| Unit 1: Entry Document | Evergreen Physics | September 10, 2018 |
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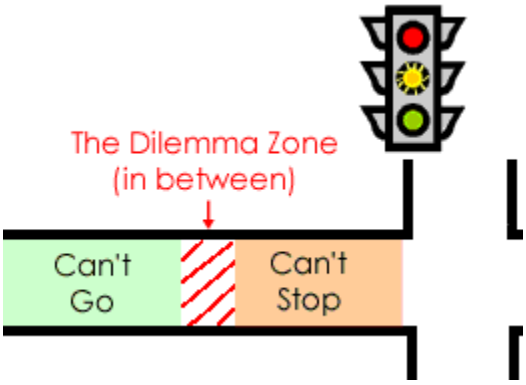
# The "Yellow Light Dilemma" Project: Finding Dangerous Intersections in White Center

*Each unit this year will culminate in a project. As you accumulate new knowledge in Physics, you will subsequently apply this understanding to designing solutions to real problems or answering big questions.*

**What:** Many factors affect driving safety. A driver's speed, acceleration, and reaction time may all influence how they can adjust to changing conditions on the road. Intersections and roads themselves may also be poorly enough designed in a way that increases the risk of accidents. In Unit 1 your job is to find three intersections with traffic lights and evaluate whether they violate what's called the Yellow Light Dilemma (YLD).

In this unit you will take up the roles of citizen scientist and traffic engineer. We will collect data and design solutions to improve the safety of our community. As a class, if we find any intersections that violate the YLD, we will report them to the King County Department of Transportation.

**Why:** Traffic safety is a major public health concern. In 2017 more than 40,000 people died in car accidents--that would be 4 out of every 5 people living in Burien today.[1] In 2007, crashes in intersections represented 40% of all crashes and caused 22% of all traffic fatalities.[2] Ensuring that intersections are safe, which includes the timing of yellow lights, is a crucial component of bolstering the safety of our roads.




**How:** Through six investigations, we will explore concepts such as velocity, acceleration, and reaction time. Here are the goals of our upcoming lessons:

- Learn why reaction time is critical to avoiding accidents while driving.
- Understand the significance of uncertainties in measurements, and distinguish between accurate and precise measurements in order to maintain a safe distance to avoid a collision.
- Understand the difference between average speed and instantaneous speed, use graphs of motion to measure velocity, and use equations to calculate average speed and velocity.
- Examine how a change in velocity determines the acceleration of an automobile and learn the difference between positive and negative acceleration.
- Learn how the speed of an automobile is related to its braking distance. Explore the concept of

[1] https://www.cnbc.com/2018/02/14/traffic-deaths-edge-lower-but-2017-stats-paint-worrisome-picture.html
[2] https://safety.fhwa.dot.gov/intersection/other_topics/fhwasa10005/brief_2.cfm

negative acceleration.

- Understand why it is unsafe to stop a vehicle beyond the STOP Zone when the light at an intersection turns yellow.