The Mathematics of City Planning and Crisis Management

This collection of problem-centered learning experiences is intended to integrate career awareness with middle school mathematics practice. Students will be divided into teams and assume the roles of city planners and managers. They will respond to various crises, and in so doing, learn about the occupations involved and the mathematics required to find solutions.

The Scenario:

In the near future, the small town of Astland, Illinois (population 50,000) is facing a refugee crisis. An unprecedented series of hurricanes has brought such devastation to the Atlantic and Gulf Coasts, that government agencies can no longer insure housing or support reconstruction in many coastal communities. Citizens are being encouraged to relocate to safer regions and many are headed to small Midwestern cities like Astland. City planners must expect 50,000 American refugees to settle in and around Astland in the next ten years, effectively doubling the population. Compounding the crises is the fact that severe weather in the Midwest has also become more frequent. All new construction must take this reality into account.

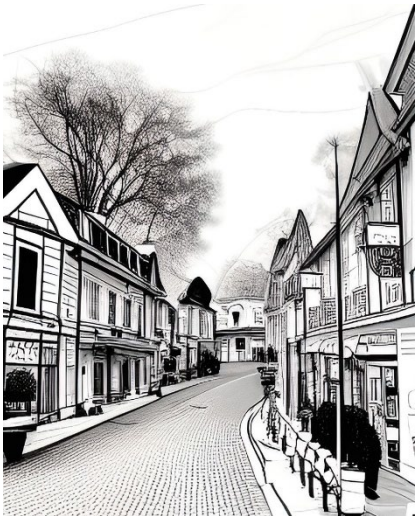
This scenario sets the stage for a collection of activities described below. Teachers may select any combination of the following activities, depending on the time available.

The scenario is narrated to students by a series of five slide shows that model local TV news reports. One "broadcast" may be used at the start of class to set the mood throughout the week, or they may all be viewed at once if desired.

The Activities:

In the **Sector Assignment Activities**, students are divided into teams, each responsible for a different organizational sector of the city. Those sectors are:

- Water and Waste
- Transportation
- Health and Human Services
- Government
- Food and Energy
- City Planning and Housing



Each sector team will be given a Sector Assignment. This problem-solving activity is related to the rapid expansion of the population and might take about 70 minutes to complete.

That work can be interrupted without warning by crises related to local **Severe Weather Scenarios**. There are three such scenarios, that each involve about 15 minutes of collaborative problem solving.

Once all teams have completed their work, they will report their findings and decisions to the rest of the class. The teacher may wish to have the sector teams combine their work into a formal presentation.

The **Occupational Research Assignment** allows students to explore several occupations related to their sector of city management. This is individual work that requires internet access and might take an hour.

The **City Modeling Activities** allow students to create a map, using paper and foam shapes, showing one possible layout of the newly expanded city. They will perform numerous calculations and construct graphs to describe their solutions. These activities will take about two hours, if you do them all.