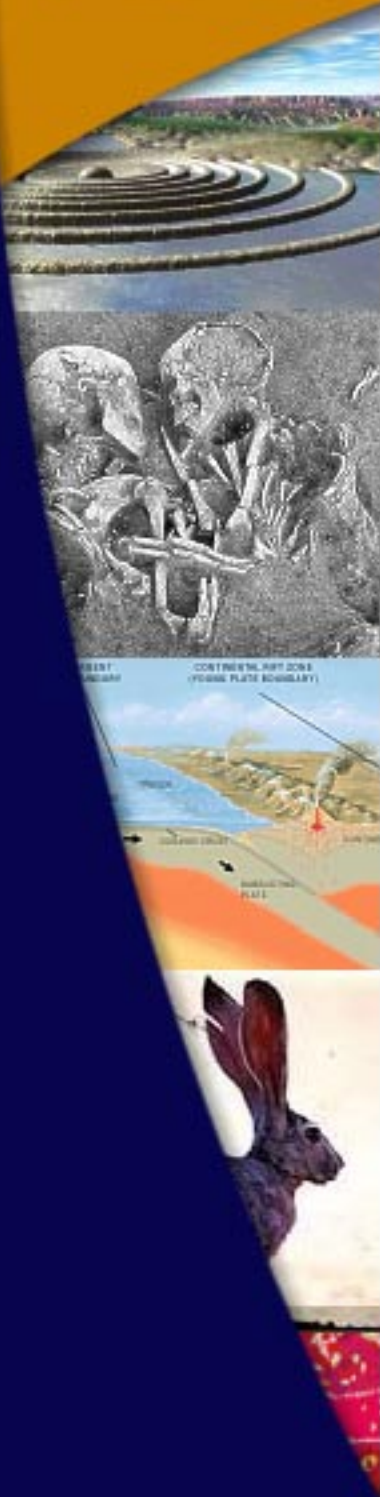


learners online

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The Emerging Digital Lower Class

J. Alan Baumgarten

Let's do a little thought experiment together. Imagine that you are booked on a flight tomorrow morning. We can call it a short trip to New Zealand.

In this thought experiment, imagine that you are travel omniscient – that is to say, you know all things that are knowable about the trip. What would your trip be like, and how would your behavior be different based on other times you have flown?

Here are some examples from my thought experiment:

- I would have purchased the tickets the moment the lowest fare class became available
- I would anticipate the weather conditions in Auckland and know exactly how and what to pack
- I would leave for the airport at exactly the right time, take the shortest route to the airport, and arrive at the right time to miss long check-in lines while not missing my flight
- I would choose the fastest moving security lane
- I would choose a seat which, as fate would have it, is in an unoccupied row

I am certain you came up with additional examples that made the travel experience fantastic.

Where I am going with all this is that information shapes our behavior and our experiences. Having the right information available to us at the right time allows us to make better decisions and enjoy better experiences.

Experienced travelers acquire knowledge about travel through experience and practice. Increasingly, airlines and other organizations are harnessing information that was previously-hidden from public view and exposing it to consumers in order to provide better customer experiences.

As educators, we need to recognize the information delivery trends that are emerging, and the information consumption behaviors that are occurring as a result. Developing a society of information-savvy and digital-literate individuals is more critical than ever. In our ongoing effort to develop the whole child, we must pay greater attention to the growing digital divide that threatens to marginalize entire student populations, inevitably leading to the formation of a new digital lower class.

The Moving Earth Revealed

Lisa Kerscher

About 40 years ago, scientific evidence pointed to a new view of the Earth, revealing that its crust is a dynamic, ever-shifting landscape. Today, students can get their own fresh views of leading-edge science and illustrations supporting this theory.

Earthquakes, tsunamis, and volcanic activity are constantly in the news. Most people grasp that these events are generally interconnected. In fact, many probably are also familiar with the basic concept of the plate tectonics theory, which serves as a sound explanation for why such global activities happen where they do.

Perhaps not surprisingly, a variety of scientific observations, analyses, and tools have come together in a way that provides the evidence to support the plate tectonics theory. For example, geological evidence, coupled with observed biological distribution patterns, offer strong support that the continents were once joined and then drifted apart. The observations of scientists who explored the oceans in-depth beginning in the mid-20th century provided additional understanding of the Earth's crust. Over the last several decades, advancing technologies, as well as improved cooperation and shared knowledge between scientific fields, has continued to revolutionize and refine what we know about Earth's fractured and dynamic nature.

Students can take virtual field trips with scientific researchers to help them better understand 21st-century study plate tectonics. Rich media, such as videos showing geologists in the field and animations illustrating global processes, are wonderful ways for students to tap into and grasp the theory's large-scale concepts and real-world research.

NS9-12.4 Earth and Space Science

Geochemical cycles

TEKS

§112.49. Geology, Meteorology, and Oceanography.

(6) Science concepts. The student knows the processes of plate tectonics. The student is expected to:

(A) research and describe the historical development of the theories of plate tectonics including continental drift and sea-floor spreading

(B) analyze the processes that power the movement of the Earth's continental and oceanic plates and identify the effects of this movement including faulting, folding, earthquakes, and volcanic activity



The Evidence

Before or after jumping into animated illustrations of tectonic processes, share a few select videos with students. Students will quickly learn that although evidence supports the plate tectonics theory, many details of these processes remain a mystery. The movies listed below can help give students not only a tangible view of what the different effects of plate tectonic processes look like, but also how scientists have studied and continue to study these effects to help define some of these details.

The American Museum of Natural History's [Science Bulletin](#) collection provides some excellent videos, essays, and interactive features that present current research about the natural world. For example, [Moving Mountains](#), an 8-minute video highlighting the St. Elias Erosion and Tectonics Project, discusses one of the world's most rapidly growing mountain ranges. This project includes cooperative teams of structural geologists, geophysicists, sedimentologists, and glaciologists who rely on both traditional and cutting-edge survey tools to collect data in a variety of ways. This movie gives a glimpse of how scientists with expertise in different disciplines work together, as well as how their work exposes new information about how the natural forces of plate tectonics and erosion may interact.

In addition to watching the video, read the essay [A Mountain Theory on the Rise](#) and look at [Explore the St. Elias Range](#). This interactive exploration will help orient students to the region's geography and plate configuration in the Map overview. Students can also zoom in for a close-up view of Icy Bay, the Malaspina Glacier, Seward Glacier, and the towering Mount St. Elias.

Through another 8-minute Science Bulletin feature, students can explore [Continental Deformation: Creating the Basin and Range](#). Like the St. Elias feature, this video not only illustrates an example of the geological forces at work, but also how scientists apply technologies to help them understand these forces.

The USGS is another great resource for insightful [Educational Videos and Animations](#) on plate tectonics. [Secrets in Stone](#), for example, chronicles the scientific discoveries in the early 1960s



that led to the general acceptance of the plate tectonics theory. [The Living Rock: The Earth's Continental Crust](#) is an hour-long film tour of global geologic processes, and it incorporates computer animated sequences. Both of these movies are available in the Windows Media Video format.

Processing the Processes

There are two excellent Web sites that help students understand the geological mechanics and the history of the plate tectonics theory. You can find one of the Web's original modules on the subject, [This Dynamic Earth: The Story of Plate Tectonics](#), at the USGS. This online edition mirrors the book published in 1996 and provides fairly detailed yet plain-language text that is accompanied by helpful graphics. (The page is also available as a [PDF](#).) This site is notably strong in providing a [Historical Perspective](#) and explaining the process of [Developing the Theory](#). This module offers a solid background in the development of the plate tectonics theory. After students review these materials, discuss how the different scientific disciplines combined to formulate this important theory. What is the significance of having a unified understanding of these processes?



You can find a more student-friendly module that describes the basic plate tectonic processes of the [Dynamic Earth](#) at Annenberg Media. As students read through each section, they will be prompted to complete some related interactivities; these activities will help reinforce term definitions and concepts.

To get the most out of this Web site, have students review it either in pairs or individually. In this module, explore the [Earth's Structure](#) and the overview of the [Plate Tectonics](#) theory. The [Plates & Boundaries](#) section illustrates the plates and boundaries. It also includes introductory explanations of convergent, divergent, and transform boundaries. An interactive map shows where the three different types of boundaries exist in relation to the named plates. The [Plates & Boundaries Challenge](#) will test students' knowledge of where these plates and boundaries are. Beyond simply testing students' ability to memorize geography, this challenge reinforces some of the theory's basic concepts.

In the [Slip, Slide, & Collide](#) section, students will get a more in-depth view of [Convergent Boundaries](#), along with [Divergent Boundaries and Transform Boundaries](#). The [Plate Interactions Challenge](#) asks students to examine real-world cases of plate boundary interactions in Africa, New Zealand, and South America. The challenge finishes with a few key-word jumbles.

Lastly, invite students to [Test Skills](#) through a 30-question interactive quiz. The results page shows which questions students answered correctly and it provides a direct link to the related page where students can find the right answer for incorrect responses. The quiz prompts students to type in their names before beginning so that they can print and turn in their graded assessments.



Piecing It Together

As students watch the videos and explore the modules, ask them to create a glossary of key terms. The interactive modules identify some obvious terms to include, whereas the movies may offer other terms that the students do not understand but can research independently. Ask students to develop the glossary cooperatively. Make sure to identify key terms and then to formulate and agree upon each definition. Keep the glossary in a shared place, where students can refer to it during their assignment.

List each tectonic plate on a piece of paper and drop them into a hat or other open container. Alternatively, you may wish to group two or more neighboring plates together as one assignment. Instruct individual students or teams to pick their plate assignments randomly out of the hat. Tell students to investigate the geological activities that have been researched or reported over the last year that may relate to that plate and its boundaries. Encourage students to look online for any scientific studies, reports listed at the USGS or other agencies, and through newspaper archives. Using applicable terminology, have students write an introduction to the plate's general nature (how it is moving and what is happening at its boundaries, for example), along with a summary report describing the recent activities. Ask students to plot these activities on a map and to create activity charts and

timelines, as appropriate. Remind them to refer to the glossary, as needed.

To review the "big picture," have students combine their findings onto one map—either hanging on the classroom wall or in a digital format. Together, examine and analyze their research. Discuss possible interrelationships in the activities over time.

Reference:

American Museum of Natural History – Science Bulletins
<http://sciencebulletins.amnh.org>

USGS – Educational Videos and Animations
http://education.usgs.gov/common/video_animation.htm

USGS – This Dynamic Earth: The Story of Plate Tectonics
<http://pubs.usgs.gov/gip/dynamic/dynamic.html>

Annenberg Media – Dynamic Earth
<http://www.learner.org/interactives/dynamicearth/index.html>

Circle Geometry

Stephanie Tannenbaum

By the time students participate in a Geometry course, they have spent a great deal of time exploring the circle. Radius, diameter, circumference, and area of circles should be familiar and the class should be proficient in these topics. Most likely, they are more than ready to explore new aspects of circle geometry. Tangent, secant, arc, chord are all aspects of the circle that help to bring more geometric meaning to this important shape.

Students investigate circle geometry concepts of tangent, secant, chord, arc, sector, and inscribed angles through the use of a variety of engaging online exercises and java explorations.

Going on a Tangent

Begin by exploring tangents. Start with OnlineMathLearning's [Tangent to a Circle](#) introduction,

video, and example. Then send students to work on the lesson, [Tangent of a Circle](#) from Math Warehouse. This is an introduction to the basic concept of the tangent and provides students with definitions, descriptions, examples, and interactive exercises. Next, continue with [Two Tangents from One Point](#) to explore the third important theorem that deals with tangents.

Keep exploring the [Tangent](#) with the applet and suggested exercises from Math Open Reference Web site. The synopsis below the applet

NM-GEO.9-12.1

Analyze characteristics and properties of two- and three-dimensional geometric shapes and develop mathematical arguments about geometric relationships

- analyze properties and determine attributes of two- and three-dimensional objects;
- establish the validity of geometric conjectures using deduction, prove theorems, and critique arguments made by others;

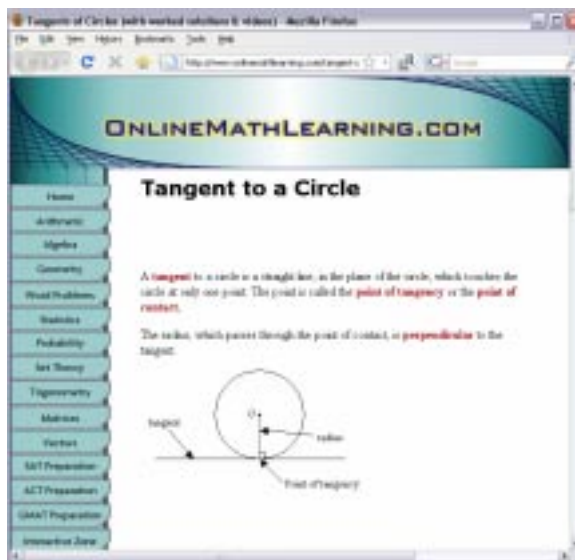
TEKS

§111.34. Geometry

(8) Congruence and the geometry of size. The student uses tools to determine measurements of geometric figures and extends measurement concepts to find perimeter, area, and volume in problem situations.

(B) find areas of sectors and arc lengths of circles using proportional reasoning

(9) Congruence and the geometry of size. The student analyzes properties and describes relationships in geometric figures.

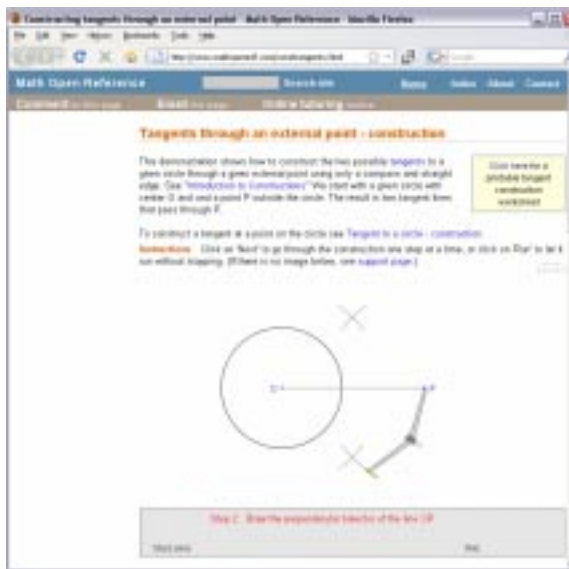


provides background information. Students should try to:

- Make the circle smaller; describe what happens to the tangent line.
- Make the circle larger; describe what happens to the tangent line.
- Change the orientation of the circle; drag the center dot either up/down/left/right. What happens to the tangent?
- With any changes made to the circle; what happens to the angle formed by the radius and the tangent of the circle?
- Using a beach ball, baseball, or other round object, and something flat, model a tangent line.

Scroll down the page and invite students to explore the next lesson, [Tangents through an external point](#). There is one more lesson to explore if time permits. [Tangents through a point on the circle](#) is another excellent activity.

Now look at some math problems. Present how to solve for the length of a tangent with the video clip, [Tangent Line](#) from Classmate, L.L.C. Continue with the lesson and set of four interactive activities from Wolfram MathWorld. [Tangent Circles](#) takes students to the next level and the four demonstrations to the right offer further opportunities to work with tangents.



Counting Off the Secants

Ask students what would happen if a tangent cut into and then out of the circle. Well, it would no longer be a tangent; it would be a secant. Introduce this concept with Math Warehouse's [Secant of a Circle](#). Continue with the applet and lesson on [Secant](#) from Math Open Reference. Make sure to explore the [intersecting secants theorem](#) at the bottom of the lesson. Wolfram MathWorld's lesson about the secant line and accompanying interactive lessons (located to the right) provide the next step in studying secant lines.

Ask students to draw a circle on the blank GSCE Maths Tutor [GeoGebra](#) tool. (The drawing icons are located along the top of

the grid; provide students enough time to explore and locate all of the tools and note that the down arrows on each icon reveal more tools). Ask them to draw a tangent line segment and then a secant line segment for their circle. They should be able to explain in their own words the difference between the two concepts.

Strike a Chord

The next logical concepts to explore are the chord and the arc. The chord is merely a line segment that lies within the circle with both endpoints somewhere on that circle's circumference. The arc is just a section of the circle's circumference. Begin with [Chord of a Circle](#) and then with [Arc of a Circle](#) both from Math Warehouse.

Follow up these lessons with the [Beginning Arcs and Chords](#) video from Classmate, L.L.C. Continue with the interactive lesson about the [Chord](#) from Math Open Resource. Once again, students should work through the lesson and examples. Click [Intersecting Chord Theorem](#) at the bottom to explore this applet as well.



Look closer at the [Arc](#) with the Math Open Resource activity. After students learn about the attributes, instruct them to scroll to the bottom and click [Arc Length](#). Then continue with [Major and Minor Arcs](#). Lastly, visit [Intercepted Arcs](#).

Return to the [GeoGebra](#) tool. Ask students to draw another circle with a radius (type 3 for the radius). Provide the following tasks:

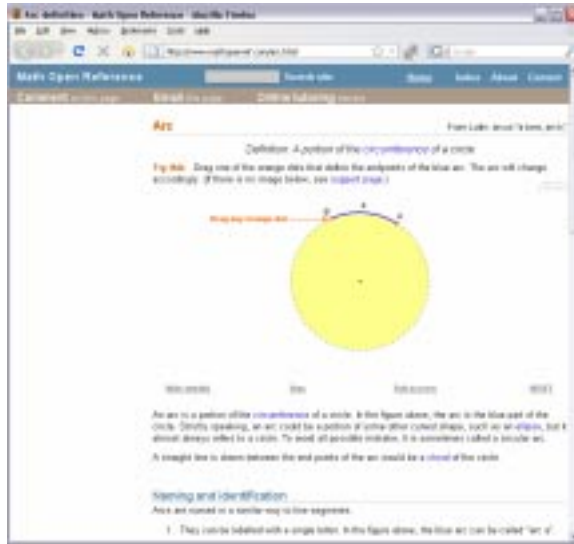
- Draw a chord
- Identify the major and minor arc for this circle
- Draw another chord
- Find the midpoint for both chords
- Draw a secant. What is the difference?
- Continue to explore various chords and arcs
- The Private (or not so) Sector

Turn the focus to the pie-shaped components of circles: sectors. Return to the Math Open Reference site about the [Sector](#). Follow

up with [Area of a Sector](#) from Math Online Learning. While discussing sectors, delve into their inscribed angles with Math Warehouse's excellent lesson and interactive set of exercises about the [Inscribed Angle of a Circle and its Intercepted Arc](#). Follow up with video clip about [Inscribed Angles](#) from Classmate L.L.C.

Now put it all together. Invite students to try the lesson and exercises, [Tangent, Secant, Arcs and Angles of a Circle](#) from Math Warehouse. For those students using graphing calculators, make sure to visit the Texas Instruments [Angles Formed by Intersecting Chords, Secants, Tangents](#) online set of activities and downloads for the graphing calculator.

Circles are fascinating polygons and comprise a significant part of the middle and high school students' exploration of geometry. The concepts of tangent, secant, chord, arc, sector, and inscribed angle are not always presented in an engaging way in the textbooks. The Internet serves as a valuable resource of vigorous, interactive lessons, demonstrations, and applets that take the study of these concepts to a more meaningful and applicable level for students of all learning styles.



Reference:

Online Math Learning – Circles and Circle Theorems
<http://www.onlinemathlearning.com/geometry-help.html>

Math Warehouse
<http://www.mathwarehouse.com/geometry/circle/>

Math Open Resource – Circles
<http://www.mathopenref.com/tocs/circlestoc.html>

Classmate, L.L.C. – Chapter 8 Circles
<http://www.yourteacher.com/browse-lessons.php?courseSubject=geometryhelp>

Wolfram MathWorld – Circles
<http://mathworld.wolfram.com/topics/Circles.html>

GSCE Maths Tutor – GeoGebra
<http://www.gcsemathstutor.com/geogebra.php>

He Cheers, They Cheer: Subject-Verb Agreement

Rachel Cummings

Mention grammar and hear students groan loudly. Grammar lessons are infamous for being boring and redundant. Surprise students with grammar lessons they will enjoy.

Traditionally, grammar education relied on repetitive textbook exercises. (You may remember correcting and rewriting endless sentences.) Today's students need not wear their pencils down to nubs to master proper subject-verb agreement, however. After all, several sites introduce subject-verb agreement, whereas others offer exercises and quizzes. Retire the textbooks and use these sites instead. Your students will cheer!

A Series of Sites

Several sites host noteworthy features that address one of the following aspects of learning subject-verb agreement: teach, practice, or apply. By visiting several sites, students cover all three aspects. Consider beginning with a PowerPoint presentation. Red River College's presentation on [Subject-Verb Agreement](#) covers basic guidelines for present-tense agreement as well as more complex issues, such as compound subjects, indefinite pronouns, and collective nouns. The 12-slide presentation provides helpful talking points and examples to use when introducing or reviewing subject-verb agreement.

For interactive exercises, send students to GrammarBytes. Six interactive [Subject-Verb Agreement](#) exercises require students to write responses in an answer box. Students can receive immediate feedback on their answers (Check my work!) or receive the answer and an explanation (I give up!). GrammarBytes tracks student

NL-ENG.K-12.6 APPLYING KNOWLEDGE

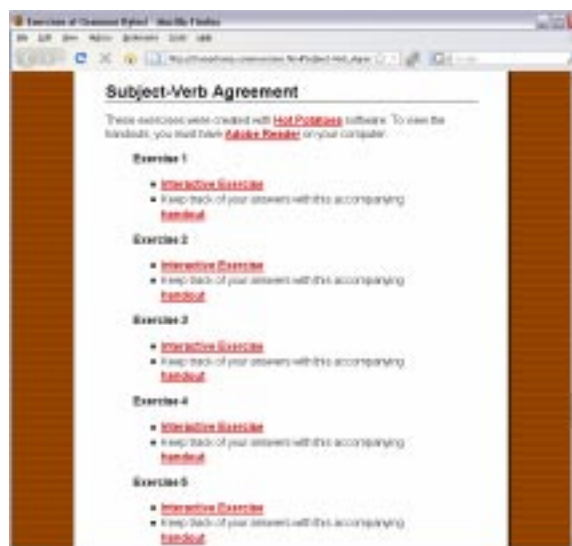
Students apply knowledge of language structure, language conventions (e.g., spelling and punctuation), media techniques, figurative language, and genre to create, critique, and discuss print and non-print texts.

TEKS

§110.42. English I

(3) Writing/grammar/usage/conventions/spelling. The student relies increasingly on the conventions and mechanics of written English, including the rules of grammar and usage, to write clearly and effectively. The student is expected to:

(B) demonstrate control over grammatical elements such as subject-verb agreement, pronoun-antecedent agreement, verb forms, and parallelism.



progress and presents a score in the green answer box at the top of the page. If you would like, have students print this page. Students may also print a handout that corresponds to the exercises; record their answers as they work. This activity allows for class discussions or think/pair/share activities.

Furthermore, Texas's LeTourneau University hosts OwLet: Online Writing and Learning, which provides numerous [interactive tutorials](#). To access the tutorial on subject-verb agreement, simply scroll down the glossary and open Subject-Verb Agreement (number 13). The tutorial addresses each of the major learning styles by providing hints specifically tailored to auditory, kinesthetic, visual, and read/write learners. (Icons indicate where these hints exist.) To begin the tutorial, click the owl at the bottom of the page, and click the pointing finger at the bottom right of each page to advance. At the conclusion of the tutorial, students may take a self-test that provides immediate feedback. Students who want to redo an incorrect or submit a missed answer may use the back arrow key on the main browser to return to the previous page. Questions include both multiple-choice and long answers that students must type out in an answer box. A 1-1/2- to 2-page writing assignment concludes this section. Advise students to ignore the link the Writing Assignment if you do not want students to write this essay.



All in One

If you would rather send students to one site to learn, practice, and apply, the BBC and Capital Community College Web sites cover each stage. Capital Community College's worthwhile resources include a PowerPoint [Subject-Verb Agreement](#) presentation that clearly explains the guidelines for following this grammar convention; examples accompany each guideline. CCC also provides a [handout](#) with the guidelines; however, this handout does not correspond to the PowerPoint presentation, as it presents the rules in a different order. At the bottom of the handout, students will find three interactive, multiple-choice quizzes. Thirteen questions comprise the [First Quiz](#). If students need help, "Hint" buttons reveal the rule at play for that section. Twelve questions make up the [Second Quiz](#); this time, students may read an explanation for each question before or after they select their answer. The [Third Quiz](#) asks students to complete eight

paragraphs by inserting the correct words. The boxes that follow each drop-down menu are for grading the quiz, and links at the bottom of the first and third allow students to submit them for scores. CCC also hosts four practice exercises. Students can find these (and the three quizzes) on the complete list of [Interactive Quizzes](#) under “Verbs and Verbal.” Students may submit each of the four exercises (numbers 34–37) for a score by following the link at the bottom of the page. The first three exercises are multiple-choice; the final one is fill-in-the-blank.



The jewel in the crown of interactive Web sites about subject-verb agreement comes from the BBC. On the [Verb subject agreement](#) page, students will find a fact sheet, game, quiz, and worksheet. Students may access each via the menu bar along the top or by clicking the titles. Instead of presenting all rules at once, the BBC breaks them into three sections through three separate fact sheets. The [first](#) defines subjects and verbs and covers regular, present-tense agreement. The [second](#) covers irregular verbs and confusing subjects, and the [third](#) examines collective nouns. All are printable; find the link to print on the top left of each page. Once they understand the rule, send students to play the [game](#), which comes complete with sound and three levels. This game challenges students to rewrite sentences using a new subject. Once students correct a sentence, they earn points and a chance to find treasure. The more students correctly rewrite questions, the greater the opportunity to find the treasure. For more practice, direct students to the [Worksheets](#). Worksheets [1](#) and [2](#) direct students to circle the correct verb, Worksheet [3](#) presents a text with 16 errors for students to find and to correct, and Worksheet [4](#) requires students to rewrite and correct sentences. All are printable and have corresponding answer keys. These worksheets also work well with think/pair/share activities or independent practice. After students hone their skills, they can move on to the [quiz](#). Again, they have the choice of three levels: not sure, feeling confident, and superstar.



Students struggling with subject-verb agreement no longer must endure endless textbook exercises. Instead, a handful of Web sites use PowerPoint presentations, interactive exercises and quizzes, and games to engage students and to provide ample practice with subjects and verbs. Grammar day? Yeah!

Reference:

Red River College – Subject-Verb Agreement

http://xnet.rrc.mb.ca/leshanson/Hot_Potato/Grammar_PPT/Subject_Verb_Agreement.ppt

GrammarBytes – Subject-Verb Agreement

http://chompchomp.com/exercises.htm#Subject-Verb_Agreement

OwLet – Grammar and Usage

<http://owlet.letu.edu/grammar.htm>

Capital Community College – PowerPoint Presentations

<http://grammar.ccc.commnet.edu/GRAMMAR/powerpoint.htm>

Capital Community College – Subject-Verb Agreement

http://grammar.ccc.commnet.edu/GRAMMAR/sv_agr.htm

Capital Community College – Interactive Quizzes

http://grammar.ccc.commnet.edu/GRAMMAR/quiz_list.htm

BBC – Verb subject agreement

<http://www.bbc.co.uk/skillswise/words/grammar/sentencebasics/verbsubjectagreement/>

Garbology: It's About More Than Just Trash

Andrea Annas

Imagine spending your days sifting through trash at a local landfill. What would you find? What could the trash tell you about the local culture? Strangely enough, this activity is not part of a fictional job. It is the real job of a garbologist.

Garbologists study human cultures by examining trash. This idea may sound strange and perhaps even implausible, but garbologists are just archaeologists examining modern cultures. Digging through a landfill is definitely a dirty job, however, and the smell can be very bad at times. In fact, in 2007, *Popular Science* magazine named garbology as one of the worst jobs in science. Although it may sound like a joke, garbology is a real academic discipline. Garbologists help us gain insight into modern cultures and learn about what happens to the trash in our landfills.

Students will be amazed to learn about the origin of garbology, what garbologists do, how their research has changed modern waste management, and how students can conduct their own garbology projects.

Trash Talk

Garbology is part of the broader social science discipline of anthropology, which is the study of humans. The field of anthropology covers many topics, including human culture, language, biology, and archaeology. For an introduction to the range of topics encompassed by anthropology, visit the American Anthropological Association's site [What is Anthropology?](#) Additionally, view the video, [Doing Anthropology](#), about the field of cultural anthropology



Curriculum Standards for Social Studies:

II. Thematic Strands

III. People, Places, and Environments.

Social studies programs should include experiences that provide for the study of people, places, and environments.

TEKS

§113.39. Social Studies Research Methods

The student understands the basic philosophical foundation for qualitative and quantitative methods of inquiry. The student is expected to:

- (A) develop and use criteria for the evaluation of qualitative and quantitative information;
- (B) generate logical and consistent conclusions from given qualitative and quantitative information; and
- (C) design a research project with a rationale for a given research method.

from the MIT Anthropology Department. When anthropologists study a culture, they attempt to leave all biases behind and simply report their findings or observations.

[Examine a field journal](#) from anthropologist William Duncan Strong from his time in 1933 Honduras; this journal is located at the Smithsonian National Museum of Natural History. To learn more about anthropology, visit the Smithsonian National Museum Natural History's [Department of Anthropology](#). [Search](#) the department's collections, [explore](#) online exhibits, and [learn](#) about research programs.



Garbology and the field of archaeology are closely related. Archaeologists examine artifacts from ancient civilizations to learn about their culture. Sometimes, that “trash” is all that is left of from a group of people. Watch [What Is Archaeology?](#) from the Archaeology Channel to learn what archaeologists do. Unlike archaeologists who examine ancient trash, garbologists examine trash from modern times.

William Rathje and the Study of Trash

William Rathje is widely regarded as the father of garbology. In 1973 as a professor of anthropology at the University of Arizona, Rathje and his students began the Garbage Project by sorting through the trash at the Tucson, Arizona, landfill. Rathje has since excavated over 15 landfills, cataloguing every piece of trash found, and he has written many books. Garbologists' findings give greater insight into modern culture. By examining trash, garbologists learn about what people in a given culture eat and drink, what they do for fun, what the culture considers trash, and much more. Interestingly, a culture's trash can actually give a more accurate picture than surveys and interviews. Rathje's Garbage Project in Tucson—and the projects that followed—showed that, contrary to popular belief, waste in landfills does not biodegrade.

Since most students have little understanding of what actually happens to their trash once the garbage truck picks it up, watch How Stuff Works' [The Garbage Story: An Introduction](#) and [Burying Garbage in Landfills](#). Then, for a closer look at garbologists' work, watch the How Stuff Works video about [Garbology](#) and [listen to Chicago Public Radio's interview with William Rathje](#). To find the interview, use your mouse to scroll down to October 8, 2003, and

click the audio link next to “Garbologist William Rathje.” For some insight into how garbology research is used, [listen to an excerpt](#) from the Archaeology Channel’s The Human Experience, which is about food waste.

Read [A Garbage Census](#), written by William Rathje published in the fall 2000 edition of the Journal for Municipal Solid Waste Management. Search the MSW Management site for “Rathje,” and select from over 30 articles that Rathje has written for the journal that span the last three decades.

A Garbology Project

Rathje’s Garbage Project started from the idea of using modern trash to help students understand the archaeological process; the project grew from there. Most high school students will not have an opportunity to participate in a real archaeological dig; however, assigning students a garbology project is a great way for them to gain hands-on experience and learn what an anthropologist does. Do not worry; your students do not have to venture to a landfill to engage in garbology. They can do it in their school, place of work, place of worship, and even their own home. For example, students at Metro High School in Columbus, Ohio, participated in a school-wide garbology project. Visit their site, [Metro-News](#), to learn about their project. [View pictures](#) and [video clips](#) about the students’ undertaking.

Students conducting a garbology project need to be familiar with the [Code of Ethics of the American Anthropological Association](#). In particular, they should abide by Section A: Responsibility, which explains the importance of being responsible to people and animals with whom anthropologists work and to those whose lives and cultures anthropologists study. Once students choose a place (culture), they should examine the culture’s trash several different times and keep a record of



everything they find. The more students visit a site and examine the trash, the more accurate their results. Students should then present their findings. Presentations can take a variety of forms; create PowerPoint presentations, give oral reports, create videos, and much more.

Since the start of Rathje's Garbage Project, garbology has become more widely accepted in the science and anthropological fields. Critics who once mocked and ridiculed garbology were surprised at the findings and research applications. One of the greatest legacies of Rathje and garbology has been its impact on waste management. Waste in landfills, including paper and food, does not biodegrade. Because of these findings, cities are changing their waste management plans, instituting recycling programs, and educating their citizens about how to reduce the amount of waste going into area landfills.

Reference:

American Anthropological Association – What is Anthropology?

<http://www.aaanet.org/about/WhatIsAnthropology.cfm>

Doing Anthropology

<http://techtv.mit.edu/videos/315-doing-anthropology>

Smithsonian National Museum of Natural History – Department of Anthropology

<http://anthropology.si.edu/index.html>

The Archaeology Channel

<http://www.archaeologychannel.org>

How Stuff Works videos

<http://videos.howstuffworks.com>

MSW Management – A Garbage Census

<http://www.mswmanagement.com/september-october-2000/a-garbage-census.aspx>

Chicago Public Radio – Interview with William Rathje

http://www.wbez.org/audio_library/848_raoct03.asp

Metro-News

<http://www.pastfoundation.org/2006Garbology/index.htm>

Code of Ethics of the American Anthropological Association

<http://www.aaanet.org/committees/ethics/ethcode.htm>

Adaptations

Alan Sills

Adaptations: How do plants and animals survive in their natural environments?

Our planet has an amazing diversity of plant and animal species, and each species lives within a specific environment. Environments change over time, from season to season and from year to year. In order for each species to survive within its environment, it must adapt to these changes and minimize its exposure to predators. In essence, adaptation is a key to the continuation of each species found here on Earth.

Students explore links to online content that facilitates the study of various species and their ability to adapt to their environments. Students will also learn the concept of environmental change, as global change continues to be a controversial and engaging topic. Finally, students will encounter interactive visuals that help bring this topic to life.

Introduction to Adaptations

Scholastics' [Animal Adaptations](#) engages viewers through an online interactive investigation. Animal adaptations, or the way an animal adapts to its environment, include the development of certain traits or behaviors over time that enables this animal to better survive in its environment. In this interactive activity, students will select an animal and report the ways in which this animal adapts to its environment. The activity begins by [investigating the facts](#) and ends by asking students to report their findings. Students can use the glossary to learn technical terminology.



Students should then record their findings in an "observe and record" section; they can then report their findings. The Web site

NS.K-4.1 Science as Inquiry

– including the abilities necessary to do scientific inquiry and understanding about scientific inquiry.

TEKS

§112.6. Science, Grade 4.

(6) Science concepts. The student knows that change can create recognizable patterns. The student is expected to:

(A) identify patterns of change such as in weather, metamorphosis, and objects in the sky;

(B) illustrate that certain characteristics of an object can remain constant even when the object is rotated like a spinning top, translated like a skater moving in a straight line, or reflected on a smooth surface; and

(C) use reflections to verify that a natural object has symmetry.

gives students the chance to read about four animals. However, there are many other options, and you may wish to place a local emphasis on the students' choice of animal. Additionally, you may allow student pairs to select their own animals. Close the activity by having the students make a poster or a PowerPoint presentation to share their findings.

Environment and Adaptations

Global Forest's [Adaptations of Animals & Their Survival in Local Environments](#) is a Flash-enhanced slideshow. Students read about and explore environments and how animals adapt to these environments. Additionally, a glossary supports the Web site. Click through the slides to learn about some adaptations, including those of the giraffe, smaller forest mammals, and more. The fourth slide has a spectacular photo, and you may wish to spend time discussing with students what animals may live in this environment and what adaptations they may need to have in order to survive and even thrive within that environment.



The slideshow highlights many animals and you may wish to have students select an animal of particular interest and to prepare a report on that animal, elaborating upon its ability to adapt beyond the information presented in the slideshow. Students can deliver their reports in front of the entire class, either using posters or PowerPoint. The slideshow ends with a quiz and gives students the opportunity to print their own certificates of completion with their score on the quiz.

Plants Adapt to Their Environments, Too

The Missouri Botanical Garden presents [Plant Adaptations](#) on their [Biology of Plants](#) Web site. The introduction (landing) page defines plants as a life form like animals. Work through the bullet points on this page, and discuss the photos to ensure that students see plants as a viable life form. Once they accept plants as a valid form of life, you can begin to address the topic of plants adapting to their environments. You may wish to create a list of common familiar environments. Give them an opportunity to relay experiences, perhaps on family trips during which they have visited

an environment (mountain forest, tropical beach, desert, and so on) that is significantly different from the environment in which they live. Ask students to identify the kinds of plants common to their own environment. At the close of this discussion, return to the [Plant Adaptations](#) page, and encourage students—in teams of two or three—to become experts in one of the environments detailed.

When students click each environment, the site defines the conditions of that environment, the common plants, and those plants' adaptations. If time permits, encourage the class to explore their environment in greater depth. Select two or three specific plants found within that environment, as well as the adaptations each plant exhibits to ensure its survival as a species within that environment. Teams of students should culminate the activity with a presentation of their findings in front of the class. As a closing thought, ask what may happen to the species they studied if the environment were to rapidly shift because of global climate change. Extend this activity by exploring regions where change is occurring, such as along the perimeter of the Sahara or areas of the United States in which warming has enabled certain species to migrate farther north than ever before. This behavior applies to both animals and plants; be sure to ask students which group may be better able to adapt to these environmental changes.



Penguins: A Unique Animal in an Exotic Location

Penguins are a classic example of an animal your students are unlikely to ever encounter in its natural environment. As such, and likely as a result of their unique appearance, penguins often captivate the interest of young people. [PenguinScience](#) has created a Web site that enables students to explore penguins' environment, behaviors, and adaptations. Begin this investigation by clicking on [Climate Change](#). Use this page to discuss the photos depicting the climatic zone and environment in which penguins live. Be sure to establish that these birds live on the fringe of Antarctica, which is a unique, cold, and isolated environment. You may choose to discuss the various charts presented on this page as well if you wish to address the impact of climate change and the ability of the penguins to adapt. Return to

the main page to continue this investigation, and use the back button on the browser to return to the home page.

To further familiarize students with penguins, direct them to the [Sounds of the Colony](#) page. Click the photos to hear the sounds emitted by these unique animals. After listening to two or three sound clips (you'll need to download each clip and then play it in your Windows media viewer), return to the main page (hit the browser's back button), and encourage students to explore some of the assorted photograph pages to further study penguins. Next, continue the lesson by directing the students to [Adelie Penguin Adaptations](#). Instruct students to study and prepare a summary report on each adaptation, discussing how this adaptation helps the penguin survive in such a forbidding environment. Posit to your students how climate change may impact penguins—especially if there is rapid change in the Antarctic sea ice or in ocean currents surrounding Antarctica.



Adaptation is the key to any species' survival. Those species most able to adapt to changes in their environment have the least risk for extinction. Extinction is the ultimate end for any species that is unable to adapt to changes in its environment. Even though well over 95% of the species known to ever exist on Earth are now extinct, concern continues to grow among some scientific communities that rapid global change could increase the rate of extinction. Since humans are connected to the global ecosystem and because we have a responsibility to shepherd the planet, we need to understand how species adapt to best minimize any risks as environments change over time.

Reference:

Scholastic – Animal Adaptations
<http://teacher.scholastic.com/dirtrep/animal/index.htm>

Scholastic: Animal Adaptations – Investigate the Facts
<http://teacher.scholastic.com/dirtrep/animal/invest.htm>

Global Forest – Adaptations of Animals & Their Survival in Local Environments
http://www.gfawesome.org/~flashVersion=true/school/lessons/ECOLOGY-1/01_-_Adaptation_of_Animals/

Missouri Botanical Gardens – Plant Adaptations
<http://www.mbgnet.net/bioplants/adapt.html>

Missouri Botanical Gardens – Biology of Plants
<http://www.mbgnet.net/bioplants/main.html>

PenguinScience
http://www.penguinscience.com/classroom_home.php

Climate Change
http://www.penguinscience.com/clim_change_ms.php

Sounds of the Colony
http://www.penguinscience.com/education/sounds_of_the_colony.php

Adelie Penguin Adaptations
<http://www.penguinscience.com/education/adaptations.php>

Finding Mathematics in Nature

Kira Hamman

Spring is finally here. If you are lucky, you can open a window in your classroom and let a warm breeze blow in. Of course, if you do that, no one will be able to concentrate on the lesson, including you. So go ahead: Go outside! Indulge your students' (and your own) spring fever and teach some math at the same time.

You can find interesting, beautiful, and at times complex mathematics everywhere in nature. The Fibonacci sequence, a series of numbers in which each entry is the sum of the previous two, shows up especially frequently: in the curve of a snail shell, the seeds of a sunflower, and the petals of a pine cone, to name just a few. The golden ratio, a number intimately connected to the Fibonacci sequence, also comes up in many natural settings.

We will first look at the Fibonacci sequence and the golden ratio from a mathematical perspective. We will then look for examples of these two mathematical concepts in the natural world around us.

The Fibonacci Sequence and the Golden Ratio

To understand the Fibonacci sequence, all students need to be able to do is add. For younger children, simply explain that the sequence begins with two 1s and continues by adding the previous two numbers to get the next, as follows:

1 1 2 3 5 8 13 21 34 55 ...

With older students, use Fibonacci's formulation of the sequence. A fabulous real-life

NM-ALG.3-5.1

Understand patterns, relations, and functions
Analyze characteristics and properties of two- and three-dimensional geometric shapes and develop mathematical arguments about geometric relationships
Apply appropriate techniques, tools, and formulas to determine measurements

TEKS

§111.13. Mathematics, Grade 1.

(4) Patterns, relationships, and algebraic thinking. The student uses repeating patterns and additive patterns to make predictions. The student is expected to identify, describe, and extend concrete and pictorial patterns in order to make predictions and solve problems.

(6) Geometry and spatial reasoning. The student uses attributes to identify two- and three-dimensional geometric figures.

The screenshot shows a web page titled "Fibonacci's Rabbits" with a diagram illustrating the growth of a rabbit population over four months. The diagram shows a tree structure where each node represents a pair of rabbits. The number of pairs at each level corresponds to the Fibonacci sequence: 1 pair at month 1, 2 pairs at month 2, 3 pairs at month 3, and 5 pairs at month 4. A list of four numbered points explains the growth process, and a table on the right lists the number of pairs at each month.

1. At the end of the first month, they mate, but there is still only 1 pair.
2. At the end of the second month the female produces a new pair, so now there are 2 pairs of rabbits in the field.
3. At the end of the third month, the original female produces a second pair, making 3 pairs in all in the field.
4. At the end of the fourth month, the original female has produced yet another new pair, the female born two months ago produces her first pair also, making 5 pairs.

Month	Number of pairs
1	1
2	2
3	3
4	5

example deals with the breeding of rabbits. An appropriate introduction is available at [Fibonacci Numbers and Nature](#).

Ask students to find the first 20 Fibonacci numbers. Next, ask them to choose their own two starting numbers (instead of 1 and 1) and create a sequence by following the Fibonacci rule. What patterns do they observe? What happens when you start with two of the same number versus two different numbers?

The golden ratio is the ratio of each Fibonacci number to the next one, as follows:

- $1/1 = 1$
- $1/2 = .5$
- $2/3 = .66\dots$
- $3/5 = .6$
- $5/8 = .625$
- $8/13 = .615\dots$
- $13/21 = .619\dots$
- $21/34 = .618\dots$
- $34/55 = .618\dots$

And so on. You may notice that these ratios are getting closer together. Indeed, they are converging to a particular number, approximately .618, which is the *golden ratio*. Ask students who have learned to divide to find the ratios of the first 10 pairs of Fibonacci numbers and to write down what they notice. Then ask them to find the ratios in the reverse order (each number divided by the previous, rather than the next) and to write down what they notice. Dr. Knott offers both [a good written explanation of this phenomenon](#) and an interesting discussion on BBC Radio about the [Fibonacci Sequence](#) and the golden ratio.

Fibonacci in Nature

The Fibonacci sequence comes up in some surprising places in nature. For example, the seeds of a



sunflower are arranged in two sets of spirals—one running clockwise, and the other running counterclockwise. The surprising point is that the number of these spirals is always a pair of consecutive Fibonacci numbers! To observe a demonstration of this, visit [Seed heads](#) and scroll down until you see the sunflower. Click “show right spirals” and “show left spirals” to see the spirals going each direction.

Pinecones have a similar pattern; check this phenomenon out on the [Pine cones](#) page. Click the links to see the spirals traced. Some [Vegetables and Fruit](#), such as pineapples, broccoli, and cauliflower, also have the Fibonacci spirals pattern.

After showing students how to count spirals, challenge them to count using real objects. If possible, go outside and collect seed heads and pinecones to bring back to the classroom. Ask students to count the number of spirals going each direction on different objects. How many different Fibonacci pairs are there? If it is not possible to take the students outside, bring pinecones and flowers into the classroom ahead of time for them to count. For homework, ask students to get a Fibonacci fruit or vegetable and do the investigation at the end of the [Vegetables and Fruit](#) page.

The Golden Ratio in Nature

The golden ratio is hidden in many places in nature, from the [spiral of a snail shell](#) to the [proportions of the human body](#). To understand [Fibonacci in nature](#), we must first make a golden rectangle, which is simply a rectangle whose side lengths are in (approximately) the golden ratio to one another. After explaining how the construction works, ask students to follow the directions to draw their own golden rectangles. They can cut the rectangles out to get a better idea of what the proportion looks like.

The golden rectangle is, for some reason, very pleasing to the human eye. Many things in our world are proportioned roughly according to the golden ratio: doors, windows, sheets of paper, iPods, and so on. Ask students who have learned about measurement to measure rectangular objects around their homes and to bring the measurements to school. In class, check the ratio between side lengths, and see which objects come closest to the golden ratio. Is



there a pattern? What kinds of things have the ratio, and what kinds of things do not? Why might that be?

For a wrap-up activity, try reading [Math Curse](#) by Jon Scieszka (check the book out at a library or pick it up from a store). In this wonderful book, appropriate for most elementary students, a little girl has a math adventure after her teacher (who is named Mrs. Fibonacci) says that “math is everywhere!”

The Fibonacci sequence and the golden ratio are all around us. Learning about these important math concepts not only helps students begin to understand the importance of mathematics in the world, but it also teaches them about order in nature. Furthermore, completing hands-on activities dealing with natural objects is a great way to counteract end-of-year wiggles. Get some flowers and start counting!

Reference:

Fibonacci Numbers and Nature

<http://www.mcs.surrey.ac.uk/Personal/R.Knott/Fibonacci/fibnat.html>

BBC Radio: The Fibonacci Sequence

http://www.bbc.co.uk/radio4/history/inourtime/inourtime_20071129.shtml

Spirals and Snails

<http://www.popmath.org.uk/rpamaths/rpampages/snail.html>

The Golden Section and the Human Body

<http://milan.milanovic.org/math/english/golden/golden2.html>

Fibonacci in Nature

<http://www.geom.uiuc.edu/~demo5337/s97b/spiral.html>

Poetry Journals for Summer Memories

Stephanie M. Hamilton

“Half a league, half a league, half a league onward; All in the valley of Death rode the six hundred” are the first lines of the Alfred, Lord Tennyson poem “Charge of the Light Brigade.” This poem, like many others, is a lyrical account of an historical event. The rhythm of poetry helps us remember and recall memories that might otherwise fade away.

As the school year comes to an end and summer looms, students might focus less on academics and more on swimming, camping, or just playing at a neighborhood park. Writing poetry is an activity that provides practice in using vocabulary; applying comprehension skills; and demonstrating proficiency in grammar, spelling, and punctuation. Two of the most challenging forms of poetry are the haiku and the cinquain; both forms require a minimal use of words and compliance to a set number of syllables.

The haiku and its “cousin” the cinquain are ancient forms of writing that students may find fun to write. Many Web sites are devoted to both forms of poetry and are appropriate for all students—from struggling readers to those who can benefit from more challenging work. In addition to writing their own haikus and cinquains in class, assign students a journal over the summer. Instruct them to write entries in one of these forms of poetry. Then, when school begins again, students can share their summer memories through verse.

NL-ENG.K-12.5 COMMUNICATION STRATEGIES

Students employ a wide range of strategies as they write and use different writing process elements appropriately to communicate with different audiences for a variety of purposes

TEKS

§110.7. English Language Arts and Reading, Grade 5. (5.19) Writing/writing processes. The student selects and uses writing processes for self-initiated and assigned writing.



Introduction to Haikus and Cinquains

Scholastic's [Writing with Writers: Poetry](#) offers students a comprehensive introduction to poetry. Students can listen to poets read their own work, learn more about different types of poetry, and then create their own poems. Select the Grade 4–8 option with Karla Kuskin, who demonstrates how to use descriptive words to create poems. Next, tell students to click the “Create Your Own Poem” section. This contains prompts for writing haikus, limericks, cinquains, and free-verse poems. Assign struggling students to work in pairs or small groups to create poems.

While students are learning more and practicing the art of poetry-writing, teachers may want to enhance their own background knowledge. [About Cinquain](#) provides a very short summary of how American poet Adelaide Crapsy invented the cinquain form after reading and translating Japanese haikus. [Haiku](#)

[for People](#) is a comprehensive summary of this traditional form of Japanese poetry. One key to the haiku, according to the Web site, is that it should contain a reference to a season by using a “kigo” or a season word. That should make writing haikus over the summer an especially fun activity for students. Lead a brainstorm activity of “summer words” prior to the end of the school year. Then, ask students to use one of these words in every haiku they compose. [Explore Japan: Haikus](#) provides a short and clear summary of haiku writing's origins.



Writing Poetry

[Composing Cinquain Poems with Basic Parts of Speech](#) is a lesson plan for teachers and contains many resources to support student learning. If time is limited, take a look at the [Sample Cinquains](#) handout, which you can download and copy for students. This handout lists several sample cinquains. It provides an overview and has a graphic organizer to help students write their own cinquains. To build fluency, invite small groups of students (or individual students) to select one cinquain to read repeatedly. (Repeated reading is an effective method for fluency building.) The last page of this handout includes a reflection sheet for students to think about their work after writing. This page is a good way to assess student progress. Encourage students who

need more challenging work to [Write an Instant Cinquain](#), or assign this as a follow-up activity.

Since haikus are a popular form of poetry writing, many Web sites are available. Consider each of these: KidZone's page [Haiku](#) and [Children's Haiku Garden](#). On the KidZone page, students learn more about how to write a haiku; you may also want to download and print the following three worksheets:

- Worksheet 1: Information about syllables and haikus. Example poem to analyze.
- Worksheet 2: Information about syllables and haikus. Write your own haiku.
- Worksheet 3: Information about syllables and haiku. Write your own "What am I?" haiku.

[Children's Haiku Garden](#) is filled with examples of haikus written and illustrated by children from around the world. Arrange groups of students to read poems from different countries and then share their thoughts with the whole group.

Throughout the last few weeks of the school year, you might have students create one poem each week based on a vocabulary word; a story from the reading lesson; or even a topic from math, science, or social studies. This activity will give students many opportunities to practice these forms of poetry. Over the summer, ask students to record their activities using the [Travel Journal](#). For each activity, students should create either a haiku or cinquain based on the events listed. At the beginning of the next school year, students could share their summer memories through verse. Students might even want to illustrate posters with their poems for display.



Reference:

Writing with Writers – Poetry
<http://teacher.scholastic.com/writewit/poetry/>

About Cinquain
<http://www.ahapoetry.com/CINQHMPG.HTM>

Haiku for People

<http://www.toyomasu.com/haiku/#whatishaiku>

Explore Japan – Haiku

<http://web-japan.org/kidsweb/explore/language/q2.html>

Composing Cinquain Poems with Basic Parts of Speech

http://www.readwritethink.org/lessons/lesson_view.asp?id=43

Write an Instant Cinquain

<http://ettcweb.lr.k12.nj.us/forms/cinquain.htm>

KidZone – Haiku

<http://www.kidzone.ws/poetry/haiku.htm>

Children’s Haiku Garden

<http://homepage2.nifty.com/haiku-eg/>

Travel Journal

<http://www.activityvillage.co.uk/Travel%20journal.pdf>

A Week for Animals

Geri Ruane

Name _____

Nearly a century ago, the American Humane Association started an annual event that takes place during the first full week in May: Be Kind to Animals Week. This event, which takes place from May 3 – 9, focuses on humane education about all types of animals. Animals play an important role in our lives and deserve humane treatment – whether they are living in the wild or inside your house!

Let's take some time in this month's Internet Challenge™ to learn about different ways that we can care for and celebrate animals. We will come to understand that kindness and respect for animals carries over to how we treat each other. We begin our online adventure.

Our first Web site is [American Humane.org – Be Kind to Animals Week](http://americanhumane.org) and it can be found at <http://americanhumane.org/protecting-animals/special-events/be-kind-to-animals-week/>

Read the information on this Web page and then answer these questions. Be sure to click "learn how" in each of the short paragraphs. Then, click your browser's "Back" button to return to the main page.

1. What kind of meter could animal abuse represent?
2. What does this phrase mean: *to give an animal a second chance at happiness?*
3. *If wildlife comes too close to home, look for ways to coexist with animals or to protect your property humanely. Which description below is an accurate definition for the word "coexist?"*
 - a. To exist together, at the same time, or in the same place
 - b. To live in peace with another or others despite differences
 - c. To live together in harmony
 - d. all of the above
4. Give one example of how to live humanely with wildlife.

5. Explain in your own words why trapping and relocating skunks is not a good choice.

9. What are microchips and why are they used?

6. Your parents are going to allow you to adopt a dog. What types of items should you have for your dog before you it comes home with you?

Awesome answers!

Our next destination is called [Pawprints and Purrs, Inc. – Be Kind to Animals Week](http://www.snicksnak.com/ac/may_bk2a.html). It is located at http://www.snicksnak.com/ac/may_bk2a.html

Read the information on this page, and then answer the following two-part question.

7. For what purpose is a dog den used?

10. (A) List two objectives of “humane education.”

(B) Explain what humane education can teach us.

8. How does exercise help a cat?

Good work!

Our next Web site is from the [Tampa Bay Online-Be Kind to Animals Week Starts Today](http://www2.hernandotoday.com/content/2008/may/04/hb-be-kind-to-animals-week-starts-today/entertainment/) located at <http://www2.hernandotoday.com/content/2008/may/04/hb-be-kind-to-animals-week-starts-today/entertainment/>

This article, even though it was written in 2008, has excellent information. Read it, and then answer this question.

11. How many years ago did the governments of the United States and Canada grant their official endorsements to “Be Kind to Animals Week?”

Excellent!

The next Web site, [The American Humane Society](http://www.americanhumane.org/about-us/newsroom/news-releases/09cat_friendly.html), discusses cat-friendly cities in the United States. Read the article at http://www.americanhumane.org/about-us/newsroom/news-releases/09cat_friendly.html

12. (A) Even though there are more cat owners in the United States, increasing numbers of cats are brought into animal shelters. What steps do you think should be taken so that this does not happen?

(B) In what ways are these cat-friendly cities in the United States making a difference?

Good work!

Extension Activity – Choose one or all of them!

- Do something special for an animal! Looking at the list of to-do items listed on this Web page, name three items that would be your “top three”

for an animal. Write down your opinions as to why they are important and hold a roundtable discussion with your teacher and classmates. Talk about it!

- Make a difference for pets and wildlife in our community or in the world! Create a presentation that shows how you would improve the lives of animals (either pets or wildlife). Use the Web sites in this activity for resources. Then, either with pencil/pen/paper and art tools or appropriate computer software design your slideshow. Include at least eight slides in your presentation along with reasons as to how your ideas would make a difference for all animals. After your project is completed, share it with your teacher and classmates. Talk about it!
- Design a poster advertising this event to your school or your community. How would you persuade people to get involved? Use appropriate software or paper, pencil, and art tools to create your announcement. After you are done, present your poster to your teacher and classmates. Talk about it!
- Design a 21st century animal shelter. What features would it have to help the lives of abandoned animals? Create your 2D or 3D model building with special design software (suggestion: free Google Sketchup 7.0 – only with teacher/parent permission), boxes or with paper, pencil, and art tools. After you have finished it, present it to your teacher and classmates. Talk about it!
- Give your opinion on the following statement: “Kindness toward animals is a building block of a humane and compassionate society.” Be prepared to talk about it!

For ideas, visit [Be Kind to Animals Week – Associated Humane Societies and Popcorn Park Zoo](http://www.ahscares.org/showarchive.asp?id=440). Find this site at <http://www.ahscares.org/showarchive.asp?id=440>

Congratulations! You have done an amazing job completing this month’s Internet Challenge™.

Answers to May's Internet Challenge™

1. Animal cruelty and abuse is not only tragic for animals, but also an indicator that other forms of abuse, such as domestic violence, could be happening
2. Every year, an estimated 3.7 million animals must be euthanized at our nation's shelters because they could not be adopted into loving homes. To give an animal a second chance at happiness means taking an animal that is unwanted, adopting it, and giving it the love and care it deserves.
3. (A) all of the above
4. Students' own answers.
5. While humane traps will not harm these animals, relocation is a poor choice. Studies have shown that many species of wildlife do not survive when placed in a new territory because of aggression from other animals, unfamiliarity with hazards such as roadways, or the inability to find food and water. Moving an animal, even a few miles away from its home, can have devastating effects. If the animal is a female, you may be removing her from her babies that depend on her for their survival.
6. Make sure you have everything your pet will need before you bring it home, such as an ID tag, food, bowls, leash, collar, dog den, and toys.
7. Dogs need a sanctuary, a place that is large enough for them to fit inside and feel secure and safe. "A home away from home" – a dog den could be a chair, a place behind the couch, or a crate. The dog den can be used to housetrain your dog for short periods of time or as a refuge from the hubbub of family activities.
8. Cats need physical exercise and a lot of mental stimulation. Without it, they can get bored and develop behavior problems. Cats like to chase things because they are natural hunters. Create games that challenge and excite them where they can hunt and catch their imaginary prey.
9. Microchips are tiny capsules injected painlessly under an animal's coat. Each chip contains a unique ID number that can be read by a microchip scanner and matched with owner information in a comprehensive database. According to the American Humane Association, microchips are effective and safe, and provide excellent backup identification for pets.
10. (A) One objective of humane education is to create a culture of empathy and caring by stimulating one's moral development and sense of responsibility. In addition, the end goal of humane education is to create a more compassionate and responsible society.
(B) Humane education teaches people how to accept and fulfill their responsibility to companion animals. It teaches people to understand the consequences of irresponsible behavior and finally, humane education encourages the value of all living things.
11. The American and Canadian official endorsements were granted in 1952, which is 57 years ago.
12. (A) Students' own opinions.
(B) These major metropolitan areas have provided a wealth of resources for cats and their owners as well as educated the public about felines and their health (including veterinary care, microchipping and cat-friendly local ordinances.)

Extension Activities – students own answers.

Our Energy Connections

Lisa Kerscher

On April 8, 2009, reports revealed that cyberspies had cracked into the U.S. electrical grid. Officials suspect that computer programs have been put in place that could damage or disrupt the nation's power supply at some time in the future. National security agents are looking into how to remove the programs and how to protect the system against future attacks.

This problem shows how sophisticated our energy use has become. Only fairly recently have humans relied on computers to help provide energy for routine and widespread use. Burning wood was one of the earliest forms of producing useful energy; however, that energy could only be used wherever the fire burned. Today, our energy sources are most often turned into electricity. Through the electrical grid, this energy gets carried across long distances. In your home or school, your computer plugs into this energy flow.

During this exploration, you will learn a lot about what energy is, how it is turned into electricity, and how that electricity gets to your home so that your lights come on with just a flip of a switch.

Energy and Electricity Basics

Get an introduction into what energy is and how people use it by visiting the [Energy Star Kids](#) site to **Find Out Why Your Planet Needs You**. Start by answering the question **What Is Energy?** For each of the five forms of energy, list one or two specific ways you use that form in your own life. For example, you may use motion energy by bicycling to school or by playing sports.

Using the menu on the left-hand side of the screen, go to the next page to answer the question **Where Does Energy Come From?** Click each star shown on the screen to learn more. Now, for each of the items on the list you made, write down the most likely energy source.



TEKS

§112.7. Science, Grade 5.

(8) Science concepts. The student knows that energy occurs in many forms. The student is expected to:
 (A) differentiate among forms of energy including light, heat, electrical, and solar energy;
 (B) identify and demonstrate everyday examples of how light is reflected, such as from tinted windows, and refracted, such as in cameras, telescopes, and eyeglasses;
 (C) demonstrate that electricity can flow in a circuit and can produce heat, light, sound, and magnetic effects;

The next page explains the two main **Types of Energy**. Mark which items on your list you think may be fueled by renewable or non-renewable energy sources. For each item, list a similar, alternative way of doing that action that would use the opposite type of energy source. For example, bicycling to school uses food, a renewable source; motorcycling to school uses gasoline, a non-renewable source.

Find out What Can Happen when we use a lot of energy. Then, learn about **Saving Energy** and how you can make big changes to make a difference. If you have time, check out **The Energy Stars, Word Bank, and Factoids** using the tab menu at the bottom of the screen.

Energy and Electricity In-Depth

Now, head over to the [EducaPoles](#) multimedia site. When you are on each slide show page, click on the link below the animation screen to view it full-screen. Use the arrow near the top of the screen to move forward through the slide show, and follow the instructions on each screen. Start with the slide show that compares [energy consumption today and in the past](#). After reading through a few introduction slides, you will follow Henry, living in 1930, and Lucas, living in 2008, tracking each boy's energy use as you go. Think about the energy-use list you created earlier. Which parts of this list would change if electricity did not exist?



Move on to learn more about [how we convert natural energy into human-made energy](#). Write a sentence about what parts of energy use have stayed the same over time. Write another sentence about what has changed in energy use.

Next, dig deeper into answering the following question: [Where does energy come from?](#) In this slide show, you will learn the pros and cons of fossil energy, nuclear energy, and renewable energy. For each type, list the specific sources that fall into that category. Also, summarize the pros and cons for each.

Having an energy source in hand is only one part of the electricity picture. [Converting Energy](#) into a useful form is another key piece. Copy the two rules the exchange of energy must follow.

Continue through the slide show to see how those two rules apply to converting energy sources to electricity. Finally, copy the chart for each of the examples showing the percentage of heat lost.

Learn more about [Tracking Electricity](#)—from the primary source to its conversion into electricity to its delivery at your home. Copy the diagram of the steam gas turbine, labeling each part and writing a sentence that describes what it does. Be careful not to include the line to the houses, however. Which part converts the mechanical energy into electricity?



Now, add onto your diagram by including the parts between where the electricity is produced and what gets the electricity to your house. Discuss with classmates how your local electricity is produced. Ask your teacher to help identify the primary energy sources that are used, where exactly the energy source may have originated, and where the power is converted into electricity. Write these notes on the classroom board to use later in your newspaper activity.

Reference:

Energy Star Kids

http://www.energystar.gov/index.cfm?c=kids.kids_index

EducaPoles

http://www.educapoles.org/index.php?/multimedia/flash_animations/&pg=3

Evaluating Web Resources

J. Alan Baumgarten

Learners Online writers spend a lot of time researching the best educational resources to support classroom instruction and provide extended learning opportunities. What are the criteria for determining which sites to use and which to pass on? This month's Geek Tutor outlines an evaluation rubric that can help you determine the quality of the Web resources you find on your own.

Teachers who use Learners Online find out about excellent educational resources for classroom use. But what about sites you learn about from other sources, or resources you find on your own? How can teachers evaluate sites to determine which are the best to use?

Finding good web sites really is not the problem. You can fire up Google, enter "Italian Renaissance" as a keyword, and get 1,620,000 results (in 0.11 seconds). No, the real problem is determining the best three out of 1.6 million within a few minutes. How do Web-savvy teachers eliminate 1,619,997 duds? And how can anyone find the best site if it happens to be result number 85,993? That is the focus of this week's Geek Tutor.

Our framework for evaluating educational web resources includes the following criteria:

- School Worthiness
- Age Appropriateness
- Credibility
- Information Integrity
- Presentation Quality

Let's look at each one of these individually.

Criteria 1: School Worthiness

Is the resource appropriate for use in public (or private) school?

As teachers, you are explicitly and implicitly aware of the kinds of information and materials that are appropriate in education settings. Some of these standards may be explicitly outlined in your school's Policies and Procedures guidelines, and you should be familiar with them. You should also be implicitly aware of content that does not align with the spirit of an academic environment. The exact lines may vary from community to community – and this is where you really need to be in touch with local standards – but there are some content themes that are universally considered out of line. Do not consider using any sites that fall short of these basic minimum standards:

- **Language.** The resource should not contain vulgar, hateful, or discriminatory language, nor should it condone the use of such language.
- **Dress.** People depicted in photos or illustrations should be appropriately dressed. Apply your school's dress code to the site as part of your evaluation criteria.
- **Illegal substances.** The site should not contain images or references to the use of alcohol, tobacco products, or illegal drugs.
- **Sexual content.** There should be no sexually explicit content or references to sexuality or sexual acts. Age-appropriate Health instruction relating to sexuality is best handled offline.
- **Highly commercial sites.** This area is a bit more of a gray area today, but commercial advertisements are still largely regarded as inappropriate for public schools. Sites that are overtly commercial and heavily monetized through banner advertisements may not be a safe choice. And keep in mind that site owners often have no control over which banner ads are shown. The site may look fine when you review it, but a different ad may appear when students visit the page, not to mention the increased risk of a student clicking through to a highly inappropriate site.

Criteria 2: Age Appropriateness

When considering the age and grade appropriateness of a Web resource, there is more to consider than just reading level. Think specifically about the type of content on the site and the way you intend to use it. If students will primarily be looking at images, it may not be a problem if the reading level is too high. If students will be watching a video clip, they can usually handle a higher level. Here are a few other considerations:

- **Age appropriate tone.** Consider the topic and evaluate the site's treatment of the topic. Is it the right tone for the grade level you are teaching? Is it fun and engaging for younger learners, or serious and scholarly for older students?
- **Age appropriate images.** Students who are more mature can tolerate exposure to more graphic and controversial images than younger students.
- **Age appropriate treatment of subject matter.** Older students are better prepared to confront the nuances of alternative historical interpretations, complex literary themes, and controversial science.

Criteria 3: Credibility

Teachers who use only state-approved curriculum materials do not have to worry about the credibility of the information sources. The major textbook publishers have a rock-solid reputation for checking facts and validating information sources.

Teachers who use Web resources don't get off quite so easy and are obliged to ensure the credibility of information that students are exposed to. Here are some considerations when evaluating site and source credibility.

Recognized authority. Is the site sponsored or hosted by a recognized authority? The [U.S. National Archives and Records Administration](#) is considered the highest authority regarding information about historical documents like the Declaration of Independence. [USHistory.org](#) also has information on the Declaration of Independence, but in contrast this site has far less authority.

A good way to investigate the authority of an information source is to look for an About page. Be suspicious of any site that does not have one.

Special credentials. Just because a resource is not hosted or maintained by a highly credible institution does not make it inappropriate for use in the classroom. Many excellent resources are published by individuals who have special experience or subject knowledge. A site about lobster fishing created by a Maine lobster fisherman with first-hand knowledge of the subject may be entirely appropriate for use in the classroom.

Criteria 4: Information Integrity

Evaluating the information integrity of a site is closely related to considerations about the credibility of the source; however, there

are some key differences that are worth pointing out. Even if the source passes the credibility test, the information presented may not pass the information integrity test. Here are some considerations:

Current and timely. Depending on the subject matter, information should be kept current. One of the most compelling aspects of the Web is its ability to continually deliver fresh content. If you are learning about weather, study today's weather. If you are studying the ozone hole, see how it's looking this month. If stale is what you want, open a textbook.

Objectivity. As you consider the credibility of the source, look for evidence of bias, slant, or an agenda. An activist organization with a scientific sounding name may contain information about the environment that is more propagandistic than objective. There are plenty of resources containing the work of recognized scientists and researchers. Favor those.

Wisdom of the crowd. Many educators are skeptical of open source information sites like Wikipedia or About.com. I personally don't share the skepticism because the peer review system helps ensure that inaccuracies are identified and corrected. I wouldn't want students to do an entire report based on Wikipedia, but it is a valid source of general information about almost anything.

Academic rigor. Sites with a high level of information integrity follow the conventions of academic rigor in that they provide appropriate citations to source material and include complete bibliographic references. Such sites are great academic models for students.

Criteria 5: Presentation Quality

While I have no grudge against Web publishers who lack the skills and the funds to create quality, well designed sites, I also know that sites with high production values are more engaging to students. As a teacher, I want every advantage I can get. Here are some considerations regarding presentation quality:

Visually rich design. Look for sites that have strong visual appeal, sites that are beautiful to look at, balanced, and well structured, with plenty of white space (empty spaces on the page that allow the eye to focus on what's important).

Color is good, but not garish or highly saturated color. Images are good, but not when they are just thrown in anywhere. Avoid sites that look like a page of heavy text ripped straight out of textbook.

Interactivity. Give extra weight to sites that follow the standard conventions for interactivity: hover states, layered dialogs, and animated transitions. These little touches help sustain students' interest in the subject matter.

Rich Media. Don't just look for sites with good textual information. Pay special attention to sites that feature rich media: audio, video, animations, simulations, games, etc.

Scoring

I personally don't use or recommend using a scoring system for evaluating sites. The reason is simple, but subtle: scoring systems are based on addition and subtraction, whereas site evaluation is more a matter of multiplication. In effect, a complete failure in any of these categories is enough to disqualify the site.

This is how the concept plays out mathematically:

School Worthiness	0
Age Appropriateness	2
Credibility	1
Information Integrity	2
Presentation Quality	x 3
Total Score	0

And this is true. If a resource is inappropriate for school, no other considerations can compensate.

Here is another example:

School Worthiness	3
Age Appropriateness	2
Credibility	1
Information Integrity	2
Presentation Quality	x 0
Total Score	0

As a teacher, I would not want to squander my students' Internet time (and all their enthusiasm for online learning) on a boring, text-heavy, poorly designed site.

Practice

How would you rate the following resources based on the criteria outlined in this article?

Energy Star Kids

http://www.energystar.gov/index.cfm?c=kids.kids_index

American Humane Society – Be Kind to Animals Week

<http://americanhumane.org/protecting-animals/special-events/be-kind-to-animals-week/>

Online Math Learning – Circles and Circle Theorems

<http://www.onlinemathlearning.com/geometry-help.html>

USGS – This Dynamic Earth: The Story of Plate Tectonics

<http://pubs.usgs.gov/gip/dynamic/dynamic.html>

Smithsonian National Museum of Natural History – Dig It! The Secrets of Soil

<http://forces.si.edu/soils/>

Experimenting in the Google Software Lab

Stephanie Tannenbaum

It is time to invite your class to don their laboratory coats and get ready to experiment with some innovative tools and applications. As the school year winds down, take a class or two to enjoy a well-deserved break from the rigorous end-of-year scramble to pack in the curriculum and prepare for semester exams. Students will welcome the opportunity to redirect their attention towards something completely off-topic. Yet, exploring new apps on the Internet will provide them with additional resources to add to their repertoire of growing Internet knowledge and skills. That ability may be a digression for the moment, but will certainly come in handy to future course work and research.

What is this online playground of new ideas? Google, always on the frontline of pioneering new territories and explorations on the Internet, has an entire laboratory of exciting prototypes to test, explore, play with, and ultimately implement. Enter [Google Labs](#) and invite students to become beta-testers. This job requires students to conduct tests on new software that is in the final stages before official release and use by the public at large. Participants in this role work with the application and then provide valuable feedback to the developers. The developers, in turn, collect and review this feedback and make necessary adjustments to the product based on testers' reviews. So in effect, students have an opportunity to play an important role in the future of Google tools!



Students collaborate with classmates to become “beta-testers” for Google Labs. This activity applies exploration of innovative

technology with real-world practices of exploration and contribution of a product.

A self-labeled “technology playground,” this is literally a collection of various programs that are in the final process of development. Students are proficient on the Internet and with technology; they will cherish the challenge of learning about innovative technology ideas. The best way to start is to read the [Frequently Asked Questions](#) page for a thorough background about what students will encounter and how to proceed. Ask students if they have ever had a great idea for a new product or invention but forgot about it since they would not know how to develop it. Discuss with students how their input might help or hinder the advancement of new technology ideas.

It is important to note that the various links in the “lab” may change at any time. Express to students that this is similar to a “rough draft”; Google engineers use this public forum as a sort of drawing board of ideas and items will move around from time to time. Require students to create a chart using a spreadsheet program where they record the various applications, their purposes, what they can do and what they cannot do with them, and then their feedback/opinion for each.

Now it is time to discover some of the groundbreaking programs offered in the Google Labs. Start with the links on the left side of the page. Students should scroll through and select one to start with. Consider pairing students up and encourage dialogue as they investigate each application. Place the following points to consider on the board; require students to address each in their spreadsheets:

- What is the purpose of this application or activity?
- Who would use this application?
- Describe the level of ease of use.
- Describe the performance of the service/tools of this application.
- Explore the various components of this application.
- Describe the visual appeal (graphics, navigation, flow); although keep in mind that it is the functionality and usability that is the primary focus at the beta testing stage.
- List some of the ways application this may be used.
- Might this application be integrated into the classroom? What age groups?

- How would you make this application better?
- What (if anything) do you think could be removed?
- Would you use this application? How?
- Write a potential feedback note or letter to Google.
(Students will read this to the whole class and ask for their response)

If possible, arrange the class so that each pair explores a designated application from the site. Try to give students as much control over their choices as possible while covering all of the applications. Spend about three quarters of the class period facilitating as students work on the Google Labs software activity. Encourage them to discuss what they find and learn. Then ask each group to give a two-minute impromptu presentation about what they accomplished and learned. If assigning a grade to this activity, it is important to not base it on “correctness”. The point of this exercise is to engage in the process of working with the development of a new technology project. Consider grading students on their collaboration and on their spreadsheet evaluation.

So whether students learned a new way to develop Web sites, or explored the latest data from Mars, or applied some new widgets, or tracked the latest world trends, or compared the most recent significant quotes that affect the world community, or worked with the Linux version of the photo editing software, or explored advanced tasks with the chat function, or created sets of items to generate a list of Web sites for further research, or worked with some fancy new Web browser extensions, students will find that technology is always updating, improving, and becoming more accessible. In large part, this is due to people who use the applications and provide valuable feedback; just like them.

Reference:

Google Labs
<http://labs.google.com>