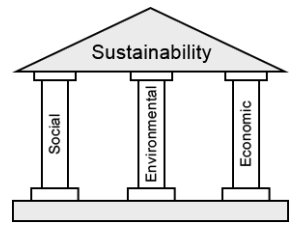


Investigative Science

Learning goal: Understand that there are three commonly recognized pillars of sustainability: environment, society, culture and economy. Students will be able to use these four pillars to assess the sustainability of a project, action or scenario.



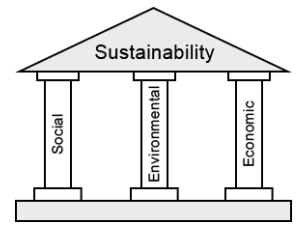
Learning scale:

1	2	3	4
Define sustainability	Understand that there are three commonly recognized pillars of sustainability: environment, society and economy.	Understand that there are three commonly recognized pillars of sustainability: environment, society, culture and economy. Students will be able to use these four pillars to assess the sustainability of a project, action or scenario.	Understand that there are three commonly recognized pillars of sustainability: environment, society and economy. Students will be able to use these four pillars to assess the sustainability of a project, action or scenario with great accuracy.

4
Describe and apply the pillars of sustainability
3
Describe the pillars of sustainability
2
Know the pillars of sustainability
1
Recognize the pillars of sustainability

Investigative Science

Learning goal: Understand that there are three commonly recognized pillars of sustainability: environment, social and economy. Students will be able to use these four pillars to assess the sustainability of a project, action or scenario.



What are the three pillars of sustainability?

Environmental sustainability :

Social sustainability:

Economic sustainability:

What are quality of life indicators?

Three pillars of sustainability

4

Describe and apply the pillars of sustainability

3

Describe the pillars of sustainability

2

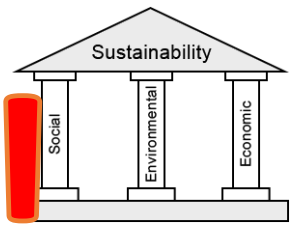
Know the pillars of sustainability

1

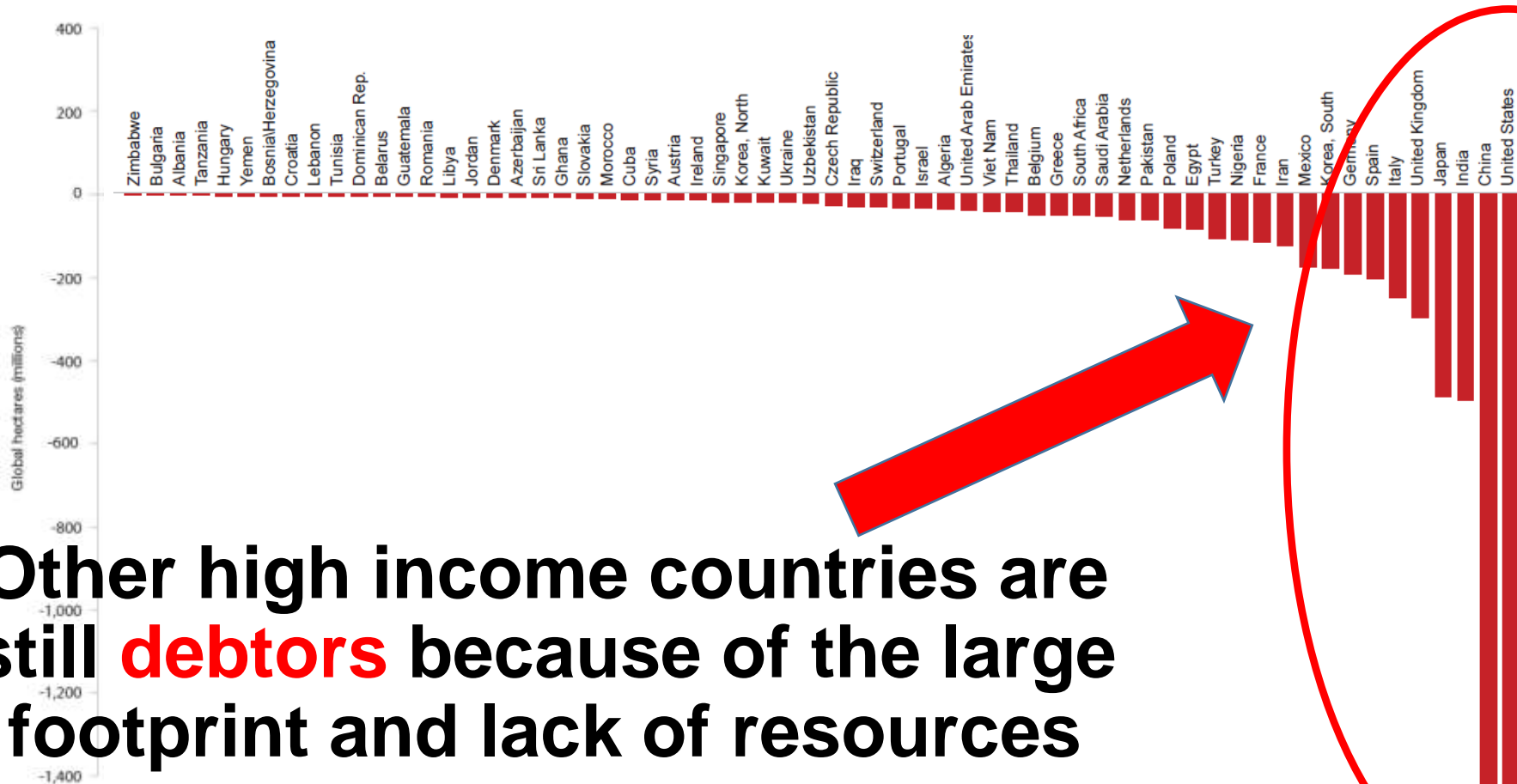
Recognize the pillars of sustainability

Investigative Science

Learning goal: Understand that there are three commonly recognized pillars of sustainability: environment, society, culture and economy. Students will be able to use these four pillars to assess the sustainability of a project, initiative or country.



Review!



Other high income countries are still **debtors** because of the large footprint and lack of resources

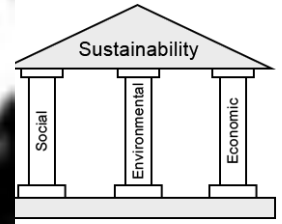
- 1 Recognize the pillars of sustainability
- 2 Know the pillars of sustainability
- 3 Describe the pillars of sustainability
- 4 Describe and apply the pillars of sustainability



Review!

Traditional Definition:

SUSTAINABLE DEVELOPMENT IS DEVELOPMENT THAT MEETS THE NEEDS OF THE PRESENT WITHOUT COMPROMISING THE ABILITY OF FUTURE GENERATIONS TO MEET THEIR OWN NEEDS.

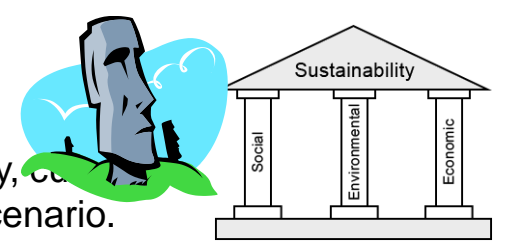


- 4 Describe and apply the pillars of sustainability
- 3 Describe the pillars of sustainability
- 2 Know the pillars of sustainability
- 1 Recognize the pillars of sustainability

Investigative Science

Learning goal: Understand that there are three commonly recognized pillars of sustainability: environment, society, and economy. Students will be able to use these four pillars to assess the sustainability of a project, action or scenario.

Review!



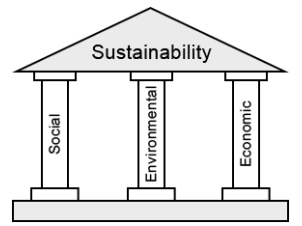
Scientific Definition:

SUSTAINABILITY IS THE CAPACITY
OF OUR HUMAN SOCIETY TO
CONTINUE INDEFINITELY WITHIN
THESE NATURAL CYCLES

- 4 Describe and apply the pillars of sustainability
- 3 Describe the pillars of sustainability
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Investigative Science

Learning goal: Understand that there are three commonly recognized pillars of sustainability: environment, society, culture and economy. Students will be able to use these four pillars to assess the sustainability of a project, action or scenario.



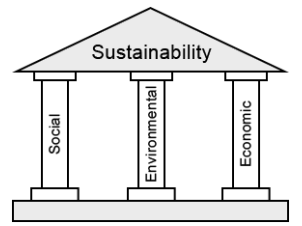
Is **“Environmentalism”** going **“green”** the same **as sustainability?**



- 4**
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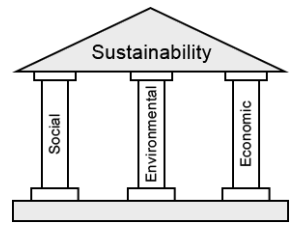
Is “**Environmentalism**” going “**green**” the same as **sustainability**?

Environmentalism :advocacy of the preservation, restoration, or improvement of the natural environment; especially : the movement to control pollution. Great goal! Is this always realistic? At what cost? Sustainability asks how do we best use natural resources and prevent pollution, but sustainability includes the whole system. How can this be accomplished equitably while still creating jobs and maintaining social structure?

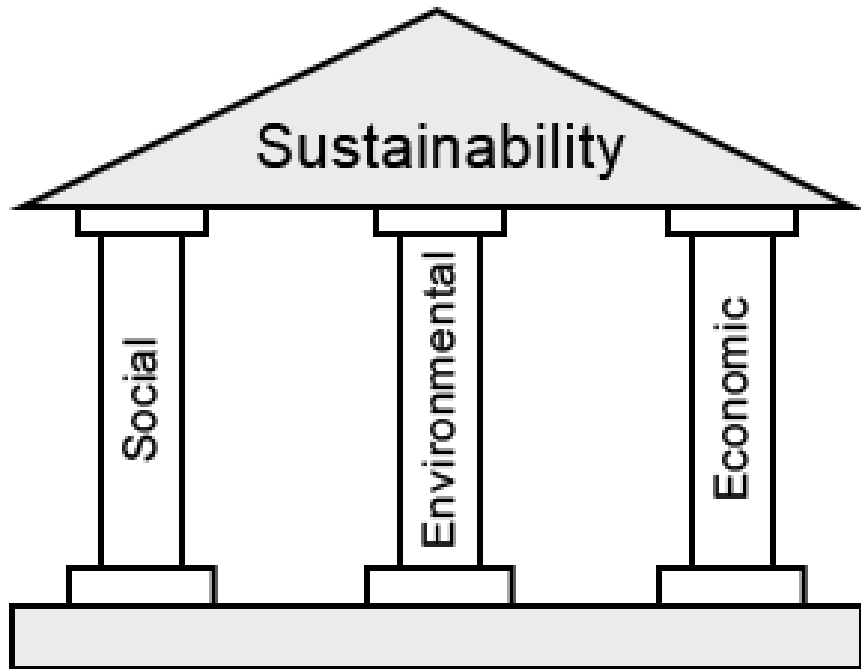
4	Describe and apply the pillars of sustainability
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Investigative Science

Learning goal: Understand that there are three commonly recognized pillars of sustainability: environment, society, culture and economy. Students will be able to use these four pillars to assess the sustainability of a project, action or scenario.



Three Pillars of Sustainability



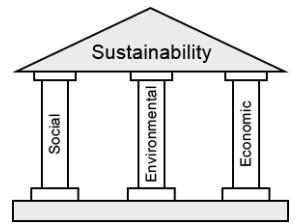
What is it?

To achieve sustainability we must balance economic, environmental and social factors in equal harmony, if any one pillar is weak then the system as a whole is unsustainable.

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Investigative Science

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Three Pillars of Sustainability



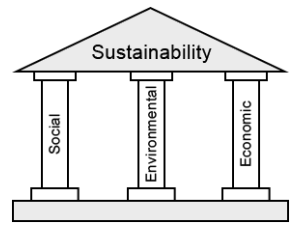
Imagine that you're sitting on this stool looking at the plans for a coal mine. Take a look at the coal mine and ask these questions:

1. Does it meet the needs of society both now and in the future?
2. Does it meet the needs of the Economy both now and in the future?
3. Does it meet the needs of the environment both now and in the future?

4 Describe and apply the pillars of sustainability
3 Describe the pillars of sustainability
2 Know the pillars of sustainability
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Investigative Science

Learning goal: Understand that there are three commonly recognized pillars of sustainability: environment, society, culture and economy. Students will be able to use these four pillars to assess the sustainability of a project, action or scenario.



Three Pillars of Sustainability



What is it?

Environmental sustainability:
Considers how we best use natural resources and how to we prevent pollution and recycle waste

Environmental Sustainability

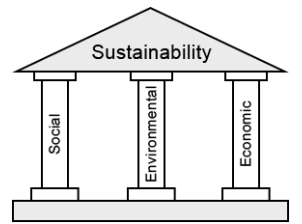
- Climate: Reducing greenhouse gas (GHG) emissions associated with biofuel production
- Air quality: Maintaining or improving air quality
- Soil health and agronomics: Maintaining or improving soil quality and land productivity
- Water quality and quantity: Increasing water use efficiency and maintaining or improving water quality
- Biological diversity: Conserving plant and wildlife diversity
- Land use: Minimizing negative land use change impacts



- 1 Recognize the pillars of sustainability
- 2 Know the pillars of sustainability
- 3 Describe the pillars of sustainability
- 4 Describe and apply the pillars of sustainability

Investigative Science

Learning goal: Understand that there are three commonly recognized pillars of sustainability: environment, society, culture and economy. Students will be able to use these four pillars to assess the sustainability of a project, action or scenario.



Three Pillars of Sustainability



What is it?

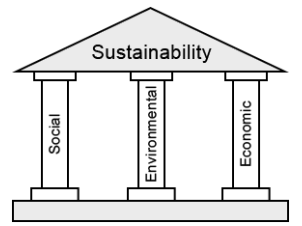
Social Sustainability:

Ensuring a high standard of living, education and equal opportunity for all. Keeping populations happy and healthy

- 4 Describe and apply the pillars of sustainability
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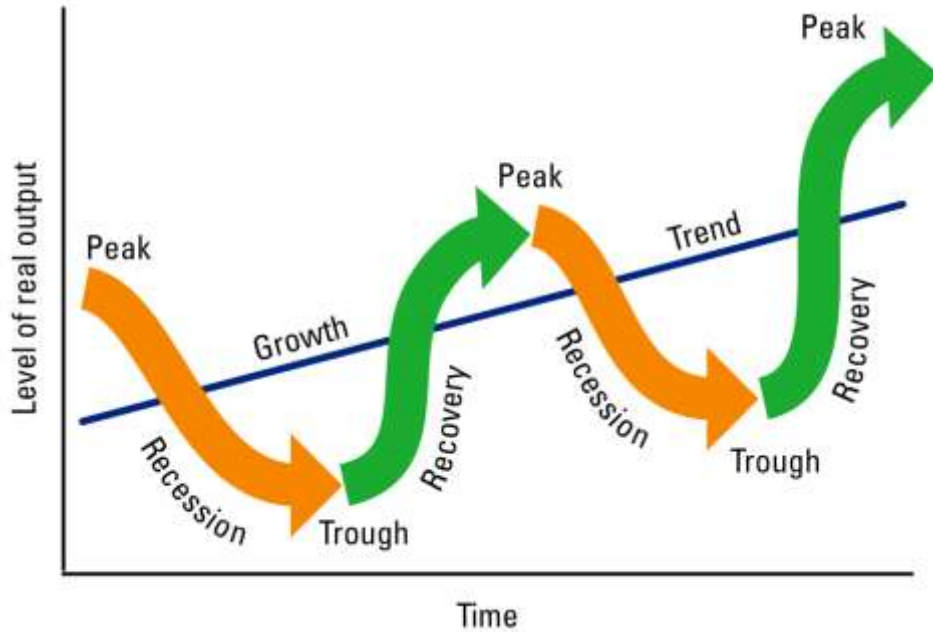
Investigative Science

Learning goal: Understand that there are three commonly recognized pillars of sustainability: environment, society, culture and economy. Students will be able to use these four pillars to assess the sustainability of a project, action or scenario.



Three Pillars of Sustainability

The Economic Cycle



What is it?

Economic Sustainability: Healthy economy, Equal allocation of economic resources. How do we create jobs and make a profit?



4

Describe and apply the pillars of sustainability

3

Describe the pillars of sustainability

2

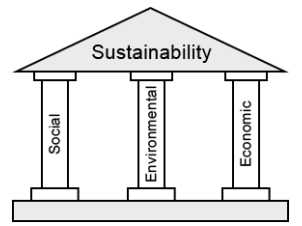
Know the pillars of sustainability

1

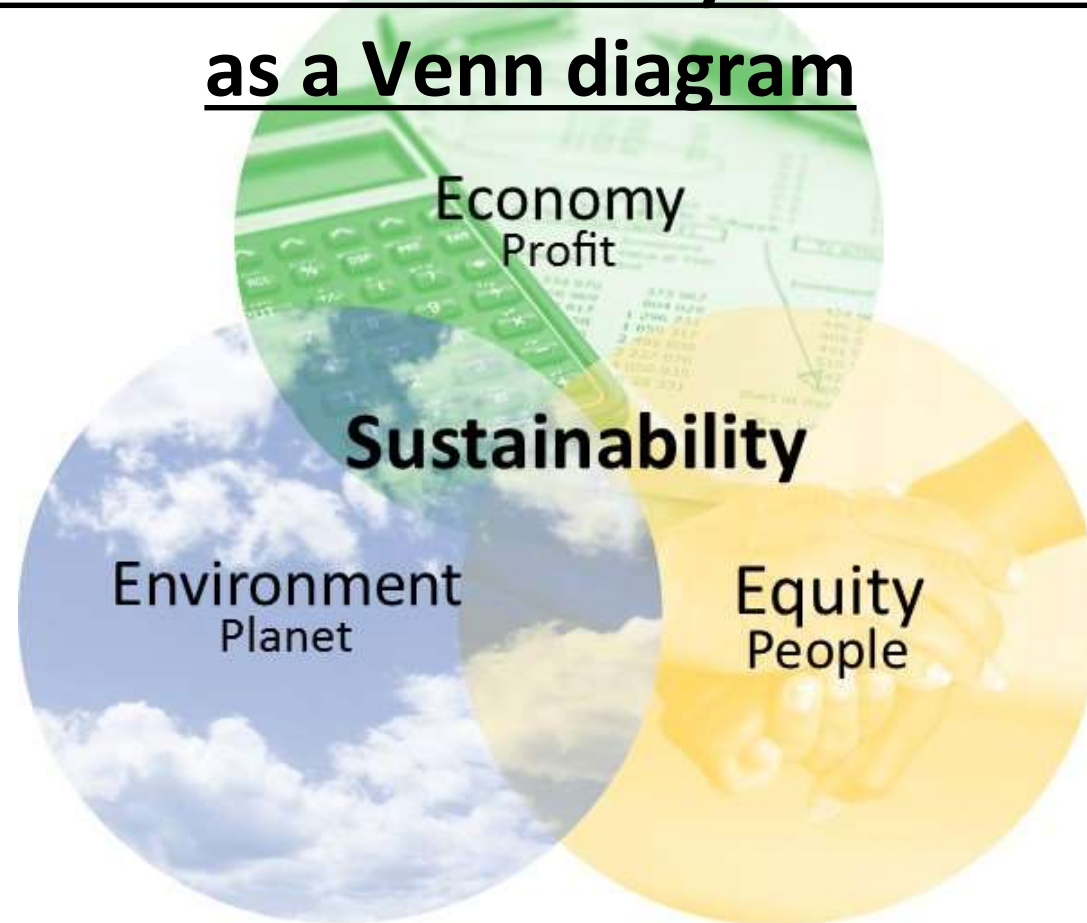
Recognize the pillars of sustainability

Investigative Science

Learning goal: Understand that there are three commonly recognized pillars of sustainability: environment, society, culture and economy. Students will be able to use these four pillars to assess the sustainability of a project, action or scenario.



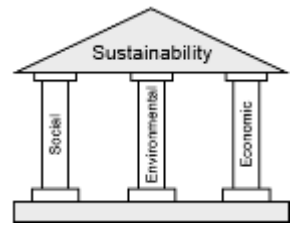
Three Pillars of Sustainability: Often illustrated as a Venn diagram



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Investigative Science

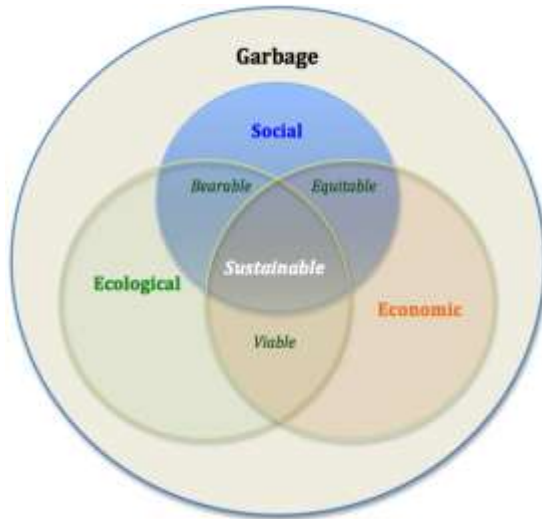
Learning goal: Understand that there are three commonly recognized pillars of sustainability: environment, society, culture and economy. Students will be able to use these four pillars to assess the sustainability of a project, action or scenario.



Dealing with GARBAGE

Is it sustainable to....

1. Throw in the street?
2. Throw it into a river?
3. Burn it?
4. Recycle everything?



4

Describe and apply the pillars of sustainability

3

Describe the pillars of sustainability

2

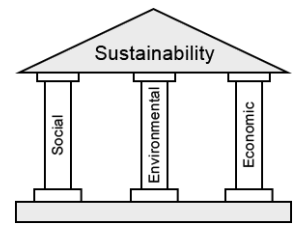
Know the pillars of sustainability

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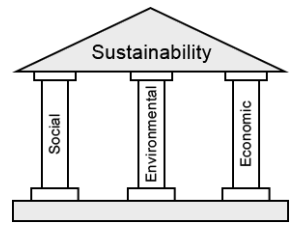
Throw garbage in the streets is economically great, fails to satisfy the social pillar



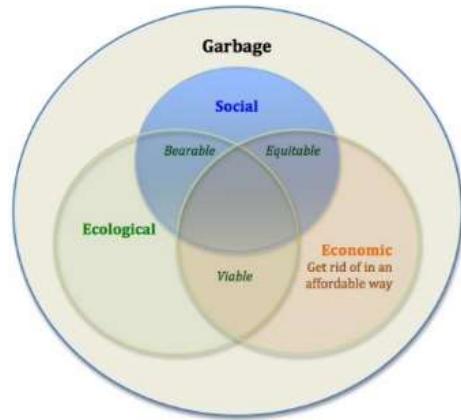
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Dumping the garbage into a river: out of sight and the off the land, but environmentally a didtaster!



L.o.U.:

4 Human pop growth scenarios

3 Trends and prediction in human pop

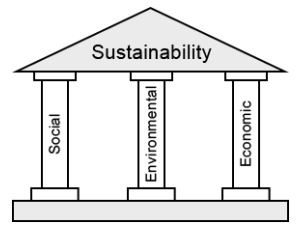
2 Define and id exponential growth

1 Define Exponential growth

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How garbage disposal can be evaluated with the three pillars of sustainability:
Environmental, great, Socially can provide jobs and environmentally sound.



Recycling all the garbage

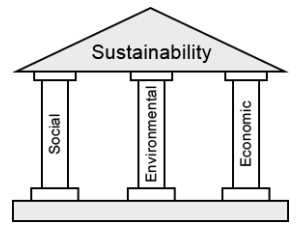
Once a profitable business for cities and private employers alike, recycling in recent years has become a money-sucking enterprise. Waste Management and other recyclers say that more than 2,000 municipalities are paying to dispose of their recyclables instead of the other way around. Consumers have indeed been filling the bigger bins, but often with as much garbage as recyclable material; a full shipping box sometimes with foam and plastic wrap attached. Residents are experimenting, perhaps with good intentions, tossing into recycling bins almost anything rubber, metal or plastic: garden hoses, clothes hangers, shopping bags, shoes, Christmas lights.



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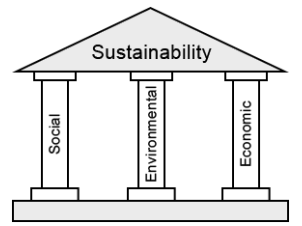
How do we know it's working? Indicators

- No system can be managed without information
- Dashboards
- Bank statements
- Achieving sustainability also requires information
- Indicators are numbers/symbols that tell something about the system

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Use of indicators

- Information for decision-making
- Public information
- Early warning, vulnerability
- Indicators can provide guidance for adaptive management, which is necessary when we do not fully understand complex systems.

4	Describe and apply the pillars of sustainability
3	Describe the pillars of sustainability
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Investigative Science

Learning goal: Understand that there are three commonly recognized pillars of sustainability: social equity, economic vitality, and environment. Students will be able to use these four pillars to

Quality of Life indicators

Public indicators that are assessed to determine if government / cities are meeting their stated goals.

Table 1. PSC Livability Principles, Themes, and Example Indicators				
Livability Principle and Theme	Example Indicator**	Soc	Econ	Env
1. Provide more transportation choices				
Commute mode/mode share	Percentage of miles traveled (or trips taken) by sustainable modes (walking, biking, public transportation) as a fraction of miles traveled by private auto (6)	✓	✓	✓
Commute time/vehicle miles traveled	Average weekday vehicle miles traveled (3)	✓	✓	✓
Carbon emissions	Greenhouse gas emissions in tons per capita			✓
2. Promote equitable, affordable housing				
Housing affordability	Gap between price of affordability for a typical household and median price of market-rate housing	✓	✓	
Equity in housing (especially as it relates to mobility and location)	Percentage of low-income households within ¼ mile of a transit stop (1)	✓	✓	
Equity in housing (especially as it relates to mobility and location)	Percentage of low-income households within ¼ mile of a transit stop (1)	✓	✓	✓
3. Enhance economic competitiveness				
Educational resources and investment	High school graduation rate	✓	✓	
Agglomeration	Jobs housing ratio (1)		✓	
Access to capital, credit, and markets	Number of internet connections per 100,000 population	✓	✓	
4. Support existing communities				
Compact, transit-oriented development	Linear distance of high capacity public transit per 100,000 population (1)	✓	✓	✓
Efficient land and resource use	Energy consumption per capita (3)		✓	✓
Clean, healthy, and functional natural communities	Percentage of water bodies that are classified as “impaired” by the U.S. Environmental Protection Agency (2,3)	✓	✓	✓