

CBL Biology: Life Science Option

BSCS Green Version 10th edition



Biology, An Ecological Approach Lesson Plan for Week 8, Day 1

Outcomes for Today

Standards Focus: 6bc

PREPARE

1. Background knowledge necessary for today's reading

This lesson is entirely based on the use of the CD-ROM. If you do not have a computer lab, the lesson can be adapted if you have a projector. It is similar to the lessons learned from the "Tragedy of the Commons." You may want to spend some time reviewing "Tragedy of the Commons" with students as it provides a good background.

2. Vocabulary Word Wall

Introduce five important, useful words from today's reading.

crisis gulf natural resource fishery trawling

- Show, say, explain, expand, explode or buzz about the word briefly.
- Show, say and define the word quickly and add to the word wall.

READ

3. Review the vocabulary and concepts previously covered in this chapter

Start at the beginning and review the concepts and vocabulary covered so far.

- Mention the setting and main ideas.
- Point to the concept chart as you quickly review it.

Aquatic ecosystems cover the greatest area of the earth.

These ecosystems are both fresh and saltwater with saltwater making up the largest percentage (over 90%) of the environments.

Although the oceanic aquatic ecosystems are vast in size, the productive parts are limited to those areas along the coastlines, and selected locations where conditions favorable to productivity occur.

Virtually all water-borne pollution eventually reaches the oceans.

In addition, the earth's oceans are subject to degradation from ships at sea, oil drilling operations, and other sources of human disturbance.

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4. Read directions for investigation

5. Read text. Chapter 23, Aquatic Ecosystems, Text Investigation 23.3, pp. 691- 693.

- Shared Reading RRP: Read, React, Predict every 2-3 pages
 Tape Partner Choral Silent Round Robin Reading

Setting	Characters	Pages
Gulf of Maine	fishing boats	CD ROM

RESPOND

6. Fix the facts. Clarify what is important

Discuss the reading and add 3-5 events to the billboard.

- Discuss the text; clarify the most important facts, concepts, ideas and vocabulary.
- Decide on the 3-5 most important **concepts** and post these on the billboard.

Students might mention:

The ocean is vast

Maybe the ocean could be overfished.

The Gulf of Maine is only a small part of the ocean.

The Gulf of Maine situation is like the pasture in the commons story.

This is a complex scene with different points of view.

The Gulf of Maine could end up as a desert in terms of fish.

7. Post information on the billboard. Add new information to ongoing whole class projects posted on the wall

- New concept information can be added to the billboard.
- An answer can be added to a question from the KWL Chart.
- New information can be added to ongoing charts and investigations.

EXPLORE

8. Explore today's investigation with inquiry activities

9. Explore today's simulation with inquiry activities

10. Collect data and post

One possible activity:

The activity is to complete the interactive portion of the Crisis in the Gulf of Maine interactive CD ROM.

Other possible activities for a class group or individual

Bookmark Open Mind Portrait g6 Graphic Organizer

g7 Main Idea Graphic Organizer c1-12 Cubing Postcard Prop

Poster Ad Map Retelling Reader's Theatre Cartoon Rap

Key Questions

How is the Gulf of Maine like the pasture?

When did the problem in this area begin to be apparent?

So who "owns" the fish in the Gulf of Maine?

List all the people/groups involved in this fishery.

The Gulf of Maine is not that large compared to the entire ocean. Why don't the boats just go a little further to catch more fish?

How can the government help with this situation?

Remember to ask literal structural idea craft author literature life
evaluate and inference questions every day.

Key Paragraph

Recall from Chapter 2 the "Tragedy of the Commons." Where are current examples of commons that may be in crisis? Follow your teacher's instructions to explore this issue on your own or working with a team. A resource for your investigation is the CD-ROM *The Commons: An Environmental Dilemma*.

EXTEND

11. Prompt every student to write a short product tied to today's reading

A Local Commons

After reviewing the idea of the commons again with students ask them to think about a local tragedy of the commons - for example a local trashed common area such as a park. Ask students to write an epitaph for a local commons.

12. Close with a short summary

Extend the reading to the students' lives or to the world.

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Biology, An Ecological Approach Lesson Plan for Week 8, Day 2

Outcomes for Today

Standards Focus: 6bc

PREPARE

1. Background knowledge necessary for today's reading

This is regarded as one of the most important chapters in the book. Please note that more lessons/days (14 in all) are dedicated to this chapter. We have heard many times over how humans continue to impact the earth. This chapter goes into great detail about how this impact can be managed. In a sense it is a hopeful chapter. First we must understand the reality. Helping save our earth and its various ecosystems is a complex challenge, but it is one that must be undertaken with scientific knowledge. Try to communicate a sense of urgency as well as hope.

2. Vocabulary Word Wall

Introduce five important, useful words from today's reading.

ebb sustainable natural resource philosophy agriculture

- Show, say, explain, expand, explode or buzz about the word briefly.
- Show, say and define the word quickly and add to the word wall.

READ

3. Review the vocabulary and concepts previously covered in this chapter

Start at the beginning and review the concepts and vocabulary covered so far.

- Mention the setting and main ideas.
- Point to the concept chart as you quickly review it.

Essentially, this chapter is a review of the entire book from the perspective of human impact on the planet.

4. Read directions for investigation

5. Read text. Chapter 24, Evolution: Managing Human-Affected Ecosystems, Text Introduction, pp. 694- 695.

- Shared Reading RRP: Read, React, Predict every 2-3 pages
 Tape Partner Choral Silent Round Robin Reading

Setting	Characters	Pages
artificial prairie	deciduous trees, single row of crops	694

RESPOND

6. Fix the facts. Clarify what is important

Discuss the reading and add 3-5 events to the billboard.

- Discuss the text; clarify the most important facts, concepts, ideas and vocabulary.
- Decide on the 3-5 most important **concepts** and post these on the billboard.

Students might mention:

Humans have dominated the earth for several thousand years.
Only recently has human impact on the earth had a major negative impact.
Some of the ways in which humans damage the earth are by clearing natural vegetation, damming rivers, and polluting the air and water.
It is important to understand the principles of biology in order to help manage human impact on the earth.
Scientists believe we can continue to live on earth if we as a species learn to manage our resources wisely.

7. Post information on the billboard. Add new information to ongoing whole class projects posted on the wall

- New concept information can be added to the billboard.
- An answer can be added to a question from the KWL Chart.
- New information can be added to ongoing charts and investigations.

EXPLORE

8. Explore today's investigation with inquiry activities

 9. Explore today's simulation with inquiry activities

 10. Collect data and post
-

One possible activity: Human Impact on the Earth

Description of activity

Procedure

Ask students to make a list of the different ways in which humans have a direct impact on the earth's natural environment. Share some of the ideas and create a class list. Use this list as a basis for the student project.

Activity

Using magazines, direct students to create a collage to represent a visual picture of the of human earthly impacts from the class list.

Discussion

Follow up with student presentations on their posters. Hopefully there is a place for public display. Student work generally seems to take on more significance if there is a public exhibition. Pride of ownership is what should be emphasized.

Other possible activities for a class group or individual

- Bookmark Open Mind Portrait g6 Graphic Organizer
- g7 Main Idea Graphic Organizer c1-12 Cubing Postcard Prop
- Poster Ad Map Retelling Reader's Theatre Cartoon Rap

Key Questions

Why do you suppose that human impact on the earth was minimal until the last several generations?

List at least ten different ways in which humans negatively impact the earth.

What is the first step towards reversing this negative trend in environmental damage to the earth?

Remember to ask literal structural idea craft author literature life
evaluate and inference questions every day.

Key Paragraph

For thousands of years, humans have dominated the land and have affected other organisms by building houses and roads, cutting trees and clearing natural vegetation for cropland and cities, damming rivers, and polluting the air and water. Our actions altered natural ecosystems. The damage to some environments has come full circle to inflict consequences on the humans themselves.

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EXTEND

11. Prompt every student to write a short product tied to today's reading

Peace World



Have students look at this image and write a short interpretation (poem, response, etc.).

12. Close with a short summary

Extend the reading to the students' lives or to the world.

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Biology, An Ecological Approach Lesson Plan for Week 8, Day 3

Outcomes for Today

Standards Focus: 6bc

PREPARE

1. Background knowledge necessary for today's reading

This lesson opens the way for the study of man's impact on the earth. Ask students why they think that humans have altered the earth to such a great degree. Ask them to consider a number of talking points:

Do humans have the right to dominate the environment?

What roles do various nations play in this process?

Why is international cooperation so important?

Do humans have more rights than animals?

Use these and other questions to stimulate interest.

2. Vocabulary Word Wall

Introduce five important, useful words from today's reading.

hominids

cranial capacity

adapted

extinct

culture

- Show, say, explain, expand, explode or buzz about the word briefly.
- Show, say and define the word quickly and add to the word wall.

READ

3. Review the vocabulary and concepts previously covered in this chapter

Start at the beginning and review the concepts and vocabulary covered so far.

- Mention the setting and main ideas.
- Point to the concept chart as you quickly review it.

For many thousands of years humans have lived on earth with little impact.

Early human-like beings were referred to as hominids.

It is only recently, in terms of geologic time, that humans have impacted earth in a negative way.

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4. Read directions for investigation

5. Read text. Chapter 24, Evolution: Managing Human-Affected Ecosystems, Text Section 24.1, pp. 696.

- Shared Reading RRP: Read, React, Predict every 2-3 pages
- Tape Partner Choral Silent Round Robin Reading

Setting	Characters	Pages
earth 25,000 years ago	early hominids	696

RESPOND

6. Fix the facts. Clarify what is important

Discuss the reading and add 3-5 events to the billboard.

- Discuss the text; clarify the most important facts, concepts, ideas and vocabulary.
- Decide on the 3-5 most important **concepts** and post these on the billboard.

Students might mention:

The early hominids lived very simple lives.
Any meat they ate was probably found and gathered up from dead animals.
The cranial capacity is the volume of the human brain.
Human cranial capacity increased greatly in the past several million years.
What this means is that the size of the human brain almost doubled.
With a larger and more complex brain, pre-humans and eventually humans became able to adapt to meet the demands of their local environment.
This larger brain also allowed humans to develop a language, which in turn, allowed them to pass their learning and culture to the next generations.

7. Post information on the billboard. Add new information to ongoing whole class projects posted on the wall

- New concept information can be added to the billboard.
- An answer can be added to a question from the KWL Chart.
- New information can be added to ongoing charts and investigations.

EXPLORE

8. Explore today's investigation with inquiry activities

9. Explore today's simulation with inquiry activities

10. Collect data and post

One possible activity:

What's Color Got to Do With It?

Understanding the origins of human skin color is an important part of understanding human evolution. This is a fairly complex lesson designed to increase student understanding.

Procedure

Details of the lesson are located at this site:

http://www.voyagesthroughtime.org/hominid/sample/lesson4/z_act2.htm

Additional/Alternate Activity

In order to understand how long humans have been on earth, compared to the period of impact, have students create a human timeline.

Directions

Divide the last 5 million years of earth's history into a 24 hour/1440 minute clock. Allow students to do a little research on the subject. Assist students with the math here and have students create a large poster with a graphic representation of human history. Note that it is only during the last few seconds that human impact begins to surface.

Discussion

Follow up with a discussion on implications for the future.

Other possible activities for a class group or individual

- Bookmark Open Mind Portrait g6 Graphic Organizer
g7 Main Idea Graphic Organizer c1-12 Cubing Postcard Prop
Poster Ad Map Retelling Reader's Theatre Cartoon Rap

Key Questions

How did early hominids live? Create a picture.

What did the early hominid diet consist of?

Explain cranial capacity.

What are the implications of increased cranial capacity in pre-humans and humans?

How did the development of language impact human populations.

Talk about the early human uses of tools.

What is a tool?

Remember to ask literal structural idea craft author literature
life evaluate and inference questions every day.

Key Paragraph

New ideas for coping with problems and changes required new tools. The earliest technological developments probably came slowly. Our ancestors learned to make their own simple stone tools, for example, using stone flakes as knives. Over time, they improved tools to serve different purposes. The rate of technological change eventually quickened, and cultural developments came more rapidly.

EXTEND

11. Prompt every student to write a short product tied to today's reading

Conversation Across Time

Review with students the significance of increased cranial capacity on humans. Now instruct them to write a short dialogue between a caveman and a present day “enlightened” human on the subject of intelligence. Put a twist on this assignment by having students write from the perspective of the so-called caveman.

12. Close with a short summary

Extend the reading to the students' lives or to the world.

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Biology, An Ecological Approach Lesson Plan for Week 8, Day 4

Outcomes for Today

Standards Focus: 6bc

PREPARE

1. Background knowledge necessary for today's reading

Upon first glance, this lesson may seem like a history lesson, which indeed it is. The difference here is that it is a history lesson through the lens of an ecologist. Reviewing the history of the human relationships with the earth is an important first step towards understanding current day challenges. The tragedy of the commons is another good history lesson with an ecological emphasis. The other important point to note here is that the gradual change of human domination over the land is one that gradually built up speed and intensity and is not exponential in terms of rate and impact.

2. Vocabulary Word Wall

Introduce five important, useful words from today's reading.

agriculture subsistence urbanization interdependence domesticate

- Show, say, explain, expand, explode or buzz about the word briefly.
- Show, say and define the word quickly and add to the word wall.

READ

3. Review the vocabulary and concepts previously covered in this chapter

Start at the beginning and review the concepts and vocabulary covered so far.

- Mention the setting and main ideas.
- Point to the concept chart as you quickly review it.

For many thousands of years pre-humans and humans existed on earth with relatively little impact upon the environment.

Early humans were primarily gatherers. That is, they ate what they could find nearby.

As humans continued to survive, their cranial capacity (brain volume) increased greatly over a relatively short period of time.

In response to changes in their environment, early populations of humans adapted, migrated, or became extinct.

The development of language made it possible to transmit culture in early human cultures.

4. Read directions for investigation

5. Read text. Chapter 24, Evolution: Managing Human-Affected Ecosystems, Text Section 24.2, pp. 696-698.

- Shared Reading RRP: Read, React, Predict every 2-3 pages
 Tape Partner Choral Silent Round Robin Reading

Setting	Characters	Pages
tropical rain forest rice fields, Java	slash and burn agriculture animals, human, plow	697

RESPOND

6. Fix the facts. Clarify what is important

Discuss the reading and add 3-5 events to the billboard.

- Discuss the text; clarify the most important facts, concepts, ideas and vocabulary.
- Decide on the 3-5 most important **concepts** and post these on the billboard.

Students might mention:

Planting their food was one of the first steps humans made to alter their environment.

Many of the first crops that were raised for humans came from near where humans were living.

Early agriculture (growing crops) took place in the tropical rain forests. It was called slash and burn.

The plow was the invention that changed early agriculture. It allowed humans to convert more ground to cropland.

Cities developed and humans began to specialize in their jobs. This was called civilization.

Much of the natural environment of the Middle East was destroyed by the civilizations living there, leading to their downfall.

7. Post information on the billboard. Add new information to ongoing whole class projects posted on the wall

- New concept information can be added to the billboard.
- An answer can be added to a question from the KWL Chart.
- New information can be added to ongoing charts and investigations.

EXPLORE

8. Explore today's investigation with inquiry activities

9. Explore today's simulation with inquiry activities

10. Collect data and post

One possible activity:

Then and Now

This is a simple activity in which students create visual images of agriculture throughout history.

Procedure

Review with students the history of agriculture as outlined in this lesson. Ask them to consider what this looked like visually. Figure 24.2 and 24.3 in the student text (pages 697 and 698) are two such examples.

Activity

Using magazines and internet resources, instruct students to create a “Then and Now” poster. Allow students to develop their own creative visual style of display. These posters should clearly show the different types of agriculture throughout recorded and pre-recorded human history. A key concept to remember is that early agriculture was labor-intensive. That is, what one human can now do (with the aid of petroleum-driven machines) compared to early agriculturists, is what is important to get across.

Discussion

Follow up with a discussion on the implications of this. In addition, this website has a very good visual display on the concept of factory farming:

<http://www.thematrix.com/>

Other possible activities for a class group or individual

Bookmark Open Mind Portrait g6 Graphic Organizer

g7 Main Idea Graphic Organizer c1-12 Cubing Postcard Prop

Poster Ad Map Retelling Reader's Theatre Cartoon Rap

Key Questions

What were some of the changes in human activity on earth around 10,000 years ago?

What does it mean to domesticate crops and animals?

Explain slash and burn agriculture. Why does the land become unproductive after several seasons?

Explain what is meant by specialized occupations.

What do many scientists think contributed to the downfall of some of the ancient great civilizations?

Remember to ask literal structural idea craft author literature life evaluate and inference questions every day.

Key Paragraph

Eventually humans learned to change their environment in a fundamental way. One of the most significant changes in human history began about 10,000 years ago when groups of people began to switch from gathering foods and hunting wild game to planting and harvesting selected wild food plants. People also began to tame, herd, and breed animals that could provide food and clothing.

EXTEND

11. Prompt every student to write a short product tied to today's reading

The Good Old Days

There have been many times when the phrase “the good old days” comes out in the course of conversation on many issues. Ask students to write a short paragraph beginning with the statement, "the good old days."

12. Close with a short summary

Extend the reading to the students' lives or to the world.

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Biology, An Ecological Approach Lesson Plan for Week 8, Day 5

Outcomes for Today

Standards Focus: 6bc

PREPARE

1. Background knowledge necessary for today's reading

The history lesson with ecological implications continues. In this lesson, students are exposed to the negative implications of the Industrial Revolution. There are several key concepts worth discussing to aid in an understanding of the Industrial Revolution from an ecological perspective. They are:

- the process of mass production
- exploration, processing, and consumption of fossil fuels in the process
- the by-products of industrialization
- quality of life issues

It is interesting to note that these very things are going on in China today. China and India and their industrialization process have major implications for the future of life as we know it on earth. Understanding this process will be the basis of the activity in this lesson as well as several future ones.

2. Vocabulary Word Wall

Introduce five important, useful words from today's reading.

urban industrialization mass production rural degradation

- Show, say, explain, expand, explode or buzz about the word briefly.
- Show, say and define the word quickly and add to the word wall.

READ

3. Review the vocabulary and concepts previously covered in this chapter

Start at the beginning and review the concepts and vocabulary covered so far.

- Mention the setting and main ideas.
- Point to the concept chart as you quickly review it.

Early humans lived with very little impact on the environment.

Their impact was limited because they were simple scavengers and gatherers.

With the passage of time, humans developed small societies and language.

The development of agriculture was the next step in the human journey on earth.

Agriculture involved modifying the land to grow crops.

Agriculture made possible the creation of cities and the beginning of urban societies.

4. Read directions for investigation

5. Read text. Chapter 24, Evolution: Managing Human-Affected Ecosystems, Text Section 24.3, pp. 698.

- Shared Reading RRP: Read, React, Predict every 2-3 pages
 Tape Partner Choral Silent Round Robin Reading

Setting	Characters	Pages
wheat field	mechanized combine	698

RESPOND

6. Fix the facts. Clarify what is important

Discuss the reading and add 3-5 events to the billboard.

- Discuss the text; clarify the most important facts, concepts, ideas and vocabulary.
- Decide on the 3-5 most important **concepts** and post these on the billboard.

Students might mention:

The Industrial Revolution began in England.

With the Industrial Revolution, production of goods increased.

This process also produced much more waste.

The use of fossil fuels allowed crop production to become more efficient and it took few farmers to do it.

It was during the Industrial Revolution that more environmental damage came about.

7. Post information on the billboard. Add new information to ongoing whole class projects posted on the wall

- New concept information can be added to the billboard.
- An answer can be added to a question from the KWL Chart.
- New information can be added to ongoing charts and investigations.

EXPLORE

8. Explore today's investigation with inquiry activities

9. Explore today's simulation with inquiry activities

10. Collect data and post

One possible activity:

Going into detail on industrialization

Attached is a multi-day supplemental lesson plan to be used for the next few days. Please see Supplemental Student Investigation attached to this lesson.

Other possible activities for a class group or individual

- Bookmark
- Open Mind Portrait
- g6 Graphic Organizer
- g7 Main Idea Graphic Organizer
- c1-12 Cubing
- Postcard
- Prop
- Poster
- Ad
- Map
- Retelling
- Reader's Theatre
- Cartoon
- Rap

Key Questions

Compare and contrast the Agricultural Revolution and the Industrial Revolution.

Why were fewer people needed for agricultural production?

Why did people move from rural to urban areas during the Industrial Revolution?

What is a renewable resource?

What is meant by mass production? Give some examples.

Remember to ask literal structural idea craft author literature life evaluate and inference questions every day.

Key Paragraph

The next major cultural change, the Industrial Revolution, spread to the United States from England in the 1800's. Goods formerly produced on a small scale by hand were now being produced on a much larger scale by machines. Eventually, locomotives, cars, trucks, tractors, and ships powered by fossil fuels replaced horse-drawn wagons, plows, grain harvesters, and wind-driven ships.

EXTEND

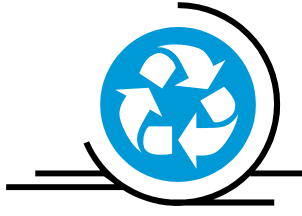
11. Prompt every student to write a short product tied to today's reading

Then or Now

Ask students to consider and write a short paragraph in response to this question:
Would you rather be living now or 100 years ago? Why?

12. Close with a short summary

Extend the reading to the students' lives or to the world.



Supplemental Student Investigation
Industrialization Today and Yesterday China and England
5 days of activities

Introduction

This is a multi-day supplemental activity and is designed for higher level work. Nevertheless, you should be able to use it as the activity part of several lessons related to the Industrial Revolution with implications for human ecosystems.

Overview

Industrialization is a global macro-change that started in the 18th century in Great Britain and continues today in developing states. Students will compare the 18th century Industrial Revolution in England to industrialization in China. They will learn how internal and external factors promoted or hindered industrialization. Another important aspect of this unit is to consider the effects of industrialization on social, political, economic, and cultural conditions.

Central Questions:

1. What factors/causes are necessary for industrialization?
2. Why did England industrialize first? Why not China?
3. What is macro-change and how is industrialization a macro-change?

Day One: Linking Consumerism and the Industrial Revolution¹

Draw a simple table on the white/black board (below).

NEEDS WANTS

Students can split into small groups and duplicate the table on a sheet of paper. Hand out the following list of items to each group:

comfortable work clothing, shoes, sugar, bed, tea, coffee, watch, hat, soap, jewelry, perfume, guns (including military weapons), razor, umbrella, knife, dress clothing, tobacco, chair, cupboard, toys

Have students place each item on their chart according to whether it is a need or want. They are to assume the perspective of someone in early 18th century England.

Ask groups to share some of their results. Chances are, not all groups will have the same results.

Ask students to consider how many of those same items we consider needs in 2007.

Ask if they think there is a difference in perspective when classifying needs and wants from 300 years ago to today. Ask them to consider the perspective of a Cro-Magnon woman 15,000 years ago. How many of the items would be a need for her?

If students have not already concluded so, explain that **all** the items are wants, none are needs.

Write the following statement on the board and have students copy it at the top of a sheet of blank paper:

“Consumerism promoted the Industrialization Revolution when shopkeepers and producers began to realize that wants and needs were infinitely stretchable.”

Ask students to define consumerism. They should be able to say consumerism is when you buy things not needed. Refer back to the example of changing “needs” from the Cro-Magnon to 17th century to 2007 and ask them to add more to their definition.

Hopefully, they can conclude that consumerism is consuming things you do not need, while believing you do need them – stretching needs and wants, stretching wants into needs. Have students write a class-constructed definition of consumerism below the earlier statement on their papers.

Ask students to predict what shopkeepers and producers in 18th century Europe did when they “began to realize that wants and needs were infinitely stretchable.” If they cannot answer, ask what shopkeepers and producers do today help “stretch” wants and needs of customers. If they still cannot answer, add this question to the homework assignment.

Day 2: Ingredients for an Industrial Revolution

Ask students what they found interesting in the reading Section 24.4.

Review the topic from yesterday by reminding them of the position statement:

“Consumerism promoted the industrialization revolution when shopkeepers and producers began to realize that wants and needs were infinitely stretchable.”

Have students share their position and written statement with a classmate. This position statement is another version of the chicken-or-egg-first question. Which came first, consumerism or **industrialization**? Many authors' position clearly is that consumerism promoted **industrialization**. Ask students who disagree or has different interpretations to share.

What is industrialization?

Share some definitions with students:

- A process that transforms agrarian and handicraft-centered economies into economies distinguished by industry and machine manufacture
- The change in social and economic organization resulting from the replacement of hand tools by machine and power tools and the development of large-scale industrial production: applied to this development in England from about 1760 and to later changes in other countries (*Webster's New World Dictionary*)
- Modernization
- The major technological, socioeconomic and cultural change in the late 18th and early 19th centuries that began in Britain and spread throughout the world (Wikipedia)
- A massive increase in production, and related acceleration of transportation, communication and sales capacities. The heart of this increase was new technology, particularly technology based on coal or water power instead of human or animal power.²

Tell students the exact definition is not important, but the concept is. **Industrialization** is a macro-change equal to the development of agriculture. The process usually takes 80-100 years for full transformation. What caused the Industrial Revolution? - a number of factors combined; there is no simple one-shot explanation.

Brainstorming activity: As a class, list ingredients they think necessary for **industrialization**.

- Draw on the board and have students duplicate on plain paper the following:

Economic

Political

Internal Factors

Industrialization

External Factors

Physical/Resources

Social/Cultural

- Explain the difference between internal and external factors. Use the example that England had a lot of capital to invest in machinery, technology, and factories because they had engaged in a great deal of trade in sugar, textiles, and slaves etc... This necessary capital was an external factor.
- An internal factor example would be the presence of coal as a raw material in England. However, a country like Japan that had to import coal would be an external factor.
- Have students write factors on their copies as the brainstorming progresses. Do not be concerned if they cannot come up with many; this is just a start.
- Looking for things like: power (coal), technology (machines, steam engine), increased iron production (technology, access to raw materials), transportation (railroads, navigable waterways), labor (population), efficient agriculture production (food), capital (trade), favorable government policy (promoted **industrialization**, trade, responsive to reform), use of corporations to raise capital, demand (for products)

Day 3: Coal, Steam, and Iron...All Aboard!

Go over factors on the chart from Day 2 if you have not already done so.

Teacher-led portion: PowerPoint – *Coal, Steam, and Iron*.

The PowerPoint traces the early development and relationship between these vital ingredients for **industrialization**. Most of the material is from *Coal: A Human History* by Barbara Freese, Penguin Books, 2003.

Write this statement on the board and have students copy it into their notebooks:
Explain what the author means when she states,

“Coal mining was one of the few occupations in which a person faced a very real risk of death by all four classical elements – earth, air, fire, and water”.

Day 4: Why England First?

Geography matters: Use a world map to locate England. Emphasize its small size compared to other countries such as Russia and **China**.

Overhead #1: relative size of England

<http://www.bus.ualberta.ca/exchange/images/blank%20world%20map.gif>

Overhead #2:

<http://www.ideo.columbia.edu/edu/dees/U4735/projections/pitman/12.coal.deposits.gif>

England had coal, but not nearly as much as many other countries. Take a closer look at England and have students think about coal and effective use of it at the start of the Industrial Revolution. Ask them what about England allowed them to harness the power of coal more effectively than other countries.

<http://www.rossoldbooks.co.uk/Images2/NM894.JPG>

(Easier transport. England was surrounded by water + there were many rivers and even canals they could use). Russia, **China**, and even other European countries did not have the water transportation system England did.

Homework: Read Bentley and Ziegler, p. 820 "The Factory System." up to p 831 "Industry and Society." As you read, look for ingredients or factors that favor **industrialization**. There are at least seven in the reading. Add them to your chart in your notebook in a third color of ink or marker.

Day 5: Why not China?

Go over the factors students found in the reading. Make sure they found and added sufficient labor force, technology/machinery, manufacturing techniques (piecework), favorable government policies, political stability, skilled and disciplined work force, economic and legal structures that support business-like corporations, banks, and brokerage firms. Ask students how each affected and promoted the process of **industrialization**.

Some students may suggest effects rather than factors of **industrialization**. Take care to make sure they understand the difference between effects of **industrialization** and factors since the reading contains both. We will cover effects of **industrialization** later.

mondediplo.com/maps/china16th

Point out to students that **China** had a more extensive and longer history of global trade and connection than England. Refer back to the coal deposit map and point out that **China** had much coal and actually used coal earlier and more extensively long before England did. Tell students that **China** had a smaller “**industrialization** revolution” 700 years before Great Britain's. During the Northern Song dynasty, **China** learned to make iron with coal 700 years before the process was re-discovered in England. Have students copy the following in their notebooks:

“With such a head start on industrialization, why did China fall behind?”