EDDIE workshop

I teach algebra-based introductory physics to non-physics majors at Savannah State University. Most of our students’ majors are Biology, Chemistry, Forensic Science, Environmental Science, Marine Science and we have a small proportion of students of Engineering Technology programs. Most physics books are written for scientists and engineers with examples that don’t engage our life sciences students. When teaching kinematics, I use very simple examples of blocks moving at a certain speed or accelerating in order to simplify the algebra, but they are far removed from the topics that interest the students. If the students think that physics is useless and not useful for their careers, they don’t study or show interest. I tell them that physics helps them develop critical thinking so that they are able to analyze real life situations to find relationships between different parts of a problem in order to be able to make predictions but we haven’t been doing that in our classes.

After I meet with the Savannah State team coming to the Eddie workshop, I started thinking about how to incorporate environmental data into my physics classes. I moved 4 years ago to Savannah in the coast of Georgia and we have had to deal with tropical storms and hurricanes multiple times per year. Whenever we have a hurricane, all over the media are predictions about when the hurricane will make landfall. We have some territories that are connected to the mainland by a highway and if the water level rises to a certain level there is not land access to those regions. In our region, we have flooding maps that also aid in helping the government to decide if a region needs to be evacuated.

Even though, climate predictions are extremely complicated, we could use a first order approximation to predict the speed of a hurricane and it s acceleration as it approaches the coast by knowing its coordinates at different points in time. We could also use the hurricane topic to discuss the difference between the linear speed of the eye of the hurricane versus the rotational speeds of the winds spinning around the center. By knowing the level of the water at different points in time, we could try to predict when a certain area with be incommunicated due to flooding. There is research that shows that the level of the oceans is rising slowly due to global warming. This information can be used to teach kinematics and the importance of being able to make predictions to inform public policy.

One important point regarding the motion of hurricanes is that the coordinates are latitudes and longitudes, which are located on our almost spherical planet. In order to simplify the math, we tend to only refer to Cartesian coordinates in our analyses, which are a decent approximation for most purposes. In recent years, there are growing online forums promoting disinformation such as the Earth been flat or casting doubt on climate change. In our physics classes, we could use real environmental data in the examples while still teaching the fundamental concepts, which could prevent people from falling prey to disinformation.

Until now, we have taught physics by doing examples at a very small scale, but we can teach it from a larger global perspective to allow our students to internalize the importance of analyzing real data, finding the relationships between the variables and using these rules to make predictions that can affect us all.

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