Matthew C. Hammond (Sept. 22, 2024) Standard GC.47

EDCI 561 Social Studies Methods

**Government & Civics—Sharing Public Resources [& the Tragedy of the Commons[[1]](#footnote-1)]**

**Overview**

Many environmental issues implicate the “tragedy of the commons”—if the public or multiple entities have free access to a finite resource, they often have the incentive to overuse it unless there is a mechanism to alter their incentives. As a result, the finite resource may end up destroying the value of the resource for everyone. This is a market failure. Therefore, solutions to environmental issues must address the tragedy of the commons, or they are likely to fail. (Note, see *Lesson Plan: Preparation* below for actions that need to be done 2 weeks in advance.)

**Standard**

* **GC.47.** *Evaluate the role of government* in a market economy, including providing for national defense, *addressing environmental concerns*, defining and enforcing property rights, attempting to make markets more competitive, *resolution of market failures* and protecting consumers’ rights.

(see Appendix 1, Item A for related standards)

**Lesson Plan**

***Preparation***

**One or two weeks in advance**, put out a candy[[2]](#footnote-2) jar in the classroom with two pieces of candy for each student. Point the candy jar out to your students and explain:

* + After the end of each school day, the candy will be replenished. But in order to be replenished, there must still be candy in the jar. One additional piece of candy will be added for every 2 candies left in the jar. Think of it as the candies having “babies.”
  + To start with, the jar has enough candy that each student can have one piece today and the jar will be replenished with enough candy to do the same tomorrow.[[3]](#footnote-3)

Don’t provide any further explanation or constantly remind students to take only one piece. However, if the students remind each other to take only one piece, don’t interfere. You may want to have a separate jar for each class, or one jar for all classes that you teach.

Record the starting number of pieces of candy, how much is left at the end of each day, how much candy was added to the jar for the next day. Do not let the students know you are tracking this. (see Appendix 1, Item B for an example of a log and chart for the data.)

**In advance:** Set up Mural, including grid for *Explore* answers.Create handouts with *Elaborate* questions (see template in Appendix 2) and pages for each resource to assign (see Appendix 1, Item C), reviewing the questions, providing additional scaffolding where needed, and checking all of the hyperlinks. Save a copy of the handout in a Google doc in place where the small groups can access it.

**Before starting the day**, count the number of candies remaining in the jar. Enter the number into your data log and create/update your chart of the data.

*Don’t use candy that may trigger any known or likely allergies.*

*Recommend use of wrapped candy.*

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| --- | --- |
| **Time** | **Texts/Materials** |
| 125 minutes  Day 1 – 80 min  Day 2 – 45 min  [assumes an 80-min period] | * Internet access to access Mural, Google doc, websites resources, and to play video in *Elaborate*:<https://www.youtube.com/watch?v=CxC161GvMPc> * Set up class Mural:   + Grid for pair-and-share answers in *Explore*   + Link to Google doc for *Elaborate* questions * Copies of base Google doc and web resources for with *Explain* questions (see template in Appendix 2) and one page for each resource with online resources (see Appendix 1, Item C)   + The National Mall (focus on use by the public)   + Potomac River (focus on clean drinking water)   + Chesapeake Bay (focus on blue crabs)   + DC Streets (focus on congestion)   + Earth (focus on global warming) |
| **Compelling Question** | |
| * Can you trust your neighbor? Why doesn’t the honor system work when it comes to public resources? | |
| **Supporting Questions** | |
| * What things do members of your community share? Citizens of the United States? People of the world? * Why would someone use more than their share of a common resource? * What happens if everyone uses more than their share of a common resource? * How do we work together to share and preserve a common resource? * What role should government plan in managing the “commons”?   + Can a common resource be shared fairly and sustainably without involving the government? | |

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| **Objective** | **Assessment** |
| Students will be able to   * Define the concept of the “tragedy of the commons” * Name 3 examples of a common public resource that could suffer the tragedy of the commons * Using an example, explain why someone would overuse a public resource * Using an example, describe the consequences if everyone overused the resource * Distinguish the different ways the tragedy of the commons can be solved * Analyze whether the solutions in place are adequate * Propose a solution to the tragedy of the commons for a particular common resource, and evaluate what role the government should have | * Posting of pair-and-share answers on Mural * Google Docs from small groups * Bumper sticker from small groups * Notes/tally sheet kept during discussions and checking in on pairs and groups. |
| **Engage Day 1 – 7 minutes** | |
| 1. Start with the candy jar.  * Hold up the depleted candy jar.   + If any candy remains in the jar, have a student publicly count the remaining pieces of candy with the class.   + *How much candy would be added for tomorrow based on this number?*   + *How will you all split it up?* * *What happened? Why?*   + Show your chart of the logged candy data, explaining that you logged the number of candies at the end of each day and how much candy you added.  1. PollEverywhere: *Did you take more than one piece of candy on any particular day? Yes or No.*  * Discuss the response.   + - *When trick-or-treating at Halloween have you ever come to a house with a basket of candy sitting out with a sign saying take a specific number of pieces?*       * *Was the basket empty when you got to the house?*       * *What did you do?*       * *What did other trick-or-treaters do?*     - *Why did people take more than one piece of candy? Is anyone willing to share why they took more than one piece?* | |
| **Explore Day 1 – 10 minutes** | |
| Pair-and-share: Answer these questions, putting your answers in the chart on the class Mural:   * + What happened when someone took more than one candy in a day?     - Did that person benefit from their actions? How?     - Did that person suffer any consequences for their actions? How?     - Did the class benefit from their actions? How?     - Did the class suffer any consequences from their actions? How?     - Why did they take more than one candy?     - What might they have been thinking?     - How would you fix this problem so the candy doesn’t go away?   *If candy was not depleted, you can still tackle by asking about why it did not. Alternatively, you can play* [*the fishing game*](https://www.youtube.com/watch?v=5ZNoYitZJdM)*.* | |
| **Explain Day 1 – 15 minutes** | |
| 1. In larger group, walk through each pair-and-share question, while reviewing the answers submitted in the Mural. Ask different pairs to explain their thinking. Using their answers, steer discussion to (or explain):  * How people have an incentive to cheat in this circumstance * How the cheater gets all of the benefit from their actions, but not all of the negatives/costs of their actions  1. For the fix-the-problem question, steer discussion to variety of options  * No candy jar * Expect everyone to be a good citizen or honor system * Social pressure * Classroom create rules and enforces them * The Man sets the rules and enforces them  1. PollEverywhere: *In the future, would you take more than one piece of candy in a day?* | |
| **Elaborate Day 1 – 58 minutes; Day 2 – 15 minutes** | |
| 1. Brief lecture (8–10 minutes)    * This problem comes up all of the time, especially in relation to natural resources.    * It’s referred to as “the tragedy of the commons” because first described using the example of farmers grazing their sheep on public land—“the commons.” Explain this example.    * Another common example used is fishing. Show this video (stopping at 3:12): <https://www.youtube.com/watch?v=CxC161GvMPc>    * *What are some other things that we all share? What does the community share? What does everyone share?*    * As appropriate, ask brief follow-up questions about whether it is a finite resource, others are harmed by overuse. 2. Task    * Explain they will work in small groups to answer questions about a particular resources and design a bumper sticker to persuade people to responsibly use that resource. They will present and explain Their bumper sticker to the class.    * Explain they will have the rest of this period to complete this task and about 10–15 minutes of the next period before presenting their bumper sticker.    * They should identify someone to (a) research the resource and who uses it, (b) research what are the costs or consequences of overuse, (c) research any rules or regulations on its use, (d) collect all of the answers and put them together in a Google doc, and (e) lead bumper sticker designer to implement the ideas of the group in creating the bumper sticker. And everyone should think about why people overuse the resource and what are the potential solutions.    * Direct them to links on class Mural and also handout hardcopies to each group of worksheet with questions and page with resource assignment and list of online resources.      + Five suggested resources or “commons” are: Chesapeake Bay, DC streets, Earth, National Mall, and Potomac River. (see Appendix 1, Item C)    * Explain that the groups are going to look at a specific public resource and answer the following questions:      + What is the public resource? Briefly describe it.      + Is it renewable or non-renewable? How does this affect its vulnerability to overuse?      + Who are the primary users or stakeholders of this resource?      + How do they specifically use the resource?      + What are the benefits to them from using the resource?        - [[Why does the user use more?        - [[What do they get right away? Do they get anything further down the road?        - [[Compare that to what they get if they use their fair share?      + What are the costs or consequences if everyone maximizes their use of the resource?      + How are those costs allocated across the users and stakeholders?        - [[Who pays that cost? Who suffers the consequences?        - [[Who is hurt by the overuse? How?      + How does cultural or social pressure influence how this resource is used?        - [[analogize to peer pressure      + Are there any current regulations or management practices in place for this resource? If so, what are they? Who enforces them? How do they impact the different users/stakeholders?        - What role does the government play? What role should the government play?      + Does the system work to protect the resource for everyone’s use?      + Are there other potential solutions that could be put in place to prevent overuse of this resource? If so, what are they? Who will enforce them? How will they impact the different users/stakeholders?        - What role will the government play? Why?        - Can technology help solve the problem of overuse?      + Can you think of any real-world examples where this resource has been depleted or is currently at risk?  * Design a bumper sticker to persuade people to responsibly use the resource.   + 3 inches by 11 inches   + It should be readable without tailgating or cause a car wreck * Submit Google doc and post bumper sticker on class Mural | |
| **Evaluate Day 2 – 30 minutes** | |
| Present their bumper sticker to the class and explain it. In your presentation (~5 minutes) briefly describe:   * The resource * Why users and stakeholders may overuse it * What are the consequences of overuse * The elements of your bumper sticker and why you chose them * What rules are in place to protect the resource from overuse and how they are enforced * Whether those rules and the enforcement are adequate * Do you propose a different approach and if so, what | |
| **Differentiation** | |
| * Depending on each group of students, you may include or not include questions on the lines with leading double brackets (“[[”) to vary scaffolding as necessary. * Depending on your students, you may create a basic examplar response to the *Elaborate* questions to provide a more detailed roadmap for students who need it. Consider using coffee from the Harvard Business School web page in the notes. * If you have a group that needs more scaffolding, assign the Chesapeake Bay to them because it focuses on crabbing and raises the same issues as overfishing which is discussed in the video. | |
| **Facilitation Notes & Reflections** | |
| Other potentially helpful resources:   * Harvard Business School Online, *Tragedy of the Commons: What It Is & 5 Examples* (<https://online.hbs.edu/blog/post/tragedy-of-the-commons-impact-on-sustainability-issues>) – examples are helpful, but I don’t think the video is accessible. | |

**Appendix 1**

* + - * 1. **Standards**

Also from the geography section of the “Statements of Practice for Social Studies” in Washington, DC’s Office of the State Secretary of Education’s *K–12 Social Studies Standard: 2023 Standards* (June 2023):

**Statements of Practice for Social Studies: Geography**

Human-Environment Interaction

The relationship between human life and the natural environment is fundamental. Throughout history, humans have modified the environment in culturally distinctive ways, as they have responded to the resource opportunities and risks present in the physical world. In doing so, they have sometimes caused damage to the natural environment (e.g., litter, pollution, habitat destructions, invasive species, flooding, drought, mudslides, wildfires, acid rain, depleting the ozone layer, climate change), which often disproportionately impact marginalized groups. (p. 9)

Other standards in different social studies classes:

**WH2.99.** Evaluate the impact of increased industrialization and global economic activities to analyze both the obstacles and proposed solutions to address climate change (e.g., UN Sustainable goals, Paris Climate Agreement), including the intersection of consumption-based modernity and environmental limits. (p. 74)

**US2.84.** Analyze the successes and challenges to the environmental movement after 2000. (p. 81)

* + - * 1. **Candy Data**

Here is a sample data log:

|  |  |  |  |
| --- | --- | --- | --- |
|  | Start | End of Day Before | Added |
| Mon 9/23 | 120 |  |  |
| Tue 9/24 |  | 60 | 60 |
| Wed 9/25 |  | 40 | 40 |
| Thu 9/26 |  | 35 | 17 |
| Fri 9/27 |  | 20 | 10 |

Using the above format in Excel, you can chart the data with a stacked bar chart as shown below:

Note: To get this chart as shown, do not put zeros in the empty cells in the data log.

* + - * 1. “**Commons” to Assign**

Links to information for students to use in exploring the commons. (Re-curate shortly before use in lesson.)

* The National Mall (focus on use of the space by the public)
  + National Park Service rules for the Mall: <https://www.nps.gov/nama/learn/management/index.htm>; <https://www.nps.gov/nama/planyourvisit/things2know.htm>
  + Trust for the National Mall: <https://nationalmall.org/freedom-of-speech>
  + GAO, cost for repairs to the National Mall: <https://www.gao.gov/products/ced-79-100>
  + National Capital Planning Commission on the Mall: <https://www.ncpc.gov/topics/nationalmall/>
* Potomac River (focus on clean water for drinking)
  + Potomac River Report Card: <https://www.potomacreportcard.org/>
  + Potamac Conservancy: <https://potomac.org/>
  + DC Water: <https://www.dcwater.com/resources/environment/chesapeake-bay-program>
* Chesapeake Bay (focus on blue crabs)
  + Chesapeake Bay Program – overview of blue crabs: <https://www.chesapeakebay.net/issues/whats-at-risk/blue-crabs>
  + Maryland blue crab regulations: <https://dnr.maryland.gov/fisheries/Pages/regulations/blue-crab.aspx>
  + Virginia recreational crabbing rules: <https://mrc.virginia.gov/regulations/VA-recreational-crabbing-rules.shtm#:~:text=Gear%20Marking,4VAC20%2D670%2D40%20%5D>.
  + Report from Chesepeake Bay Foundation: <https://www.cbf.org/document-library/cbf-reports/CBF_BadWatersReport6d49.pdf>
* DC Streets (focus on congestion)
  + DC Department of Transportation: <https://ddot.dc.gov/>
  + News report on DC traffic congestion: <https://www.transitdisplay.com/news-resources/public-transit/washington-dc-traffic-ranked-second-worst-in-the-us/>
  + U.S. Department of Transportation site: <https://highways.dot.gov/public-roads/marchapril-1998/partners-motion-dc-congestion-busters>
  + Harvard report on emissions from traffic congestion injuring health: <https://www.hsph.harvard.edu/news/hsph-in-the-news/air-pollution-traffic-levy-von-stackelberg/>
* Earth (focus on global warming)
  + UN Climate Change: <https://unfccc.int/>
  + Climate Change Preparedness Conference: <https://ccpconference.com/>

**Appendix 2**

***Template for* Elaborate *questions***

(“[[” lead lines with scaffolding questions you may or may not want to include or may choose to include for specific groups or students.)

**Team Name:**

**Team Members:**

**Resource:**

1. **Briefly describe your resource.**
2. **Is it renewable or non-renewable? How does this affect its vulnerability to overuse?**
3. **Who are the primary users or stakeholders of this resource?**
4. **How do users and stakeholders specifically use the resource?**
5. **What are the benefits to each user or stakeholder from using the resource?**
   1. [[Why does the user use more?
   2. [[What do they get right away? Do they get anything further down the road?
   3. [[Compare that to what they get if they use their fair share?
6. **What are the costs or consequences if everyone maximizes their use of the resource?**
7. **How are those costs allocated across the users and stakeholders?**
   1. [[Who pays that cost? Who suffers the consequences?
   2. [[Who is hurt by the overuse? How?
8. **How does cultural or social pressure influence how this resource is used?**
   1. [[analogize to peer pressure
9. **Are there any current regulations or management practices in place for this resource?** 
   1. **If so, what are they? Who enforces them?**
   2. **How do they impact the different users/stakeholders?**
   3. **What role does the government play? What role should the government play?**
10. **Does the system work to protect the resource for everyone’s use? Why/why not?**
11. **Are there other potential solutions that could be put in place to prevent overuse of this resource?** 
    1. **If so, what are they? Who will enforce them?**
    2. **How will they impact the different users/stakeholders?**
    3. **What role will the government play? Why?**
    4. **Can technology help solve the problem of overuse?**
12. **Can you think of any real-world examples where this resource has been depleted or is currently at risk?**

1. This lesson plan is written without mentioning the “tragedy of the commons” in the beginning to avoid any signaling that might cause someone to research ahead of time or reveal the topic to someone who already knows the concept. Hopefully, this can avoid inadvertently short circuiting the lesson for other students. [↑](#footnote-ref-1)
2. It does not have to be candy, but it does have to be something that tempts students to take more than their share. [↑](#footnote-ref-2)
3. This is a variation on the fishing game, described here: <https://teachingapscience.com/tragedy-commons-5e/>; <https://www.youtube.com/watch?v=5ZNoYitZJdM>. [I thought about using the fishing game but was concerned that it might not seem relevant to students in an urban classroom.] [↑](#footnote-ref-3)