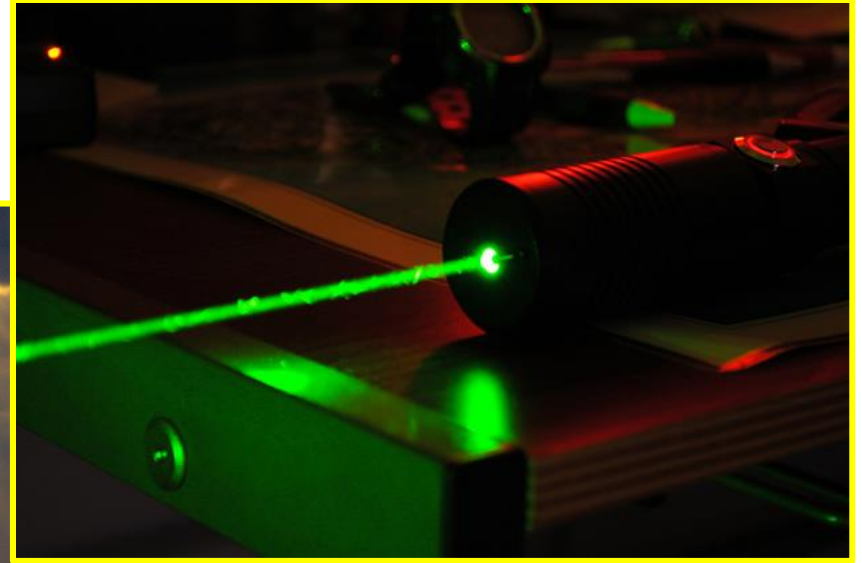
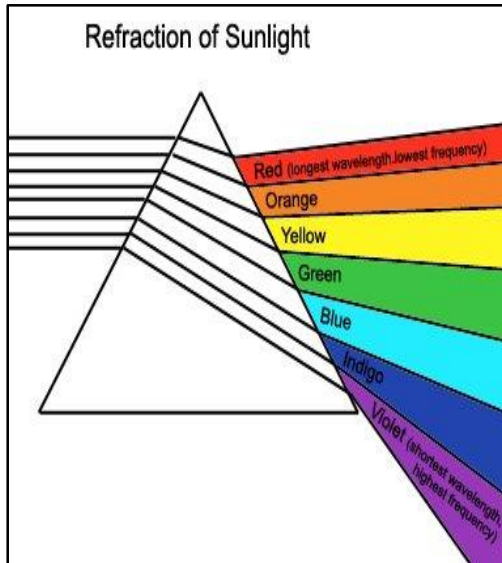


Rays of Light...

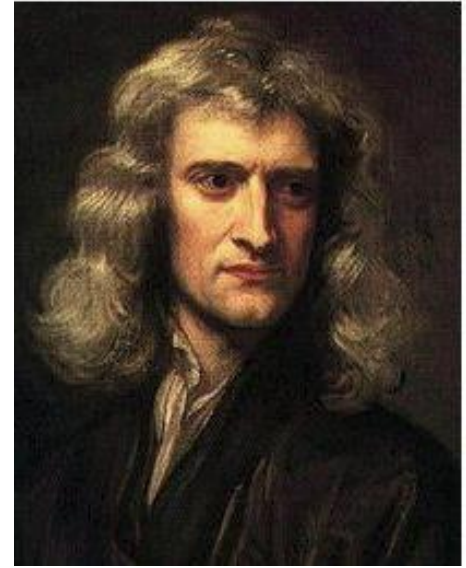


what are they made of ?



Decomposition of Sunlight

Isaac Newton, 1665



Common (Aristotle) wisdom:
white light is the purest form - colored light must therefore have been altered somehow...

- Newton **shined a beam of sunlight through a glass prism** and showed that it decomposed into a **spectrum** cast on the wall – therefore all the colors were together in the sunlight.
- He thought he then should be able to **combine the colors** of the spectrum and **make the light white again**: he placed another prism upside-down in front of the first prism. The band of colors combined again into white sunlight.
- Newton was the first to prove that **white light is made up of all the colors that we can see**.

Infrared Light Discovery

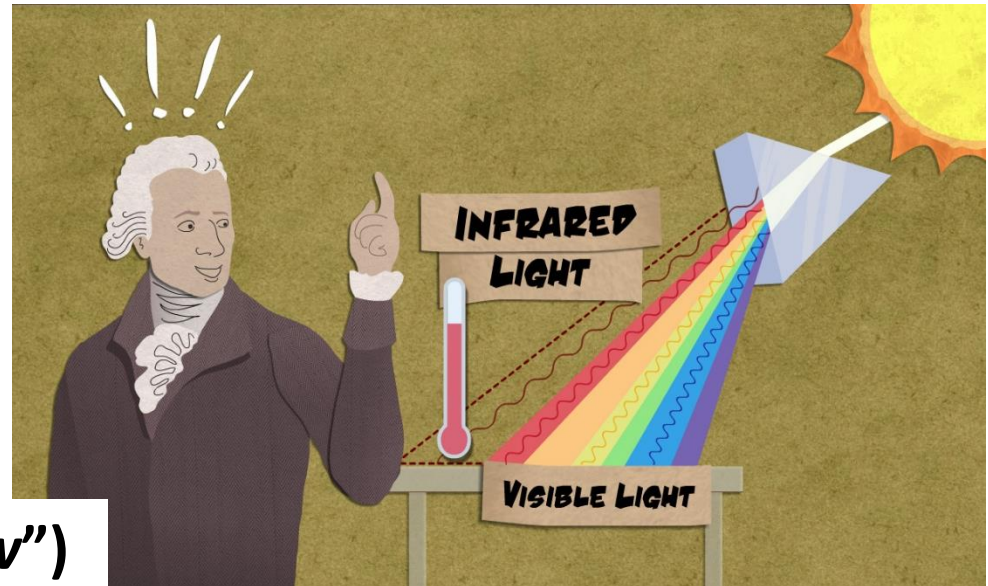
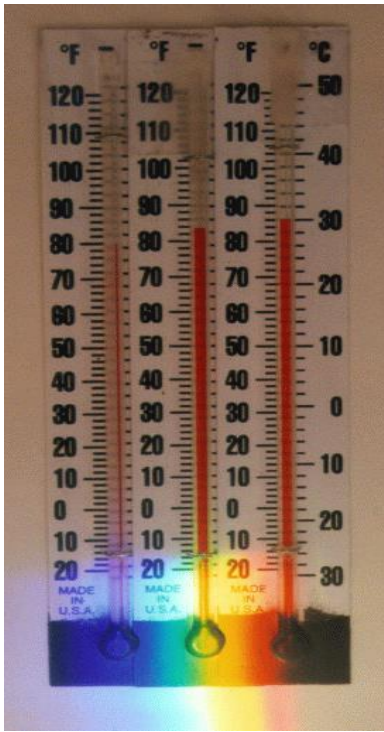
Friedrich Herschel, 1800

Measured temperature of different colors of light.

- Observed the **increase in temperature** as he moved the thermometer from violet through blue, green, yellow, and orange to red where it reached its peak...
- ...and **moved the thermometer just outside** the red portion of the spectrum in an area that – to the human eye – contained no light at all...

- **“Invisible rays”** in this area had the **highest temperature of all**.
- First time anyone had demonstrated that there were forms of radiation that humans couldn't see.

Infrared (from Latin “*below*”)



Ultraviolet Light Discovery

Johann Ritter, 1801



Measured the effect of different colors of light on a light-sensitive chemical, silver chloride.

- In the **red** portion of the spectrum darkening of the chemical was relatively **slow**.
- Progressing through orange, yellow, green, blue, and violet, he observed that each new batch of silver chloride grew darker faster...
- ...and placed the chemical **just outside the violet** portion of the spectrum in an area that – to the human eye – contained no light at all...
- “**Invisible rays**” in this area had the **greatest effect** (fastest darkening) **of all**.
- Same experiment can be done using a sheet of photographic paper.

Ultraviolet
(from Latin “*beyond*”)

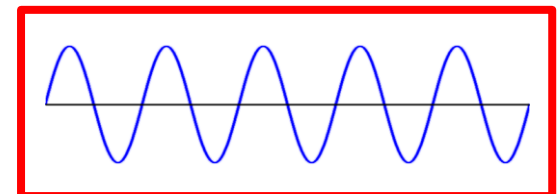


Is This a Familiar Sight?

Waves in the Ocean



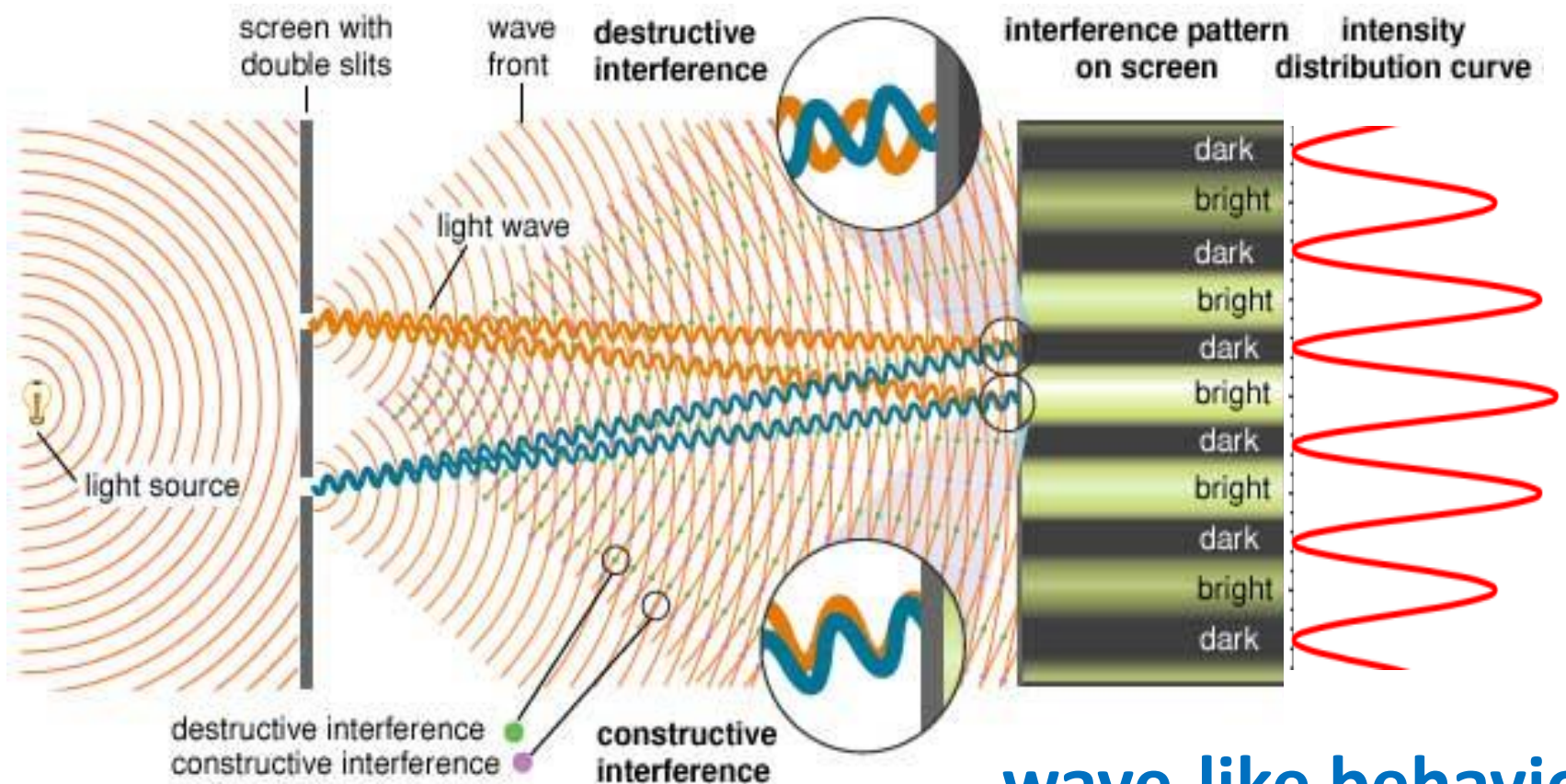
***“High-low”
pattern behind
the obstacle***



Double-Slit Experiment

Thomas Young, 1803

Light passing through two parallel slits will interfere, producing a *pattern of bright and dark fringes*.



wave-like behavior