

## POGIL 4.0: Sustainability

### Review

*\*\*Read Chapter 4.0 of the E-text and then complete this part of the POGIL worksheet.*

*\*\*Please fill out worksheet in a different font or text color (green or blue) so it is easy to distinguish your answer from the questions.*

**Note: Many of the questions on this POGIL are a reflection on what you have learned and are opinion oriented questions that ask you to think about what solutions are possible.**

**READ THIS:** *In and of itself, “being sustained” has many meanings that are often individual and values-specific. One person may need a luxury car, large house and high paying job to feel sustained; another may be happy with a bicycle, a small house and a self-sufficient farm.*

EQ1. In your own words, describe what the word “sustain” means to you.

### Sustain means to endure or continue on

AQ2. In the context of human demands for and impacts on ecosystem services, define sustainability in a few grammatically correct sentences.

Sustainability in this context means that the use of resources does not exceed the ability of the earth to replenish them. It also means making decisions that consider the social, environmental and economic impacts, making decisions that only make positive gains in all three. If a decision is going to trade off one for the other, maybe we need to start thinking of other solutions that have mutually supportive gains! (you may have a different answer for this one ☺ )

IQ3. Compare your answer to Q1 **with those of your group**. Making a decision for the use of resources today that takes other value systems into consideration is complex. Describe two challenges that would need to be addressed in order to make an equitable decision.

Opinion: this is up to you. Use the general discussion forum to discuss answers with your fellow students!

IQ4. Making a decision for the use of resources today that takes future generations into consideration is complex. Describe two challenges involved in making such a decision.

1. environmental systems are very complex, response of the system to decisions may be very uncertain. This uncertainty makes decision makers very wary of trying new things.

2. We must also consider the needs of the current generation and the fact is that many people have no access to basic needs. How do we take future generations in to account without diminishing the current quality of life and improving the quality of life for others.

3. other challenges?

**READ THIS:** *For every country for which there is data, we find that education, gender equality and the empowerment of women reduces birth rates, slows population growth and improves local*

*economies. This may be intuitive to people living in societies that value women's education, but it is not the norm form many societies.*

IQ5. Formulate an argument that could be used to support education, gender equality and the empowerment of women in a society that has not traditionally valued such concepts.

When women are educated and have the power to make decisions about children and family, they do not have as many children. This does a few things, it reduces the health strain on women, allows more resources for the existing children and more time for the women to help provide for the family.

**READ THIS:** *In 1992, the United Nations Conference on Economic Development (UNCED), also known as the Rio Conference or the Earth Summit, brought forward the precautionary principle. It states, "[i]n order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation."*

IQ6. Consider risk assessment protocols for testing chemicals that typically only test the toxicity of individual chemicals rather than combinations of chemicals. Imagine that you are designing a product and would like to approach design of that product utilizing the precautionary principle. Choose a hypothetical product that you could design and describe two design protocol requirements that could be considered precautionary. (Hint: think about where the raw materials come from, how the product will be used and what will be done with it when the user no longer needs it).

**Product: kitchen flooring**

1. While the flooring should be durable and meet all design criteria to make it marketable, it must have non toxic inputs, the ingredients to the flooring must be completely safe to enter the environment and should not produce any "offgassing" of gaseous chemicals.

2. When flooring is past its lifespan, the company will take it and recycle it in to other flooring or other products.

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AQ7. In a few grammatically correct sentences, describe the relationship between the precautionary principle and sustainability.

The precautionary principle means that all major decisions will consider potential impacts and use precaution when making them. In the same sense, we have to make sure that we don't get in analysis paralysis... no action does not help either. Using the precautionary principle is key to sustainability and making decisions that reduce or eliminate negative impacts and seek mutually supportive gains in all areas (economic, social and environmental) and improves all types of ecosystem services.

IQ8 In your own words, define "restore."

Restore means to bring back to the way "it" was originally. This could mean in appearance and or in function.

IQ9. In your own words define "conserve."

Save or use sparingly

AQ10. Consider an abandoned parking lot in a city. It is unlikely that the lot could be returned to the habitat that was there before the city was built. If the lot was turned into an urban garden, what regulating and supporting services could be restored?

Provisioning- could provide a substantial amount of food locally

Regulating- flood regulation, reduction of non-point source pollution, temperature regulation in the form of shade

Cultural- connection to food, greening up a city, change the urban landscape

**READ THIS:** *Urban, agricultural, and road systems have often been developed on the flat floodplains near streams and rivers. When high water events occurred, infrastructure and crops in the floodplain were damaged or destroyed. Rather than moving to higher ground, people respond to these events by damming rivers, channelizing waterways and building dikes on stream banks. Though often effective for the immediate area in the short-term, long-term impacts are often created downstream or upstream of the flow modification structures. Problems include an increase in flooding, loss of habitat, and changes in sedimentation regimes and nutrient cycling.*

AQ 11. Imagine that you are a city planner in charge of restoring an abandoned industrial site that borders a river. What is the former "un-degraded" state that you are going to use as a guide for your restoration plan? Justify your answer.

In this case, it may be difficult to completely restore it to the pre-human state, however we can work to restore the ecosystem services that were provided before.

1. Clean up any chemical/industrial materials that are in the soil, depending on the site this could be very expensive (lead mine, gas station)

2. excavate and change slope of the riparian zone.

3. Native plantings in riparian area.

Etc.

AQ12. Imagine that you are a restoration specialist for the National Park Service (NPS). NPS has been bequeathed a 100-acre parcel that was an old homestead and orchard. The mission of the National Park Service is to "preserve unimpaired the natural and cultural resources and values of the national park system for the enjoyment, education, and inspiration of this and future generations." What is the former "un-degraded" state that you are going to use as a guide for your restoration plan? Justify your answer.

Because the mission is both natural and cultural resource values, then I think the "undegraded" state is as close to an pre-human state while still having human access. This will require some limits on visitors, but access is key to building cultural value in an outdoor space.