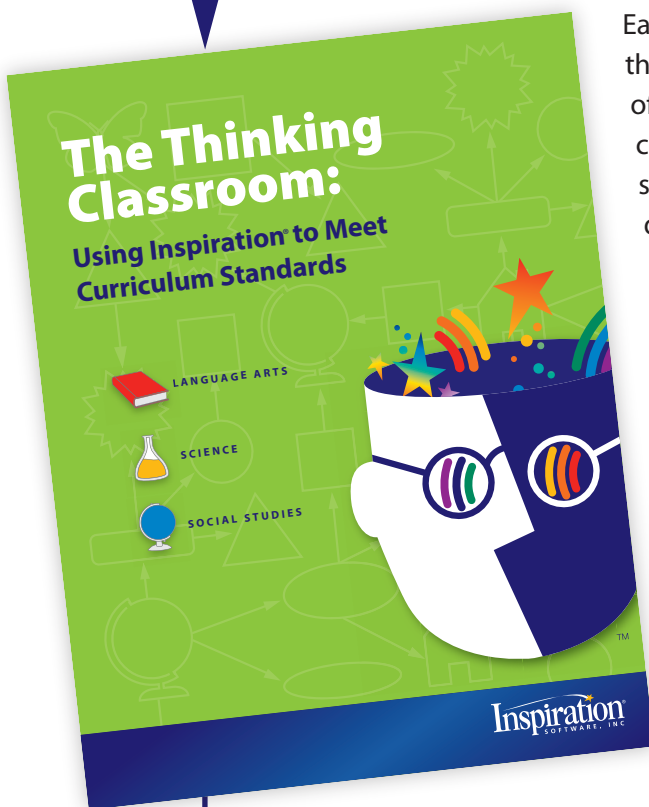# Excerpts from
The Thinking Classroom:
Using Inspiration® to Meet Curriculum Standards

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.

The Thinking Classroom:
Using Inspiration® to Meet Curriculum Standards

LANGUAGE ARTS

SCIENCE

SOCIAL STUDIES

™

Inspiration®
SOFTWARE, INC

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

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.

TABLE OF CONTENTS

Included below is the complete table of contents from *The Thinking Classroom: Using Inspiration to Meet Curriculum Standards*. The Comparison section, which is highlighted, is featured in this excerpt.

COMPARISON
## Similarities, Differences and Parallels
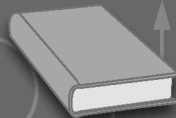
LANGUAGE ARTS

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.

Similarities

Differences

Differences

A

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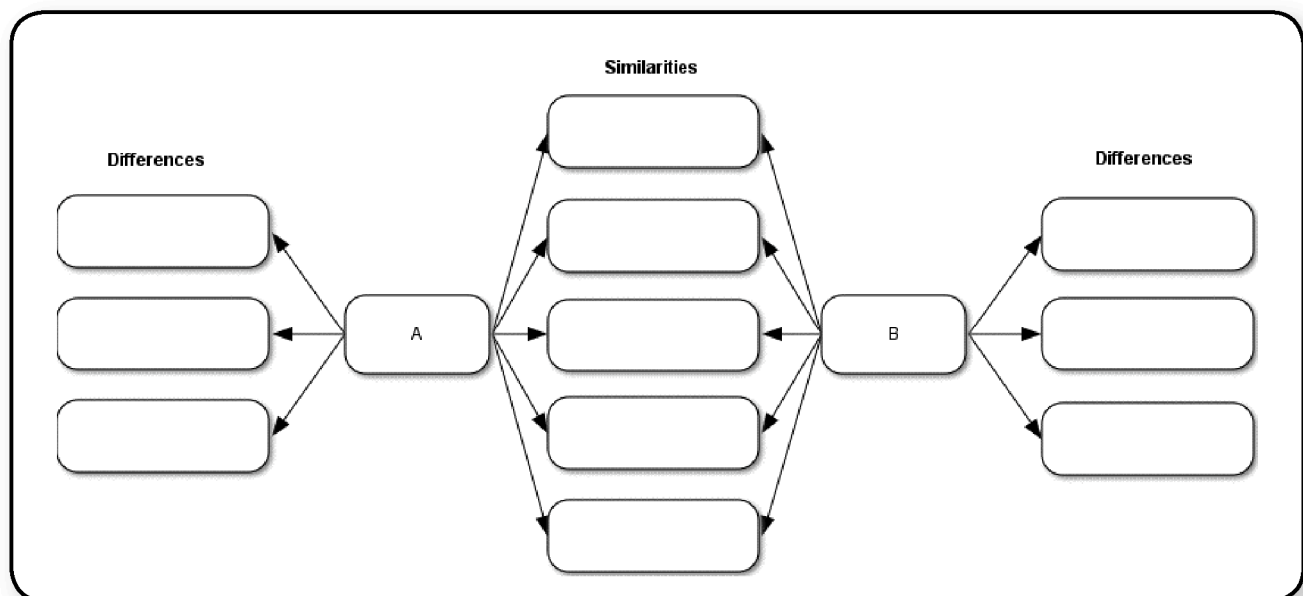
The process of comparison necessarily triggers the learner's prior knowledge. Juxtaposing the known with the unknown and the familiar with the new, organizes and builds on existing networks of information. When information becomes "formatted" in this way, it becomes more understandable and accessible,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

Unique attributes:

Shared attributes:

Unique attributes:

IDEA 1

IDEA 2
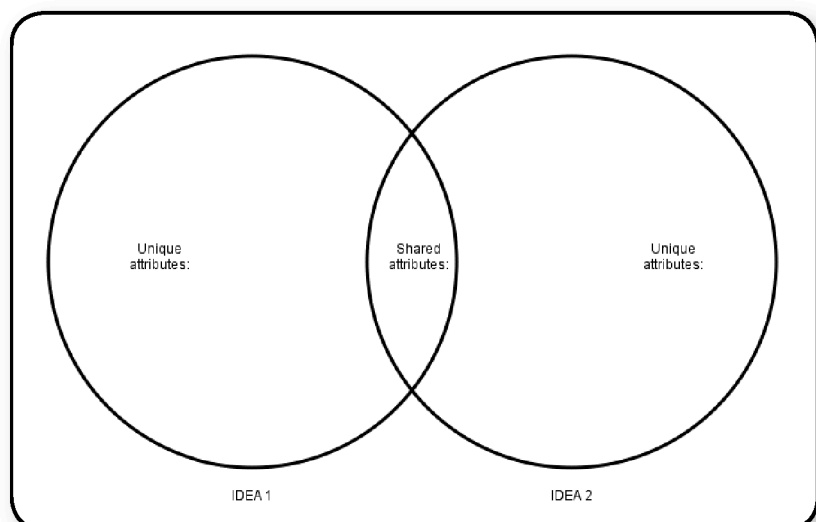
Inspiration offers numerous ways to support students as they explore this powerful thinking strategy. Using Inspiration, students can:

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.
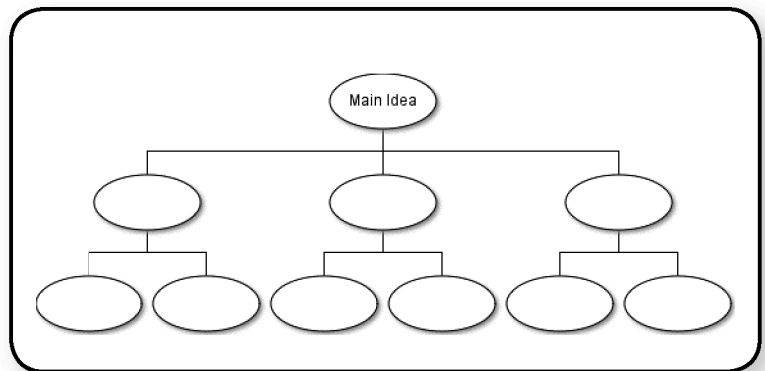
Create and Decode Metaphors

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.
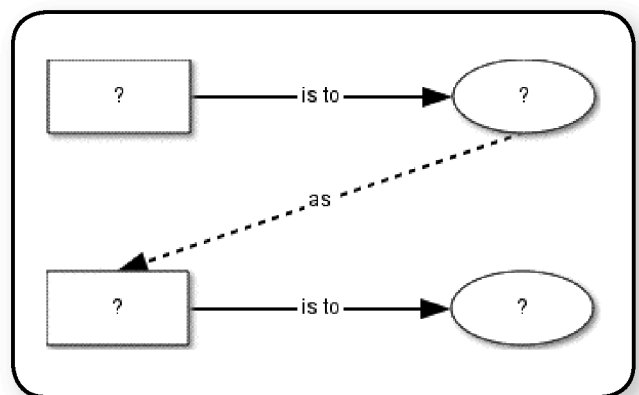
Comparison in Language Arts

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.
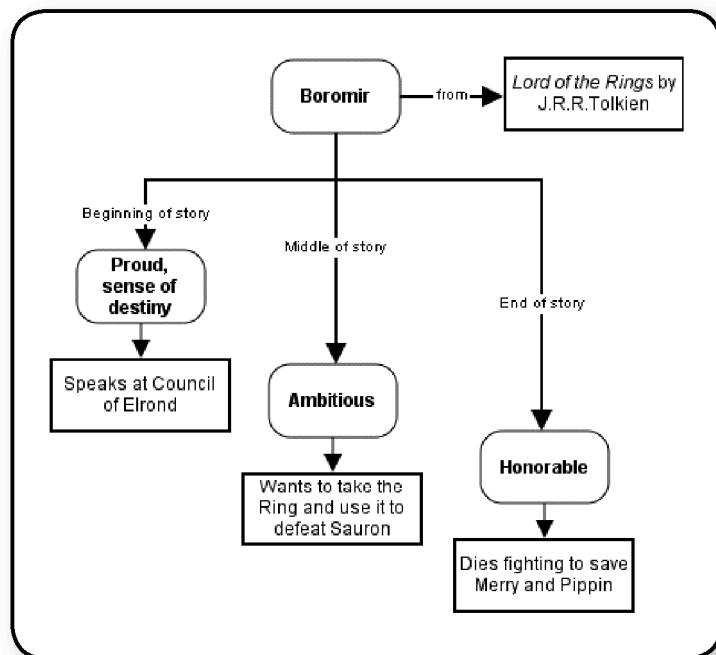
Comparing Characters

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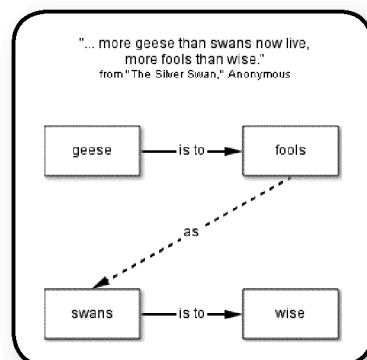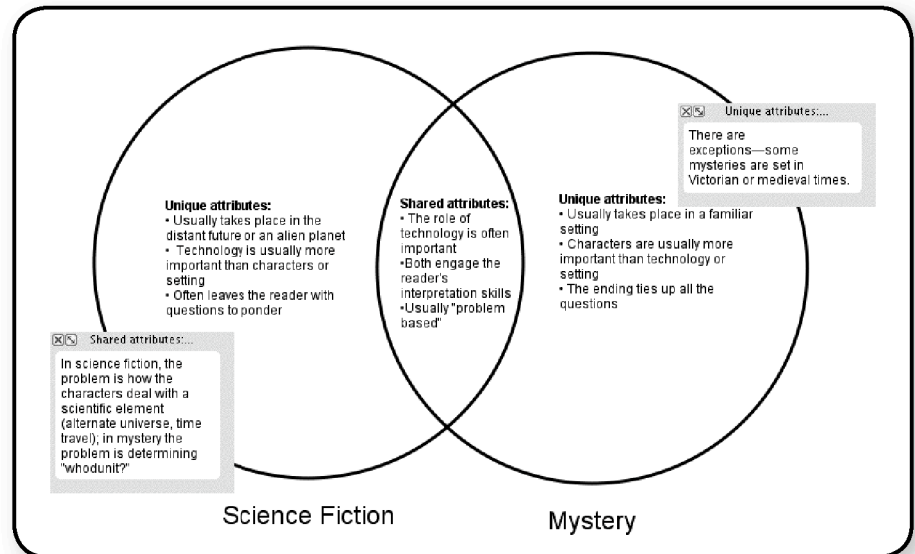
Drawing comparisons between characters from different works can prompt rich discussions about authorial theme and purpose.
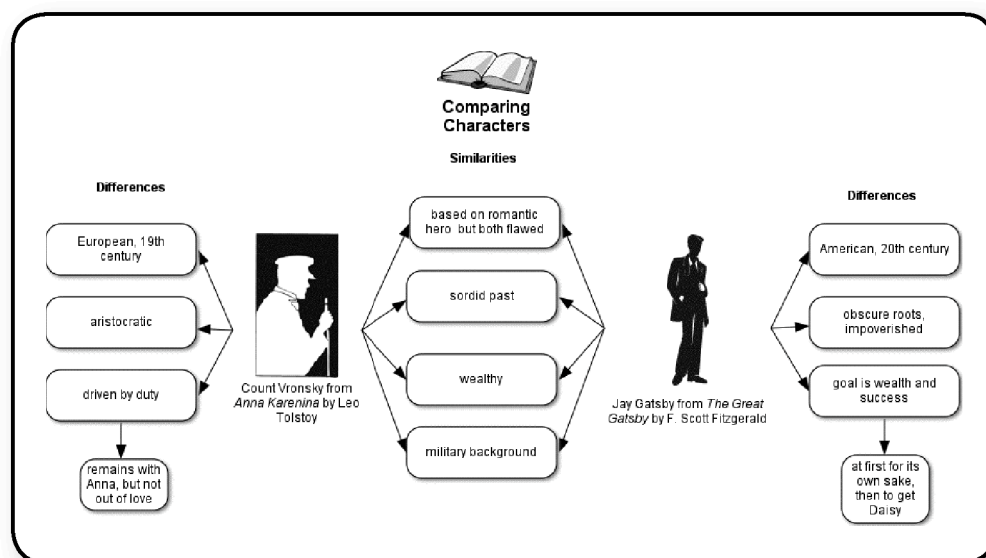
Comparing Genres

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.

Unique attributes:...
There are exceptions—some mysteries are set in Victorian or medieval times.

Unique attributes:
• Usually takes place in the distant future or an alien planet
• Technology is usually more important than characters or setting
• Often leaves the reader with questions to ponder

Shared attributes:
• The role of technology is often important
• Both engage the reader's interpretation skills
• Usually "problem based"

Unique attributes:
• Usually takes place in a familiar setting
• Characters are usually more important than technology or setting
• The ending ties up all the questions

Shared attributes:...
In science fiction, the problem is how the characters deal with a scientific element (alternate universe, time travel); in mystery the problem is determining "whodunit?"
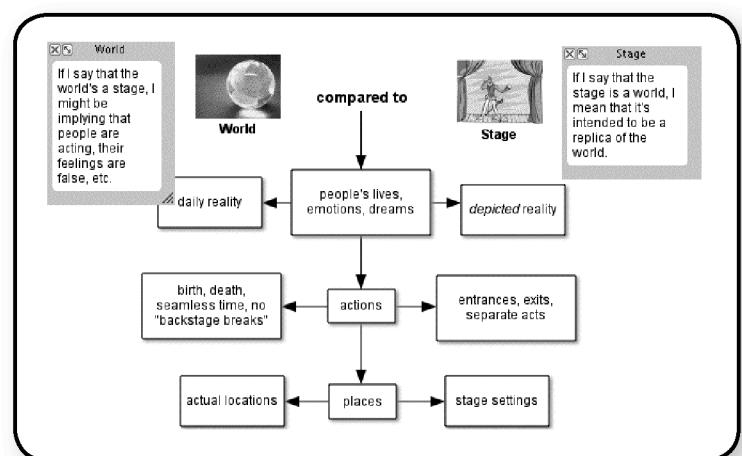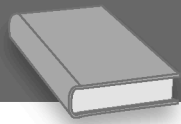
Science Fiction   Mystery

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.

"... more geese than swans now live, more fools than wise."
from "The Silver Swan," Anonymous

geese —is to→ fools

as

swans —is to→ wise

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.

World
If I say that the world's a stage, I might be implying that people are acting, their feelings are false, etc.

World   compared to   Stage

Stage
If I say that the stage is a world, I mean that it's intended to be a replica of the world.

daily reality ← people's lives, emotions, dreams → depicted reality

birth, death, seamless time, no "backstage breaks" ← actions → entrances, exits, separate acts

actual locations ← places → stage settings

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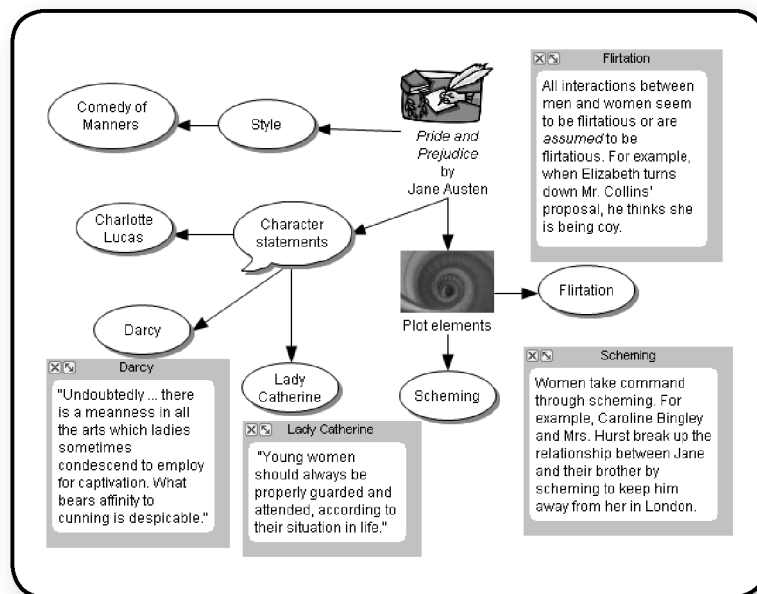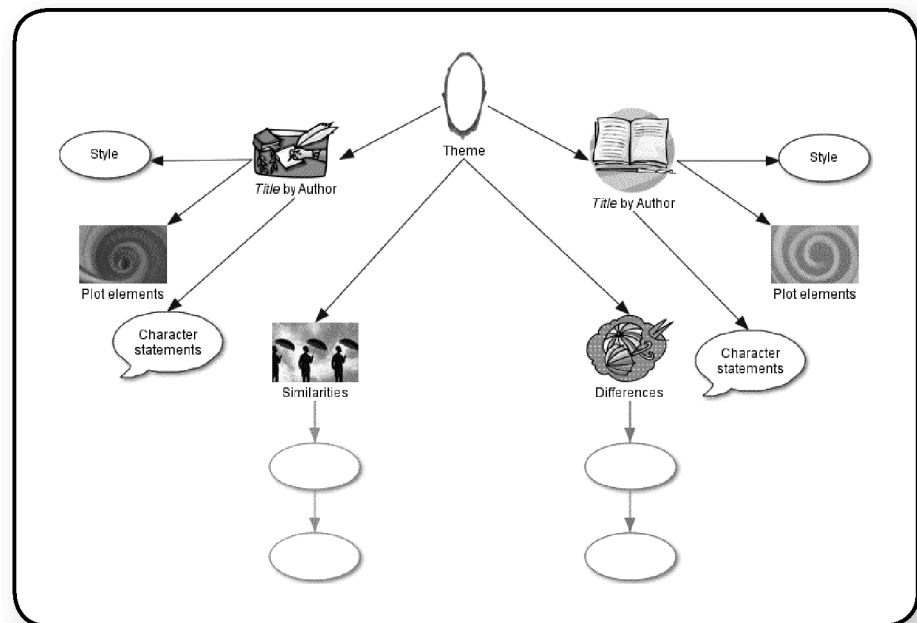
2 Choose a familiar story and decide on one theme to analyze. Ask students to add details, descriptions and quotations that relate to the theme. Enter them into the template.

3 Have students discuss their ideas and use Inspiration to record them.

4 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.
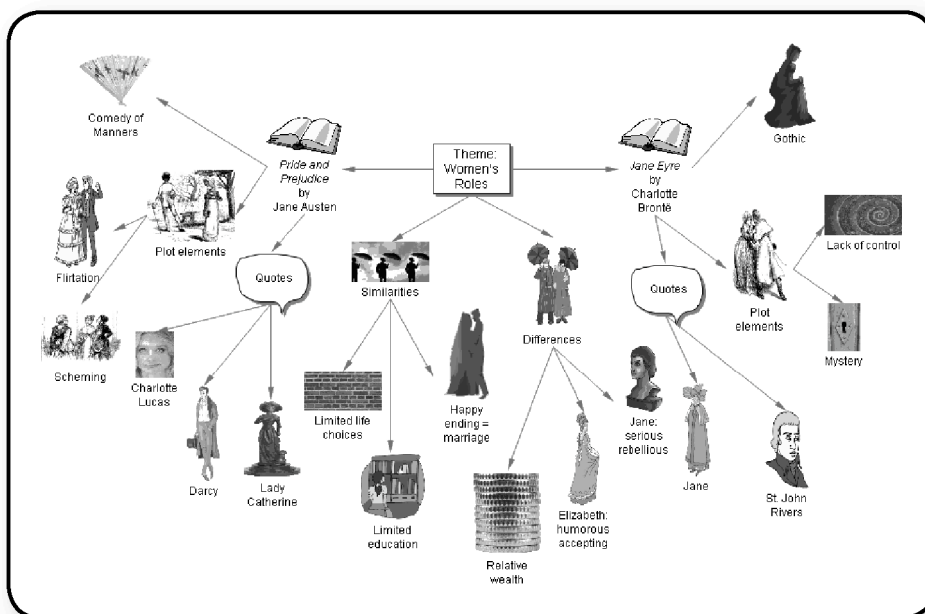
5 Have students switch to Diagram View and use the Symbol Search feature to capture their discussion visually.

6 In Outline View, students can continue to add details and refine their thinking.

7 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.

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.
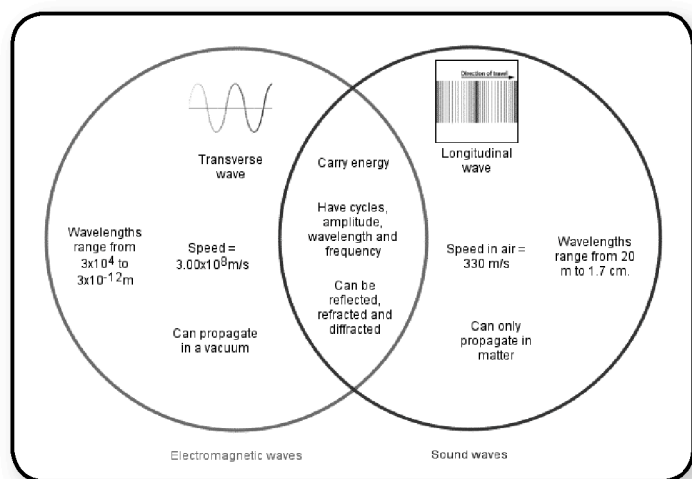

Comparing Phenomena

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.

Fusion Power

Conclusion

Most convincing article is
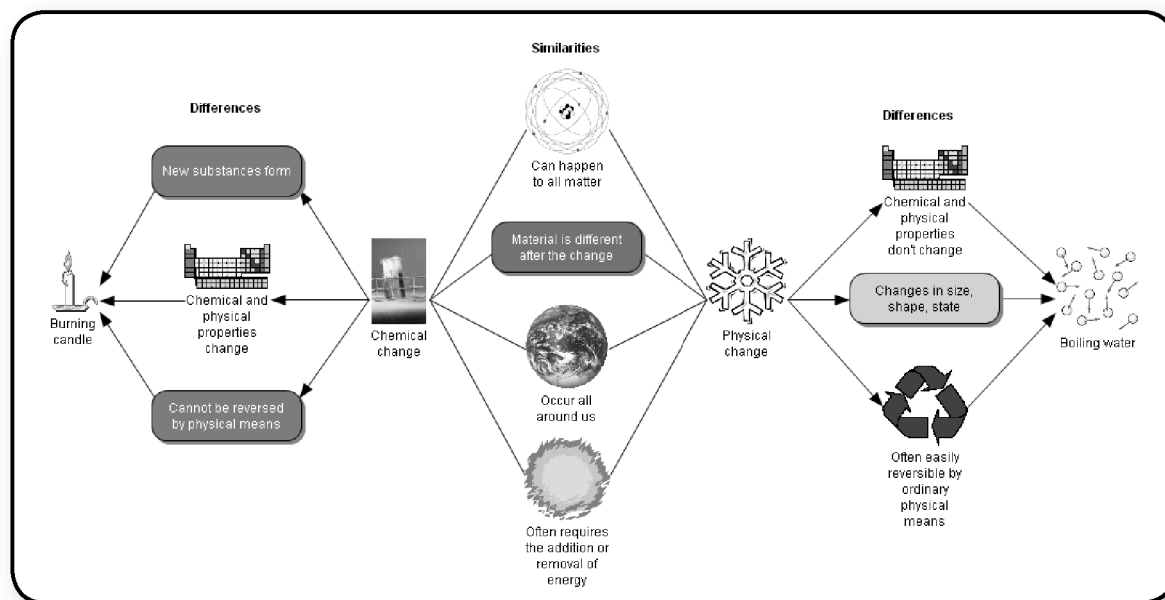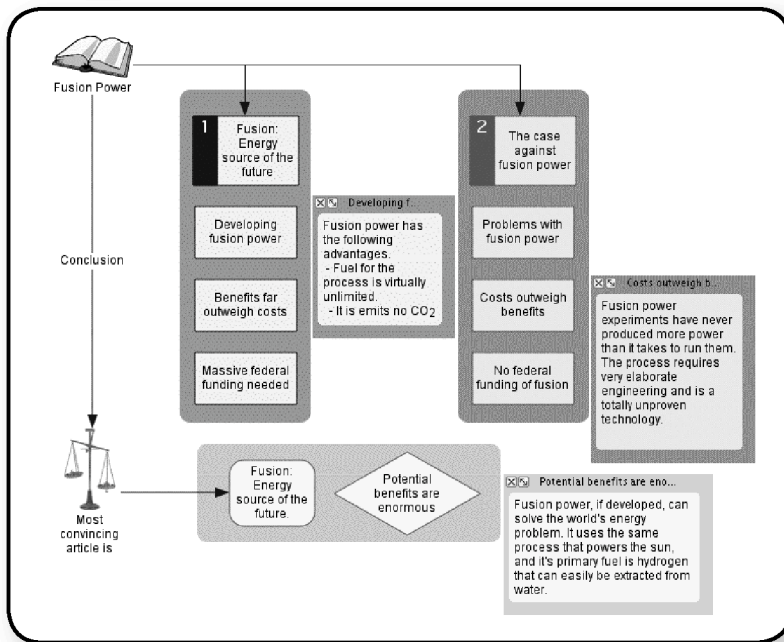
Comparing Ideas

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.
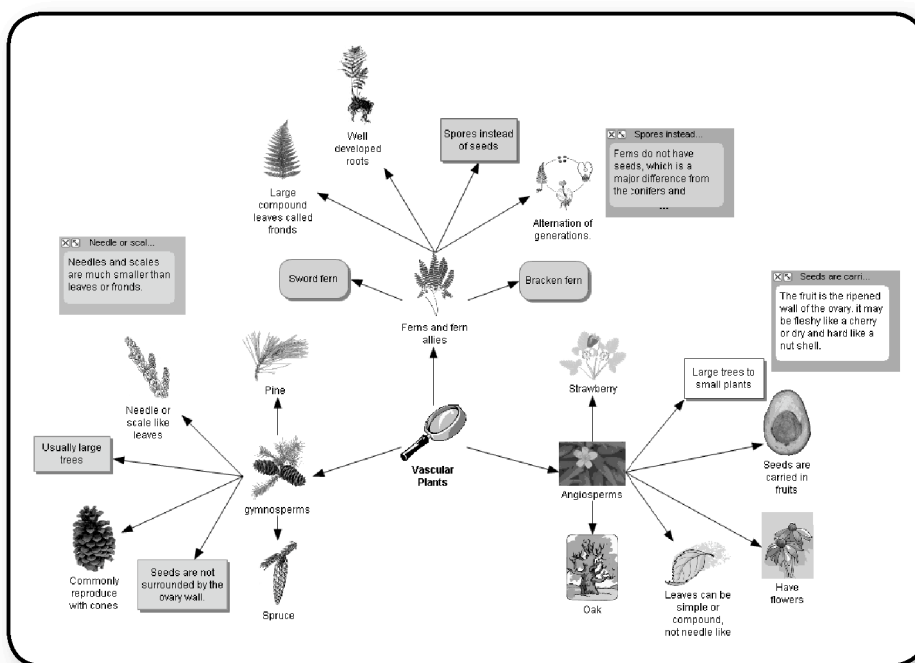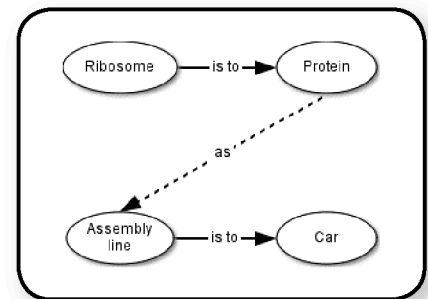

Comparing Through Classification

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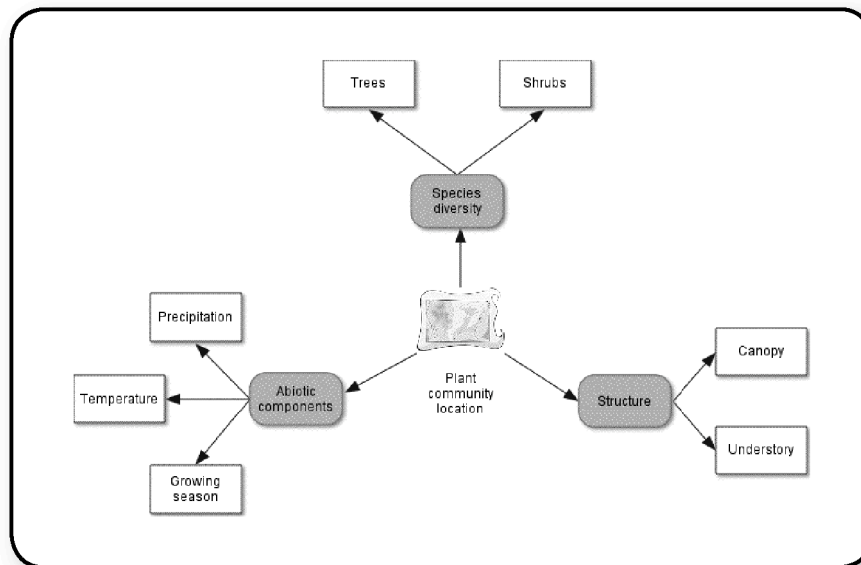
1 Introduce the Plant Community Analysis template and review concepts as necessary.

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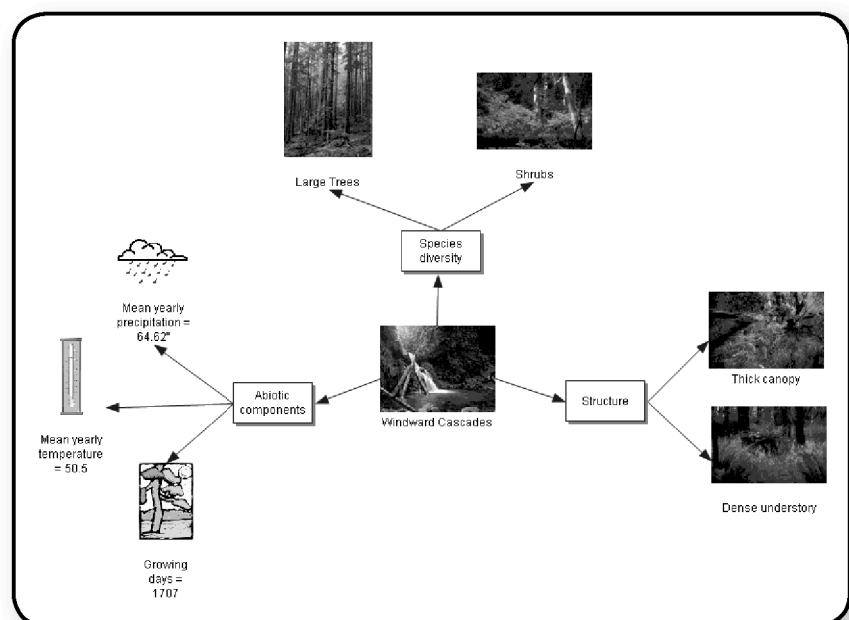
3 Have each team partner with a team who has researched the opposite slope of the mountain range to compare diagrams. Ask teams to switch to Outline View and use the drag-and-drop function to combine their outlines.

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, salal, 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.

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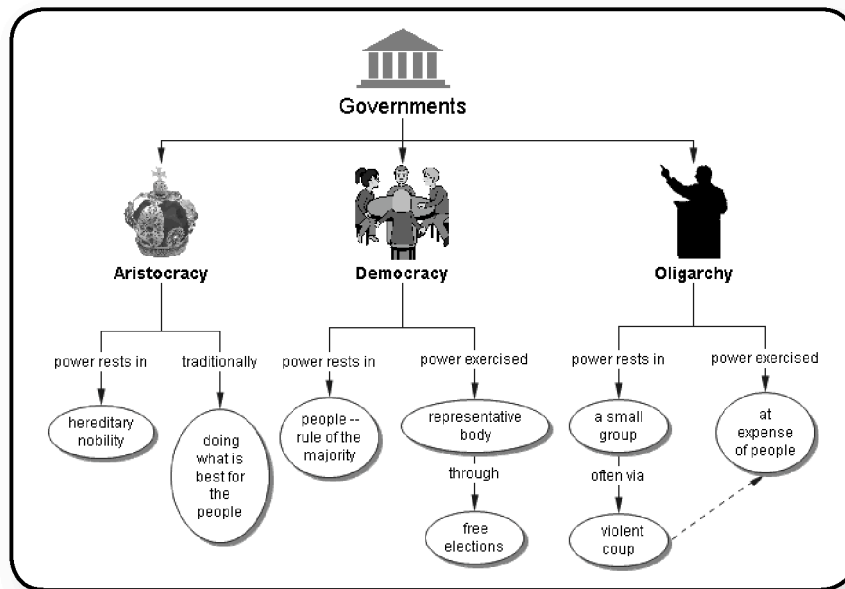When these air masses reach the leeward side of the mountains, they have lost most of their moisture and are much cooler. This results in much lower levels of rainfall and a shorter growing season, and this has a dramatic effect on the plant community. This is a good example of the how organisms, in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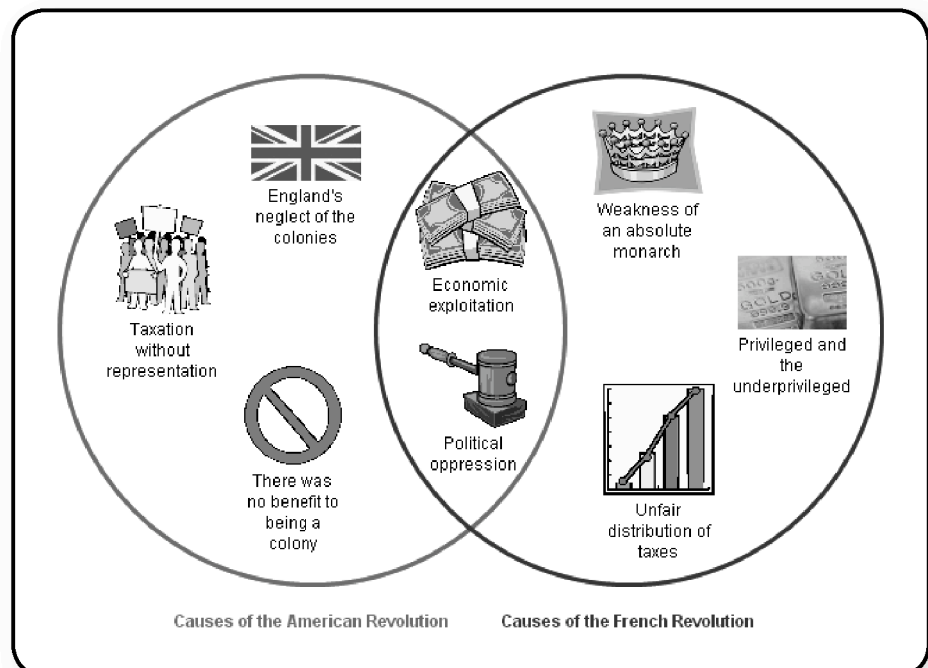

Governments

Aristocracy — Democracy — Oligarchy

Aristocracy: power rests in — hereditary nobility; traditionally — doing what is best for the people

Democracy: power rests in — people -- rule of the majority; power exercised — representative body — through — free elections

Oligarchy: power rests in — a small group — often via — violent coup; power exercised — at expense of people

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.

England's neglect of the colonies

Taxation without representation

There was no benefit to being a colony

Economic exploitation

Political oppression

Weakness of an absolute monarch

Privileged and the underprivileged

Unfair distribution of taxes

Causes of the American Revolution   Causes of the French Revolution

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.
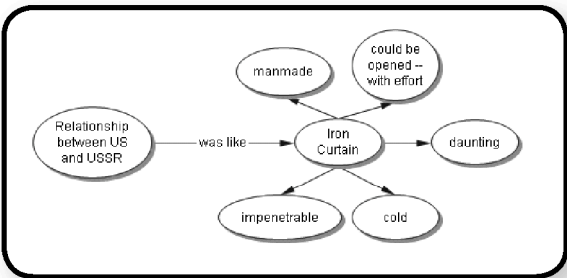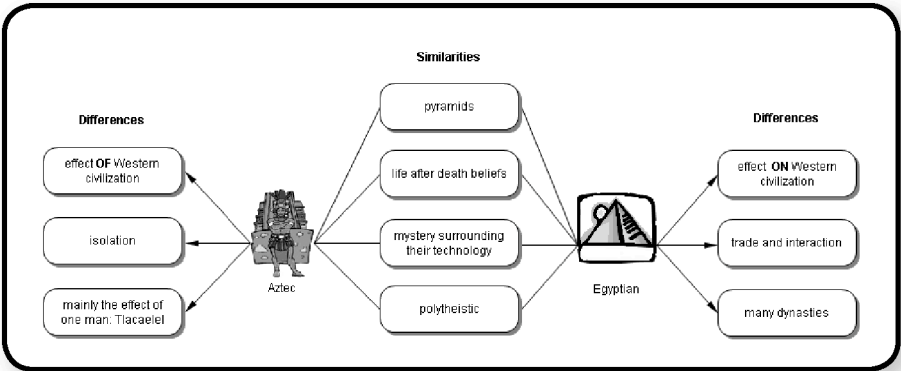
Understanding Historical Analogies and Metaphors

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.
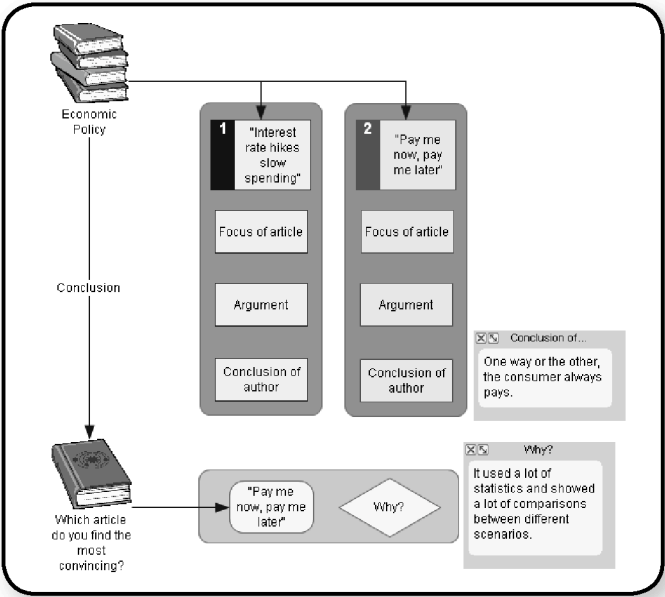
Lesson: Comparing Technologies

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.
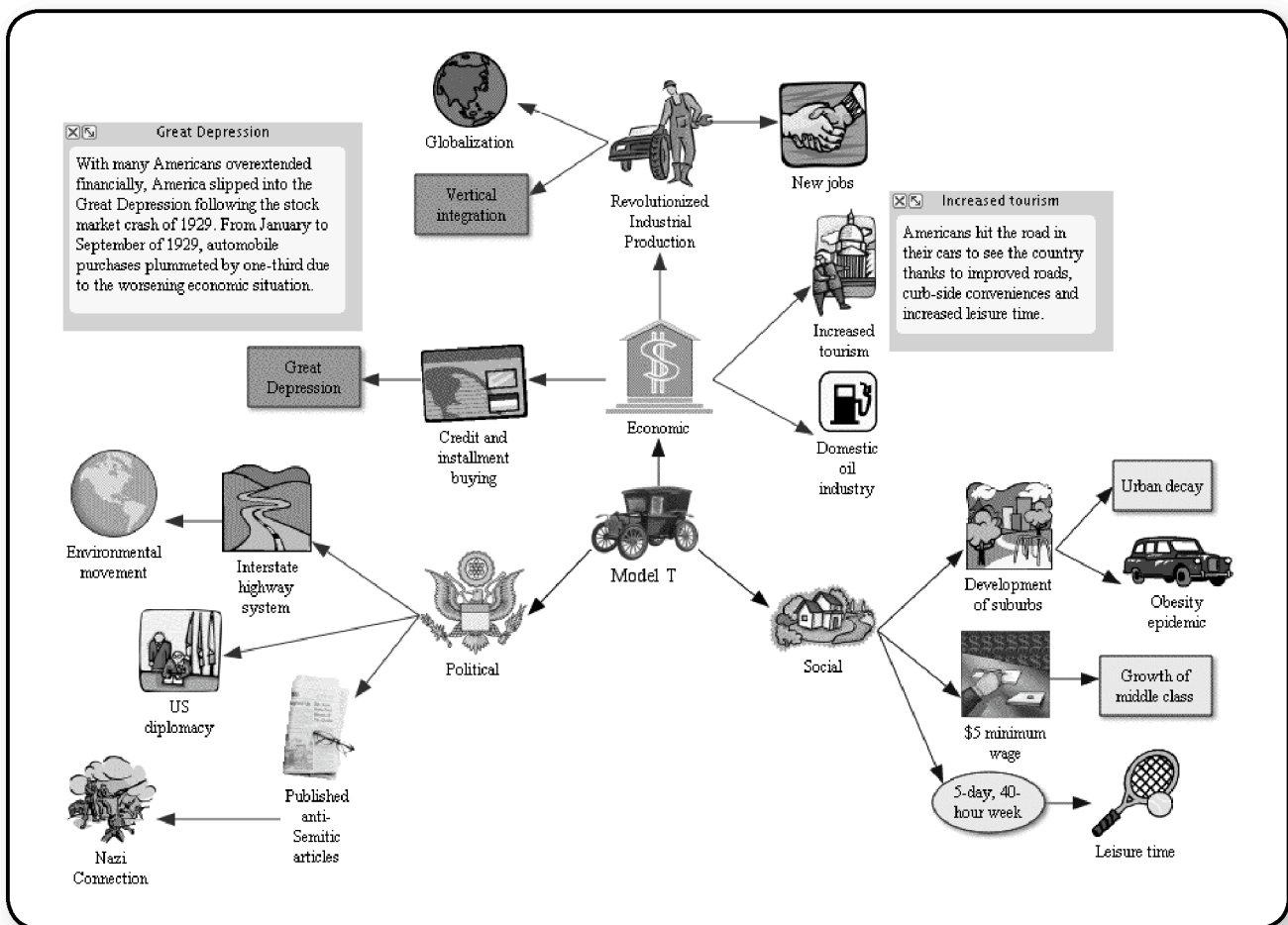
4 Ask students to form new teams of two with someone who has researched a different technological innovation.

5 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.
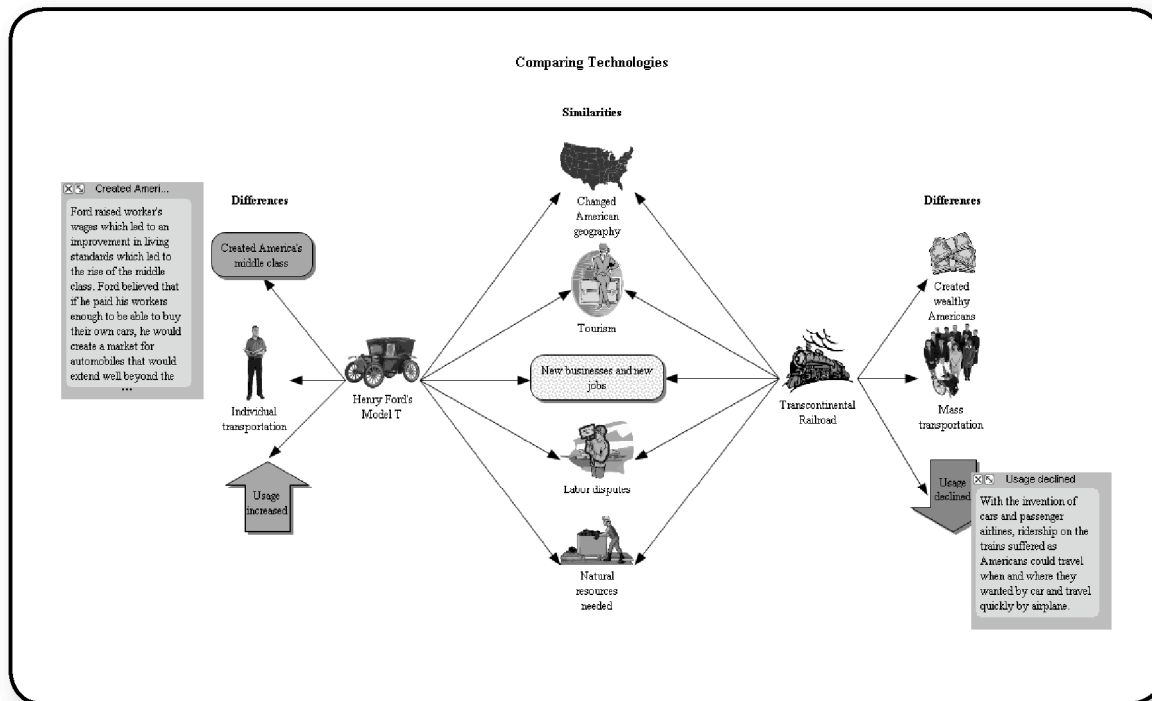
6 When students have completed their diagrams, have them switch to Outline View and click the Transfer button to finalize their paper in a word processor.

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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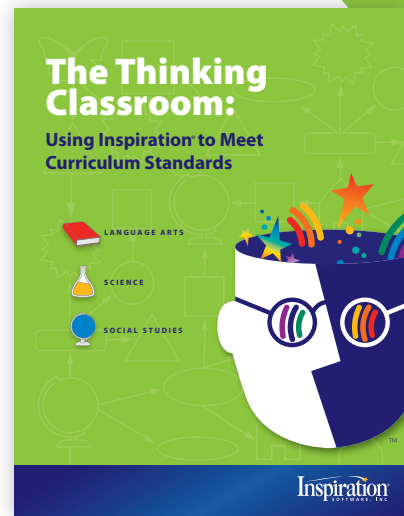
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