

6/16 ①

25.5 fs

$25.5 \times 10^{-15} \text{ sec}$

$\frac{3 \times 10^8 \text{ m}}{\text{Sec}}$

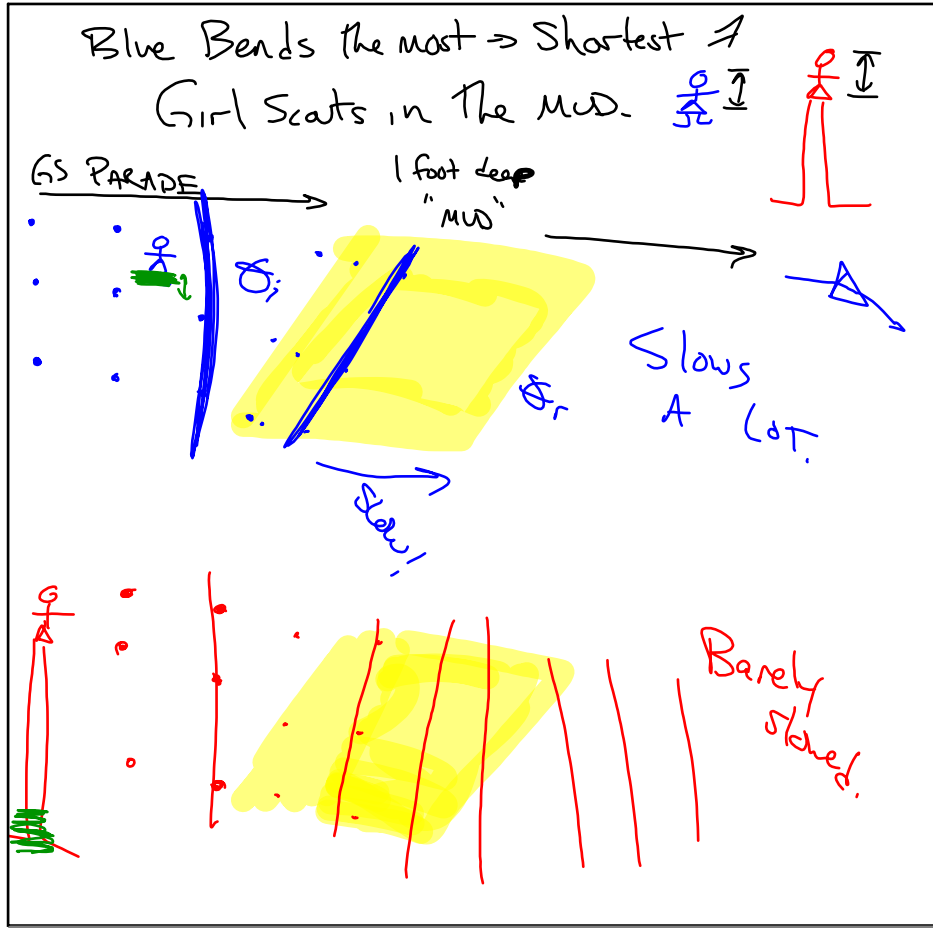
$\frac{3 \times 10^8 \text{ m}}{\text{Sec}} \quad 25.5 \times 10^{-15} \text{ sec}$

Oct 30-7:23 AM

① 213

Spectrum

Oct 30-8:41 AM



Light = energy  
 $\hookrightarrow$  have mass?

MAX Planck - Planck's constant  $h$

$E \propto f$  - Proportion

$E = hf$  - Equality

$6.63 \times 10^{-34} \text{ J}\cdot\text{sec.}$

Oct 30-8:55 AM

$E = hf$        $E = mc^2$

$C = f\lambda$        $f = \frac{c}{\lambda}$

$hf = mc^2$

$\frac{hc}{\lambda} = mc^2$

$\frac{h\nu}{\lambda} = \frac{mv^2}{1}$

$\frac{h\nu}{mv^2} = \frac{\lambda}{1}$  ← De Broglie Wavelength

Mass  $(K_s)$  →  $\frac{h}{mv} = \lambda$  (Meters!)

Momentum →  $\frac{h}{p} = \frac{\lambda}{1}$

$J = \frac{kg \cdot m^2}{s^2}$

$C = \text{speed of light}$   
 $v = \text{velocity (generic)}$

Oct 30-8:57 AM

### Photoelectric effect

Light energy → substance →  $e^-$

Whole # quanta

Energy level diagram:

- ground level
- level 1
- level 2
- level 3 (Excited level)

↑ Add Energy

↓ release energy as LIGHT

Wavelength

Oct 30-9:04 AM

Which color has the most energy

ROYGBIV

Long  $\lambda$  (Red) (Blue) Short  $\lambda$

(150) (MOST E)

$c = f \lambda$  (constant)  $\rightarrow$   $E = hf$

(OK? SKY)

Oct 30-9:16 AM

6 TON school bus traveling  $\frac{40 \text{ miles}}{\text{hr}}$  Find  $\lambda$

$6.63 \times 10^{-34} \text{ J}\cdot\text{s}$

$\lambda = \frac{h}{mv}$

1 TON = 2000 pounds
1 Kg = 2.2 pounds

1 mile = 1.6 Km
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6 ton	2000 lbs	1 kg
1 ton		2.2 pounds

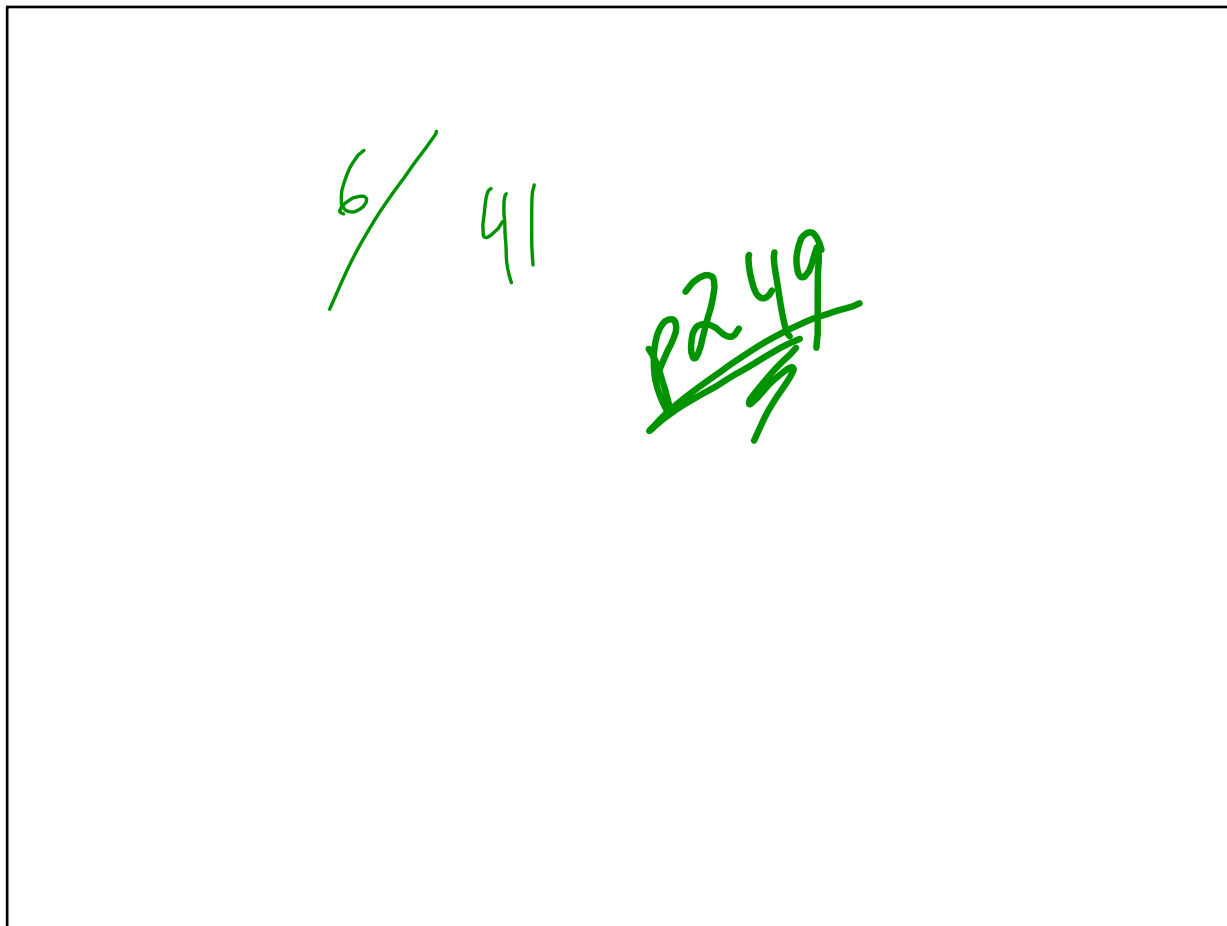
5443.164 Kg

40 miles	1600 m	1 hr
hr	1 mi	3600 s

17.88 m/s

$\lambda = 6.812 \times 10^{-39} \text{ m}$

Oct 30-9:20 AM



Oct 30-9:31 AM