Wildfire Mapping Using Drones
2024 NHERI Summer Institute Lesson Plan
Jonathan Sandoval, NISD

Subject Areas
Algebra 1

Associated Unit
Linear – Rate of Change/Writing Linear Functions

Lesson Title
Wildfire Mapping Using Drones

Grade Level
8th grade

Time Required
8-10 Days

Summary
Students will collect data from piloting drones to calculate rate of change from battery usage and speed of a drone. Students will write linear functions to represent battery life and speed of a drone.

Students will use the ArcGIS Wildfire Map to apply what they have learned about their drones.

Engineering Connection
Drone navigation
Coding drones
Civil and Environmental Engineering

Engineering Category
Civil Engineering
Environmental Engineering

Keywords
Wildfires

Mapping
Coding
Drone
Linear
Slope
Slope Intercept Form
Rate of Change
Infrastructure

Educational Standards
Texas TEKS

A.3(B) calculate the rate of change of a linear function represented tabularly, graphically, or algebraically in context of mathematical and real-world problems

A.2(C) write linear equations in two variables given a table of values, a graph, and a verbal description

Prerequisite Knowledge
Students will need to understand the slope formula in order to calculate rate of change of battery life and speed calculation.

Students will need to understand slope intercept form in order to write equations using slope and y-intercept.

Learning Objectives
Students will learn how to apply the concepts of rate of change and linear functions to understand drone functionality and map the spread of wildfires.

Introduction/Motivation
NHERI group will conduct research on the effects that wildfires have on a community. The NHERI group is proposing research on mitigating wildfire propagation in discrete events. RAPID Facility located at the University of Washington in Seattle, Washington utilizes drones after a natural disaster occurs to assess the impact and assist in recovery efforts. Students will assist in gathering data from new models of drones in order to better assist in RAPID efforts to assist in recovery efforts of any given natural disaster.

Lesson Background & Concepts for Teachers

Slope Formula
Rate of Change
Linear Functions
Slope Intercept Form

Vocabulary/Definitions

- *Rate of change* - The speed at which a variable changes over a specific period of time
- *Linear* - arranged in or extending along a straight or nearly straight line
- *Data set* - a collection of related sets of information that is composed of separate elements
- *Slope* - The speed at which a variable changes over a specific period of time
- *Slope intercept form* - Linear functions written in the form of **y = mx+b**, where m is defined as the slope and b is defined as the y-intercept
- *y-intercept* - The point on the graph where the data set crosses the y-axis, in real world situations it is the starting value

Assessment

Students will be given different models of drones which they will test pilot to gather information about the drone (battery life and speed). Students will then use the data to answer a series of questions about the drone.

Students will then go to the website and gather information about a current wildfire which they will use to answer another series questions.

Supporting Program

US Wildfire Activity Web Map - ArcGIS

Classroom Testing Information

Students may work with a partner to complete the project-based assessment.

Students will receive accommodations as needed according to their testing needs, i.e., emergent bilinguals, special education, 504.

Contact Information

Jonathan Sandoval
Algebra 1
Anson Jones STEM Magnet Middle School
jonathan.sandoval@nisd.net