

Optimization and Disaster Relief

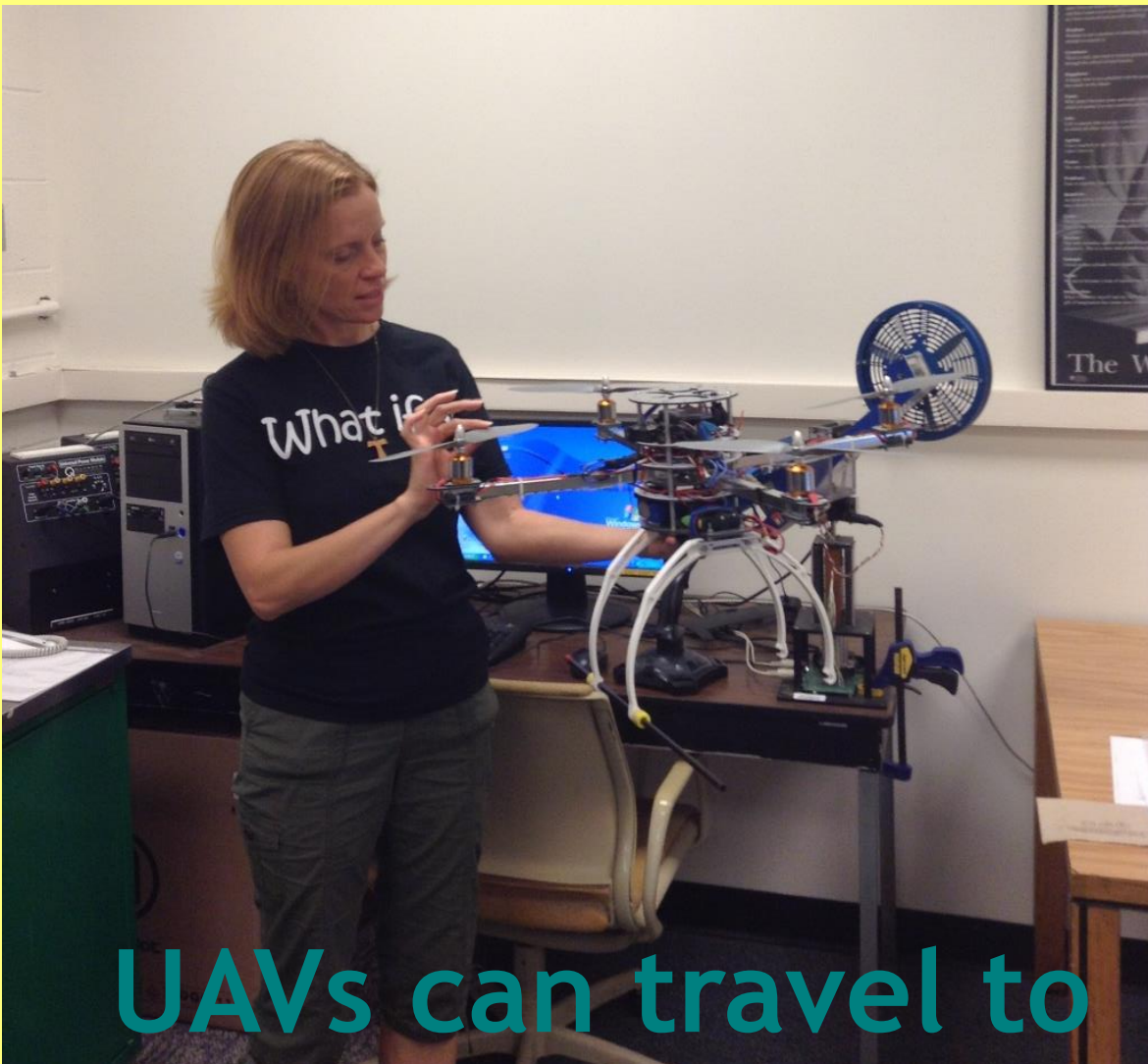
Marcia Roth
Catholic Central High School
Integrated Science and Advanced Math

Summer Research

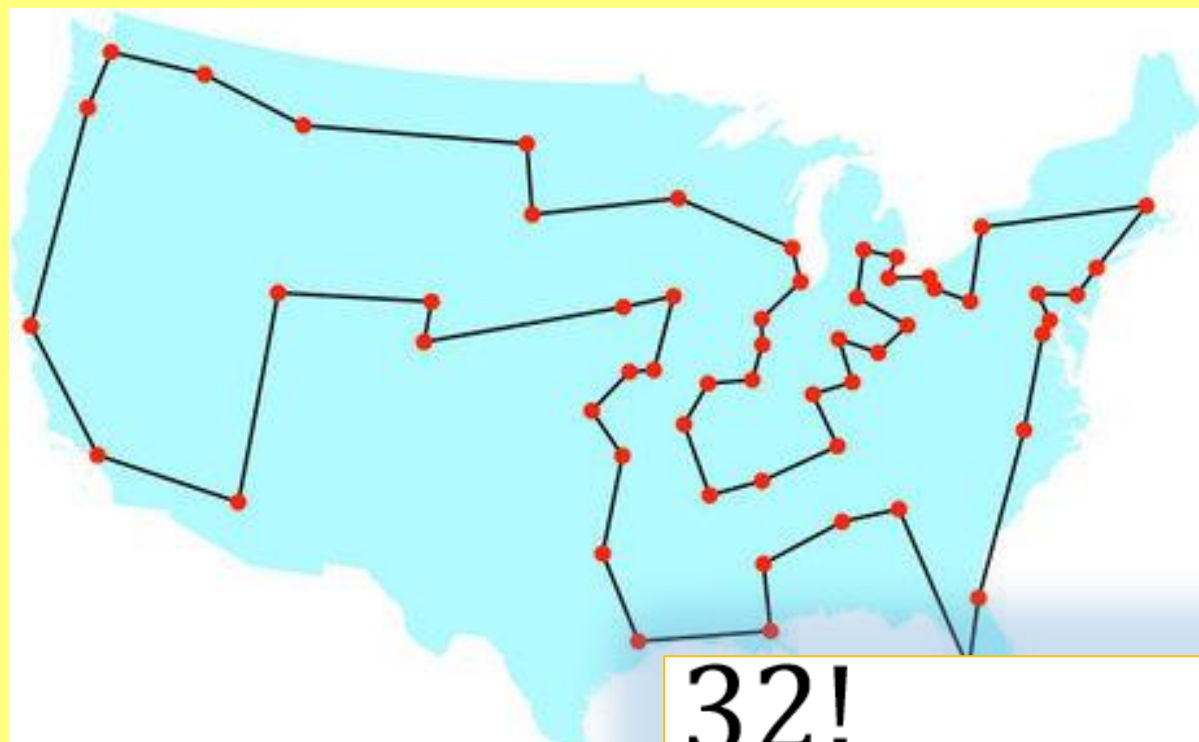
Into the Classroom

Think About...

Solving for the Shortest Path / Traveling Salesman Problem



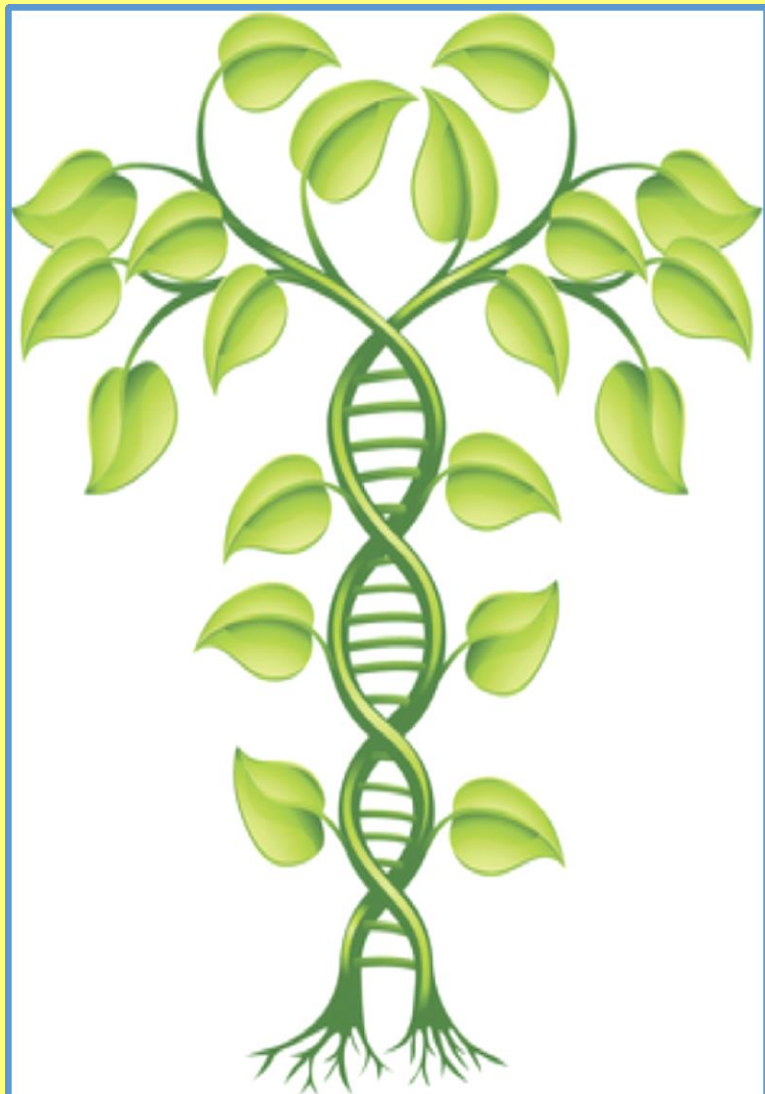
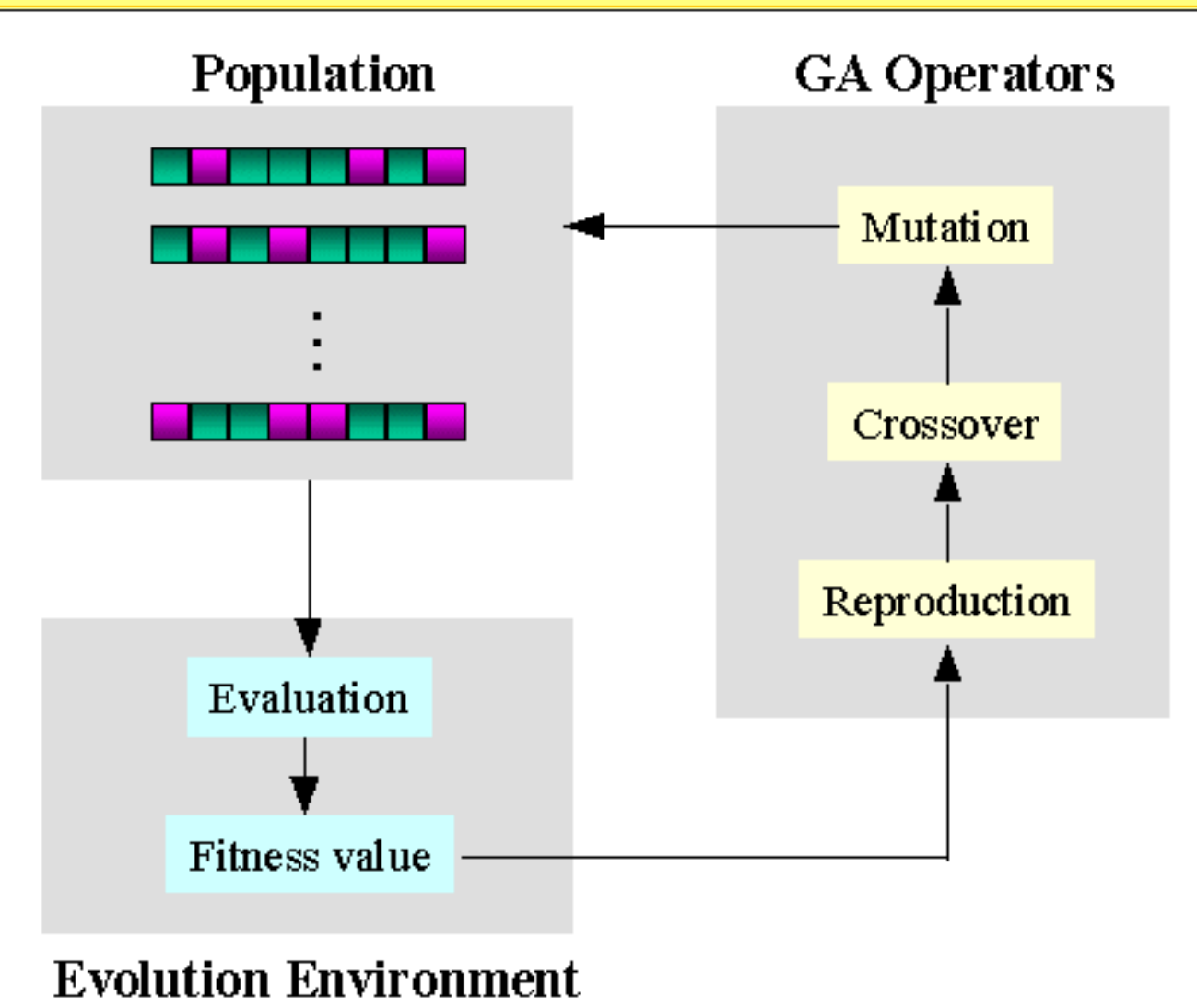
UAVs can travel to many locations that manned vehicles can't.



What is the shortest possible path?
MANY options!

$$\frac{32!}{2} = 1.3 \times 10^{35}$$

Genetic Algorithms and Optimization



Sample of paths = population
Fitness function = natural selection
New paths = reproduction
Iterations = generations

Careers: Unmanned Aerial Vehicles (UAVS) and Engineers



Challenge-Based Learning:

What?

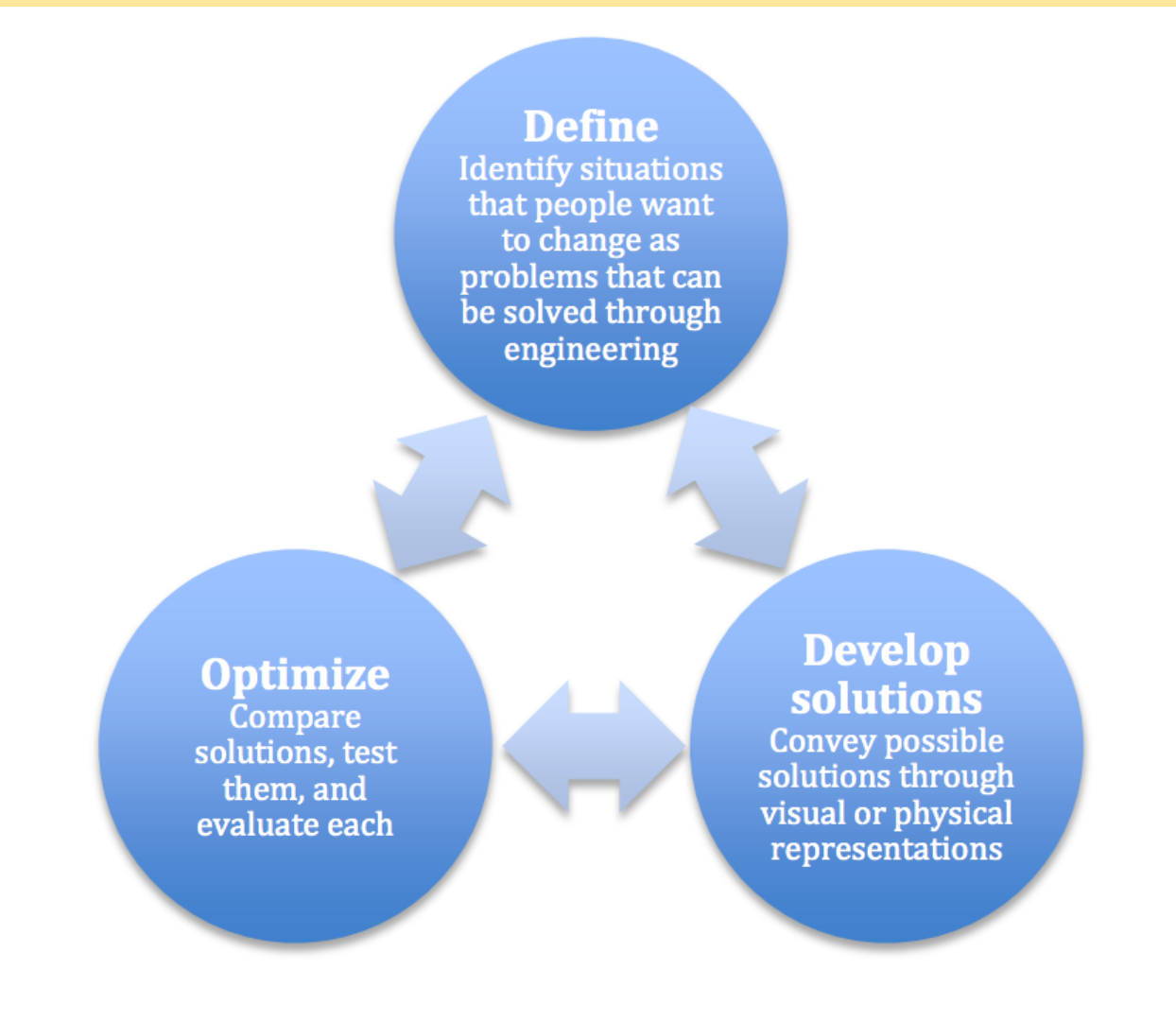
- teachers and students together
- compelling issues
- solutions to real problems
- take action



How?

Engineering Design Process:

- multiple solutions
- testing and revising
- under constraints



How can we Minimize the Losses from Natural Disasters?



Natural Hazards vs Natural Disasters



“Failure is the opportunity to begin again more intelligently.”
Henry Ford

