Student Material

Design a Sustainable City



Have you ever considered what your town/city looked like 100 years ago? Have you ever thought about what your town/city will look like in the future?

In 2015, the United Nations (UN) adopted the 17 UN Sustainable Development Goals as an "urgent call to action" to unite the world and provide a "pathway to peace and prosperity" for all people. UN Sustainable Development Goal 11 challenged the world to "make cities and human settlements inclusive, safe, resilient and sustainable."

According to the UN, 156 countries have developed national urban polices; however, only half of those are in the "implementation phase." Successful cities have a plan for their future. What does a sustainable town/city of the future look like to you?

According to thezebra.com, there are 10 characteristics of sustainable urban planning. These characteristics include:

- Public transportation
- Walkable and bikeable neighborhoods
- Vehicle charging stations, solar farms
- Green buildings
- Food production
- Accessible public resources
- Water conservation
- Public green spaces
- Waste management

Select one of these characteristics and use the Design Process to address how to create or improve your chosen characteristic in order to make your town/city more sustainable and future ready. Then advocate for your design with a town/citywide campaign!

You have the power to improve the future by designing a sustainable town/city. Be the change!

© 2021–2023, IDE Corp. and EdQuiddity Inc
Permission to duplicate for registered users of MyQPortal only.

Student Material

Design a Sustainable City *Rubric*

	Novice	*Apprentice*	*Practitioner*	*Expert*
Formulate ***Design Journal***	includes: ☐ description of the current problems in the town/city ☐ description of a better situation ☐ descriptions include images or graphs if changes are not made	includes: ☐ description of the current problems in the town/city ☐ description of a better situation ☐ description of what will happen if the problem is not solved ☐ descriptions include images or graphs of present and future if changes are not made	includes: ☐ description of the current problems in the town/city ☐ description of the ideal situation ☐ description of what will happen if the problem is not solved ☐ descriptions include images and graphs of present and future if changes are not made to illustrate the problem clearly	all of *Practitioner* plus scale model of the city's future if nothing is changed
Explore ***Design Journal***	includes: ☐ research about the problem ☐ questions or notes on what still needs to be determined ☐ who I can contact for more information	includes: ☐ research about the problem ☐ questions or notes on what still needs to be determined and how you will learn it ☐ who I can contact for more information	includes: ☐ research about the problem ☐ questions or notes on what still needs to be determined and how you will learn it ☐ ideas on how I can test out my ideas ☐ who I can contact for more information	all of *Practitioner* plus *How-To Sheets* or instructional videos on effective research tips

© 2021–2023, IDE Corp. and EdQuiddity Inc
Permission to duplicate for registered users of MyQPortal only.

Ideate ***Design Journal***	includes: ☐ generation of a couple ideas to solve the town/city's problem ☐ necessary resources to create a solution ☐ evidence of collaboration with peers	includes: ☐ generation of many ideas to solve the town/city's problem ☐ necessary resources to create a solution ☐ evidence of collaboration with peers to generate more ideas	includes: ☐ generation of many ideas to solve the town/city's problem ☐ necessary resources to create a solution ☐ evidence of collaboration with peers to generate more ideas and receive feedback on the ideas you thought of	all of *Practitioner* plus *How-To Sheets* or instructional videos on how to ideate more ideas
Sift ***Design Journal***	includes: ☐ analysis of the top idea on whether it addresses the problem ☐ analysis of the top idea over its feasibility ☐ analysis of the top idea and their unintended consequences ☐ explanation of the best solution ☐ who this solution will affect	includes: ☐ analysis of the top few ideas on whether they address the problem ☐ analysis of the top few ideas over their feasibility ☐ analysis of the top few ideas and their unintended consequences ☐ which idea will be the best solution ☐ who this solution will affect	includes: ☐ analysis of each idea on whether it addresses the problem ☐ analysis of each idea over its feasibility ☐ analysis of each idea and its unintended consequences ☐ identify which idea will be the best solution ☐ identify who this solution will affect	all of *Practitioner* plus Tip Sheet for identifying the feasibility and unintended consequences for peers to use
Simulate ***Design Journal*** **and**	Design Journal includes: ☐ data collection when testing out prototype/models on how this solution will improve the sustainability of the city ☐ final prototype/model design, materials, and specifications ☐ some people to see your design	Design Journal includes: ☐ data collection when testing out prototype/models on how this solution will improve the sustainability of the city ☐ final prototype/model design, materials, and specifications ☐ list of appropriate audience	Design Journal includes: ☐ data collection when testing out prototype/models on how this solution will improve the sustainability of the city ☐ final prototype/model design, materials, and specifications ☐ brainstormed list of appropriate audience prototype/model includes:	all of *Practitioner* plus models of other possible solutions that have been tested

© 2021–2023, IDE Corp. and EdQuiddity Inc
Permission to duplicate for registered users of MyQPortal only.

Prototype/ Model	prototype/model includes: ☐ model for how this solution will improve the sustainability of the city	prototype/model includes: ☐ working model for how this solution will improve the sustainability of the city	☐ working model for how this solution will improve the sustainability of the city ☐ comparisons to other proposed solutions	
Advocate ***Presentation*** **and** ***Campaign***	presentation includes: ☐ information that speaks directly to a selected audience ☐ convincing reasons for the changes to the city's design campaign includes: ☐ digital or print format for reaching more people in the target audience	presentation includes: ☐ information that speaks directly to a selected audience ☐ convincing reasons for the changes to the city's design and how to do it campaign includes: ☐ digital or print format for reaching more people in the target audience	presentation includes: ☐ information that speaks directly to a target audience ☐ audience that can influence necessary changes ☐ convincing reasons for the changes to the city's design and how to do it campaign includes: ☐ digital or print format for reaching more people in the target audience ☐ digital or print format to include the members of the town/city	all of *Practitioner* plus ☐ the presentation encourages audience participation and feedback ☐ the campaign includes ways for the target audience and public to spread the word and gain support

© 2021–2023, IDE Corp. and EdQuiddity Inc
Permission to duplicate for registered users of MyQPortal only.

Teacher Material **Design a Sustainable City** *Scaffold for Learning* (Sample for one possible week of activities)

Benchmark Videos and Discussions What are the problems facing today's cities? The effects of climate change IDE Corp.'s Design Process		
Instructional Texts/Websites NationalGeorgraphic.org *Climate Change* NationalGeographic.org *Köppen Climate Classification System*	*Instructional Videos* How to research climate change in cities The purpose of using graphs NationalGeorgraphic.org *Climate 101: Cause and Effect*	*How-To Sheets* How to research climate change in specific cities How to make and analyze graphs How to formulate a problem
Learning Centers Sustainable development practices Match claims and reasons Making graphs with given data	*Interactive Websites* Brainpop.com: The Forces of Nature, Climate Change, and Our Fragile Environment	*Small-Group Mini-Lessons* Effective research tools and search terms Reading and interpreting data in graphs Understanding climate predictions Writing a claim Supporting a claim

© 2021–2023, IDE Corp. and EdQuiddity Inc
Permission to duplicate for registered users of MyQPortal only.

Practice Activities	Application Activities
Identify town/city on the Köppen Climate Classification System Determine the climate issues affecting local city/towns Research how cities are solving problems of climate change currently	Writing a claim with supporting reasons Determine what the future of the city/town will be if no action is taken Research ideal situation
Assessment Activities	**Reflection Activities**
Evaluate claim and reasons with rubric Peer edit and provide feedback of peer claims and reasons	Reflect on which research was the most influential Reflect on when to appropriately use graphs and how to select the graph that will support your work

© 2021–2023, IDE Corp. and EdQuiddity Inc
Permission to duplicate for registered users of MyQPortal only.

Teacher Material

Design a Sustainable City *Facilitation Questions*

COMPREHENSION *Ask questions that ensure students understand content and skills needed to solve the problem.*	What are some problems facing the city you selected? What has been done to address these problems? How successful were they? Who works to solve these problems in the city/town?
APPLICATION *Ask questions that ensure the ability of students to apply learning to new situations.*	What are some cities doing to address the climate change problems you have identified? What needs to change in your city to prepare it for the future? Which sustainable city characteristic will have the biggest impact on your city?
CONNECTION *Ask questions that ensure the ability of students to apply learning to their lives.*	How have you experienced climate change? How does climate change affect your life? Have you experienced any sustainable challenges that were addressed in your city? In another city?
SYNTHESIS *Ask questions that encourage students to create new information from existing data.*	What will happen if nothing is done to address climate change in this city/town? What solutions did you research that could be used in other climate change situations? What have you researched that other cities are doing that could support your design?
METACOGNITION *Ask questions that prompt students to think about their own thinking process.*	What was challenging about the design process? When did you feel successful in the design process? Why? Which activity best supported your understanding of the problem?

© 2021–2023, IDE Corp. and EdQuiddity Inc
Permission to duplicate for registered users of MyQPortal only.

Teacher Material

Design a Sustainable City *Facilitation Grid* (Sample for 1 week)

Students	Research from multiple sources of the problems plaguing specific city	Research on the ideal situation	Identify necessary information from the Köppen Climate Classification System	Understand prediction models of climate change	Formulate a problem based on relevant research	Write a claim	Write supporting reasons for a claim	Read and interpreting graphs	Create graphs with collected research	

M – mastery *P – peer tutor level* *HW – needs homework for reinforcement*

W – working on it *ML – needs a mini-lesson*

EDQUIDDITY
EDUCATION FOR YOUR WHATNESS

© 2021–2023, IDE Corp. and EdQuiddity Inc
Permission to duplicate for registered users of MyQPortal only.

Student Material

Design a Sustainable City *Transfer Task*

Now that you are a climate change expert, consider an area outside of a city that can be built sustainably. You will select an area that is suburban or rural, identify a climate problem facing the area, and design a solution for a more sustainably developed future.

- Research the area and determine a climate problem facing the area.
- Explain the current situation and what will happen if it is not addressed.
- Design a solution to the problem and test it out.
- Recognize any unintended consequences.
- Explain how your solution will sustainably develop the area for the future.

© 2021–2023, IDE Corp. and EdQuiddity Inc
Permission to duplicate for registered users of MyQPortal only.

Teacher Material

Design a Sustainable City *Teacher Notes Guide*

Unit Overview

Inspired by UN Sustainable Development Goal 11, students will research the climate change issues in a particular area and design an aspect to improve the sustainability of the town or city using IDE Corp.'s Design Process.

Common Core State Standards Addressed

CCSS.ELA-LITERACY.RST.6-8.1
Cite specific textual evidence to support analysis of science and technical texts.

CCSS.ELA-LITERACY.RST.6-8.2
Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions.

CCSS.ELA-LITERACY.RST.6-8.3
Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.

CCSS.ELA-LITERACY.W.6.1
Write arguments to support claims with clear reasons and relevant evidence.

National Standards/Content Addressed

MS-ESS2-5.	Collect data to provide evidence for how the motions and complex interactions of air masses result in changes in weather conditions.
MS-ESS2-6.	Develop and use a model to describe how unequal heating and rotation of the Earth cause patterns of atmospheric and oceanic circulation that determine regional climates.
MS-ESS3-5.	Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century.

Enduring Understandings	Essential Questions
Climate change has impacted how we need to design towns and cities. Researchers collect information to support design decisions. There are specific climate change issues in specific towns and cities. The design process will support you to identify and solve problems.	How can you address climate challenges facing towns and cities near you? What do you want the cities of the future to look like? How can you use IDE Corp.'s Design Process to reimagine towns and cities? What information will you need to collect to inform your design?

© 2021–2023, IDE Corp. and EdQuiddity Inc
Permission to duplicate for registered users of MyQPortal only.

21st Century Skills Addressed

Note any components from each 21st Century area that will be directly addressed through this unit.

COMPLETE LIST of 21st Century Skills:

Core Content and Interdisciplinary Themes

- Subject-Area Mastery
- Global Awareness
- Civic Literacy
- Environmental Literacy

Learning and Innovation

- Critical Thinking and Problem Solving
- Creativity and Innovation
- Communication and Collaboration

Information and Media Literacy

- Information Literacy
- Information and Communication Technology

Life and Career:

- Flexibility and Adaptability
- Initiative and Self-Direction
- Social and Cross-Cultural Skills
- Productivity and Accountability
- Leadership and Responsibility

© 2021–2023, IDE Corp. and EdQuiddity Inc
Permission to duplicate for registered users of MyQPortal only.