Urban Transportation Renewal

This activity challenges students to make tradeoffs as they plan the technological infrastructure of a city center. But the really tough choices come in a surprise twist at the end of the challenge.

Precepts
■ Community planning involves both new developments and urban renewal.
■ Community design and re-design are essentially problem-solving scenarios
■ Communities are more than a series of monolithic structures; thus planning considers infrastructure such as roads, communications, utilities, etc.

Curricular connections

Science [NRC Standards]:
5. Science and technology;
6. **Science in personal and social perspectives**
   - personal and community health
   - population growth
   - natural resources
   - environmental quality
   - natural and human-induced hazards
   - science and technology in local, national, and global challenges (NRC, p. 193)

Social Studies [NCSS Standards]:
I. Culture;
II. **Time, continuity and change**;
III. People, places, and environments

Technology [ITEA/NASA standards]:
4. Cultural, social...effects of technology;
7. **Influence of technology on history**;
20. Construction technologies

What the Students do

■ … use provided materials to plan model a community in accordance with identified constraints
■ … modify a model of a community in response to new constraints
■ … keep an accurate financial ledger
■ … report their activities to the class
Activity 1

Problem: You group is to design and present a three-dimensional plan for one city zone. You will use model blocks to represent structures, and markers (or cardboard strips) for roads, train tracks, and bicycle paths.

Resources
- 1' X 2' community (plywood)
- supply of roads and model buildings (houses, businesses…)
- $9,000,000 budget
- paperwork: ledger, price lists…

Constraints
- 100 residents accommodated
- 15 commercial businesses; 3 industries
- roads to allow sufficient access to all structures
- money should be left for the future

Procedure
- In groups, students receive and review the activity sheet.
- Teacher or students select team members: mayor, engineer, accountant, city planner, &c.
- Teacher checks draft ledgers and city layouts.
- Groups construct their model cities.
- Groups present their models to the class.

Activity 2

Problem: Your group will be given an existing community model to redesign. You will have to redesign based on a new law which prohibits any motor-powered vehicle which carries less than 10 people.

Resources
- existing community model; supply of roads and model buildings
- $2,000,000 added to existing budget
- paperwork: ledger, price lists…

Constraints
- accommodate 200 residents, 20 commercial businesses, 5 industries
- roads to allow sufficient access to all structures and observe new laws
- money should be left for the future

Procedure
- In groups, students receive and review the activity two sheet.
- Groups review their adopted city. They may consult with the prior mayor or accountant.
- Activity continues as before…
- Groups present their models to the class.
- Class discusses the relationship between this activity and actual urban planning.

Rules about debt
- Groups may borrow from the available reserves of other groups at a fixed 20% APR.
- Groups lending money may only encumber the interest; i.e., they cannot spend money they’ve lent to another group.
- No group is required to lend out money.
- Debts (including 1 year of interest) are reflected as negative figures on the ledger
- Groups may borrow up to 10% of their total allotment; i.e., $1.2 million.
- Groups unable to meet all constraints must declare bankruptcy.

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Discussion questions

- What will happen to your city zone if the population doubles again?
- What effects did you have on the environment when you retrofitted your adopted city?
- In what ways could changes in the communications infrastructure impact the transportation infrastructure, and vice versa?

Environmental Quality / Natural Resources

- What impact would a law restricting the use of polluting vehicles have on you?
- Should we restrict the use of polluting vehicles?
- Are there alternatives to our use of petroleum-using personal vehicles?

Local and Global Science/Technology Challenges

- Should research on population and transportation be funded privately or publicly?
- Should the US only aid nations who are using their resources to improve technologically?
- What are the risks and benefits of new energy sources like nuclear and geothermal?

Typical outcomes

- Students …are very creative, yet often their designs reflect their own environments.
- …often need to be taught accounting.
- …always have ideas for improving the activity.
- …are often upset at having to switch models
- …sometimes focus on the activity, not reflect on its meaning

Random thoughts…

- This activity has been successful at a variety of grade levels in focusing students on…
- …resources and constraints
- …team work and individual responsibilities
- …how urban areas change over time
- …the relationship among various technological systems (housing, transportation, economics)
- The ‘Urban Transportation Renewal’ activity can tie together various curricular areas
- In science and technology, it can introduce students to topics related to science/technology/society, environments, and resources
- The activity is flexible and may be taken in many directions.