



Estimated Time: three to four 45 min. periods

Objectives:

- Describe the connection between urban planning, air quality, and climate change.
- Define sustainable and give examples of sustainable actions.

CA State Standard Connections: The Physical Science and Investigation & Experimentation standards both apply to this lesson for all grades K through 3.

4th Grade California: A Changing State

Use maps, charts and pictures to describe how communities in California vary in land use, population density, and transportation.

Additional Materials:

- One roll of butcher paper
- Pencils with erasers (one per student)
- Crayons, colored pencils, paints
- Street maps of local town or city



Designing a Clean Air City



Students will have a chance to apply all they have learned about climate change basics, reducing impacts from electricity use, reducing impacts from product use and disposal, and reducing impacts from transportation to create a Clean Air City. Reduction of greenhouse gas emissions from product cycles, waste disposal, transportation, and electricity production can all be a part of their dream city. In this lesson, students will map out ideal cities to learn how thoughtful land use planning and environmentally responsible choices can lead to improved air quality, through the reduction of greenhouse gas emissions, and improved quality of life.

Key Words

Urban Planner: person who helps plan communities.

Mixed Use Community: community with schools, offices, homes, stores, green space, and public spaces easily accessible to one another.

Sustainable: actions done in a manner that do not deplete natural resources faster than they can be naturally replenished.

Commute: regular travel from two destinations, such as home to work or home to school.

Preparation

Review Lesson 16 Background for an overview on the effects of land use planning on climate change. Prior to this lesson, make a chart or overhead listing the items to be included or considered in the students' planning of their Clean Air City. Prepare map materials for pairs or small groups of students.

Review extensions section and visit the various websites. Experiment with the Smog City website: <http://www.smogcity.com/welcome.htm> Run Smog City and change the dials and settings and see how the Air Quality Index (AQI) changes. How does the AQI change when you change the temperature, wind and population? What happens when you change the dials for emission levels for cars & trucks, off road, industry and consumer products?

SETTING THE STAGE

- Display a map of your local town, city, or San Luis Obispo County. Begin by having students think about where they live, play, shop, and go to school.
- Ask students “How do you usually commute to these places?”
- Explain to students that people in most cities and suburbs have to drive/commute to their destinations because the distances are too far, there is no public transit, or it is too dangerous to walk or bike.
- Ask students what would change in their lives if they could live, shop, play, and go to school in a mixed use neighborhood, with a mixture of homes, stores, parks, work, etc. all close together so a person can walk or bike between them. “What would they do that they can’t do now?” “Would there be things they couldn’t do that they do now?”
- Tell students that they will have the chance to become **urban planners**. Have them visit the Cal Poly City & Regional Planning Department website <http://planning.calpoly.edu/>
- Explain that their task as urban planners will be to design a sustainable Clean Air City. Explain that sustainable describes human activity that uses nature’s resources at a rate that they can be replenished naturally, and that a “clean air” city is one that has no or few air pollution sources.



Suburban and Urban City, Farms, Parks/Forest Land Images on CD.

ACTIVITY 1 – Design a Clean Air City

1. Divide the class into small groups. Explain to the groups that today they will work together as urban planners to design their own imaginary cities using their creativity and all the things they have learned about air pollution and greenhouse gases. Their goal is to design a Clean Air City. Being a city planner is very much like being one of the early settlers and pioneers in our country. They came to an area and had to decide how to use the land and where to locate all the different parts of a community. They had to deal with many issues including waste disposal, food production, power production, and water supply. Contact your local city or county planning department office or Cal Poly City & Regional Planning Department for more information on designing a clean air city.
2. In their groups have students brainstorm and record a list of things they would need to include or think about in their planning. Use the ideas below to guide the discussion.
 - **Energy sources:** Non-combustion, solar, wind, hydro, biomass.
 - **Product Use:** Where does food come from? Locally grown fresher and less emissions; stores close to houses.
 - **Waste:** Transfer stations, composting, and recycling stations.
 - **Transportation:** Reduce automobile travel with bike paths, subways, walking paths. Housing close to schools, stores, places to work, access to green

space.

- **Green Space:** Plants and trees take up carbon dioxide and make your city attractive.

3. You may want to generate a set of basic map symbols, which everyone uses for common sites such as homes, schools, roads, etc. Teams may add additional symbols of their own choosing, as needed. This will help simplify reading the maps.
4. Guide students with the following instructions:

Planning a Clean Air City

- Create a name for your city, and write it at the top of your paper
 - Draw the city limits and natural landmarks such as rivers or forests
 - Create symbols for homes, shopping centers, schools, parks, community gardens, farmer's markets. Make a map legend showing each symbol and its meaning.
 - Mark transportation routes by type, of travel (bike routes, light rail)
 - Each city plan should show:
 - Transportation means and routes
 - Energy sources
 - Food sources
 - Work places
 - Homes
 - Stores, libraries, parks, and entertainment
 - Mixed use neighborhoods
 - Waste disposal area/Recycling centers
 - Create a list of choices/actions which environmentally responsible citizens can make to reduce greenhouse emissions, that cannot be shown on a map, such as taking shorter showers, using less of something, and bringing their own bags when they shop. Attach the list to your map.
5. Provide each group with a large sheet of butcher paper and pencils with erasers. Markers, colored pencils, etc. can be used later when the planning is complete.
 6. Circulate around the classroom and assist as needed. Once the groups have completed their maps, have each group come to the front of the class, one group at a time, to explain their map and their list of choices/actions to the rest of the class.

ASSESSMENT

Listen to students as they plan their cities. Are they using the vocabulary and ideas they have learned? Are they applying their knowledge to create something new? Are they talking about decisions and trade-offs that must be made?

Use each group's list of ideas for the Clean Air City and their final product, the map of their city and the choices and actions list to assess how well they understand the factors that influence the generation of greenhouse gases and what can be done to reduce them.

EXTENSIONS

1. Present the Clean Air City maps – Provide each group with markers, paints, etc. to label and color their Clean Air City maps. Hang maps in the classroom or in another part of the school for others to see. Invite a “buddy class” to come visit the classroom and have each group explain what makes their city a Clean Air City.
2. Research real-life clean air cities and sustainable cities – Have the student's research actual sustainable cities and clean air cities that have been or are being designed in real life. Students can search key words such as: sustainability, green city, eco-city clean air city, or mixed use city. See the website <http://www.coolcalifornia.org/> for more ideas and look at the section for schools <http://www.coolcalifornia.org/schools>
3. Go on a field trip to the SLO County Botanical Garden - From their website: The mission of the San Luis Obispo Botanical Garden is to display the diverse plant life of the Mediterranean climate zones of the world and to provide opportunities for education, recreation, conservation and research. Through its programs and facilities, the Garden will foster an appreciation and understanding of the relationship between people and nature and will encourage a sense of stewardship toward the natural environment. Free educational tours are now offered to school groups ranging from preschool to 7th grade. All tours are aligned with the State of California Content Standards. Phone: (805) 541-1400
Website: <http://www.slobg.org/>



Research Energy Alternatives

Research energy alternatives using the internet and write a discussion on what types of alternate energy would be feasible for your clean air city. For example, visit the following wind energy website:

<http://projects.4-hcurriculum.org/curriculum/wind/book1.aspx>



Research Waste Alternatives

Contact the San Luis Obispo Integrated Waste Management Authority to find out about various waste management alternatives, such as the Commercial Recycling Program and school recycling.



Research Transportation Alternatives

Research transportation alternatives using the Internet and write a discussion on what types of alternate transportation would be feasible for your clean air city. For example, visit the following APCD websites:

<http://www.slocleanair.org/programs/cleancar.php>

<http://www.slocleanair.org/programs/c5.php>



Support A Local Garden Project

The ECOSLO Community School Garden Project seeks to teach students horticulture skills, natural resource stewardship, and social values through integrated academics and a school garden. Through this program ECOSLO hopes for students to be instilled with a great respect for where their food comes from, to value landscapes and open space, and to be empowered with a means to be a contributing and capable member of their community. Currently, there are four SLO County schools participating in the garden program. Students work in the garden once a week under the tutelage of Laura Lopez, a local horticulturalist and the Garden Program Coordinator. Activities include: establishing perennial gardens, composting, mulching, pruning, seed saving and sowing, plant propagation, weed control, nutrition and food preparation, community service, and field trips to various nurseries, farms, and gardens. By shrinking the gap between the youth and our natural environment, the program encourages these students to simply be aware of and care for the earth, and at the same time provides them options for applying themselves during school and after graduation.