

CBL Biology: Life Science Option

BSCS Green Version 10th edition



Biology, An Ecological Approach Lesson Plan for Week 9, Day 1

Outcomes for Today

Standards Focus: 6bc

PREPARE

1. Background knowledge necessary for today's reading

It is suggested that you read through student text Section 24.4 first. Ask yourself this question: What can I as one teacher do? This is where the concept of the *circle of concern* and *circle of influence* come into play. Here is a brief explanation from Stephen Covey's writings:

<http://www.cut-the-knot.org/manifesto/ctk.shtml>

It is easy to become overwhelmed by the circle of concern after one realizes the depth of the challenges facing us and our survival on earth. Ask yourself what influences you can have as a teacher and then pursue them. Note: This will be the basis of a multi-day student activity in future lessons.

2. Vocabulary Word Wall

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

fossil fuels synthetic stressor cultural adaptation throwaway lifestyle

- 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.
As we review the rather short history of humans on earth, we see that:
 - Early humans simply found what they needed for survival where they happened to live.
 - As human brain size and intelligence increased, humans developed language which allowed them to transmit their various cultures to the next generations.
 - Agriculture (the planting and harvesting of food crops) came next in the history of human development on earth.
 - The industrial revolution began in England and moved to the United States. With it came mass production of goods and services along with a new set of environmental problems.

We are now at a point in human evolution and development where our progress threatens the overall health of the planet.

4. Read directions for investigation

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

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

Setting	Characters	Pages
urban slum	tightly packed sub-standard housing	699

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 book says there are six million people on earth. I'll bet there are many more than that.

Note: Go to this link for an up to date census report:

<http://www.census.gov/main/www/popclock.html>

Most of the people on earth live in or near cities.

A non-renewable fuel means that once it is gone, it is gone forever.

All kinds of toxic stuff ends up in the ocean.

After reading about all the ways humans mess up the environment, I am concerned about my future and the future of my kids.

We have become a throwaway society. That means we just use it and toss it.

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

The Industrial Revolution *Continued*

Please see **Day Two** of the **Supplemental Student Investigation, Industrialization Today and Yesterday: China and England** which is attached to this lesson plan.

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

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Key Questions

What is an urban area? Give local examples.

Give two examples of non-renewable fossil fuels.

What is the primary reason for global warming?

Look at Figure 24.5 on page 600 of your student text. How can this cycle be broken?

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

Key Paragraph

Environmental degradation occurs slowly. The early stages are not always obvious. In fact, individuals who stand to profit from exploiting the environment often deny their projects will degrade it. As the population continues to increase, there is pressure to take more resources from the limited biotic and abiotic environment.

EXTEND

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

Hope Springs Eternal

Propose this to students:

Now that you have an idea of why we as a species are in our present environmental situation, write a hopeful letter to a person who will be born in 50 years. Indicate to this person of the future what personal role you have played as a member of society.

12. Close with a short summary

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

CBL Biology: Life Science Option

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Biology, An Ecological Approach Lesson Plan for Week 9, Day 2

Outcomes for Today

Standards Focus: 6bc

PREPARE

1. Background knowledge necessary for today's reading

Sometimes it is important for scientists to back off to obtain a so-called bird's eye view of things in order to gain perspective and a greater understanding. If you have used GoogleEarth, you are aware that this is an excellent visual aid for students to gain an excellent perspective of their world as it relates to one earth. If at all possible, make use of this powerful tool to build interest for this lesson.

2. Vocabulary Word Wall

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

infrared

old air

CO₂

concentration

naked eye

- 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.

Human impact on the life support systems of earth remained at a minimal level for many hundreds of thousands of years.

Within the past several hundred years, impact has grown to the point where ecosystems are considered to be threatened.

Human activities ranging from advanced mechanized farming to increased levels of production of goods all have negative consequences to natural ecosystems.

In short, the complexity of the web of life on earth is threatened.

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4. Read directions for investigation

5. Read text. Chapter 24, Managing Human-Affected Ecosystems, Text Investigation 24.1, pp. 710- 712.

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

Setting	Characters	Pages
Vermont forest	damaged trees	711

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 naked eye refers to what we can see with normal eyesight and no glasses, microscope or other visual enhancements.

Infrared photography can detect levels of heat not visible to the naked eye.

Aerial photography gives us a view above the surface of the earth.

Looking at the maps works for me. I am a visual learner.

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

Views of our earth from above.

In this activity, students will look at data in various formats (figures, photographs, and temperature scans using infrared technology) and draw conclusions based on their observations.

Activity 1

Table 24.1

Direct students to the data contained in Table 24.1 on page 711 of the text. This data was obtained by scientists who gathered air samples between 1958 and 1990. Essentially it is a measure of the level of carbon dioxide, CO₂, in the air during this time span. Ask students to look at the data and draw conclusions about the pattern of change.

Activity 2

Ask students to observe Fig. 24.12 on page 711 of their text. Explain that this is an aerial photograph showing environmental damage to trees. Ask them to speculate as to the cause.

Activity 3

Ask students to observe the maps on page 711. Explain to them that these are indicators of the surface temperature of the earth during two seasons of 1979. Again ask students to record their observations.

Discussion

Ask students how such data can assist scientists in their studies.

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

So how is the “old air” from 1958 in Hawaii different from “new air” of recent years?

What can you tell from the aerial photo in Fig. 24.2.

Summarize your observations from Fig. 24.13 on page 712 of your text.

What other types of similar data graphics might be used by scientists to study global warming?

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

Key Paragraph

Aerial photos give the “big picture” of events in an area. Infrared film and computer imaging disclose events invisible to the naked eye. Consequently, objects giving off heat appear dark in black-and-white photos or show up as a different color in color photos. Some color prints show warmer areas as green; others show them as red. In either case, the contrast with cooler areas is striking.

EXTEND

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

Where to live?

By looking at the map on page 712 of your text, what area of the earth would you like to live in if you could choose it? Write a paragraph making your case.

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 9, Day 3

Outcomes for Today

Standards Focus: 6bc

PREPARE

1. Background knowledge necessary for today's reading

It all gets down to people. More specifically, it gets down to numbers of people. Put another way, all of the problematic environmental issues studied to date in this chapter are a factor of the number of people living in a limited ecosystem known as planet earth. As the number of humans on earth continues to rise, the threats to the environment become more pronounced. Addressing these threats will continue to be a challenge. In essence, this lesson is a reminder of this factor which was covered earlier in the year.

2. Vocabulary Word Wall

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

momentum **generation** **biotic** **abiotic** **reproductive age**

- 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.

Up to this point in the chapter, we have seen that the relationship of humans to the earth has been primarily one of increasing control over natural ecosystems. A result of this control has been detrimental to the environment in many ways. The development of agriculture allowed for a more rapid growth in the local populations of humans.

Technology has also played an important role in the development of human culture.

Resource (non-renewable) depletion has been an unfortunate by-product of human growth here on earth.

4. Read directions for investigation

5. Read text. Chapter 24, Managing Human-Affected Ecosystems, Text Section 24.5, pp. 700- 701.

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

Setting	Characters	Pages
planet earth	over 6 billion (and increasing) humans	700

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 changes harmful to the earth that are brought about by humans are generally slow in coming in the early stages.

Much of the environmental damage to the earth is a result of a “short term gain” mindset. In other words, “Let’s have it now.”

The solution to much, if not all, of the earth’s environmental problems is to slow human population growth.

This is a challenge for many countries because there are large numbers of young people.

Put another way, younger people will still have babies.

Population age structure graphs can give us a visual picture (page 701) of the population dynamics of a country.

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

The Industrial Revolution *Continued*

Please see **Day Three** of the **Supplemental Student Investigation, Industrialization Today and Yesterday: China and England** which is attached to this lesson plan.

Description of activity

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 aren't the early stages of environmental degradation obvious?

Why is it that individuals exploit natural environments?

Explain population momentum.

How can a population of a country increase even though people have only one or two children?

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

Key Paragraph

Environmental degradation occurs slowly. The early stages are not always obvious. In fact, individuals who stand to profit from exploiting the environment often deny that their projects will degrade it. As the population continues to increase, there is more pressure to take more resources from the limited biotic and abiotic environment.

EXTEND

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

The Voice of Earth

Prompt students with this one:

Let's suppose you are the earth. Speak to all the people living on your surface about the future by asking them a big favor. Write a paragraph from this perspective entitled, "Please Help Me."

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 9, Day 4

Outcomes for Today

Standards Focus: 6bc

PREPARE

1. Background knowledge necessary for today's reading

This is a time in history when it is becoming increasingly apparent that environmental problems know no boundaries between countries or even continents. It is also a time in our history when nationalism is on the rise in some parts of the world. Many forces are combining to pose an even greater threat to the health of the planet. The nuclear disaster at the Chernobyl plant is an example of an environmental catastrophe which had ramifications reaching far beyond the site. The Chernobyl situation has been referred to as the canary in the coal mine.

2. Vocabulary Word Wall

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

boundary bioremediation eubacteria smelter sterility

- 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.

The root causes of the earth's environmental problems all come back to human activities.

Human impacts began with modifications to the land for agriculture.

Continued population growth along with industrialization has compounded the problem.

Human population growth is the primary challenge in any conversation about environmental degradation of ecosystems on earth.

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4. Read directions for investigation

5. Read text. Chapter 24, Managing Human-Affected Ecosystems, Text Section 24.6, pp. 701- 705.

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

Setting	Characters	Pages
Prince William Sound, Alaska	eubacteria	702
Chernobyl (Ukraine)	thousands of radiated humans	703

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:

A single nation (especially a small one) cannot solve many of the environmental pollution problems of the earth alone.

This is because the issues of the air pollution that takes place don't stop at artificial boundaries between countries.

The Chernobyl nuclear power plant disaster will be the cause of premature death of thousands of people.

All of the people living near the Chernobyl plant had to move out of the area forever. A large area was transformed into a "ghost city" and countryside.

The abandoned area has since recovered as natural plants and animals have taken over in spite of the radiation damage.

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

Could It Happen Here?

In this exercise, students will be asked to predict what could happen if there were a nuclear disaster such as the one in Chernobyl.

Procedure

Ask students to study Figure 24.8 on page 704 of the student text. The large arrows represent prevailing wind patterns.

Activity

With the use of the internet or other resources, assign students to look into the Chernobyl disaster. Ask them to first develop several simple research questions such as the toll in human life. They could also research how weather was a critical factor in the number of lives that were lost or sickened. Once they develop their essential research questions, allow them to do their research.

Next have students pick a key metropolitan area in the United States and assume that Chernobyl happened in this location. Using the map and their research, have them draw up a scenario for their area in the wake of a Chernobyl level nuclear power plant disaster. Their reports should be shared with the class.

Discussion

Discuss this with the entire class. Follow up with an activity such as student letters to a power company asking them about safeguards to prevent this type of accident.

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 is cooperation among nations essential to solving environmental problems?
How was bioremediation used to help out after the Exxon Valdez oil spill disaster?
What was the effect of the Chernobyl disaster on the various forms of life in the power plant vicinity?
Why is acid rain a problem beyond international borders?

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

Key Paragraph

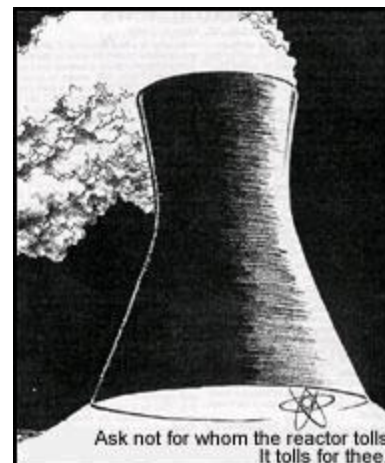
One nation alone cannot curb worldwide pollution or ensure the preservation of endangered species. Just as ecological problems fail to stop at state boundaries, they fail to stop at national boundaries. Air pollution drifts into other countries, and water pollution flows into the oceans.

EXTEND

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

One Picture

Ask students to pick one of these political cartoons and write a one-paragraph response.



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 9, Day 5

Outcomes for Today

Standards Focus: 6bc

PREPARE

1. Background knowledge necessary for today's reading

A key concept introduced in this lesson is that of stewardship of the earth. Question students to ascertain their understanding and thinking on this. Stewardship may be a bit of a challenge to explain on a personal level to students. In a way, stewardship is quite the opposite of conquering. It means to watch over as well as the ability to live with. Stewardship is concerned with the future. There are a number of historical examples of stewards of the earth. Individuals such as John Muir and Stuart Udall, the former Secretary of the Interior, will always be remembered as such. Telling their stories can help put a face on this very important principle.

2. Vocabulary Word Wall

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

stewardship efficiency ozone biotechnology fertility

- 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.

The increasing environmental problems on the earth have only recently become critical.

Many individuals, groups, and countries seem to be in denial over the enormity of the collective problems.

Solving the earth's environmental problems will take multinational cooperation and effort.

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4. Read directions for investigation

5. Read text. Chapter 24, Managing Human-Affected Ecosystems, Text Section 24.7, pp. 705- 706.

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

Setting	Characters	Pages
United States	increasing numbers of energy-efficient homes and cars	705

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:

We humans continue to try and conquer nature.

Many of the natural biomes of the earth have been forever changed by man.

Population growth can be controlled but it is not just the responsibility of the females of the world.

New homes and automobiles are more energy efficient. What this means is that we make better use of the energy used to run them.

Laws like the Clean Air Act are enacted to help protect the environment.

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

Title Bioethical Issues from Different Perspectives

You will need the Teacher Resource CD for this activity. Go to Chapter 24 and find **Investigation 24.4**. This investigation takes a look at a hypothetical land use issue. Students will be asked to express individual concerns and then make team decisions. Different perspectives will be explored and decisions made. You will need to access the blackline masters and individual role cards from the CD.

Procedure

Obtain copies of the role cards, graphs and related materials from the CD. Each student should have an individual role card. Give students time to “get into character” as assigned by their role.

Activity

Carry out the activity as if it were a public hearing. You may want to blow up the topographic map included on the CD to refer to during the discussion.

Discussion

Debrief the activity with students. As an extension, look for local issues being discussed and possibly attend such a hearing on land use.

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 is meant by conquering nature? Give several examples.
How can human population growth be controlled?
What is meant by energy efficiency? Give several examples.
Give an example of a law designed to protect the environment.

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

Key Paragraph

As humans, we are an integral part of nature, yet we have attempted to “conquer” nature. Rather than trying to conquer nature, we must learn to coexist with it. By understanding nature, we will be better able to preserve the environment in which we live. We will then pass stewardship of our planet to future generations.

EXTEND

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

King/Queen for a Day

Pose this writing prompt to the students:

Let us suppose you became the king or queen of the entire planet. You have been given the power to give two commands. Write a short paragraph describing your commands in detail and tell why you chose to carry them out.

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** ***Five 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

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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 2006. 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 2006 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

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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 disagreed or had 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 century 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...his 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 to 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.

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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 **China** actually used coal earlier and more extensively long before England learned to use it. Tell students that **China** had a smaller "industrialization revolution" 700 years before Great Britain started theirs. 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?"