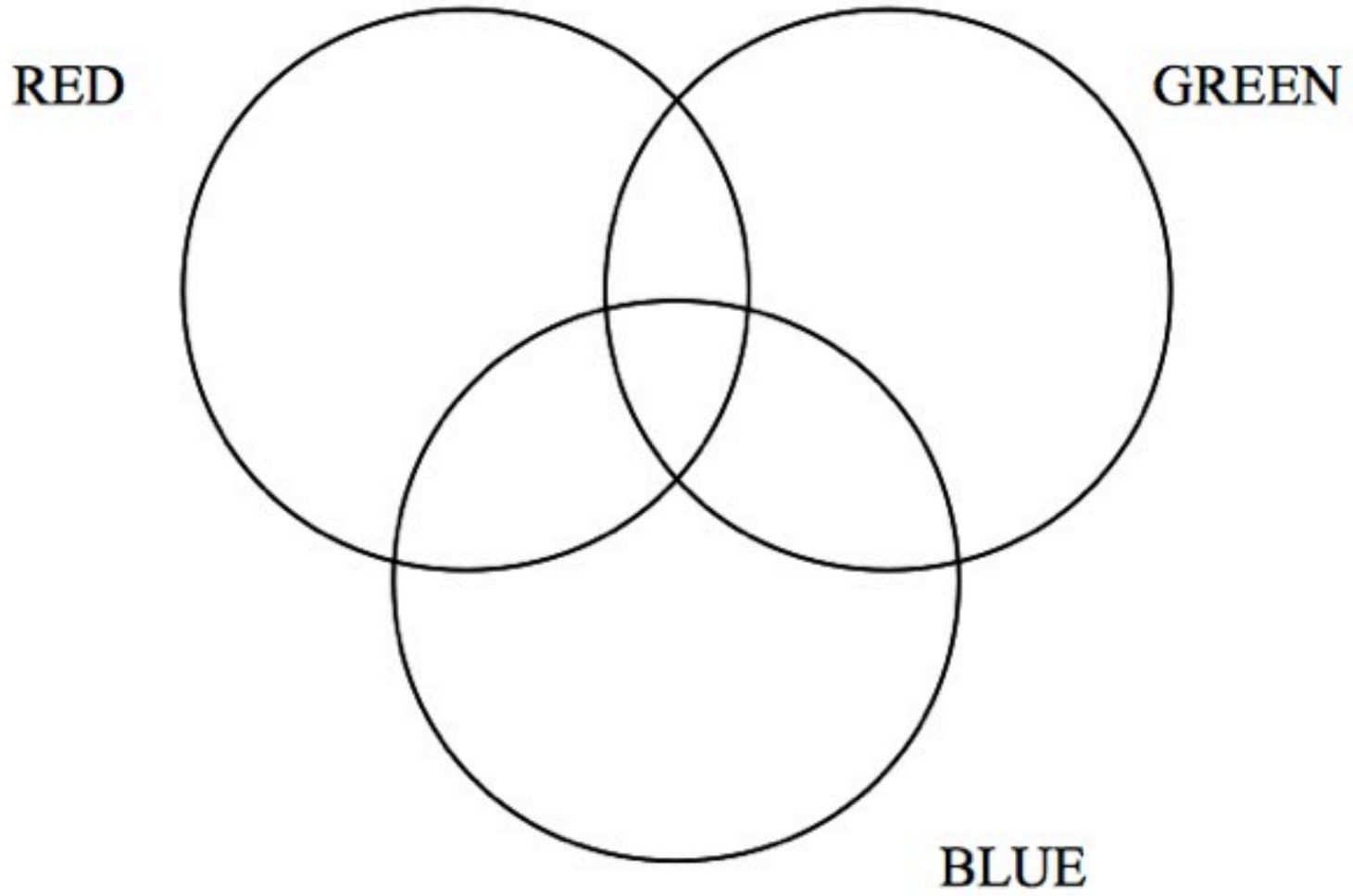
Do Now

- Get an index card from the front desk.
- Take out your lab from over the weekend, a pencil and a calculator.



1-4: Write the color that appears in each numbered section.

5) With a white beam and a red filter, what color is seen?

6) What is the filter doing?

Today

- Finish electromagnetic wave calculations.
- Begin mechanical waves.

Tonight

- Mechanical Waves worksheet
- On school wires

Mechanical Waves

- Kinetic Energy
- Needs an energy source to release energy.
- The energy is then transferred through a medium. **Waves transport energy**.

Agitation

- Energy in put into an object.
- The object wants to return to its initial position.
- It will release the energy that was input.

Oscillation

- A string is plucked on a guitar.
- The string wants to return to its resting position. **Restoring Force.**
- It attempts to return, but passes is resting point due to high kinetic energy.
- The string goes to the opposing side and attempts to return... repeat.

Examples

- Springs
- Pendulums
- Strings

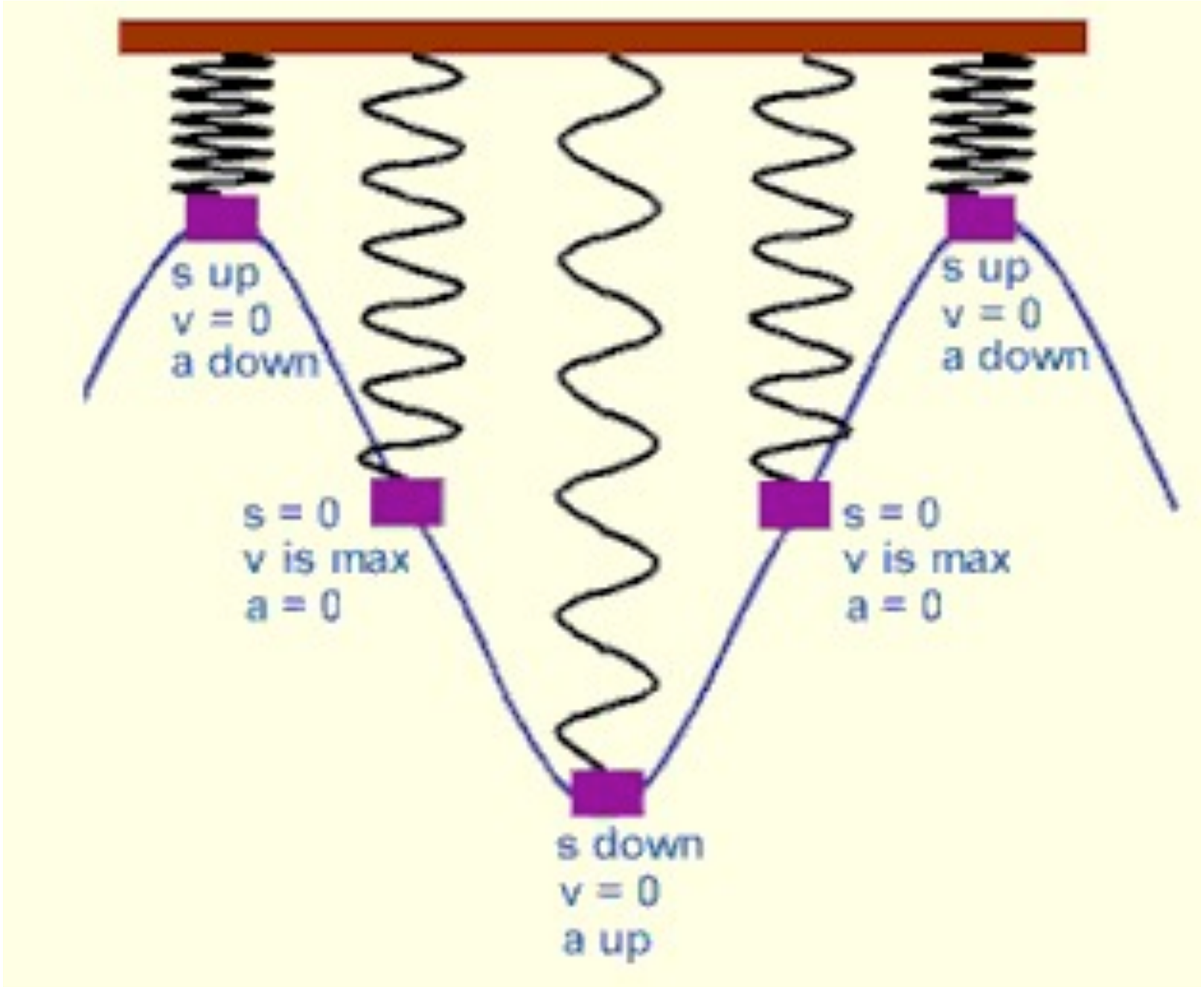
Predict

- What will that the most affect on the time it takes a pendulum to go through one oscillation:
  - Its initial displacement
  - The length of the pendulum
  - The mass on the end

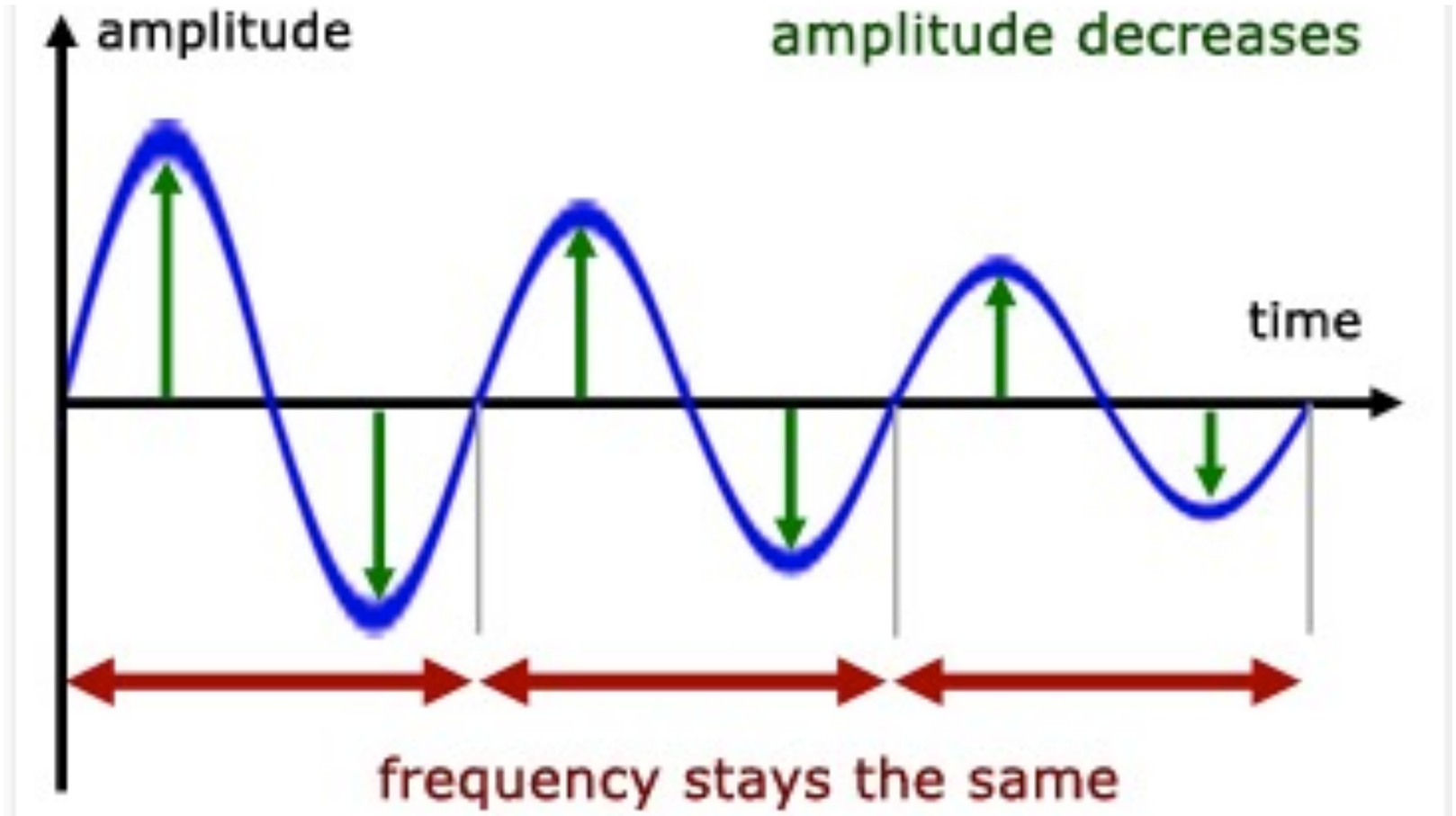
Pendulum Wave Effect

Sinusoidal Nature

- The position of an oscillating object is plotted on a position time graph.
- Its resting state is the principal axis.
- If the object is in motion, the graph looks like a sign wave.



Mass on a Spring


amplitude
amplitude decreases
time
frequency stays the same

Dampening

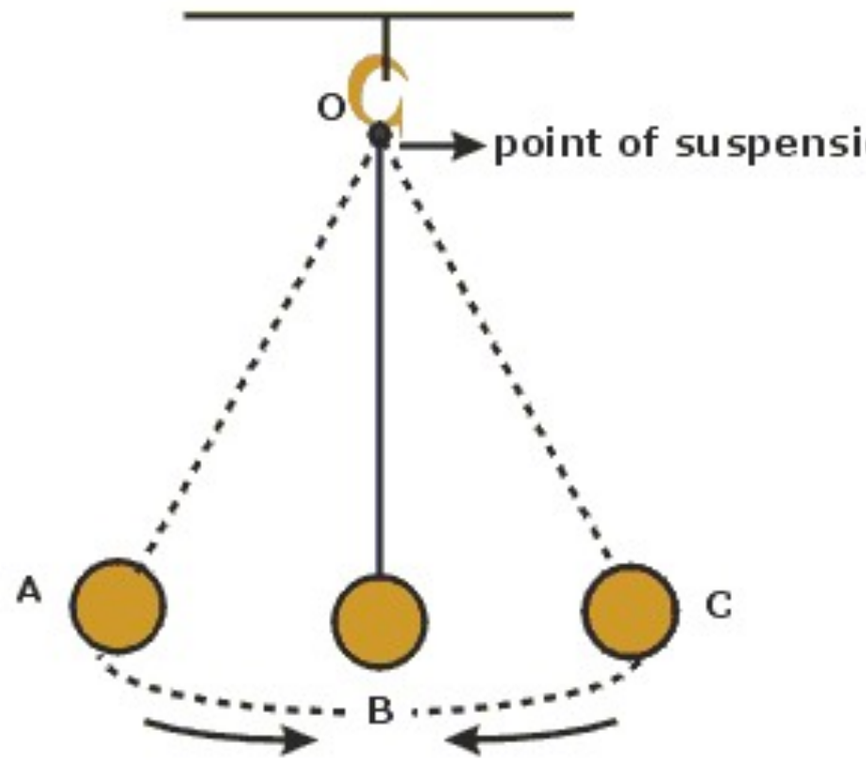
Terms

- Amplitude-Maximum displacement of a particle from its resting point.
- Period-Time for one full oscillation.
- Frequency-oscillations per unit time.

Equations

- Period [S] = 1/ Frequency [Hz]
- Frequency = 1/Period

A pendulum reaches point C every 2 seconds. What is the frequency of motion?



An A note has a frequency of 440Hz. What is the period for one oscillation of the string?

Longitudinal and Transverse Waves

- Transverse - What we think of as "normal" waves. Crest and trough. Movement is normal to the motion of the wave.
- Longitudinal waves - compression waves. Energy is transferred **through** a material. movement is in the direction of the wave.

Longitudinal Waves

- A particle is displaced
- It pushes on the particle next to it
- That particle pushes the next one
- Each particle that is pushed pushes back, returning the particle to its original position.

Reminder

- Sound travels at about the same speed (about 345m/s) in air.
- The frequency changes, and we hear a different tone.
- The wavelength also changes.

Sound Table

What Happened?

- The sound waves vibrated the metal.
- They bounced around an created interference.
- In some places the waves were larger, in other the waves were creating total interference.

Speed of Waves

- Speed = wavelength/period
- Speed = wavelength x frequency

An A note has a frequency of 440Hz. If the speed of sound in air is 345m/s, what is the wavelength of the wave?

The wavelength of a C note is 0.659cm.
What is the frequency of the note?