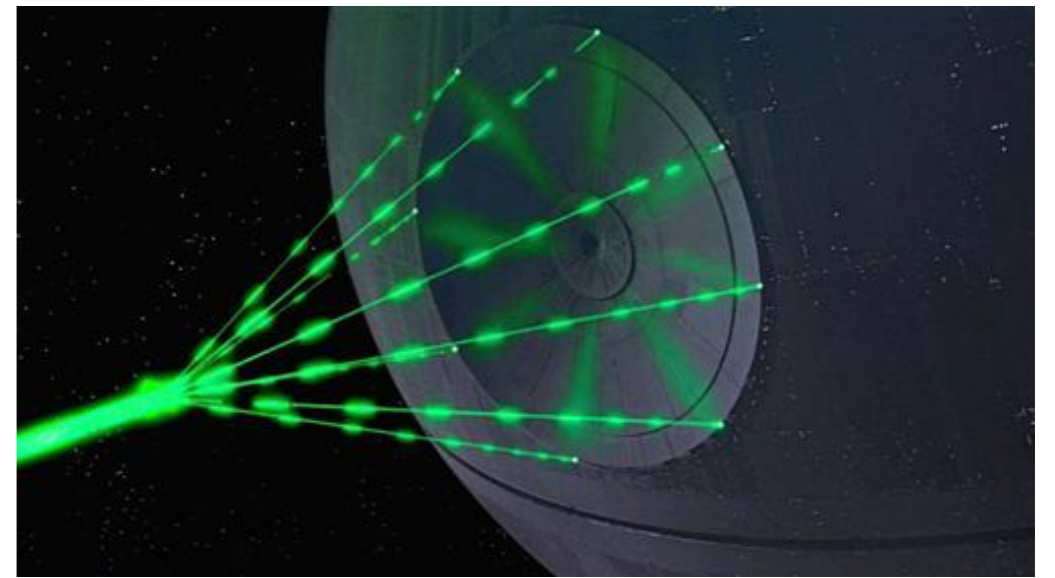
Microwaves



Telecommunications



Remote controls



Lasers (not visible)

Infrared (Infra = below)



Heat Lamps (fast food)



Human vision



***Light shows at
concerts***

Visible light



Rainbows



Lasers you can see



***Stimulates vitamin D
production***

***Skin
tanning
and
burning
(cancer
risk)***

Ultraviolet

Kills bacteria/sterilizes





X-rays



***Medical
Imaging***



Cancer treatment

***Security
(airport
screening)***

And now, to lighten your day....

What is Light? 11.1

Read p.463 - 469

Page 469

1, 4 - 10



Gamma Rays



Cancer treatment