Chapter 5

TRANSPORTATION
Design Challenge:
You need a car to get around in most American cities. Automobiles pollute our air and many people—including kids—do not or cannot drive. We need your help to design a transportation system that is ECO-FRIENDLY and KID-FRIENDLY!

Mural at the London Transport Museum (UK)

How many modes of transportation can you find?
DESIGN CHALLENGE ASSIGNMENT

Design a transportation system for your city that is ECO-FRIENDLY and KID-FRIENDLY.

1. Choose which modes of transportation you want in your city.

2. Plan a network of transportation paths to connect the districts, public spaces, and landmarks you designed in previous assignments.

Draw your paths lightly in pencil so that you can easily erase them if you change your mind about the design.

If you use any special symbols, colors, or lines, be sure to explain them in your map key.

When you are satisfied with your plan, you should use markers or colored pencils to finish your design.
KEY POINTS TO REMEMBER ABOUT TRANSPORTATION

TRANSPORTATION SYSTEMS CONNECT DIFFERENT PARTS OF CITIES.

TRANSPORTATION IS A MEANS OF TRAVELING OR OF CARRYING SOMEBODY OR SOMETHING FROM ONE PLACE TO ANOTHER. EXAMPLES INCLUDE WALKING, BIKING, CARS, BUSES, SUBWAYS, FERRIES AND TRAINS.

Transportation has changed over time as new technologies have been developed. In the future we may have modes of transportation that do not exist right now.

TRANSPORTATION PATHS ARE THE ROUTES AND INFRASTRUCTURE FOR A TRANSPORTATION SYSTEM. EACH MODE OF TRANSPORTATION NEEDS A CERTAIN TYPE OF PATH. FOR EXAMPLE, PEDESTRIANS NEED SIDEWALKS, CARS TRAVEL ON STREETS, AND TRAINS USE TRACKS.

DISCUSSION QUESTIONS

1. What types of transportation does your city have?

2. What types of transportation have you seen in other cities?
DESIGNING TRANSPORTATION PATHS

Paths can be many shapes and patterns. Paths can be made from many types of materials. Paths can be above ground (elevated), at ground level or underground (subterranean).

Teacher Note: The book 49 Cities (by WORKac) has an extensive collection of ideal city plans from throughout history. The plans include a fascinating array of path patterns.
Information map posted on a Damascus street (Syria)

London Transport Museum exhibit (UK)

Museum of Madrid exhibit (Spain)

Information map posted on a London street (UK)
Model displayed at the Building Centre (London, UK)

Museum of London exhibit (UK)
WALKING AND BIKING

**Advantages:**
- Eco-friendly
- Kid-friendly
- Healthy
- Cheap
- Works well in compact cities that build UP (not OUT)

**Disadvantages:**
- Not protected from bad weather
- Can’t carry very much
- Difficult to travel very far (especially difficult in sprawling cities)

Dublin, Ireland  
Long Beach, California (USA)

Streets and parking spaces converted into areas for pedestrians and bicyclists

Vancouver, British Columbia (Canada)  
New York City (USA)  
Shanghai, China

Separate lanes for cars, pedestrians, and bicycles

*Concept of transportation advantages/disadvantages is from the National Building Museum’s City by Design curriculum

PUBLIC TRANSPORTATION

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**Buses, Ferries, Subways, Streetcars, Trains...**

**Advantages:**
- Reduces traffic by transporting many passengers
- Some new buses use natural gas (which emits less exhaust fumes)
- Electric subways/streetcars/trains do not emit harmful exhaust fumes
- Cheaper than buying/maintaining a car
- Passengers can relax while riding

**Disadvantages:**
- Buses pollute the air
- Can be crowded at rush hour
- Expensive to build tracks/tunnels
- Stops and schedules may not be convenient for everyone

**How to Make Public Transportation More Convenient:**
- Build mixed use districts with housing, shopping and places to work near transit stops
- Allow bikes on trains and buses so people can get to stops without a car
- Offer free or low cost passes for children and the elderly

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*Concept of transportation advantages/disadvantages is from the National Building Museum’s City by Design curriculum*

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**UNUSUAL MODES OF TRANSPORTATION**
Buses in Curitiba, Brazil travel in special lanes so they don't get stuck in traffic. They also have special boarding stations for passengers to pay their fare BEFORE the bus comes. It saves time because nobody has to wait in line to pay the driver and there are lots of doors to get on and off the extra-long buses.

Aerial gondolas are great for climbing steep mountains.

Funiculars and elevators are also effective ways to climb steep hills. The Santa Justa Elevator in Lisbon, Portugal takes people up to a bridge to reach the hilltop neighborhood of Bairro Alto. The elevator was designed by Gustave Eiffel (He also designed the Eiffel Tower in Paris, France).

Shanghai, China is connected to its airport with a maglev train that travels up to 268 miles per hour. Maglev, or magnetic levitation, uses magnets to lift and propel the trains much quicker and quieter than wheeled trains. Some unique taxi systems include tricycles in Beijing, China and gondolas in Venice, Italy.
Scientists and inventors are studying lots of ideas for the future...

**Alternative Fuels:** Biofuels, wind, solar, tidal...

**New technologies:** Driverless cars and vehicles that can travel on land, in water, and in the air...

Exhibits at London Transport Museum (UK)

Do you have another idea?

LANGUAGE ARTS EXTENSIONS
WRITING
Describe your transportation system in a paragraph:

- **Topic Sentence:** Define *transportation system*.
- **Supporting Details:** Describe the modes of transportation and path system you designed for your city.
- **Concluding Sentence:** How is your transportation system *kid-friendly* and *green*?

**WORD WORK**

<table>
<thead>
<tr>
<th>transportation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Part of speech:</strong> Noun</td>
</tr>
<tr>
<td><strong>Definition:</strong> Means of carrying people and/or goods from one place to another.</td>
</tr>
</tbody>
</table>

**Vocabulary:**

- transportation
- mode
- mobility
- route
- system
- pedestrian
- access
- connection
- ferry
- path

**Teacher Note:** You can adapt this page to meet your grade level standards and classroom needs. Ideas include putting the words in alphabetical order, synonyms/antonyms, definitions, sentences, singular/plural, parts of speech, using words in prepositional phrases/similes/sentences with conjunctions, syllables, prefixes/suffixes/word origins/word families.
IN DEPTH: CAR-ORIENTED CITIES

PROS:
Cars are very convenient because drivers can go anywhere they want, anytime they feel like it. They can also travel long distances and carry heavy items. Although the vast majority of cars still use gasoline, we are starting to see eco-friendly innovations such as electric cars, hybrid cars (electric and gas), biofuels (from plants), wind power, solar power and tidal power.

CONS:
Lack of mobility for those who do not drive
Car-oriented cities are spread out over large areas. In fact, distances are usually too far to walk or bike, and it is not possible for public transit to cover such large areas effectively. This makes life difficult for the many people who do not drive cars. The elderly, physically disabled, children, and low-income residents are all at a disadvantage in car-oriented cities.

Health and Safety
Lack of exercise: Obesity is at its highest level ever. Driving robs us of opportunities to incorporate exercise into our daily routines by walking or biking to our destinations.
Car accidents: Car accidents result in incredibly high numbers of deaths and injuries.

Congestion
Traffic jams waste time and fray nerves.

Infrastructure Costs
It is very expensive to build and maintain roads, freeways, bridges, parking structures, and tunnels.

Land Consumption
Consuming land for roads, freeways, and parking lots destroys natural habitats, countryside, and farms.

Air Pollution/Fossil Fuels/Global Warming/Oil Spills
You already know that the vast majority of cars use fossil fuels, which create pollution and contribute to global warming. Did you also know that pavement (of roads and parking lots) also raises temperatures in urban areas? In addition, pavement prevents the ground from absorbing precipitation. And to top it all off there have been devastating oil spills in our oceans (including the 1989 Exxon Valdez spill in Alaska and the 2010 British Petroleum leak along the Gulf Coast of the United States.

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