PROJECT 1 : Designing a City of the Future

PROJECT-BASED LEARNING ASSIGNMENT OVERVIEW

▶ **Getting Started:**

Now that students have explored sustainability, climate change, and efficient, healthy, and resilient cities throughout the three lessons offered, they are ready to work in groups to design their concept of a city of the future. Students can use the content developed in Lessons 1, 2, and 3, in addition to perspectives gained from the Environmental Justice Lesson, as they develop their designs. The open-ended nature of the assignments and project allow for a range of depth and sophistication of the resulting work. You have the flexibility to implement this project work in whatever way best compliments your curriculum.

REMOTE LEARNING SUGGESTIONS

If you are implementing this program virtually or in a combination of in-school and at-home learning, you can utilize collaborative programs to assist students such as Google Docs, Zoom meetings, Google Hangouts, Flipgrid to name a few.

Your school may have specific programs approved for use. Students can develop their projects individually but we highly recommend group collaboration if possible.

Before students begin the project, introduce them to the discipline of environmental engineering. Have students read the section, "What is Environmental Engineering?" (pages 1-2) and "Building on a Remarkable Legacy" (pages 2-3) in the report introduction.

Lead students in a discussion of all the different types of people/careers that would have to be involved in creating their city. Discuss that an interdisciplinary approach is needed to address the problems/issues faced by cities.

When designing their city, students should address the following aspects:

- Providing sustainable water, energy, and food supplies
- Intervention and adaptation of climate change
- Disaster Resilience and creating an efficient and healthy city
- Addressing environmental justice in solutions and designs for equity throughout the city

Environmental Engineering
for the 21st Century
Addressing Grand Challenges

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▶ **Additional Research:**

Students should incorporate infrastructure (such as water, transportation, and energy) into their planning and consider the roles of green infrastructure, smart system technology, and distributed systems in their designs. Have students research these components by using the following assigned readings from Grand Challenge 4 in the report, specifically:

- Re-envisioning Urban Infrastructure (pages 56-57)
- Advancing Smart Cities (pages 57-60)
- What Can Environmental Engineers Do (pages 63-65)

▶ **Group Presentations:**

We encourage you to have each student group develop a presentation (the format is at the discretion of the educator – suggestions would be PowerPoint, video, graphs, documents, etc.) depicting their City of the Future design. We suggest providing the students with 2 to 3 class periods to do research and 3 to 4 class periods to work on the design. This can also be assigned as an out-of-class time project for teams to work on.

> **Students should consider the following questions as they are designing their city:**
>
> - What do you think is most important to make a city more efficient? To make a city healthier? To make a city more resilient?
> - What types of tradeoffs do city planners face to accomplish those goals?
> - How can your design ensure that benefits are provided to all city residents, regardless of income, race, or ethnicity?
> - How might you overcome challenges to move from today's infrastructure to a better one in the future?