

Excerpts from

The Thinking Classroom:

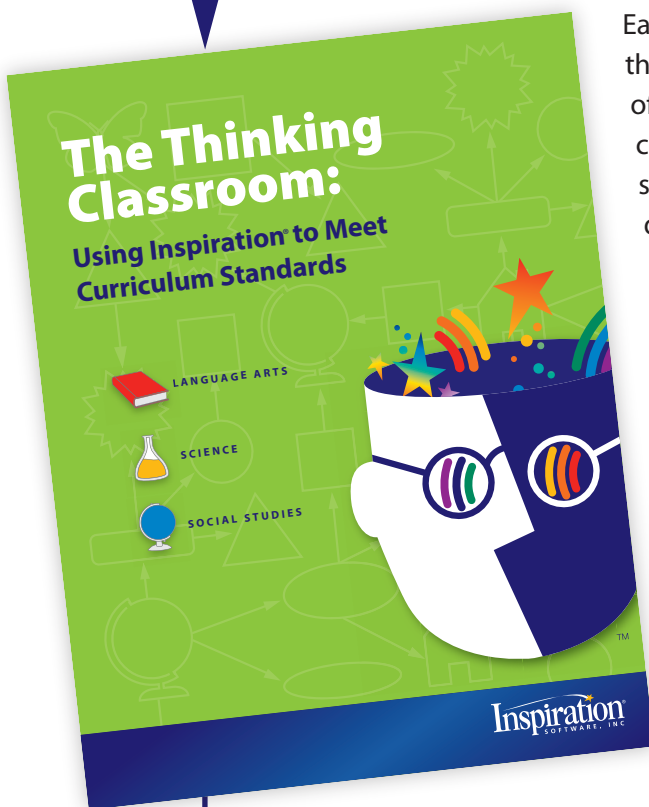
Using Inspiration® to Meet Curriculum Standards

The Thinking Classroom: Using Inspiration® to Meet Curriculum Standards supports teachers as they help students develop their critical thinking strategies in order to meet curriculum standards. This innovative teacher resource book takes a new approach by offering in-depth explanations of visual learning's role in mastering fundamental thinking skills.

Each of the book's six sections focuses on a fundamental thinking skill. Each section includes an overview of a cognitive strategy, its application in the major curriculum areas of language arts, science and social studies, plus examples of Inspiration templates and diagrams that students can use to apply the strategy to a wide range of topics. Lesson plans for each subject area provide all the information teachers need to model a thinking skill and help their students practice the strategy.

This preview of *The Thinking Classroom: Using Inspiration to Meet Curriculum Standards* contains:

- Introduction to *The Thinking Classroom*
- Complete table of contents from *The Thinking Classroom*
- One complete section focusing on the fundamental thinking skill, Comparison
- Ordering information





INTRODUCTION

Dear Educator,

Teaching critical thinking skills to students in today's information-rich environment is fundamental to helping them succeed and develop into effective lifelong learners. Designed specifically for teachers, *The Thinking Classroom* provides an in-depth exploration of visual learning's role in mastering critical thinking skills.

Expanding on Inspiration's innovative thinking and learning software, *The Thinking Classroom* creates important new links between visual learning strategies and classroom thinking skills. Each of the book's six sections is dedicated to a different thinking skill. Within these sections are examples for teaching and learning the particular skill with emphasis on the curriculum areas of language arts, science and social studies.

This book, along with our other visual learning tools, is a roadmap for educators to effectively combine visual learning methods, technology and thinking skills. This book is just a beginning, though. We hope you'll feel free to modify any of these lessons and examples to meet the particular needs of your own classroom, curriculum and students.

Sincerely,



Mona Westhaver
President and Co-founder
Inspiration Software, Inc.

Teaching How to Think - A Visual Learning Approach

Learning how to think is one of the most essential skills for student success in every curriculum area. Educational theorists and cognitive psychologists have offered various ideas as to what learning is and how it takes place, but it is clear that thinking skills—however we define them—are at the core of learning and student success.

This book is designed to help you introduce critical thinking strategies to your students using proven visual learning techniques in order to meet curriculum standards. What is known about how thinking and memory work suggests that visual learning techniques—associating verbal information with images—enhance understanding, build connections and expand our brain’s capacity to learn. In the classroom, visual learning is enriched through the use of graphic organizers, such as webs, concept maps and idea maps. These tools can help students clarify their thinking, and process and organize new information. By representing information spatially and with images, students are able to focus on meaning, group similar ideas easily and make better use of their visual memory.

The Thinking Classroom is organized around six critical thinking skills, applying proven visual learning techniques in language arts, science and social studies. Teachers and students use Inspiration® to focus their energies on thinking, analyzing, integrating and refining ideas to achieve academic success.

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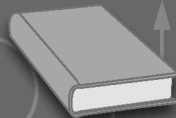
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COMPARISON

Similarities, Differences and Parallels



LANGUAGE ARTS



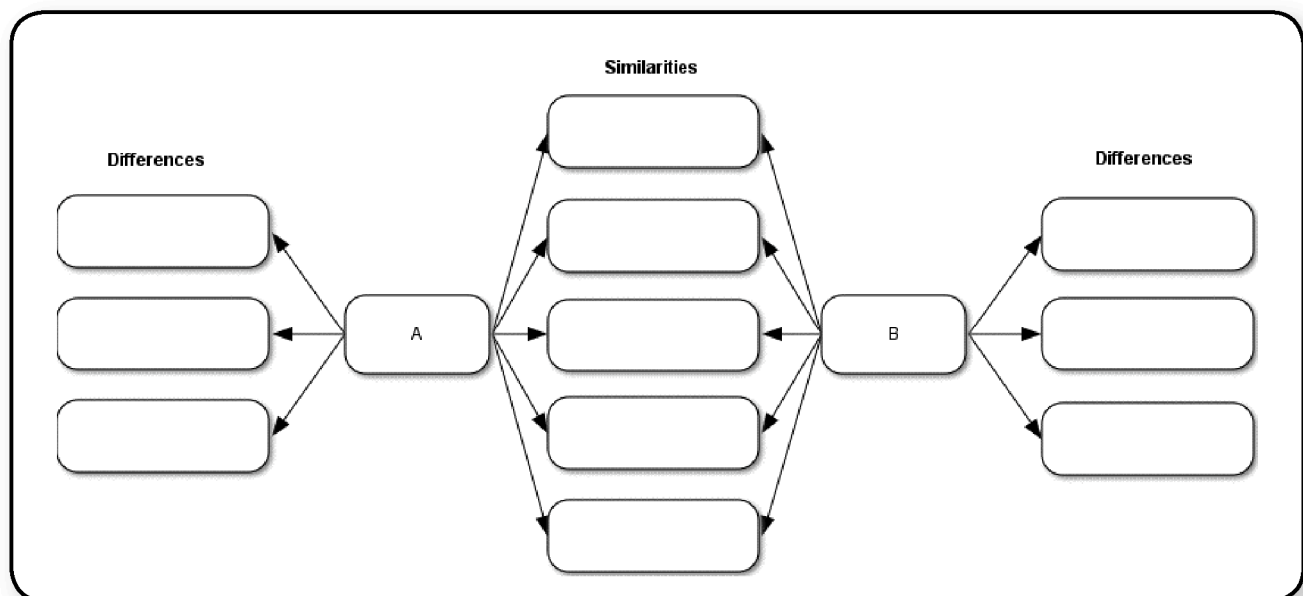
SCIENCE



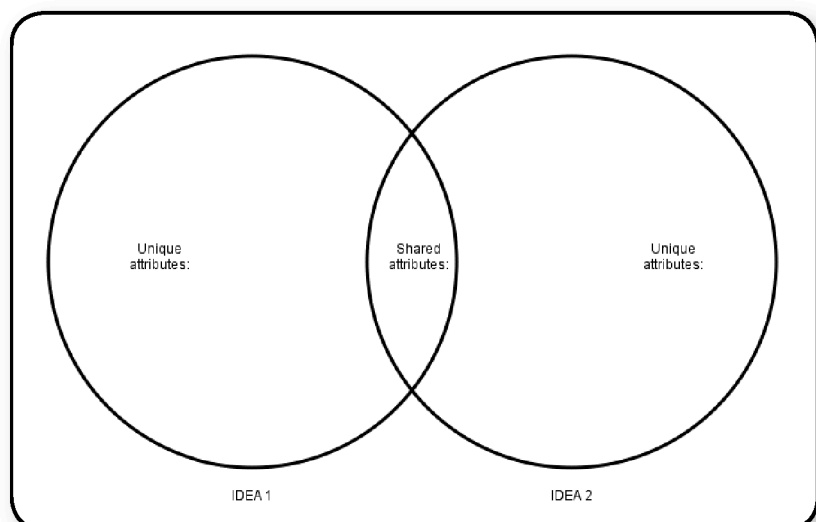
SOCIAL STUDIES

Introduction: Comparison

One of the most important thinking skills is the ability to compare information. In *Classroom Instruction That Works* (2001), Robert Marzano ranks the identification of similarities and differences as the single most effective learning strategy. Moreover, he says, “Representing similarities and differences in graphic or symbolic form enhances students’ understanding and ability to use knowledge.” Because students are constantly assimilating new information, simple comparison supports their efforts as they begin to generalize and create definitions. As students progress, this skill is important for classifying information, creating metaphors and thinking via analogy.



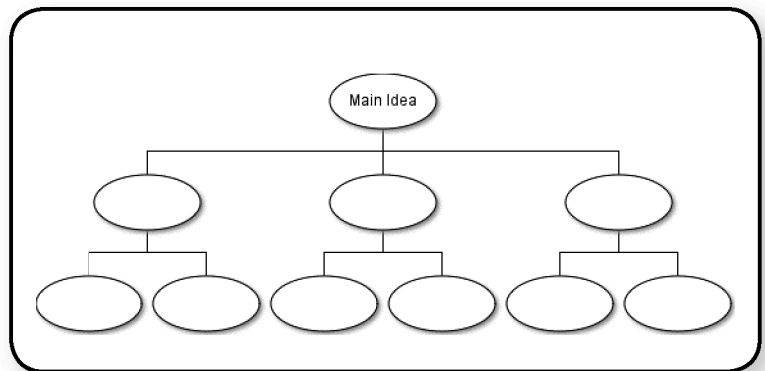
The process of comparison necessarily triggers the learner’s prior knowledge. Juxtaposing the known with the unknown and the familiar with the new, organizes and builds on existing networks of information. When information becomes “formatted” in this way, it becomes more understandable and accessible, and therefore, more useful.



Inspiration offers numerous ways to support students as they explore this powerful thinking strategy. Using Inspiration, students can:

Classify Information

Information classification prompts students to take comparison to the next step; in addition to identifying similar and different traits, they can sort the information into discrete categories.



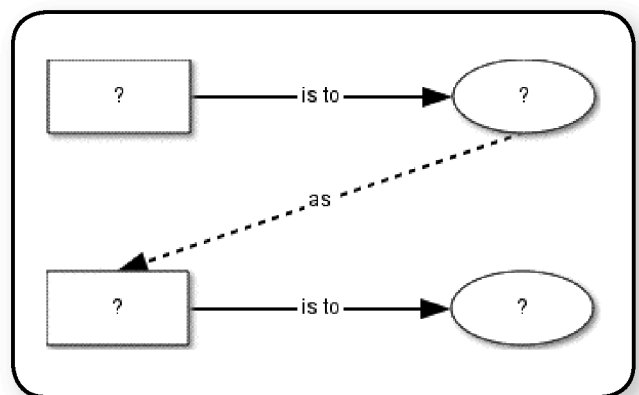
X — is like —> Y

Create and Decode Metaphors

All symbol systems—language and mathematics, for example—have their basis in metaphor. Understanding both the visual and verbal metaphors embedded in information is basic to a student's ability to become "fluent" in a subject.

Engage in Extended Analogy-based Thinking

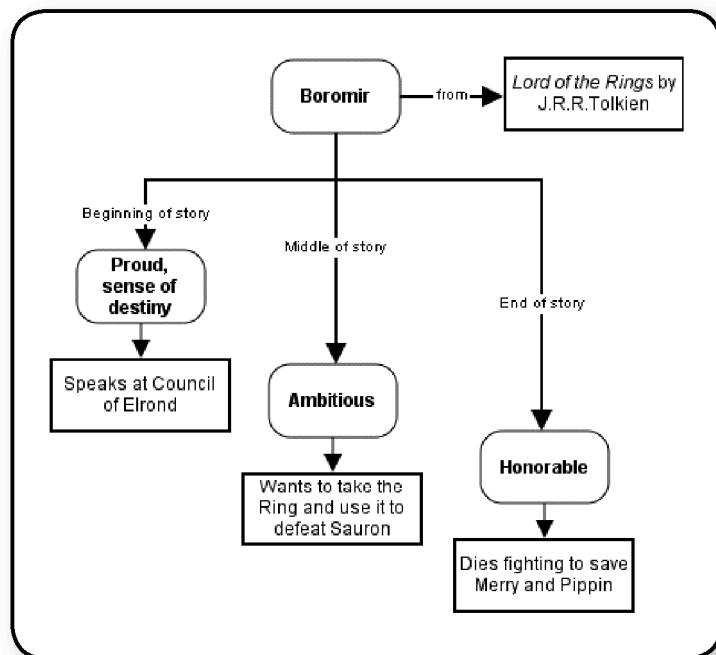
An analogy points out a similarity between two things that are otherwise different. When drawing an analogy, students engage in reasoning that requires them to infer often subtle relationships between ideas. Important ideas are often represented by analogies—Cold War or Black Market, for example. When nurtured as a thinking skill, this level of comparison gives students the ability to analyze ideas both visually and verbally, and helps them communicate in political, philosophical or theoretical ways.





Comparison in Language Arts

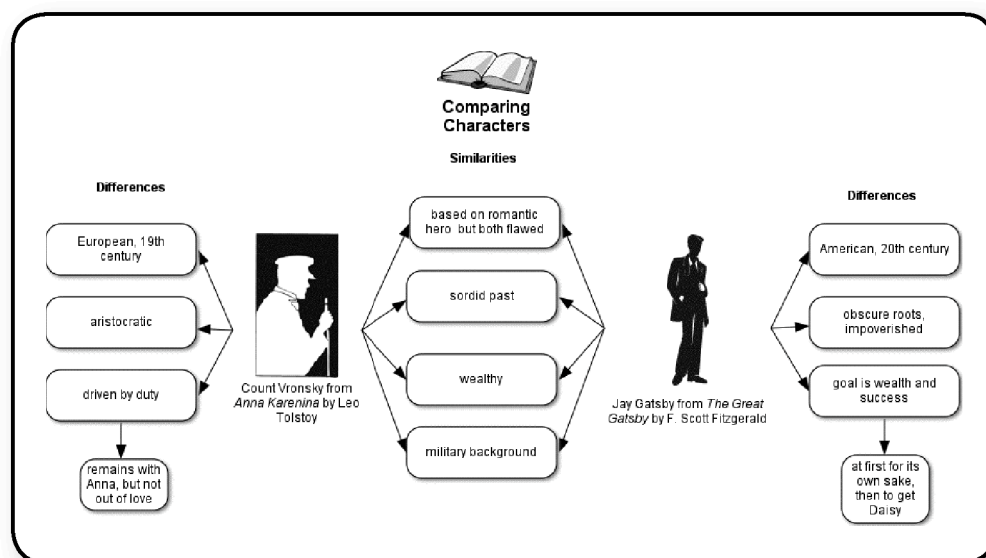
Educational standards call on language arts students to differentiate among various literary genres, explore ideas couched in metaphor, define theme and purpose in novels and use analogies to express their ideas. All of these tasks are supported when students apply comparison strategies.



Comparing Characters

Some critics suggest that the key to literary interpretation centers on how characters change in response to the plot. Comparing the various stages in a character's development from the beginning of the story to the end can reveal an author's message.

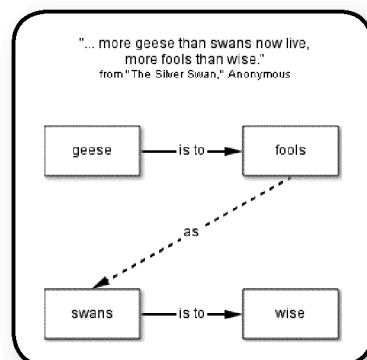
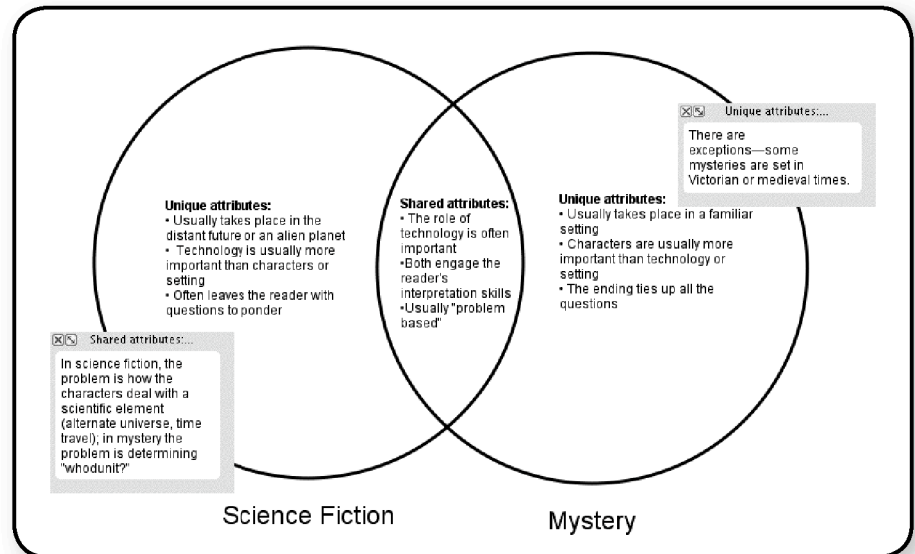
Drawing comparisons between characters from different works can prompt rich discussions about authorial theme and purpose.





Comparing Genres

Literary genres are distinguished by major differences in theme, plot, setting and style of writing, such as fiction, non-fiction and poetry. However, they also share similarities. Differences may define the genre, while similarities may help students arrive at a general definition of fiction.

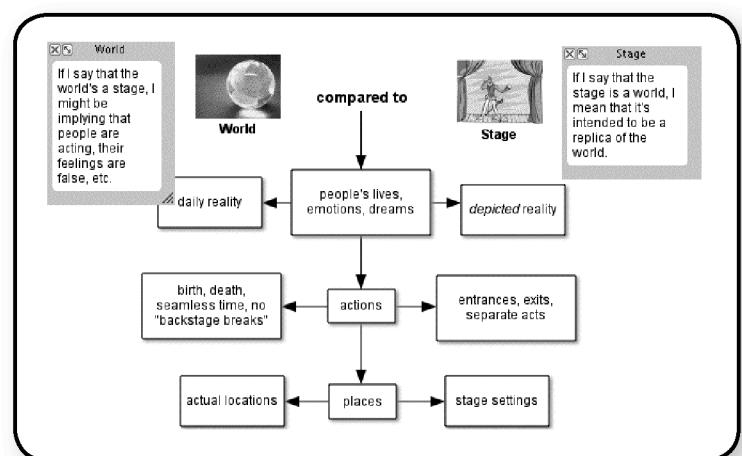


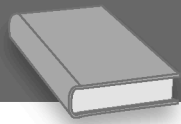
Comparing by Using Metaphors and Similes

Finding the common ground between unlike concepts is the basis of metaphor. Understanding analogies rooted in figures of speech such as metaphor and simile is not only important in the study of literature, but basic to the development of good critical thinking skills. As a comparison strategy, metaphor and simile offer students a learning arena ripe for interconnecting verbal information with visual ideas—the basis and inspiration for visual learning.

Comparison by Classification

Many concepts in language arts are quite similar—form, style and voice, for example, or satire, parody and farce. Students can use comparative classification to help them determine such subtle differences.



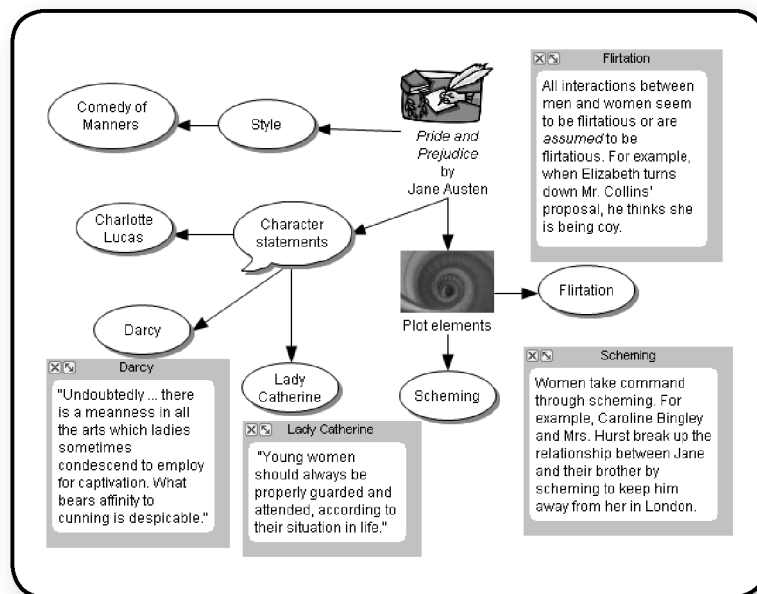
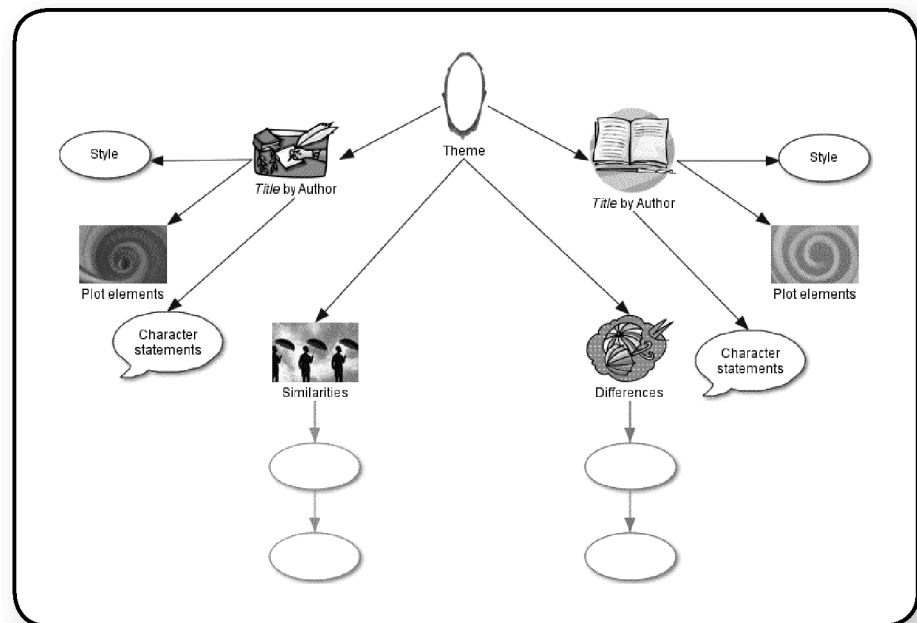


Lesson: Thematic Comparison

Standards:

- Students understand how themes are used across literary works and genres.
- Students use language and perspectives of literary criticism to evaluate literary works.

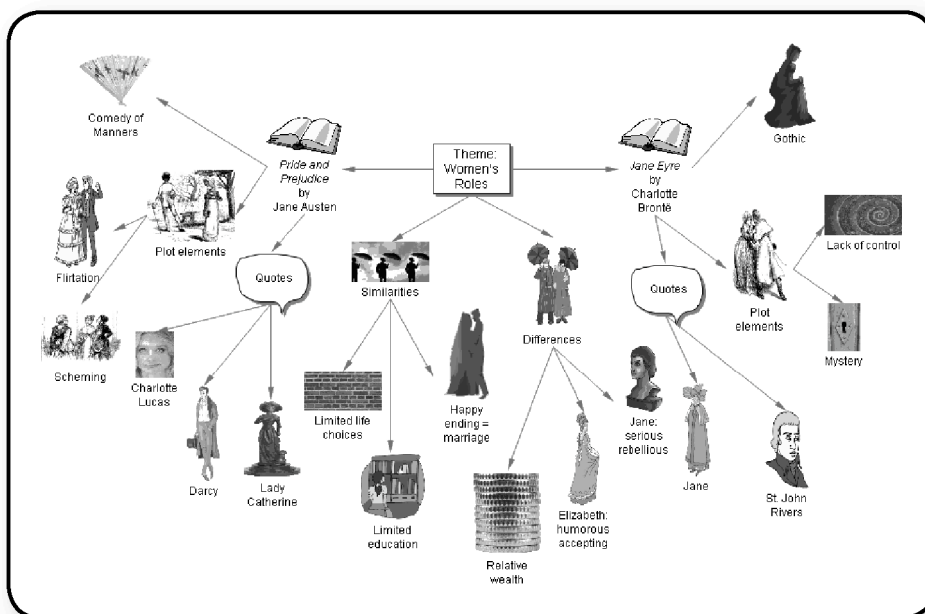
- 1 Introduce the Thematic Comparison template and review concepts as necessary.




- 2 Choose a familiar story and decide on one theme to analyze. Ask students to add details, descriptions and quotations that relate to the theme. Enter them into the template.

COMPARISON | LANGUAGE ARTS LESSON

- Have students discuss their ideas and use Inspiration to record them.
- Introduce a new work of literature that shares the selected theme. As students read, ask them to be aware of ways in which the style, plot and characters reinforce that theme. When students have finished reading, have them meet in their groups to discuss similarities and differences in the ways the theme was exemplified in each novel. Instruct them to complete the Thematic Comparison template together, entering their ideas in Outline View.



- Have students switch to Diagram View and use the Symbol Search feature to capture their discussion visually.

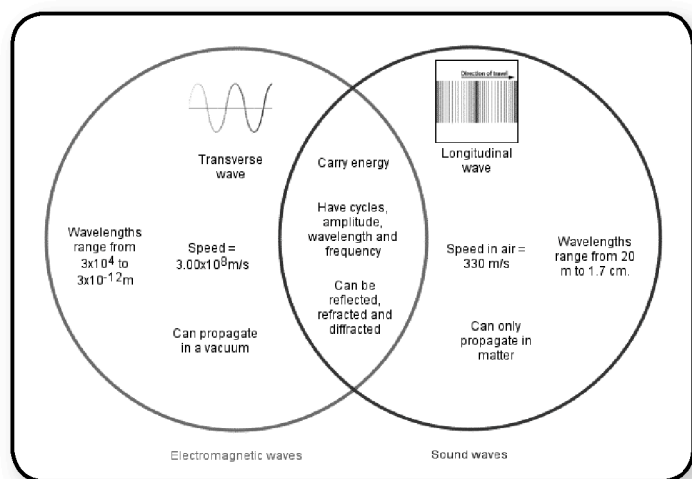
- In Outline View, students can continue to add details and refine their thinking.
- If students are writing a paper based on this diagram, instruct them to click the Transfer button  to finalize their writing in a word processor.

	<p>II. Jane Eyre by Charlotte Brontë</p> <p>A. Plot elements</p> <ol style="list-style-type: none"> Mystery Women discover hidden information that only the men know by unraveling mysteries. Lack of control Most women have no control over the paths their lives take. Even when Jane advertises for a position, she can only seek that of governess or companion. <p>B. Quotes</p> <ol style="list-style-type: none"> Jane "Women are supposed to be very calm generally: but women feel just as men feel; they need exercise for their faculties, and a field for their efforts as much as their brothers do; they suffer from too rigid a restraint, too absolute a stagnation, precisely as men would suffer, and it is narrow-minded in their more privileged fellow-creatures to say that they ought to confine themselves to making puddings and knitting stockings, to playing on the piano and embroidering bags." "I am no bird; and no net ensnares me; I am a free human being with an independent will..." "...as [St. John Rivers] wife — at his side always, and always restrained, and always checked — forced to keep the fire of my nature continually low, to compel it to burn inwardly and never utter a cry, though the imprisoned flame consumed vital after vital — THIS would be unendurable." St. John Rivers "...your aspirations after family ties and domestic happiness may be realised otherwise than by the means you contemplate: you may marry." "...Jane, you are docile, diligent, disinterested, faithful, constant, and courageous; very gentle, and very heroic: cease to mistrust yourself — I can trust you unreservedly. As a conductress of Indian schools, and a helper amongst Indian women, your assistance will be to me invaluable."
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Comparison in Science

Science curriculum requires students to learn vast quantities of information and understand complex relationships. As a thinking skill, comparison is used to determine similarities and differences between closely related processes and phenomena. Students also use comparison to classify a wide range of facts and ideas and to develop analogies to understand challenging concepts.

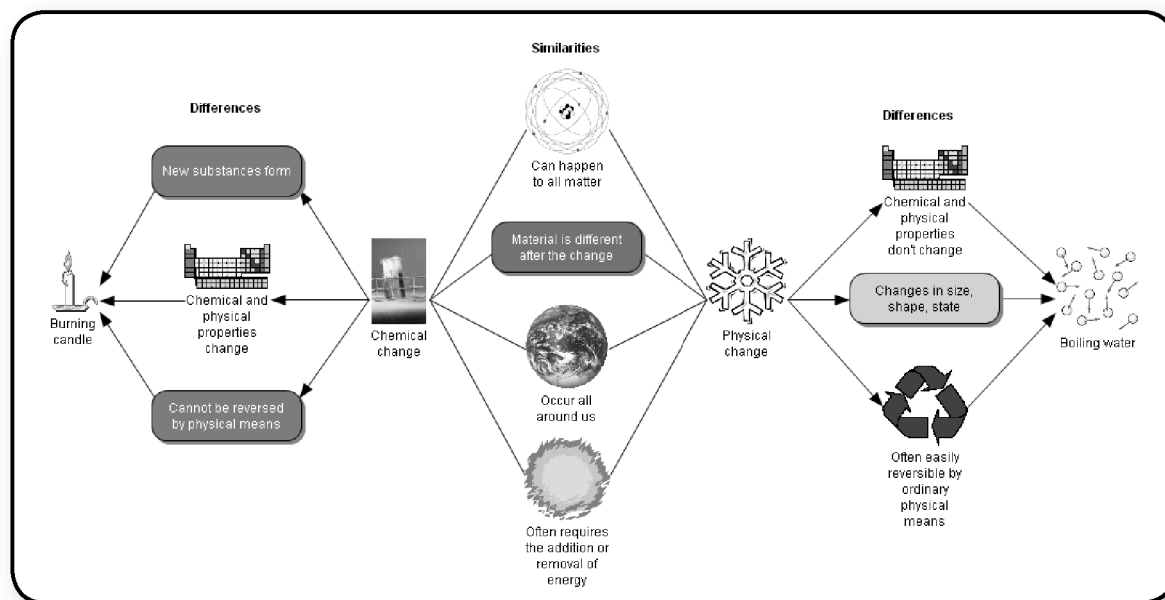


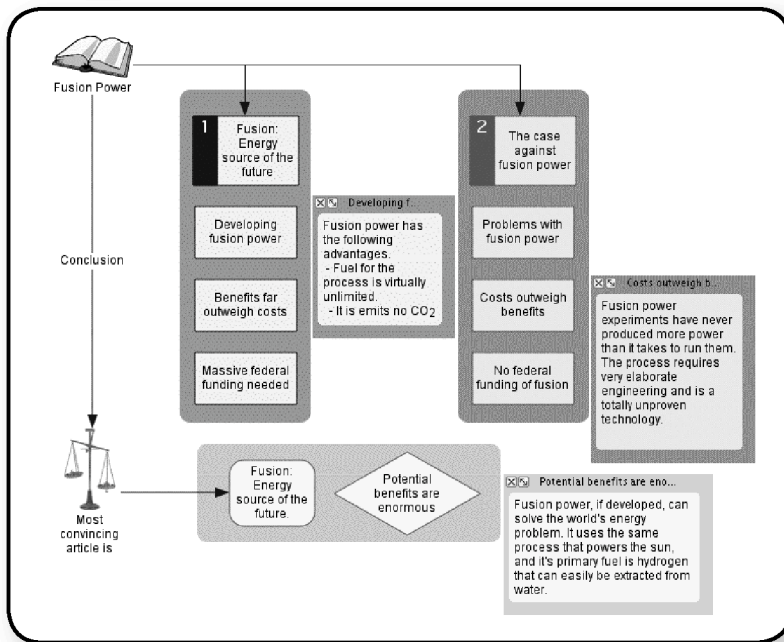
Comparing Phenomena

Physical phenomena such as waves can be distinguished by major differences in speed, plane of vibration, wavelength and frequency. Moreover, all waves display similar qualities and behaviors such as refraction and reflection. The differences define the particular wave form, while the similarities help students develop a general definition of waves.

Comparing Processes

Comparing processes often leads science students to new insight and understanding. For example, comparing the processes of mitosis and meiosis is an important first step in recognizing patterns of human heredity. In this example, students use a comparison strategy to understand the nature of chemical change, and they build a scaffold for tackling more challenging levels of study.



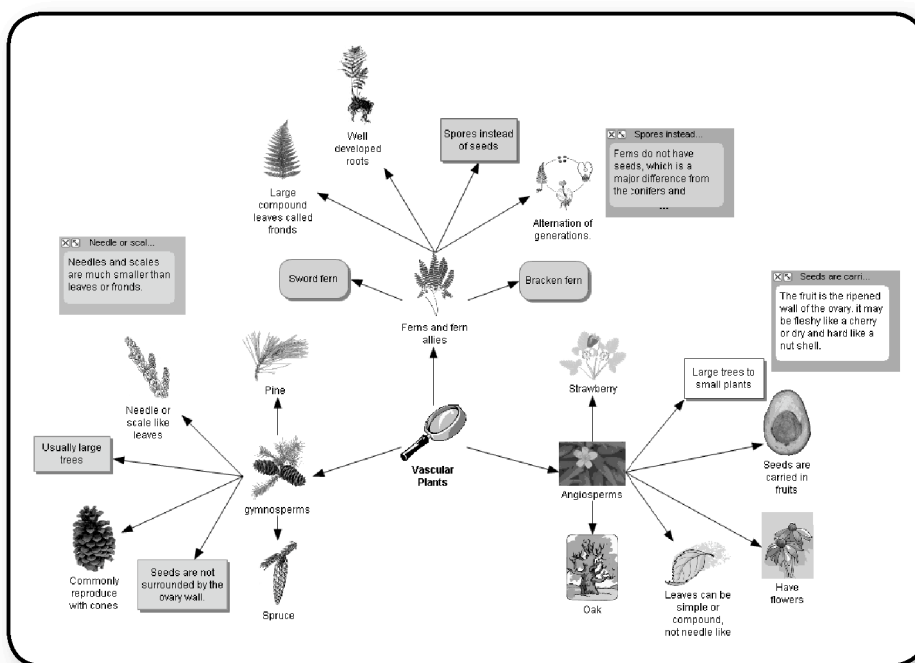
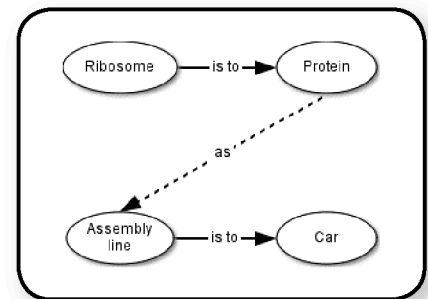


Comparing Ideas

Science curriculum standards ask students to understand the role science plays in solving societal problems. Our global community harbors considerable disagreement about developing certain technologies based on certain scientific advances; the issues involved are frequently complex. Using good comparison strategies, students can understand and take positions about important and controversial uses of scientific knowledge such as nuclear fusion.

Comparing With Analogies

Drawing analogies engages a thinking skill that helps students make the leap from the known to the unknown.



Comparing Through Classification

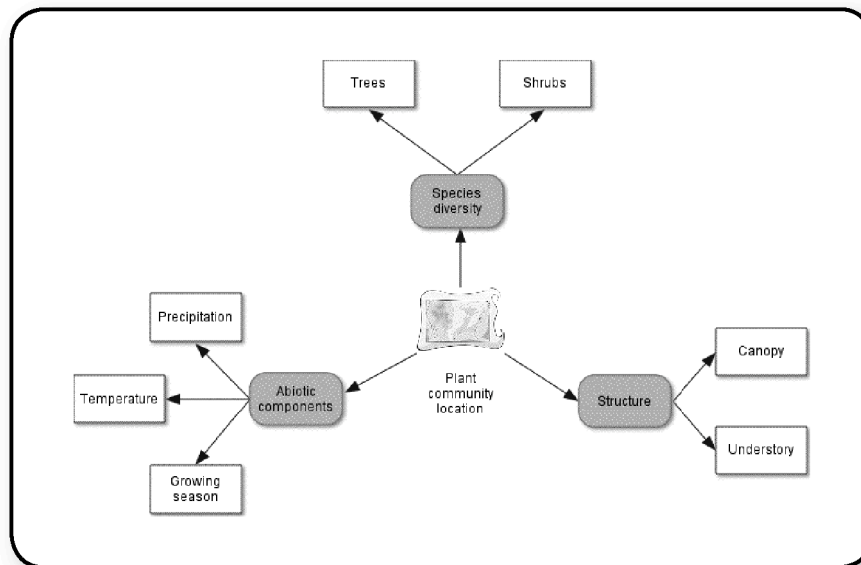
Dichotomous keys, the periodic table, and categories of chemical reactions are all classification systems that illustrate similarities and differences between the categories and help students arrive at definitions. Here, students compare the higher vascular plants as a means of classifying them into distinct groups.



Lesson: Abiotic Factors in Ecosystems

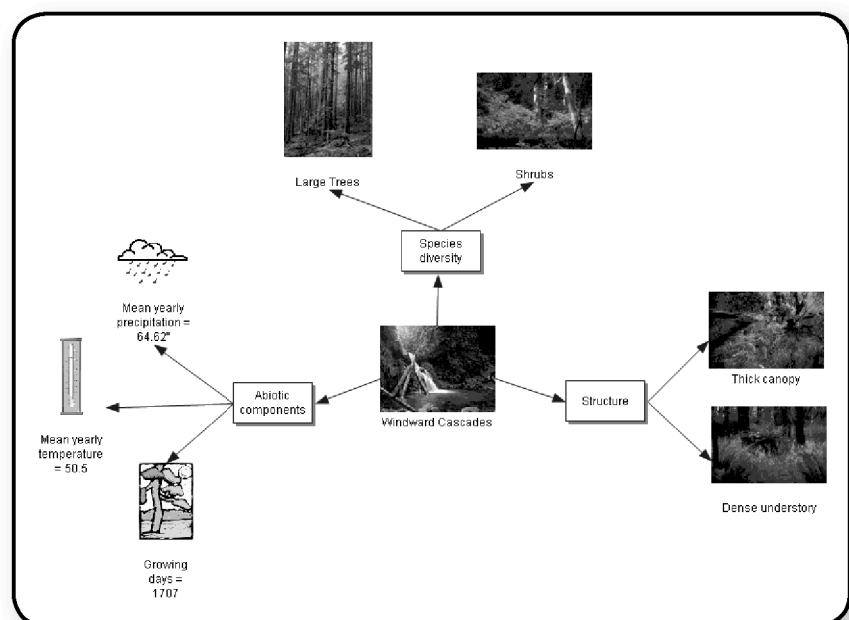
Standards:

- Students understand that abiotic factors affect the number and types of organisms an ecosystem can support.
- Students understand that organisms are structurally and physiologically adapted to their environment.



1 Introduce the Plant Community Analysis template and review concepts as necessary.

2 Ask students to form teams of two to research the features of habitats on either the windward or leeward slope of a major mountain range and enter the information they gather into the template. Have students analyze information from web sites listing climatological data and cite the source by dragging the URL (creating a hyperlink) onto the "Abiotic components" symbol.





- 3 Have each team partner with a team who has researched the opposite slope of the mountain range to compare diagrams. Ask teams to switch to Outline View and use the drag-and-drop function to combine their outlines.

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Windward Cascades

A. Abiotic components

1. Mean yearly precipitation = 64.62"
2. Mean yearly temperature = 50.5
3. Growing days = 1707

B. Species diversity

1. **Shrubs**
Common shrubs found on the windward side of the Cascades include vine maple, sassa, service berry, Ceanothus, Oregon grape, huckleberry, salmon berry and thimble berry and several fern species.
2. **Large Trees**
At least 16 species of conifer make up the forests on the windward side of the Cascades. The forests are very dense, with heavy understory growth. Douglas Fir is the dominant species, along with hemlock, pine, grand fir, noble fir, and cedar. Old growth Douglas Fir trees can be over 8 feet in diameter and 300 feet tall.

C. Structure

1. **Canopy**
The forest canopy on the windward side of the Cascades is dense due to the large number of mature trees per acre.
2. **Understory**
The understory is very dense on the windward side of the Cascades due to the large number of shrubs and ferns per acre. It is very difficult to travel through this forest without a cleared trail.

Leeward Cascades

A. Abiotic components

1. Mean yearly precipitation =11.73"
2. Mean yearly temperature = 46.1
3. Growing days = 1499

B. Species diversity

1. **Trees**
The dominant forest tree on the leeward slope of the Cascades is Ponderosa pine. On drier sites, Rocky Mountain Juniper is common.

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Conclusion

There are major differences in species diversity and vegetation structure between the plant communities on the leeward and windward slopes of the Cascade Mountains. The windward slope community is much more diverse. For example, over sixteen species of conifers can be found on the windward slope, while the leeward side is dominated by only two species, Ponderosa Pine and Rocky Mountain Juniper. In addition, there are significant differences in community structure between the two locations. The windward forest has a canopy that is much more closed than the leeward forest, and the understory on the windward side consists of a very dense growth of a variety of shrub species while the leeward understory is open and park-like.

One possible cause of this pattern is the differences in climate between the two locations. The windward side of the mountains has significantly higher levels of rainfall, higher average temperatures and a longer growing season. The reason for this is that the windward side is exposed to relatively warm, moisture laden air masses from the Pacific Ocean. As these air masses rise up over the mountains, they deposit most of their moisture before crossing the crest of the mountains. These factors make the windward slope much more favorable for plant growth.

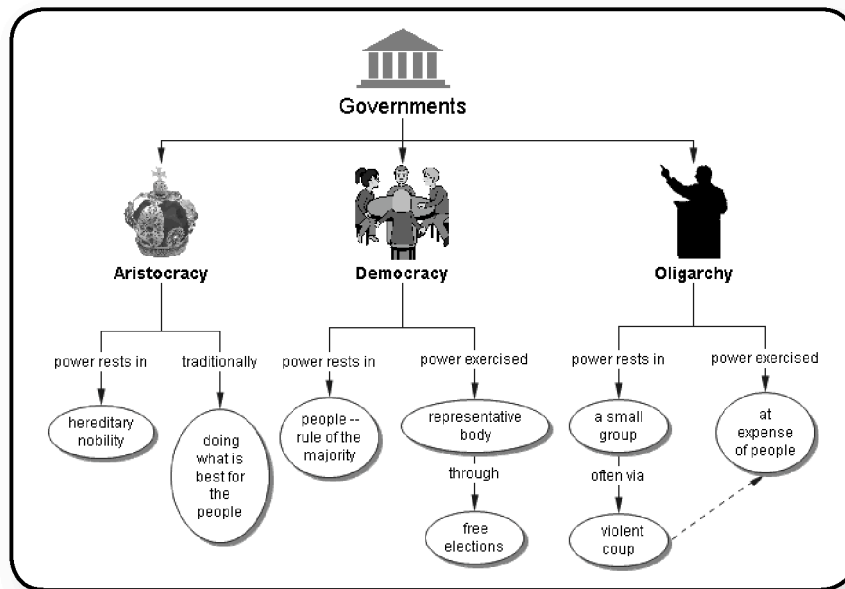
When these air masses reach the leeward side of the mountains, they have lost most of their moisture and are much cooler. This results in much lower levels of rainfall and a shorter growing season, and this has a dramatic effect on the plant community. This is a good example of the how organisms, in this case plants, are adapted to the abiotic components of their habitat.

- 4 Instruct each team to add a conclusion to their outline. The conclusion should summarize the comparison of the two plant communities and offer a possible explanation for the differences between them.



Comparison in Social Studies

The curriculum of social studies is driven by strategic use of comparison. The concepts of before and after, here and somewhere else, and this reason versus that, are comparative by nature and call upon students and teachers to regard them side by side in order to draw well-considered conclusions.

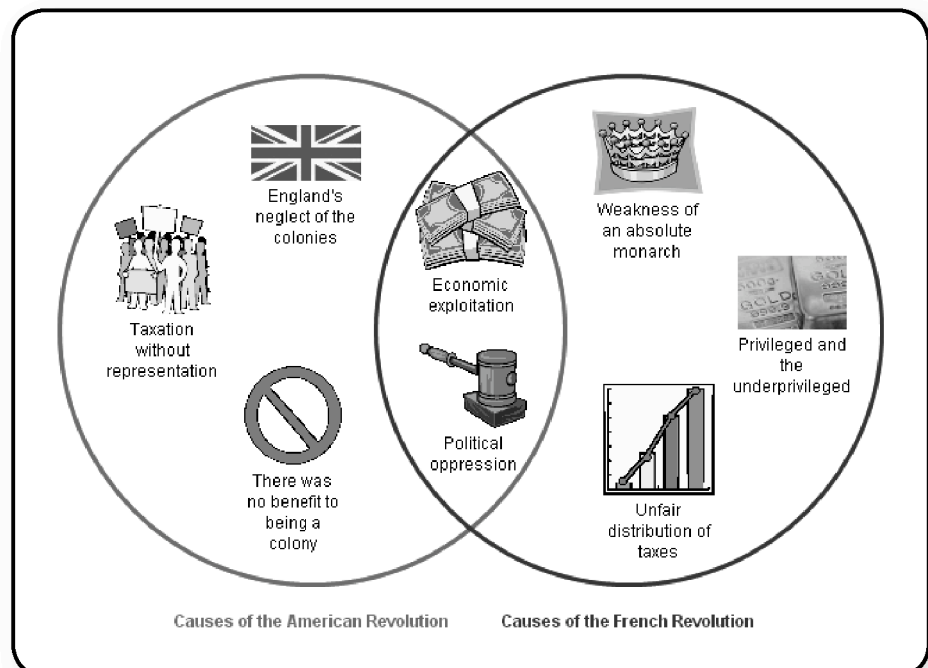


Comparing Governments

Anarchy, autocracy, democracy, oligarchy, theocracy— understanding the similarities and differences between various forms of government helps students create a systematic framework to link historical, political and current events.

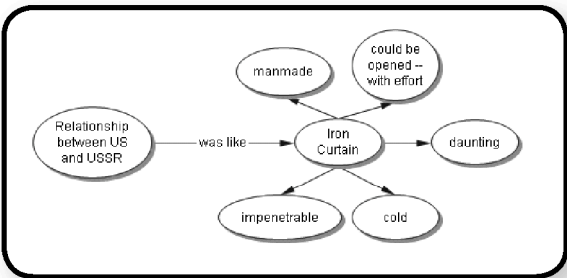
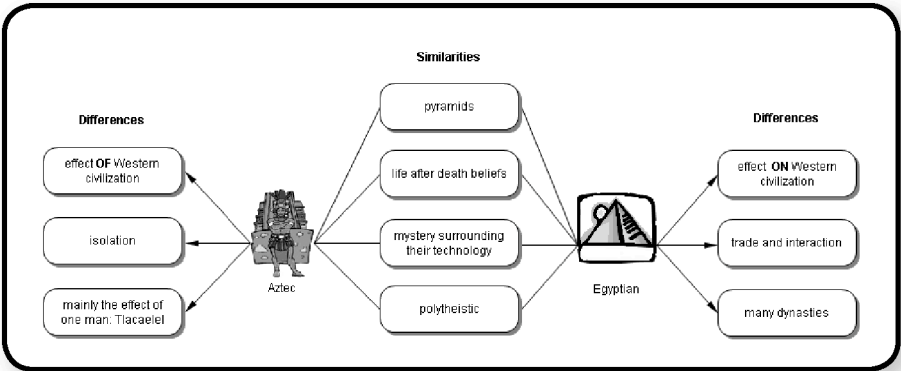
Comparing Historical Events

Comparing events in history helps students understand the relationship between continuity and change, and how the ideas shaping these events created the present, and may signal the future.



Comparing Cultures

Within any society or community, subtle changes take place in response to the process of growth, interaction with other cultures and technological improvements. Social studies students can explore a culture up close and intimately, or they can study the everyday life and meaning of a certain culture’s practices from the vantage of an outside observer. The process of comparing different cultures will unearth major differences in tradition, religion and commerce.



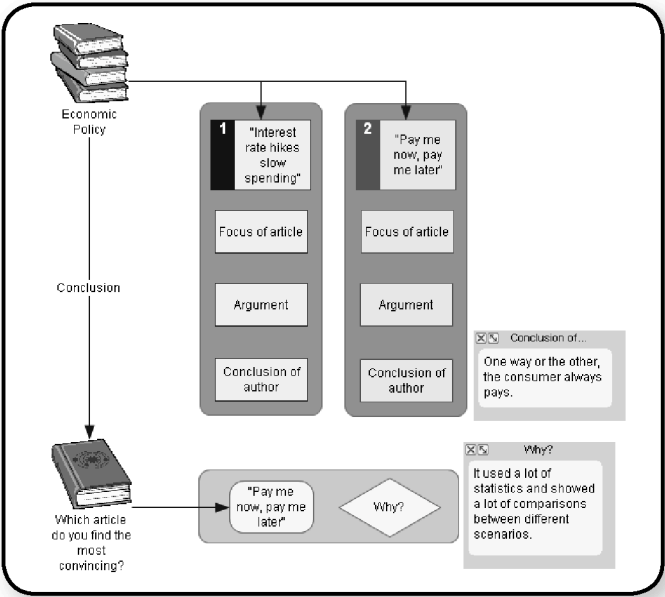
Understanding Historical Analogies and Metaphors

The language of social studies is rich with metaphor, making it colorful and dramatic. The “decay of the old order,” or a society “scarred by the wounds of time,” describes such historic periods as the latter days of the Roman Empire or Imperialist Russia at the end of czarist rule. When social studies students examine ancient rituals

such as “the day of the dead” or study “rhythms of modern life,” they apply the language of metaphor to fashion a thoughtful comparative analysis. Extending the power of metaphor to a visual analysis helps students further discern meaning for themselves.

Comparing Arguments

One of the best ways to encourage students to think critically is to have them compare opposite, but compelling, arguments. Such a task prompts them to read and visualize beyond the flow of rhetoric and examine actual evidence and propositions.



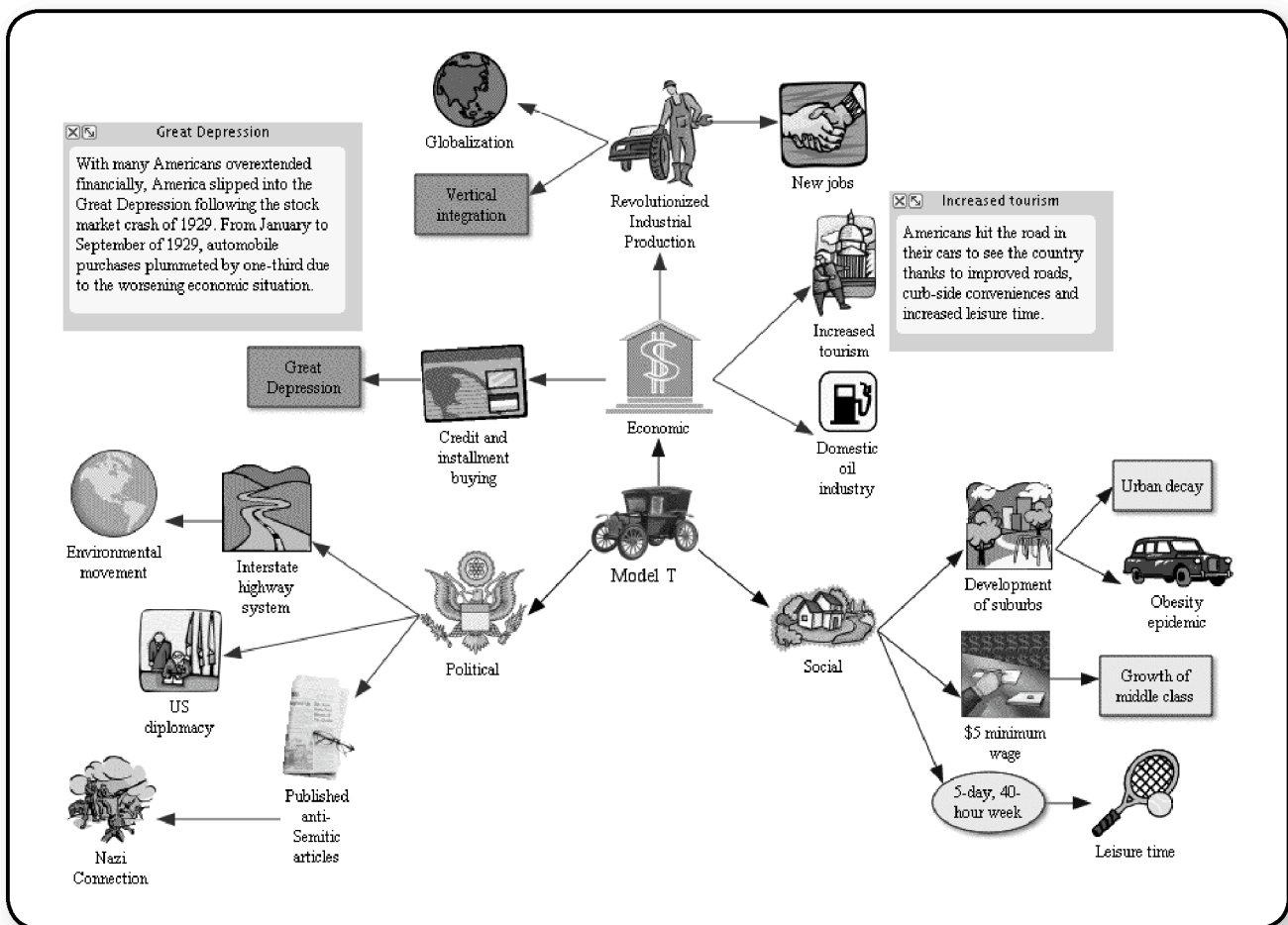


Lesson: Comparing Technologies

Standards:

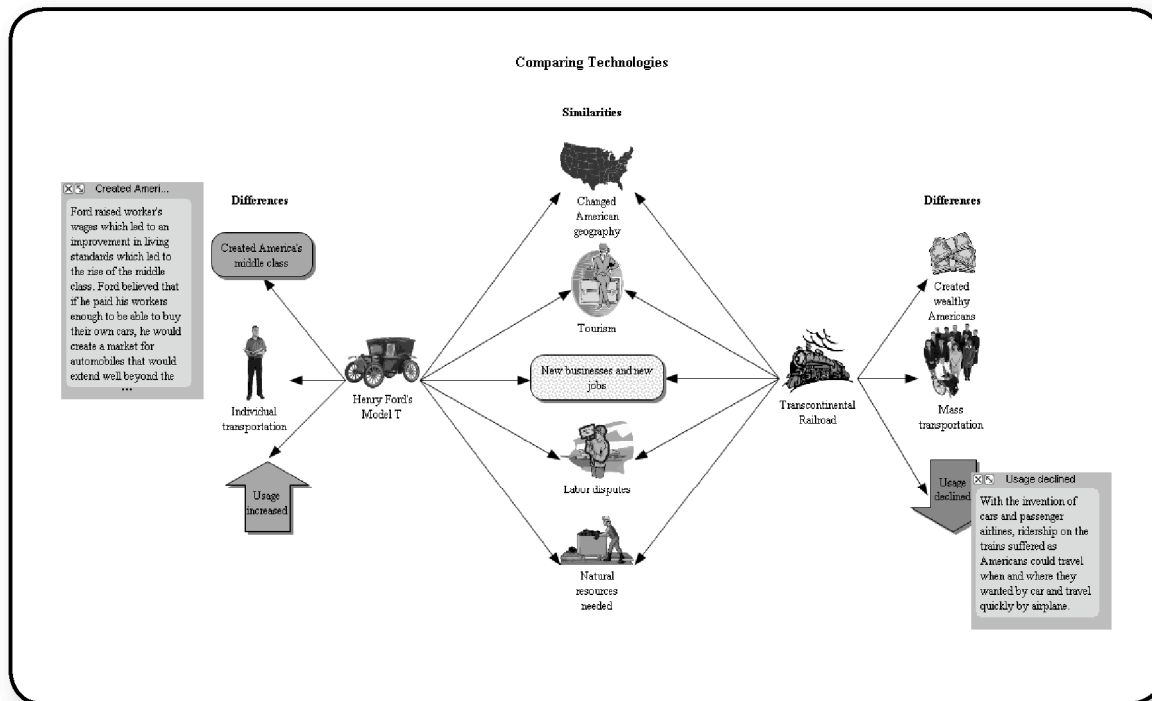
- Students explore how transportation has changed trade and economic activities.
- Students understand the impact of technological inventions on society.


- 1 Have students form teams of two and select a technological innovation from a specific period in American history.
- 2 Ask teams to consult the Internet and print resources to research the innovation they have selected.
- 3 Introduce the Exploring Innovations template and review concepts as necessary. Have each team record their information in the appropriate symbols.



COMPARISON | SOCIAL STUDIES LESSON

- Ask students to form new teams of two with someone who has researched a different technological innovation.
- Have each team review their Exploring Innovations diagrams and use the Comparing Technologies template to compare their innovations by entering information in the appropriate symbols.



- When students have completed their diagrams, have them switch to Outline View and click the Transfer button  to finalize their paper in a word processor.

Comparing Technologies	
Similarities	
1. Changed American geography	Both technologies drastically altered America's geography. The Model T led to the creation of the suburbs and the American Interstate System; the railroad diminished lands in Native American control, caused the building of new cities and opened the American West to development.
2. Tourism	Before the transcontinental railroad was built, it would take a person months and close to \$1000 to travel from New York to San Francisco. Suddenly, with the railroad complete, the same trip took seven days and \$150 for a first-class ticket. Affordable travel was a reality. Tourist destinations quickly developed to give Americans places to tour. Yellowstone National Park was established in 1872 as a natural reserve for Americans to enjoy, and other tourist sites quickly sprang up around the major railroads. As car usage became more extensive in the United States, motels were created to permit travelers safe and clean accommodations around the country.
3. New businesses and new jobs	Both forms of transportation created whole new industries. Building the transatlantic railroad created thousands of new jobs for workers. With the end of the American Civil War in 1865, veterans of the war were looking for work and found it building the railroad. In addition, approximately 10,000 Chinese men were employed to build the railroad. This influx of immigration created lasting Chinese-American communities in Western cities such as San Francisco and Los Angeles. Cities sprang up across the country along the rail lines, and new markets were developed for goods and services. Widespread use of the Model T, and later models of automobiles, spawned national highway projects, suburban development, the oil industry, convenience shopping malls, the fast food conglomerates and countless other businesses and the jobs needed to support them.
4. Labor disputes	These two industries required massive amounts of manpower to support them. Labor strikes complicated the railroad from the beginning. Eventually, railway workers—including conductors, firemen, engineers and telegraph operators—joined together to form the American Railway Union in 1893, and its power was able to pressure the railway owners to improve wages until the union's collapse during the Pullman Strike of 1894 when 100,000 railway workers went on strike and paralyzed the nation's economy. As a result of this strike, President Cleveland ordered an injunction forcing the workers to return to the job. Although the union dissolved, the plight of the workers inspired states to pass laws regulating working conditions and shortening the workday. These reforms were the beginning of worker protection laws in the United States. Similarly, auto workers continued to demand improved labor conditions. During Roosevelt's Second New Deal, auto workers went on strike by staging a sit-down strike to protest seasonal layoffs, "speed-ups" and working conditions. Once again, the pressure of workers in such a powerful industry continued to pave the way for improving working conditions for every American laborer.
5. Natural resources needed	Both new technologies increased demand on America's natural resources. The railroad demanded a steady supply of coal, while the Model T led to increased oil exploration. Means of extracting natural resources such as coal, iron ore and petroleum, were improved during the Industrial Revolution. Due to these technological refinements, coal mining became a raging business throughout the Appalachians, from Pennsylvania to Alabama. Since the discovery of oil in Pennsylvania in 1839, production of oil increased from 2,000 barrels a year in 1839 to 64 million barrels per year in 1900. In 2005, America had roughly 22 billion barrels of oil in reserves.

Ready to order?

The Thinking Classroom: Using Inspiration® to Meet Curriculum Standards

Help students develop critical thinking strategies, such as making comparisons and determining cause and effect, with this in-depth exploration of visual learning's role in mastering fundamental critical thinking skills. Each of the six cognitive strategies includes specific applications and an example lesson in language arts, science and social studies.

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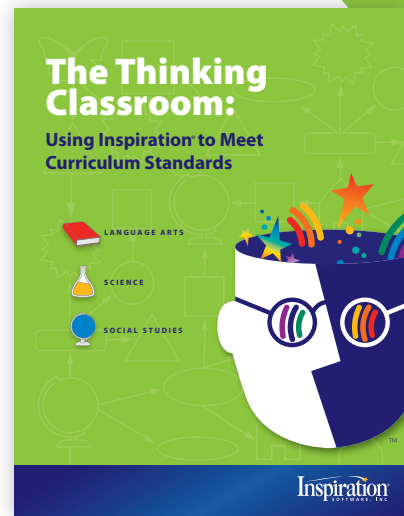
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