

**Inquiry Activity • Paper and Pencil****Chapter 2****Choose an Approach**

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**Problem** *Which approach is best for implementing a particular environmental policy?*

**Background****Paint It White**

What if global warming could be impeded with a bit of white paint? In 2009, Secretary of Energy Steven Chu suggested that the effects of painting most rooftops white and making pavement light-colored would be comparable to the effects of the entire world not driving cars for over 10 years. Here's how it works: white and light-colored surfaces reflect sunlight. The reflected sunlight travels back up through the atmosphere as light energy. In contrast, dark-colored surfaces absorb sunlight and radiate heat energy that is then trapped by the atmosphere. This is why cities are known as "heat islands," with higher average temperatures than surrounding areas.

Sometimes called the "white-paint approach," this policy idea would involve much more than just paint. Pavements would need to be resurfaced with light-colored material. Light-colored non-paint materials could be used to cover rooftops. Although this approach would not address the root causes of global warming, Secretary Chu claims that the increased reflection of sunlight from light-colored surfaces would slow the effects of global warming.

**Policy Approaches**

In some cases, one size fits all, but not so for implementing a policy. A single policy can be approached from a multitude of angles. Individuals and companies could be given a tax break, for example, if they participate in a particular program. Participation in a program could also be subsidized. This lowers the cost of participation. Other incentives for participation may be offered at the local level. Penalties may be used instead of incentives. Companies that do not participate in a program, for example, may be required to pay a tax.

## Build Science Reasoning Skills

**Cost-Benefit Analysis** No environmental policy is perfect. All policies have costs as well as benefits. When considering the implementation of a policy, the costs and benefits must be carefully considered.

- Infer** Fill in Data Table 1 with costs and benefits of a policy that requires rooftops and pavement surfaces to be light colored.

Data Table 1. Policy Costs and Benefits	
Costs	Benefits

- Evaluate** Based on your analysis of costs and benefits, do you think that a policy requiring light-colored rooftops and pavement surfaces should be implemented? Defend your answer.

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## Procedure

- Step 1** With your group, discuss the proposed policy and four possible policy approaches: tax breaks, subsidies, local incentives, or tax penalties.
- Step 2** Complete Data Table 2 with benefits and costs of each policy approach.
- Step 3** Exchange completed tables with another group.
- Step 4** Study the table that the other group prepared.
- Step 5** Work with your group to prepare at least three questions for the other group about their analysis of the costs and benefits of the different policy approaches.
- Step 6** Get together with the other group. Ask questions and discuss responses.
- Step 7** After you finish discussion with the other group, decide in your own small group whether you want to make any revisions to your group's analysis of the costs and benefits of the different policy approaches.
- Step 8** If your group decides to make revisions, do so.
- Step 9** On your own, decide which policy approach you think is best. Circle or highlight that approach in the table below. It is okay if group members choose different approaches; this step should be done individually.

3. Fill in the data table below with costs and benefits of each policy approach.

Data Table 2. Approach Costs and Benefits		
Policy Approach	Costs	Benefits
Tax breaks		
Subsidies		
Local incentives		
Tax penalties		

## Analyze and Conclude

4. **Summarize** Describe the overall costs and overall benefits of a policy requiring rooftops and pavement surfaces to be light colored.

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5. **Evaluate** According to your analysis of the costs and benefits of different policy approaches, which approach do you think would be LEAST effective for implementing a policy requiring light-colored surfaces? Explain your answer.

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6. **Evaluate** Based on your analysis of the costs and benefits of the different policy approaches, which approach do you think would be MOST effective? Explain your answer.

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7. **Extension** Propose an alternative policy that would achieve the same goals as Secretary Chu's proposed policy requiring light-colored surfaces. The alternative policy may be a revised version of Dr. Chu's policy, or an entirely different idea.

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