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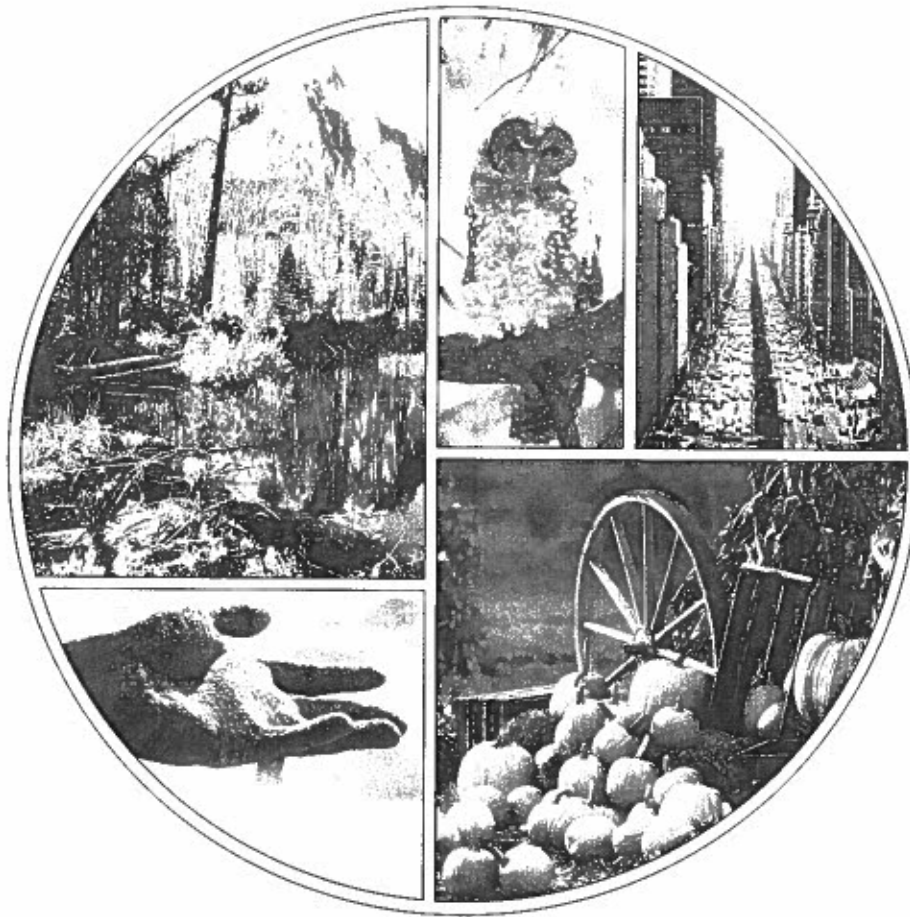
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Sincerely,

Sally Wood
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Curt L. Anderson



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Curt L. Anderson is Director of the Center for Economic Education and Professor of Economics at the University of Minnesota, Duluth. His research interests are in the fields of natural resource and environmental economics, as well as economic education. His work has appeared in the *Journal of Environmental Economics and Management*, *Journal of Environmental Systems*, and *Growth and Change*. In addition his teaching ideas

have appeared in the *Journal of Economic Education*, *College Teaching*, *Great Ideas in Teaching Economics*, and the National Council on Economic Education's curriculum journals, *The Senior Economist* and *The Elementary Economist* (now, *Economics for Kids*). He has received teaching awards from his University and in the National Awards for Teaching Economics for his contributions to economic education instruction.

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UNIT THREE: LESSON SIX

banning the use of certain chemicals, prohibiting dumping), it is difficult to enforce these rules given the vast size of the area which must be patrolled.

Lack of Economic Power: many natural resource industries are dominated by a few large firms which can influence supply and therefore influence price.

Free Mobility: ownership or leasing of major ore deposits by firms already in many mineral industries creates a barrier to firms wishing to enter these industries.

Perfect Information: the effect of many pollutants on climate, people's health, plants and animals, and ecosystems in general is still very much unknown. People's demand for some products might change if this information became available.

Property Rights and Incentives

12. Explain that this activity provides another example of how incentives are affected by property rights (in this case, the "universality" condition of The Guide to Ideal Markets has not been met).
13. Ask for 10 volunteers for a lucrative job (flash a \$5 roll of dimes!). The volunteers should go to a cleared area of the room and form a circle. The circle should have a diameter of at least six feet (bigger if possible).
14. Take 50 paper clips and toss them on the floor inside the circle. Tell the students that they are going to be paid to pick up the clips. Tell them there will be two periods in which they may pick up the clips. In the first period they will be paid a dime for each clip they pick up, while in the second period they will be paid twenty cents for each clip they pick up. Note that only those clips not picked up in period one will be available to be picked up in period two. Finally, note that each period will last for only one minute and that clips must be turned in in the period in which they were picked up.
15. Ask if everyone understands; then begin period one. Although there may be some talk (colluding!) about waiting, soon someone will start gathering up the clips as fast as he or she can, and everyone else will jump in. All the clips will be picked up in period one! Pay the students!
16. Next use masking tape to line the floor in a tic-tac-toe pattern. Have one student stand in each cell and have the tenth student stand off to the side. Again toss the clips on the floor so that they fall into the various cells. Tell the students you are going to repeat the game, again paying a dime for every clip picked up in the first period and twenty cents for clips picked up in the second. However, this time students may only pick up clips in their own cell.
17. Begin period one. Not too surprisingly, none of the clips is now picked up. Thank students for participating and tell them that the second period will begin as soon as you win the lotto! Ask the students to return to their seats.
18. Ask: If the goal of society is to get the most value from its scarce resources (i.e., allocative efficiency), when should the clips have been picked up? In the second period, since the willingness and ability to pay for them (their value) then is greater — twice as much.

19. Note that this happened the second time the game was played but not the first. Ask: What was different?

Property rights to the clips were assigned the second time.

20. Ask: How did the assigning of property rights change the incentives of the players? Discuss responses.

Because players could control when their clips would be picked up during the second round, they received the benefit of waiting. In the first round, their waiting might have cost them the opportunity to get anything at all.

21. Relate this game to the harvesting of whales (the floor is the "ocean," the clips are the "whales," and the students are the "whale hunters"). Note that no one has the incentive to manage or control the stock of whales, since they don't own them and can't control others' access to them. Thus, the exploitation of whales can be traced to a lack of adequately defined property rights.

22. Next ask students to think about the amount of beef and chicken consumed every day in the United States. Ask: Why aren't we worried about "Saving the Cattle" or "Saving the Chickens" as some are concerned about "Saving the Whales"? Possible answer follows:

Cattle and chicken stocks are privately owned. Thus, if a rancher foresaw pending extinction or a future shortage of cattle, she would withhold her cattle from the market today to take advantage of the higher expected price in the future. Thus, private property rights provide the incentives for owners to sell their resources at the time when the resources are most highly valued.

23. Ask: What other resources are like whales? (You might help students get started by asking who owns the air in the room.)

Possible answers include:

air, groundwater, oil pools, wildlife species — eagles, deer, coyotes, ducks, tuna, etc.

24. What does the game played today suggest about how these resources would be used in the absence of any outside intervention?

They might be overused and/or used too quickly from the perspective of allocative efficiency.

An Economic Function of the Government

25. Explain that a major economic function of the government is to define and enforce property rights.

26. Ask students to discuss how the government has defined property rights or "rules of the game" for environmental resources.

Some suggestions follow:

Air and water: The Environmental Protection Agency sets national ambient standards, while states establish allowable emissions of various substances to meet these standards.

Wildlife: the Department of the Interior and state Departments of Natural Resources establish hunting and fishing seasons and quotas to control the harvest of wildlife species.

Scenic forests and wilderness areas: the National Park Service and various state agencies establish camping and other rules of use for these areas.

Ocean fisheries: 200-mile limit, harvest quotas.