

Physics

Fall 2026

Weeks 1 - 2

Wednesday August 12

- T: Intro and Safety
- O: I will understand and comply with classroom procedures and policies and I will become an expert on laboratory safety
- D: by completing a safety contract.

In your group, introduce yourself to each other.

- Tell each person your name, grade level.
- What your favorite subject is in school
- What your least favorite subject is.

I will randomly call on people and have you share what someone at your table told you about themselves (so make sure you are actually listening to them).

Dr. Christian Edgar

Astronomy and
Physics

About me:

6th year at MacArthur, 20th year teaching

BA in Chemical Physics, minors in math and computer science

Masters of Education in Curriculum, Instruction, and Assessment

Doctorate of Education in K-12 Leadership

Army Veteran, 6 years as an MP with the 101st Airborne

Group Roles

- 1) Leader
 - 2) Supplies
 - 3) Time
 - 4) Scribe
-
- If someone is absent (or your group has only 3 people), then the role underneath your role has to cover both jobs. For example, if 3 is absent, then 4 must do 3 and 4's job. If 4 is absent, then 1 must do 1 and 4's job.

Flipped Classroom (use of class website)

- In canvas, locate the link to the class website (it is on the home page). Click on the link.

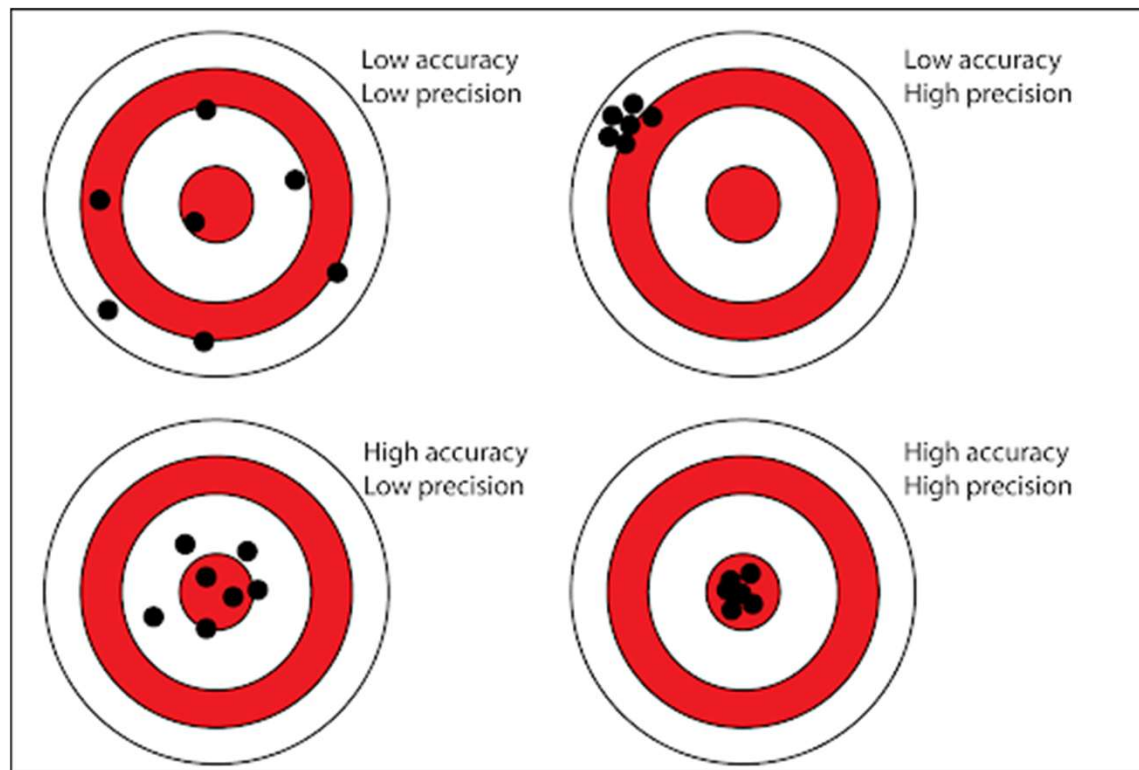
Friday (August 14)

- **T:** 2C - use mathematical calculations to assess quantitative relationships in data
- **O:** I will be able to explain the importance of accuracy, precision, and details in a scientific manner
- **D:** by measuring the classroom with different instruments and discussing the pros and cons of each

Simple Definitions

- Precision: How good you are
- Accuracy: How good your equipment is

Target Practice



Frame of Reference



Frame of Reference

- “an abstract coordinate system whose origin, orientation, and scale are specified by a set of reference points”

Speed of Light

- 3.0×10^8 m/s
- Star gazing = looking in the past

Vocabulary

- Distance = how much ground is covered
- Displacement = how far is it from the beginning
- Scalar = having only magnitude
- Vector = having magnitude and direction

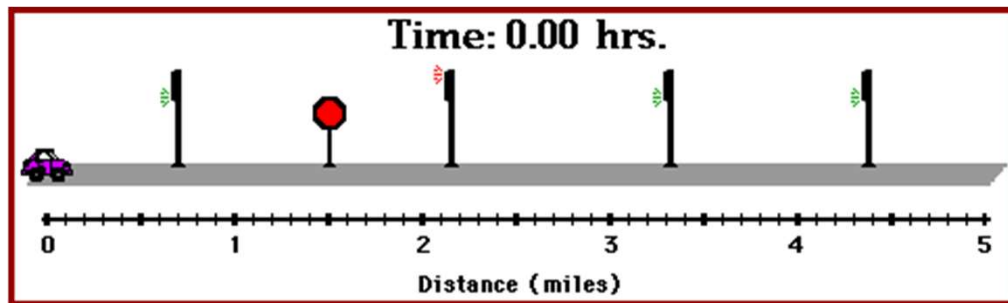
Calculating Distance and Displacement

- To find total distance, just add the scalar component of each leg of the journey
- To find the displacement, draw a straight line from the starting point to the finish (you may have to use the good ol' Pythagorean theorem)

Monday, August 17

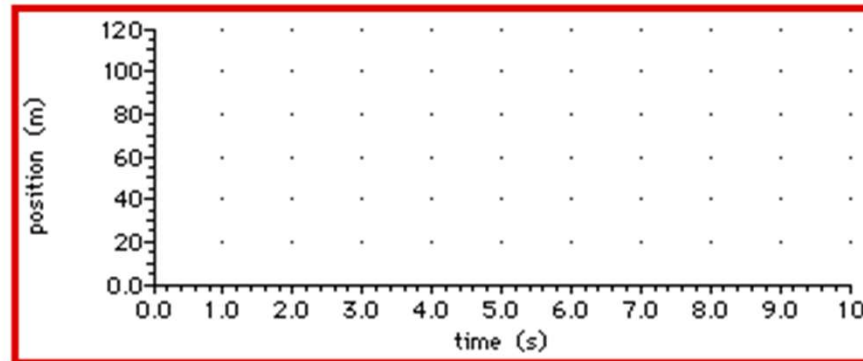
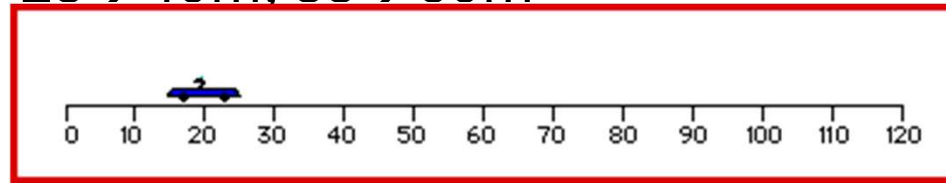
- T: 2C - use mathematical calculations to assess quantitative relationships in data
- O: I will be able to solve for and explain speed and velocity
- D: by taking notes, solving problems, and discussing my results with my group.

Speed is the distance traveled
by a moving object over
a period of time



Constant speed

- A moving object that doesn't change its speed
- Constant speed means equal distances are covered in an equal amount of time
- Ex. $1\text{s} \rightarrow 20\text{m}$, $2\text{s} \rightarrow 40\text{m}$, $3\text{s} \rightarrow 60\text{m}$



Calculating Speed

- Speed = $\frac{\text{Distance}}{\text{Time}}$
- If a runner travels 100 m in 10 seconds what was his average speed?
- Probably not constant
- Can solve for the other pieces too
- Distance = speed x time
- Time = $\frac{\text{Distance}}{\text{Speed}}$



Velocity is speed in
a given direction

$$\text{Average Velocity} = \frac{\Delta \text{ position}}{\text{time}} = \frac{\text{displacement}}{\text{time}}$$

average velocity = $\frac{\text{displacement}}{\text{time interval}}$

$$\bar{v} = \frac{\Delta d}{\Delta t}$$

- **instantaneous velocity - the velocity that something has at any one instance**

- *(The terms instantaneous speed and avg. speed may also be used)*

*The average velocity for a trip
might be 53 miles/hour.*

***However, during this trip your
instantaneous speed might
have been 0 miles/hour at a
stoplight or 70 miles/hour on
the open road.***

Graphing distance vs time

- Always put the independent variable on the x-axis
- The slope of the line equals the velocity
 - Remember the slope formula ($\Delta y / \Delta x$)
 - Δ (delta) means change. Mathematically it means to subtract

Wednesday (August 19)

- T: 5C - describe and analyze motion in one dimension using equations with the concepts of distance, displacement, speed, velocity, frames of reference, and acceleration
- O: I will be able to demonstrate my understanding of velocity and speed
- D: by completing a lab and a worksheet over the concepts.

Journal 1.1

- What are my strategies to succeed this school year?
- For each journal, you will need three things:
 - 1) write the date
 - 2) write the prompt (the question)
 - 3) write AT LEAST 4 sentences in response to the prompt.