Learn at Home
Grade 7

October 31, 2012

Day 1 Schedule

Subject	Minutes Per Day (At Least!)	Assignments	What Did I Learn Today?
English Language Arts	45	☐ Activity 1: Reading ☐ Activity 2: Writing	☐
Math	45	☐ Activity 1: Variables and Expressions	☐
Science	45	Complete at least one of the following activities: ☐ Activity 1: *Earthquake Shakes Japan (English or Spanish)* ☐ Activity 2: *Science Inquiry Project – Geology*	☐
Fitness and Health	30	☐ Exercise for 30 minutes. Choose from the Activity Calendars at the back of this booklet.	☐
Arts	30	☐ Choose one or two activities from the Dance Activities at the back of the booklet	☐
Educational TV Shows	30	☐ Choose TV shows to further your learning at home	☐

Day 1 English Language Arts

Activity 1: *Reading*

- Read the next chapter in the book of your choice and identify one or two **key ideas** that you find especially *interesting* and *important*. Write specific details from the text that gives information about the key ideas.

Complete the Key Ideas chart:

Important and interesting ideas	Specific details from the text

Activity 2: *Writing*

- Using the information you recorded in your Key Ideas chart, write a paragraph to analyze why one or more key ideas you identified are especially interesting and important. Include specific details from the text that support your analysis.

Day 1 Math

Vocabulary

Learn the math vocabulary words below. You will use these vocabulary words in the activities today.

- **Variables:** A quantity that varies, or changes
- **Algebraic Expression:** A rule written with numbers and symbols
- **Evaluate:** To determine the value

Activity 1: *Variables and Expressions*

Please complete the worksheet on Variables and Expressions, which you will find on the following pages. Choose at least 15 exercises to solve. Solve both Applications (#34 and #35). Be sure to *show all of your work.*

- Skill 1: Variables and Expressions

Notebook Activity

In a notebook, describe how you would prove that your answer to question 34 is correct. Describe your steps.

Additional Activity: *Integers*

Do you have more time? Complete the second worksheet on Integers.

- Skill 2: Integers

SKILL 1

Name ____________________ Date __________

Variables and Expressions

Algebra is a language of symbols. In algebra, letters, called **variables**, are used to represent unknown quantities. A combination of one or more variables, numbers, and at least one operation is called an **algebraic expression**.

$x - 9$ means x minus 9.

$7m$ means 7 times m.

ab means a times b.

$\frac{h}{4}$ means h divided by 4.

To **evaluate** an algebraic expression, replace the variable or variables with known values and then use the order of operations.

EXAMPLE *Evaluate $2c - 7 + d$ if $c = 8$ and $d = 5$.*

$2c - 7 + d = 2(8) - 7 + 5$	*Replace c with 8 and d with 5.*
$= 16 - 7 + 5$	*Multiply.*
$= 9 - 5$	*Subtract.*
$= 14$	*Add.*

EXERCISES *Evaluate each expression if $x = 9$, $y = 5$, and $z = 2$.*

1. $x + 6$

2. $y - 3$

3. $z + 11$

4. $23 - x$

5. $6z$

6. $14 + y$

7. $4z + 5$

8. $24 - 2x$

9. $3y - 7$

10. $\frac{x}{3}$

11. $\frac{14}{z}$

12. $\frac{xy}{15}$

13. $4x - 2y$

14. $6z - x$

15. $18 - 2x$

16. $6y - (x + z)$

17. $3x - z$

18. $5(y + 7)$

19. $2x + y - z$

20. $5z - y$

21. $4x - (z + 2y)$

22. $\frac{2x + 3z}{12}$

23. $\frac{7z - Y}{x}$

24. $\frac{5y - 7}{x}$

25. $(11 - 3z) + x + y$

26. $7(x - z)$

27. $6y - 9z$

28. $\frac{xy}{3} - z$

29. $\frac{40}{y} + x$

30. $\frac{4(x - y)}{z}$

31. $3x - 2(y - z)$

32. $(14 - 6z) + x$

33. $10z - (x + y)$

APPLICATIONS

34. The weekly production costs at Jessica's T-Shirt Shack are given by the algebraic expression $75 + 7s + 12t$ where s represents the number of short-sleeve shirts produced during the week and t represents the number of long-sleeve shirts produced during the week. Find the production cost for a week in which 30 short-sleeve and 24 long-sleeve shirts were produced.

35. The perimeter of a rectangle can be found by using the formula $2l + 2w$, where l represents the length of the rectangle and w represents the width of the rectangle. Find the perimeter of a rectangular swimming pool whose length is 32 feet and whose width is 20 feet.

SKILL **20**

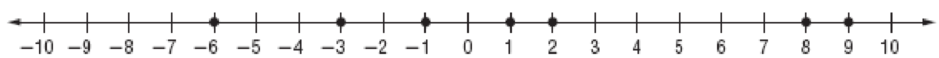
Name ______________________ Date __________

Integers

Numbers greater than zero are called **positive numbers**. Numbers less than zero are called **negative numbers**. The set of numbers that includes positive and negative numbers, and zero are called **integers**.

EXAMPLE ***Emily recorded the temperature at noon for a week. The temperatures she recorded were 9°F, 8°F, −6°F, −3°F, −1°F, 2°F, and 1°F. What was the lowest and highest temperature recorded?***

To answer the question, locate the temperatures on a number line.



On a number line, values increase as you move to the right.

Since −6 is furthest to the left, −6°F is the coldest temperature. 9 is the farthest number to the right, so 9°F is the highest temperature.

The **absolute value** of a number is the positive number of units a number is from zero on a number line.

EXAMPLE ***Refer to the table. Which city's population changed the most?***

Population Change, 1990–2000	
Atlanta, GA	+22,457
Baltimore, MD	−84,860
Columbus, OH	+78,560
Detroit, MI	−76,704
Indianapolis, IN	+49,974
Philadelphia, PA	−68,027

Find the absolute value of each number.

$|+22{,}457| = 22{,}457$
$|-84{,}860| = 84{,}860$
$|+78{,}560| = 78{,}560$
$|-76{,}704| = 76{,}704$
$|+49{,}974| = 49{,}974$
$|-68{,}027| = 68{,}027$

Since the absolute value of −84,860 is the greatest, Baltimore, Maryland, had the greatest population change.

EXERCISES *Fill in each blank with <, >, or = to make a true sentence.*

1. 5 ____ −5 **2.** −4 ____ 3 **3.** 0 ____ −2

4. −6 ____ −12 **5.** −35 ____ −16 **6.** 19 ____ −22

7. 34 ____ 21 **8.** 23 ____ 23 **9.** −45 ____ −52

Write each set of integers in order from least to greatest.

10. {45, −23, 55, 0, −12, −37} **11.** {56, −22, 34, −34, 12, −12}

12. {−450, −100, 254, 564, −356} **13.** {1,276, −3,456, −943, −237, −467}

Find the absolute value.

14. $|-3|$ **15.** $|-5|$ **16.** $|16|$ **17.** $|27|$

18. $|156|$ **19.** $|-359|$ **20.** $|-821|$ **21.** $|1{,}436|$

APPLICATIONS *Write an integer to describe each situation.*

22. Julio finished the race 3 seconds ahead of the second place finisher.

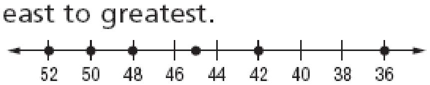
23. Matthew ended his round of golf 4 under par.

24. Denver is called the Mile High City because its elevation is 5,280 feet above sea level.

For Exercises 25–27, refer to the table.

Record Low Temperatures	
California	−45°F
Illinois	−36°F
Maine	−48°F
Nevada	−50°F
New York	−52°F
Pennsylvania	−42°F
Washington	−48°F

25. Use a number line to order the temperatures from least to greatest.



26. The record low temperature for Michigan is −51°F. Which states have higher record low temperatures?

27. Indiana's record low temperature is −36°F. Which states in the table have lower record low temperatures?

Day 1 Science

Complete Activity 1 or 2 below:

Activity 1: *Earthquake Shakes Japan*

- Read the article below and answer the questions that follow.
- Para Espanol, prime aquí: http://schools.nyc.gov/Documents/teachandlearn/LearnatHome/ELL/7day1sp.pdf

Vocabulary
Learn the vocabulary words below. You will use these vocabulary words in today's activity.

- **colleague** (*noun*): a coworker
- **havoc** (*noun*): destruction
- **magnitude** (*noun*): a measure of the amount of energy released by an earthquake, as indicated on the Richter scale
- **Richter scale** (*noun):* a scale from one to 10 used to measure how strong an earthquake is
- **tectonic plates** (*noun*): pieces of the earth's crust that move against one another

Earthquake Shakes Japan

WAJIMA, Japan (Achieve3000, March 27, 2007). A powerful earthquake shook coastal central Japan on Sunday, March 25. The disaster killed at least one person and caused major damage.

The earthquake, which measured 6.9 on the Richter scale, struck off the north coast of the Sea of Japan. Television footage taken during the quake showed buildings shaking violently for about 30 seconds. Footage captured afterwards showed collapsed buildings and shops with shattered windows. The footage also revealed streets littered with roof tiles and roads with cracked pavement.

"We felt violent shaking. My [coworkers] say the insides of their houses are a mess, with everything smashed on the floor," said Wataru Matsumoto, deputy mayor of the town of Anamizu, which was near the epicenter of the quake.

The quake brought destruction to the affected area. It knocked down at least 68 homes and left another 164 partially destroyed. The violent shaking triggered landslides, cut power, and interfered with phone service. It also broke underground water pipes and halted public transportation.

Even after the quake was over, its effects continued. Japan's Meteorological Agency issued a warning about possible tsunamis and stated that aftershocks could continue for a week. Thirty-six minutes after the quake, a small tsunami hit the shore, and officials removed the tsunami warning. Several aftershocks, two of them measuring 5.3 and 4.8 on the Richter scale, shook the area.

"A fairly big aftershock hit just minutes ago, and I jumped out the door," said Tomio Maeda, manager of a convenience store in Anamizu. "It's scary; I guess it's not over yet."

The quake killed at least one person and injured more than 200 others. The Fire and Disaster Management Agency reported that most of the injuries and damage were concentrated in the city of Wajima, which is about

193 miles northwest of Tokyo. That area is not considered prone to earthquakes; its last major earthquake took place in 1933.

Speaking to a parliamentary upper house committee on the day after the disaster, Japanese Prime Minister Shinzo Abe described the damage in detail. He then promised his support for the victims.

"The government will make every effort to help the victims of the earthquake so they can [go back to their] normal lives," the prime minister said.

One day after the earthquake, officials declared that Japan's new earthquake early alert system was a success. The system is designed to issue early warnings of possible tsunamis. It is more sensitive than the one it replaced and can detect slight underground shaking that happens before a major quake occurs. This allows officials to warn people to get to high ground before a possible tsunami hits the shoreline.

"Before the new system went into effect, it took about three minutes to get out a tsunami alert. On Sunday, we were able to get the alert out within a minute, so I'd say it was a success," said Meteorological Agency official Yosuke Igarashi.

Japanese officials are constantly working on improvements to Japan's earthquake warning system, and for good reason. Japan sits on four tectonic plates, making it one of the world's most earthquake-prone countries. In the last few years, Japan has experienced several major quakes. In October 2004, an earthquake measuring 6.8 on the Richter scale hit northern Japan, killing 40 people and damaging more than 6,000 homes. It was the deadliest quake to hit Japan since 1995. That year, a quake measuring 7.2 killed 6,433 people in Kobe, in western Japan. Experts say that Tokyo, the nation's capital, has a 90-percent chance of suffering a major quake in the next 50 years.

The Associated Press contributed to this story.

Instructions:
Select the correct answer.

Question 1:
What is today's article mainly about?
1. A recent tsunami in Japan and its effects
2. Damage to stores from a tsunami in Japan
3. A recent earthquake in Japan and its effects
4. Damage to roads from an earthquake in Japan

Question 2:
Which information is **not** in the article?
1. How Tokyo residents prepare their homes for a major earthquake
2. What Japanese officials think about the country's early warning system
3. How likely it is that a major earthquake will hit Tokyo within 50 years
4. What kind of damage occurred from a recent earthquake and its aftershocks

Day 1 Science (continued)

Question 3:
Why does the author point out that the last major earthquake in Wajima took place in 1933?
1. To show that people there are not afraid of earthquakes
2. To show that the city does not have a warning system in place
3. To show that people there do not know anything about earthquakes
4. To show that the city does not experience many strong earthquakes

Question 4:
The reader can tell from the article that Japanese officials __________.
1. Expect earthquakes to occur and try to be prepared for them
2. Are not creating a warning systems fast enough to keep people safe
3. Expect large tsunamis to occur because they happen nearly every day
4. Are not worried about the effects of large earthquakes or possible tsunamis

Question 5:
After which paragraph would the author place a quote from a resident of Wajima who was surprised by the strong earthquake?
1. After paragraph 3
2. After paragraph 5
3. After paragraph 7
4. After paragraph 11

Question 6:
Which statement best summarizes the *last* paragraph?
1. Japan has had a few small earthquakes.
2. Officials in Japan have a lot of work to do in cleaning up the damage.
3. Japan is very prone to large earthquakes.
4. Officials in Japan are unhappy with the earthquake and tsunami warning system.

Question 7:
Which is the closest antonym for the word *prone*?
1. Restless
2. Unlikely
3. Primitive
4. Spectacular

Question 8:
Another name for a *tsunami* is a(n)__________.
1. Ocean
2. Current
3. Whirlpool
4. Tidal wave

Day 1 Science (continued)

Additional Question

Your state plans to send aid to assist people affected by the earthquake in Japan. What do people need? Make a list in order of importance. Explain why you placed the aid in this order.

Use details from the article, as well as your own ideas, in your response.

Day 1 Science (continued)

Activity 2: *Science Inquiry Project – Geology: The History of Seismographs*

The following activity is Day 1 of a three day project

Vocabulary
Learn the vocabulary words below. You will use these vocabulary words in today's activity.

- **Earthquake**: A sudden movement of the Earths Crust.
- **Stress**: A force that tends to distort or deform something by compressing or stretching it.
- **Seismograph**: An instrument that detects and records vibrations and movement in the Earth, especially during an earthquake.

The earthquakes occurring in New Madrid, Missouri, in 1811 and 1812, San Francisco, California, in 1906, and Prince William Sound, Alaska, in 1964, three major natural disasters in United States history, cost millions of dollars in property damage, and countless lives lost. The first earthquake ever recorded occurred in China in 1177 B.C. Europeans began describing their earthquakes in detailed writings in the 1500s. Although earthquakes are mentioned in written records as early as 580 B.C., these narrative reports were subject to exaggeration and bias. In more modern times, cameras, television, and computers have increased the quantitative observations and record-keeping abilities of scientists.

With the advancements of science and technology, how do earth scientists measure earthquakes? Using highly technical instruments, they measure direction, pressure, stress levels, energy build up and release, and movement. They are able to closely monitor earthquake data. One of their most valuable instruments is the seismograph.

With the advancements of science and technology, how do earth scientists measure earthquakes? Using highly technical instruments, they measure direction, pressure, stress levels, energy build up and release, and movement. They are able to closely monitor earthquake data. One of their most valuable instruments is the seismograph.

Directions: Below is a sample schedule of how you might complete this assignment over the four days.

- **Day 1: Research the history of seismographs from early Chinese cultures to the present day technological design. Use** www.crustal.ucsb.edu/ics/understanding/ and the handouts that follow.
- Day 2: Identify problems past scientists have confronted when attempting to measure earthquake location and intensity.
- Day 3: Design a simple seismograph that will track a simulated earthquake and complete a set of blueprints.
- Day 4: Then write and "produce" a 3-5 minute informative commercial for your home seismograph.

Suggested Additional Resources:

- www.crustal.ucsb.edu/ics/understanding/ - Complete the quiz, and read of famous Earthquake accounts
- http://pubs.usgs.gov/gip/earthq1/ - Measure earthquakes, research how earthquakes happen, examine "science fair project" and read how to build a seismometer.

Source: This activity is from Glencoe NY Science, Grade 7, Unit 1: Geology
http://glencoe.mcgraw-hill.com/sites/0078778646/student_view0/unit1/unit_project_3.html

Mark Twain and the October 8, 1865, San Francisco Earthquake

After a brief stint as a Confederate soldier, Mark Twain headed west with his Unionist brother to see the Wild West. His experiences are captured in the book, *Roughing It*, one of Twain's earlier works. In the fall of 1865, while in the city of San Francisco, Twain experienced his first earthquake.

> It was just after noon, on a bright October day. I was coming down Third Street. The only objects in motion anywhere in sight in that thickly built and populous quarter were a man in a buggy behind me, and a streetcar wending slowly up the cross street. Otherwise, all was solitude and a Sabbath stillness.
>
> As I turned the corner, around a frame house, there was a great rattle and jar, and it occurred to me that here was an item!--no doubt a fight in that house. Before I could turn and seek the door, there came a terrific shock; the ground seemed to roll under me in waves, interrupted by a violent joggling up and down, and there was a heavy grinding noise as of brick houses rubbing together. I fell up against the frame house and hurt my elbow. I knew what it was now... a third and still severer shock came, and as I reeled about on the pavement trying to keep my footing, I saw a sight! The entire front of a tall four-story brick building on Third Street sprung outward like a door and fell sprawling across the street, raising a great dust-like volume of smoke!
>
> And here came the buggy--overboard went the man, and in less time than I can tell it the vehicle was distributed in small fragments along three hundred yards of street. ... The streetcar had stopped, the horses were rearing and plunging, the passengers were pouring out at both ends, and one fat man had crashed halfway through a glass window on one side of the car, got wedged fast, and was squirming and screaming like an impaled madman. Every door, of every house, as far as the eye could reach, was vomiting a stream of human beings; and almost before one could execute a wink and begin another, there was a massed multitude of people stretching in endless procession down every street my position commanded. Never was a solemn solitude turned into teeming life quicker.

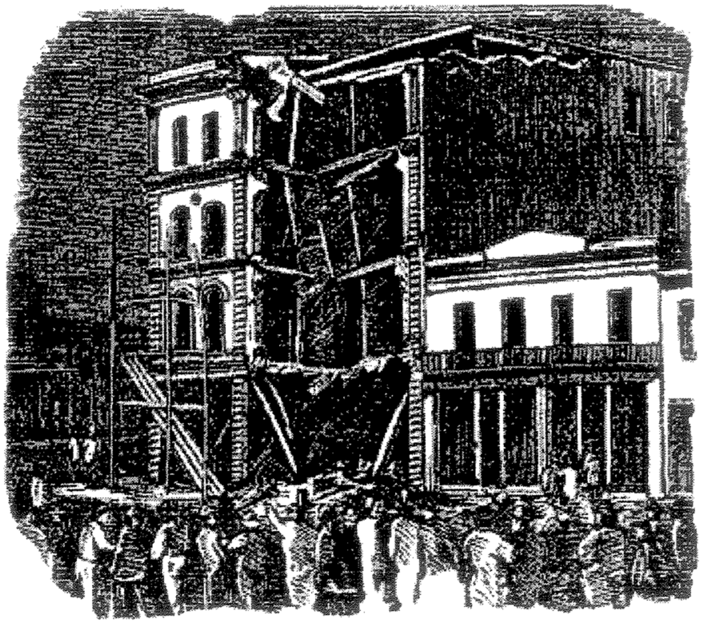


Image courtesy of The Museum of the City of San Francisco.

This image shows a four-story brick building on the corner of Third and Mission streets in San Francisco following the 1865 earthquake. It appeared in *The Daily Alta California*, and is probably the very same building Twain describes as "sprung outward like a door" in the above quote.

Forty-one years after Twain experienced this earthquake, in 1906, a truly great earthquake struck San Francisco, starting a fire that burned most of the city. Another famous American novelist, Jack London, was there to record the events of the fire.

[redacted]

A Brief History of Seismology to 1910: Page 1 of 3

Would you believe that giant snakes, turtles, catfish, or spiders live underneath the ground, and it is their movements that create earthquakes? Maybe you wouldn't, but your ancestors did. Ancient peoples had many fanciful explanations for earthquakes, usually involving something large and restless living beneath the earth's surface.

Aristotle was one of the first to attempt an explanation of earthquakes based on natural phenomena. He postulated that winds within the earth whipped up the occasional shaking of the earth's surface.

Empirical observations of the effects of earthquakes were rare, however, until 1750, when England was uncharacteristically rocked by a series of five strong earthquakes. These earthquakes were followed on Sunday, November 1, 1755, by a cataclysmic shock and tsunami that killed an estimated 70,000 people, leveling the city of Lisbon, Portugal, while many of its residents were in church. This event marks the beginning of the modern era of seismology, prompting numerous studies into the effects, locations, and timing of earthquakes.

Prior to the Lisbon earthquake, scholars had looked almost exclusively to Aristotle, Pliny, and other ancient classical sources for explanations of earthquakes. Following the Lisbon earthquake, this attitude was jettisoned for one that stressed ideas based on modern observations. Cataloging of the times and locations of earthquakes and studying the physical effects of earthquakes began in earnest, led by such people as John Michell in England and Elie Bertrand in Switzerland.

The hundred or so years following the Lisbon earthquake saw sporadic but increasing studies of earthquake phenomena. These efforts were often spurred on by earthquake catastrophes, such as the 1783 Calabrian earthquakes that killed 35,000 people in the southern toe of Italy.

A Brief History of Seismology to 1910: Page 2 of 3

As communication between various parts of the world became more common, earthquake observations from throughout the world could be combined. Following an earthquake in Chile in 1822, the author Maria Graham reported systematic changes in the elevation of the Chilean coastline. Observations of coastline changes were confirmed following the 1835 Chilean earthquake by Robert FitzRoy, captain of the H.M.S. *Beagle*, while Charles Darwin was onshore examining the geology of the Andes.

In the 1850s, 60s, and 70s, three European contemporaries made cornerstone efforts in seismology. Robert Mallet, an engineer born in Dublin who designed many of London's bridges, measured the velocity of seismic waves in the earth using explosions of gunpowder. His idea was to look for variations in seismic velocity that would indicate variations in the properties of the earth. This same method is still used today, for example in oil field exploration. Robert Mallet was also one of the first to estimate the depth of an earthquake underground.

At the same time as Mallet was setting off explosions of gunpowder in England, Alexis Perrey, in France, was making quantitative analyses of catalogs of earthquakes. He was looking for periodic variations of earthquakes with the seasons and with lunar phases. And in Italy, Luigi Palmieri invented an electromagnetic seismograph, one of which was installed near Mount Vesuvius and another at the University of Naples. These seismographs were the first seismic instruments capable of routinely detecting earthquakes imperceptible to human beings.

The foregoing work set the stage for the late 1800s and early 1900s, when many fundamental advances in seismology would be made. In Japan, three English professors, John Milne, James Ewing, and Thomas Gray, working at the Imperial College of Tokyo, invented the first seismic instruments sensitive enough to be used in the scientific study of earthquakes.

A Brief History of Seismology to 1910: Page 3 of 3

In the United States, Grove Karl Gilbert, after studying the fault scarp from the 1872 Owens Valley, California earthquake, concluded that the faults were a primary feature of earthquakes, not a secondary one. Until his time, most people thought that earthquakes were the result of underground explosions and that faults were only a result of the explosion, not a primary feature of earthquakes.

Also in the United States, Harry Fielding Reid took Gilbert's work one step further. After examining the fault trace of the 1906 San Francisco earthquake, Reid deduced that earthquakes were the result of the gradual buildup of stresses within the earth occurring over many years. This stress is due to distant forces and is eventually released violently during an earthquake, allowing the earth to rapidly rebound after years of accumulated strain.

The late 1800s and early 1900s also saw scientific inquiry into earthquakes begun by Japanese researchers. Seikei Sekiya became the first person to be named a professor in seismology; he was also one of the first people to quantitatively analyse seismic recordings from earthquakes. Another famous Japanese researcher from that time is Fusakichi Omori, who, among other work, studied the rate of decay of aftershock activity following large earthquakes. His equations are still in use today.

The twentieth century has seen an increased interest in the scientific study of earthquakes, too involved to discuss here. It should be noted, however, that research into earthquakes has broadened and contributions now come from numerous areas affected by earthquakes, including Japan, the United States, Europe, Russia, Canada, Mexico, China, Central and South America, New Zealand, and Australia, among others.

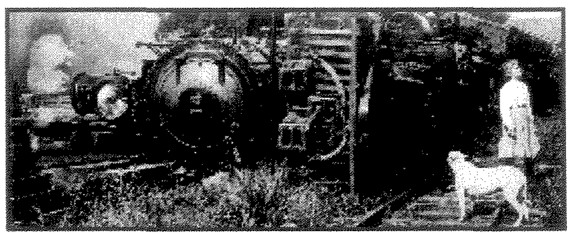
Source:

This account is loosely based on *The Founders of Seismology*, by Charles Davison, Arno Press, New York, 1978.

USGS

Introduction

One of the most frightening and destructive phenomena of nature is a severe earthquake and its terrible aftereffects. An earthquake is a sudden movement of the Earth, caused by the abrupt release of strain that has accumulated over a long time. For hundreds of millions of years, the forces of plate tectonics have shaped the Earth as the huge plates that form the Earth's surface slowly move over, under, and past each other. Sometimes the movement is gradual. At other times, the plates are locked together, unable to release the accumulating energy. When the accumulated energy grows strong enough, the plates break free. If the earthquake occurs in a populated area, it may cause many deaths and injuries and extensive property damage.



Full size image - 155k

Today we are challenging the assumption that earthquakes must present an uncontrollable and unpredictable hazard to life and property. Scientists have begun to estimate the locations and likelihoods of future damaging earthquakes. Sites of greatest hazard are being identified, and definite progress is being made in designing structures that will withstand the effects of earthquakes.

Many buildings in Charleston, South Carolina, were damaged or destroyed by the large earthquake that occured August 31, 1886. - 87k

USGS

Earthquakes in History

A dramatic picture of horses killed by a collapsed building wall in the 1906 San Francisco earthquake

The scientific study of earthquakes is comparatively new. Until the 18th century, few factual descriptions of earthquakes were recorded, and the natural cause of earthquakes was little understood. Those who did look for natural causes often reached conclusions that seem fanciful today; one popular theory was that earthquakes were caused by air rushing out of caverns deep in the Earth's interior.

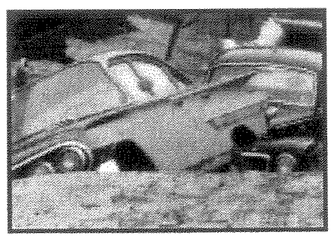
The earliest earthquake for which we have descriptive information occurred in China in 1177 B.C. The Chinese earthquake catalog describes several dozen large earthquakes in China during the next few thousand years. Earthquakes in Europe are mentioned as early as 580 B.C., but the earliest for which we have some descriptive information occurred in the mid-16th century. The earliest known earthquakes in the Americas were in Mexico in the late 14th century and in Peru in 1471, but descriptions of the effects were not well documented. By the 17th century, descriptions of the effects of earthquakes were being published around the world - although these accounts were often exaggerated or distorted.

The most widely felt earthquakes in the recorded history of North America were a series that occurred in 1811-1812 near New Madrid, Missouri. A great earthquake, whose magnitude is estimated to be about 8, occurred on the morning of December 16, 1811. Another great earthquake occurred on January 23, 1812, and a third, the strongest yet, on February 7, 1812. Aftershocks were nearly continuous between these great earthquakes and continued for months afterwards. These earthquakes were felt by people as far away as Boston and Denver. Because the most intense effects were in a sparsely populated region, the destruction of human life and property was slight. If just one of these enormous earthquakes occurred in the same area today, millions of people and buildings and other structures worth billions of dollars would be affected.

The San Francisco earthquakes of 1906 was one of the most destructive in the recorded history of North America - the earthquake and the fire that followed killed nearly 700 people and left the city in ruins.

The great 1906 San Francisco earthquake and fire destroyed most of the city and left 250,00 people homeless. Full size image - 151k.

The Alaska earthquake of March 27, 1964, was of greater magnitude than the San Francisco earthquake; it released perhaps twice as much energy and was felt over an area of almost 500,000 square miles.



Anchorage, Alaska, 1964 - 167k

The ground motion near the epicenter was so violent that the tops of some trees were snapped off. One hundred and fourteen people (some as far away as California) died as a result of this earthquake, but loss of life and property would have been far greated had Alaska been more densely populated.

Geologic Information -- Education and Outreach

This page is URL:http://pubs.usgs.gov/gip/earthq1/history.html
Maintained by John Watson and Kathie Watson
Last modified 10-23-97 (jmw)

USGS

Where Earthquakes Occur

The Earth is formed of several layers that have very different physical and chemical properties. The outer layer, which averages about 70 kilometers in thickness, consists of about a dozen large, irregularly shaped plates that slide over, under and past each other on top of the partly molten inner layer. Most earthquakes occur at the boundaries where the plates meet. In fact, the locations of earthquakes and the kinds of ruptures they produce help scientists define the plate boundaries.

There are three types of plate boundaries: spreading zones, transform faults, and subduction zones. At *spreading zones*, molten rock rises, pushing two plates apart and adding new material at their edges. Most spreading zones are found in oceans; for example, the North American and Eurasian plates are spreading apart along the mid-Atlantic ridge. Spreading zones usually have earthquakes at shallow depths (within 30 kilometers of the surface).

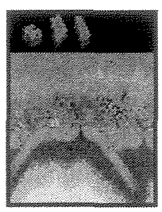


Illustration of Plate Boundary Types - 95k

Transform faults are found where plates slide past one another. An example of a transform-fault plate boundary is the San Andreas fault, along the coast of California and northwestern Mexico. Earthquakes at transform faults tend to occur at shallow depths and form fairly straight linear patterns.

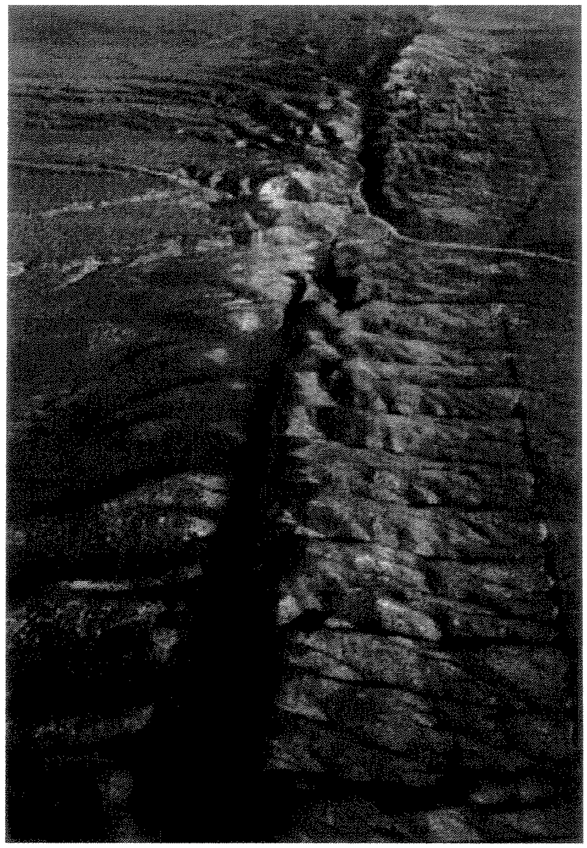
Subduction zones are found where one plate overrides, or subducts, another, pushing it downward into the mantle where it melts. An example of a subduction-zone plate boundary is found along the northwest coast of the United States, western Canada, and southern Alaska and the Aleutian Islands. Subduction zones are characterized by deep-ocean trenches, shallow to deep earthquakes, and mountain ranges containing active volcanoes.

Map of the Tectonic Plates - 67k

Earthquakes can also occur within plates, although plate-boundary earthquakes are much more common. Less than 10 percent of all earthquakes occur within plate interiors. As plates continue to move and plate boundaries change over geologic time, weakened boundary regions become part of the interiors of the plates. These zones of weakness within the continents can cause earthquakes in response to stresses that originate at the edges of the plate or in the deeper crust. The New Madrid earthquakes of 1811-1812 and the 1886 Charleston earthquake

USGS

How Earthquakes Happen



An aerial view of the San Andreas fault in the Carrizo Plain, Central California.

An earthquake is the vibration, sometimes violent, of the Earth's surface that follows a release of energy in the Earth's crust. This energy can be generated by a sudden dislocation of segments of the crust, by a volcanic eruption, or event by manmade explosions. Most destructive quakes, however, are caused by dislocations of the crust. The crust may first bend and then, when the stress exceeds the strength of the rocks, break and "snap" to a new position. In the process of breaking, vibrations called "seismic waves" are generated. These waves travel outward from the source of the earthquake along the surface and through the Earth at varying speeds depending on the material through which they move. Some of the vibrations are of high enough frequency to be audible, while others are of very low frequency. These vibrations cause the entire planet to quiver or ring like a bell or tuning fork.

A *fault* is a fracture in the Earth's crust along which two blocks of the crust have slipped with respect to each other. Faults are divided into three main groups, depending on how they move. *Normal faults* occur in response to pulling or tension; the overlying block moves down the dip of the fault plane. *Thrust (reverse) faults* occur in response to squeezing or compression; the overlying block moves up the dip of the fault plane. *Strike-slip (lateral) faults* occur in response to either type of stress; the blocks move horizontally past one another. Most faulting along spreading zones is normal, along subduction zones is thrust, and along transform faults is strike-slip.

Geologists have found that earthquakes tend to reoccur along faults, which reflect zones of weakness in the Earth's crust. Even if a fault zone has recently experienced an earthquake, however, there is no guarantee that all the stress has been relieved. Another earthquake could still occur. In New Madrid, a great earthquake was followed by a large aftershock within 6 hours on December 6, 1811. Furthermore, relieving stress along one part of the fault may increase stress in another part; the New Madrid earthquakes in January and February 1812 may have resulted from this phenomenon.

The *focal depth* of an earthquake is the depth from the Earth's surface to the region where an earthquake's energy originates (the *focus*). Earthquakes with focal depths from the surface to about 70 kilometers (43.5 miles) are classified as shallow. Earthquakes with focal depths from 70 to 300 kilometers (43.5 to 186 miles) are classified as intermediate. The focus of deep earthquakes may reach depths of more than 700 kilometers (435 miles). The focuses of most earthquakes are concentrated in the crust and upper mantle. The depth to the center of the Earth's core is about 6,370 kilometers (3,960 miles), so event the deepest earthquakes originate in relatively shallow parts of the Earth's interior.

The *epicenter* of an earthquake is the point on the Earth's surface directly above the focus. The location of an earthquake is commonly described by the geographic position of its epicenter and by its focal depth.

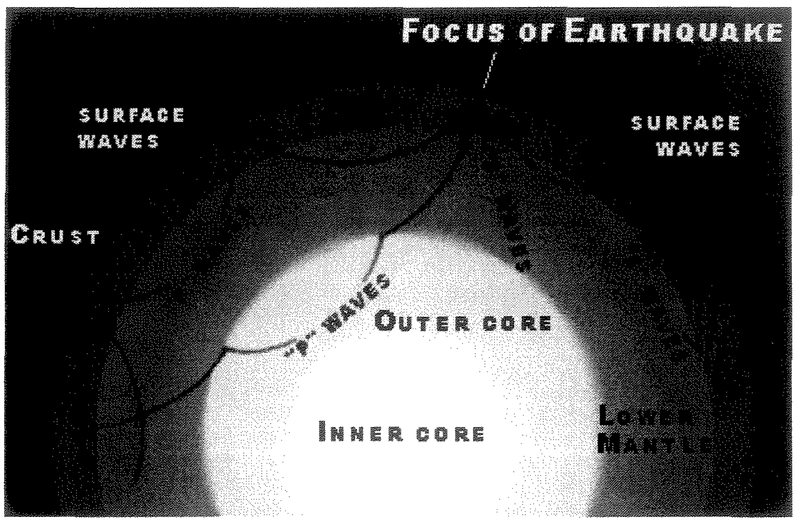
Earthquakes beneath the ocean floor sometimes generate immense sea waves or tsunamis (Japan's dread "huge wave"). These waves travel across the ocean at speeds as great as 960 kilometers per hour (597 miles per hour) and may be 15 meters (49 feet) high or higher by the time they reach the shore. During the 1964 Alaskan earthquake, tsunamis engulfing coastal areas caused most of the destruction at Kodiak, Cordova, and Seward and caused severe damage along the west coast of North America, particularly at Crescent City, California. Some waves raced across the ocean to the coasts of Japan.

Liquefaction, which happens when loosely packed, water-logged sediments lose their strength in response to strong shaking, causes major damage during earthquakes. During the 1989 Loma Prieta earthquake, liquefaction of the soils and debris used to fill in a lagoon caused major subsidence, fracturing, and horizontal sliding of the ground surface in the Marina district in San Francisco.

Landslides triggered by earthquakes often cause more destruction than the earthquakes themselves. During the 1964 Alaska quake, shock-induced landslides devastated the Turnagain Heights residential development and many downtown areas in Anchorage. An observer gave a vivid report of the breakup of the unstable earth materials in the Turnagain Heights region: *I got out of my car, ran northward toward my driveway, and then saw that the bluff had broken back approximately 300 feet southward from its original edge. Additional slumping of the bluff caused me to return to my car and back southward approximately 180 feet to the corner of McCollie and Turnagain Parkway. The bluff slowly broke until the corner of Turnagain Parkway and McCollie had slumped northward.*

Measuring Earthquakes

The vibrations produced by earthquakes are detected, recorded, and measured by instruments call seismographs. The zig-zag line made by a seismograph, called a "seismogram," reflects the changing intensity of the vibrations by responding to the motion of the ground surface beneath the instrument. From the data expressed in seismograms, scientists can determine the time, the epicenter, the focal depth, and the type of faulting of an earthquake and can estimate how much energy was released.



The two general types of vibrations produced by earthquakes are *surface waves*, which travel along the Earth's surface, and *body waves*, which travel through the Earth. Surface waves usually have the strongest vibrations and probably cause most of the damage done by earthquakes.

Body waves are of two types, *compressional* and *shear*. Both types pass through the Earth's interior from the focus of an earthquake to distant points on the surface, but only compressional waves travel through the Earth's molten core. Because compressional waves travel at great speeds and ordinarily reach the surface first, they are often called "primary waves" or simply "P" waves. P waves push tiny particles of Earth material directly ahead of them or displace the particles directly behind their line of travel.

Shear waves do not travel as rapidly through the Earth's crust and mantle as do compressional waves, and because they ordinarily reach the surface later, they are called "secondary" or "S" waves. Instead of affecting material directly behind or ahead of their line of travel, shear waves displace material at right angles to their path and therefore sometimes called "transverse" waves.

The first indication of an earthquake is often a sharp thud, signaling the arrival of compressional waves. This is followed by the shear waves and then the "ground roll" caused by the surface waves. A geologist who was at Valdez, Alaska, during the 1964 earthquake described this sequence: *The first tremors were hard enough to stop a moving person, and shock waves were immediately noticeable on the surface of the ground. These shock waves continued with a rather long frequency, which gave the observer an impression of a rolling feeling rather than abrupt hard jolts. After about 1 minute the amplitude or strength of the shock waves increased in intensity* *and failures in buildings as well as the frozen ground surface began to occur   After about 3 1/2 minutes the severe shock waves ended and people began to react as could be expected.*

The severity of an earthquake can be expressed in several ways. The *magnitude* of an earthquake, usually expressed by the *Richter Scale*, is a measure of the amplitude of the seismic waves. The *moment magnitude* of an earthquake is a measure of the amount of energy released - an amount that can be estimated from seismograph readings. The *intensity*, as expressed by the *Modified Mercalli Scale*, is a subjective measure that describes how strong a shock was felt at a particular location.

The Richter Scale, named after Dr. Charles F. Richter of the California Institute of Technology, is the best known scale for measuring the magnitude of earthquakes. The scale is logarithmic so that a recording of 7, for example, indicates a disturbance with ground motion 10 times as large as a recording of 6. A quake of magnitude 2 is the smallest quake normally felt by people. Earthquakes with a Richter value of 6 or more are commonly considered major; great earthquakes have magnitude of 8 or more on the Richter scale.

The Modified Mercalli Scale expresses the intensity of an earthquake's effects in a given locality in values ranging from I to XII. The most commonly used adaptation covers the range of intensity from the condition of "I -- Not felt except by a very few under especially favorable conditions," to "XII -- Damage total. Lines of sight and level are distorted. Objects thrown upward into the air." Evaluation of earthquake intensity can be made only after eyewitness reports and results of field investigations are studied and interpreted. The maximum intensity experienced in the Alaska earthquake of 1964 was X; damage from the San Francisco and New Madrid earthquakes reached a maximum intensity of XI.

Earthquakes of large magnitude do not necessarily cause the most intense surface effects. The effect in a given region depends to a large degree on local surface and subsurface geologic conditions. An area underlain by unstable ground (sand, clay, or other unconsolidated materials), for example, is likely to experience much more noticeable effects than an area equally distant from an earthquake's epicenter but underlain by firm ground such as granite. In general, earthquakes east of the Rocky Mountains affect a much larger area than earthquakes west of the Rockies.

An earthquake's destructiveness depends on many factors. In addition to magnitude and the local geologic conditions, these factors include the focal depth, the distance from the epicenter, and the design of buildings and other structures. The extent of damage also depends on the density of population and construction in the area shaken by the quake.

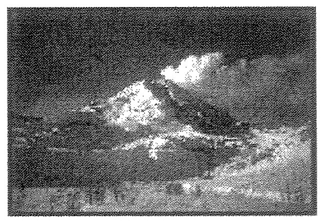
The Loma Prieta earthquake of 1989 demonstrated a wide range of effects. The Santa Cruz mountains suffered little damage from the seismic waves, even though they were close to the epicenter. The central core of the city of Santa Cruz, about 24 kilometers (15 miles) away from the epicenter, was almost competely destroyed. More than 80 kilometers (50 miles) away, the cities of San Francisco and Oakland suffered selective but severe damage, including the loss of more than 40 lives. The greatest destruction occurred in areas where roads and elevated structures were built on stable ground underlain by loose, unconsolidated soils.

The Northridge, California, earthquake of 1994 also produced a wide variety of effects, even over distances of just a few hundred meters. Some buildings collapsed, while adjacent buildings of similar age and construction remained standing. Similarly, some highway spans collapsed, while others nearby did not.

USGS

Volcanoes and Earthquakes

Earthquakes are associated with volcanic eruptions. Abrupt increases in earthquake activity heralded eruptions at Mount St. Helens, Washington; Mount Spurr and Redoubt Volcano, Alaska; and Kilauea and Mauna Loa, Hawaii.



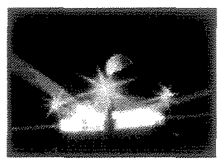
A sudden increase in earthquake tremors signaled the beginning of eruptions at Redoubt Volcano in 1989-90.
Full Size Image - 228k

The location and movement of swarms of tremors indicate the movement of magma through the volcano. Continuous records of seismic and tiltmeter (a device that measures ground tilting) data are maintained at U.S. Geological Survey volcano observatories in Hawaii, Alaska, California, and the Cascades, where study of these records enables specialists to make short-range predictions of volcanic eruptions. These warnings have been especially effective in Alaska, where the imminent eruption of a volcano requires the rerouting of international air traffic to enable airplanes to avoid volcanic clouds. Since 1982, at least seven jumbo jets, carrying more than 1,500 passengers, have lost power in the air after flying into clouds of volcanic ash. Though all flights were able to restart their engines eventually and no lives were lost, the aircraft suffered damages of tens of millions of dollars. As a result of these close calls, an international team of volcanologists, meteorologists, dispatchers, pilots, and controllers have begun to work together to alert each other to imminent volcanic eruptions and to detect and track volcanic ash clouds.

USGS

Predicting Earthquakes

The goal of earthquake prediction is to give warning of potentially damaging earthquakes early enough to allow appropriate response to the disaster, enabling people to minimize loss of life and property. The U.S. Geological Survey conducts and supports research on the likelihood of future earthquakes. This research includes field, laboratory, and theoretical investigations of earthquake mechanisms and fault zones. A primary goal of earthquake research is to increase the reliability of earthquake probability estimates. Ultimately, scientists would like to be able to specify a high probability for a specific earthquake on a particular fault within a particular year. Scientists estimate earthquake probabilities in two ways: by studying the history of large earthquakes in a specific area and the rate at which strain accumulates in the rock.



This time-exposure photograph of the electronic-laser, ground-motion movement system in operation at Parkfield, California, to track movement along the San Andreas fault. Full size image - 40 k

Scientists study the past frequency of large earthquakes in order to determine the future likelihood of similar large shocks. For example, if a region has experienced four magnitude 7 or larger earthquakes during 200 years of recorded history, and if these shocks occurred randomly in time, then scientists would assign a 50 percent probability (that is, just as likely to happen as not to happen) to the occurrence of another magnitude 7 or larger quake in the region during the next 50 years.

But in many places, the assumption of random occurrence with time may not be true, because when strain is released along one part of the fault system, it may actually increase on another part. Four magnitude 6.8 or larger earthquakes and many magnitude 6 - 6.5 shocks occurred in the San Francisco Bay region during the 75 years between 1836 and 1911. For the next 68 years (until 1979), no earthquakes of magnitude 6 or larger occurred in the region. Beginning with a magnitude 6.0 shock in 1979, the earthquake activity in the region increased dramatically; between 1979 and 1989, there were four magnitude 6 or greater earthquakes, including the magnitude 7.1 Loma Prieta earthquake. This clustering of earthquakes leads scientists to estimate that the probability of a magnitude 6.8 or larger earthquake occurring during the next 30 years in the San Francisco Bay region is about 67 percent (twice as likely as not).

Another way to estimate the likelihood of future earthquakes is to study how fast strain accumulates. When plate movements build the strain in rocks to a critical level, like pulling a rubber band too tight, the rocks will suddenly break and slip to a new position. Scientists measure how much strain accumulates along a fault segment each year, how much time has passed since the last earthquake along the segment, and how much strain was released in the last earthquake. This information is then used to calculate the time required for the accumulating strain to build to the level that results in an earthquake. This simple model is complicated by the fact that such detailed information about faults is rare. In the United States, only the San Andreas fault system has adequate records for using this prediction method.

Both of these methods, and a wide array of monitoring techniques, are being tested along part of the San Andres fault. For the past 150 years, earthquakes of about magnitude 6 have occurred an average of every 22 years on the San Andreas fault near Parkfield, California. The last shock was in 1966. Because of the consistency and similarity of these earthquakes, scientists have started an experiment to "capture" the next Parkfield earthquake. A dense web of monitoring instruments was deployed in the region during the late 1980s. The main goals of the ongoing Parkfield Earthquake Prediction Experiment are to record the geophysical signals before and after the expected earthquake; to issue a short-term prediction; and to develop effective methods of communication between earthquake scientists and community officials responsible for disaster response and mitigation. This project has already made important contributions to both earth science and public policy.

Scientific understanding of earthquakes is of vital importance to the Nation. As the population increases, expanding urban development and construction works encroach upon areas susceptible to earthquakes. With a greater understanding of the causes and effects of earthquakes, we may be able to reduce damage and loss of life from this destructive phenomenon.

Day 2 Schedule

Subject	Minutes Per Day (At Least!)	Assignments	What Did I Learn Today?
English Language Arts	45	☐ Activity 1: Making Inferences ☐ Activity 2: Writing	☐
Math	45	☐ Activity 1: Multiplying and Dividing Integers	☐
Science	45	Complete at least one of the following activities: ☐ Activity 1: *Earthquake Shakes up Hawaii (English or Spanish)* ☐ Activity2: Continue *Geology* activity through the study of Seismographs	☐
Fitness and Health	30	☐ Exercise for 30 minutes. Choose from the Activity Calendars at the back of this booklet.	☐
Arts	30	☐ Choose one or two activities from Visual Arts Activities at the back of the booklet	☐
Educational TV Shows	30	☐ Choose TV shows to further your learning at home	☐

Day 2 English Language Arts

Activity 1: *Making Inferences*

- Continue reading a chapter in the book of your choice. Today you will focus on making text-based inferences. An *inference* is an educated guess you can make based on evidence in the text. Writers don't always state every point they are trying to make. Rather, writers sometimes present details in the text that suggest a certain unstated point—and they trust readers to infer the point.

  To make text-based inferences, read with special attention to ideas that are suggested in the text—but are unstated.

  As you read, try to make two or three text-based inferences, and record them in the chart. You might want to use one of these response frames to state each of your inferences and the supporting evidence:

  I can tell that . . . because . . . .
  It seems like . . . because . . . .

Details in the text	+	Your "educated guess" about what the details suggest	=	Text-based Inference

Day 2 English Language Arts (continued)

Details in the text	+	Your “educated guess” about what the details suggest	=	Text-based Inference

Day 2 Mathematics

Activity 1: *Multiplying and Dividing Integers*

Complete the following activity:

- Skill 22: Multiplying and Dividing Integers

Notebook Activity

In your notebook, write a letter to a friend explaining how you would combine like terms and why.

SKILL 22

Name ________________________ Date ____________

Multiplying and Dividing Integers

When multiplying or dividing integers:
If two integers have the same sign, their product or quotient is positive.
If two integers have different signs, their product or quotient is negative.

EXAMPLE *Solve each equation.*

$a = 8 \times (-4)$ *One factor is positive and the other is negative.*
$a = -32$ *The product is negative.*
The solution is −32.

$b = -3 \times (-12)$ *Both factors are negative.*
$b = 36$ *The product is positive.*
The solution is 36.

$c = -63 \div (-7)$ *Both factors are negative.*
$c = 9$ *The quotient is positive.*
The solution is 9.

$d = -52 \div 4$ *The factors have different signs.*
$d = -13$ *The quotient is negative*
The solution is −13.

EXERCISES ***Tell whether the product or quotient is positive or negative. Then find the product or quotient.***

1. 8×9

2. $4 \times (-5)$

3. $-81 \div (-9)$

4. $-16 \div 4$

5. -5×7

6. $27 \div 3$

7. $56 \div (-8)$

8. $-3 \times (-6)$

9. $-42 \div 7$

10. 6×8

Solve each equation.

11. $a = -16 \times 4$

12. $b = 120 \div 20$

13. $c = -240 \div (-4)$

14. $d = -64 \div 8$

15. $e = 14 \times (-8)$

16. $f = 144 \div 6$

17. $g = -80 \div (-16)$

18. $h = 14 \times 36$

19. $j = -11 \times 11$

20. $k = -16 \times (-9)$

21. $m = 240 \div (-8)$

22. $n = -315 \div 9$

23. $p = 14 \times 12$

24. $q = 18 \times 0$

25. $r = 285 \div (-15)$

26. $s = -33 \times (-9)$

APPLICATIONS ***A full 60-gallon water storage tank drains at a rate of 3 gallons per minute.***

27. How much water is in the tank after 4 minutes?

28. How much water is in the tank after 8 minutes?

29. How long does it take to drain 15 gallons of water?

30. How long does it take to drain the entire tank?

31. Suppose water is added to the tank at a rate of 2 gallons a minute. How long will it take to drain the tank?

Day 2 Science

Complete Activity 1 or Activity 2 below.

Activity 1: *Earthquake Shakes Up Hawaii*

- Read the article below and answer the questions that follow.

Vocabulary

Learn the new vocabulary words below. You will use these vocabulary words in today's activity.

- **assess** (*verb*): to make a judgment about something
- **fatality** (*noun*) death resulting from accident or disaster
- **infrastructure** (*noun*) basic structural foundations, like roads, bridges, and so on
- **magnitude** (*noun*) a measure of the amount of energy released by an earthquake, as indicated on the Richter scale

Earthquake Shakes Up Hawaii

HONOLULU, Hawaii (Achieve3000, October 16, 2006). On the morning of October 15, Hawaii experienced its strongest earthquake since 1983. The quake left many people without power, and some had to leave their homes until officials could assess the damage.

The earthquake hit 10 miles north-northwest of the island of Hawaii, also known as the Big Island. The quake measured 6.6 on the Richter scale, and several strong aftershocks followed, including one measuring at least 5.8. Hawaiian earthquakes, which are caused by volcanic activity on the islands, are usually fairly minor. As a result, this quake frightened many residents and tourists.

"We were rocking and rolling," said resident Anne LaVasseur, who was on the second floor of a two-story, wood-framed house on the Big Island when the quake struck. "I was pretty scared. We were swaying back and forth, like King Kong's pushing your house back and forth."

The earthquake caused only minor injuries and no fatalities, but the shaking caused damage on the islands, making some areas unsafe. At one hotel, the water pipes burst, creating a dramatic waterfall down the front of the building. Rockslides in many locations forced officials to close roads. Officials evacuated hotels and hospitals, sending hotel guests to gymnasiums and patients at the affected hospitals to other medical centers.

Soon after the shaking stopped, several areas lost electricity. Why? Power plants in Hawaii have built-in monitors that shut down operations if they detect an earthquake. Plant workers had to reboot all systems in order to restore electricity, a process that took several hours. By Monday morning, Rodney Haraga, director of the Hawaii Department of Transportation, reported that most of the Big Island had power. The island of Oahu, however, was still largely in the dark.

Residents and tourists may have been frightened, but they responded by staying calm. Despite a lack of traffic signals, the roads were quiet. Drivers crossed intersections carefully, while police directed traffic at the busier spots. Unable to depend on their refrigerators, people stocked up on provisions at stores. Lines ran down the street outside of the Times supermarket in Kaimuki on Oahu on Sunday morning. Within three hours, the store was out of flashlights and candles.

"We're not really panicking or anything," said Iri Park, leaving the store with a cart full of bags. Park was at the store with Japanese tourist Kenji Aoki to stock up on junk food, which requires no cooking. Aoki said he did not take the earthquake too seriously; being from Japan, he's used to even stronger tremors.

Despite the power outage, some gas stations and restaurants were able to open. Near the supermarket, a normally quiet Vietnamese restaurant was packed with people eager to escape their darkened homes. With no TV or computer, Brian Correa and his family had spent the day telling one another stories. At dinnertime, the Correas decided to get some Vietnamese food—but not because they lacked supplies.

"We have stuff at home," Correa said. "We just wanted to get out of the house."

Meanwhile, officials continued to deal with the damage. "We were totally prepared for a disaster such as this, but obviously with a disaster this big you can't be prepared for everything," Haraga explained.

Instructions:
Select the correct answer.

Question 1:
What is this article mainly about?
1. Hawaii recently had the only earthquake in its history.
2. Residents of Hawaii were recently warned about a strong earthquake that could have left people homeless.
3. Hawaii recently had the weakest earthquake in its history.
4. Residents of Hawaii were recently evacuated from their homes and left without power after a major earthquake.

Question 2:
According to the article, which of these is a way that people in Hawaii kept busy in the hours following the earthquake?
1. Studying for school
2. Watching television
3. Shopping for goods
4. Playing video games

Question 3:
In which paragraph could the author *best* place information on how the Richter scale works?
1. Paragraph 1
2. Paragraph 2
3. Paragraph 3
4. Paragraph 4

Day 2 Science (continued)

Question 4:
Which is the closest antonym for the word *evacuate*?
1. Enter
2. Judge
3. Master
4. Cleanse

Question 5:
Based on details in the article, what do Iri Park and Brian Correa have in common?
1. They entertained their families after the earthquake.
2. They shopped for food after the earthquake.
3. They went out of their homes after the earthquake.
4. They stayed in a hotel during the earthquake.

Question 6:
Which reference source would probably contain the most information on the relationship between volcanoes and earthquakes?
1. Atlas
2. Thesaurus
3. Dictionary
4. Encyclopedia

Question 7:
Which of these statements is an opinion?
1. Hawaii experienced an earthquake on October 15.
2. Vietnamese restaurants are the best places to go for dinner.
3. The October 15 earthquake in Hawaii caused no fatalities.
4. Rodney Haraga is the director of the Hawaii Department of Transportation.

Question 8:
Here is a sentence from the article:
Unable to depend on their refrigerators, people stocked up on *provisions* at stores.
A synonym for *provisions* must be __________.
1. Supplies
2. Credit
3. Receipts
4. Damage

Day 2 Science (continued)

Activity 2: *Science Inquiry Project – Geology (continued): How Seismographs Measure Earthquakes*

Vocabulary
Learn the new vocabulary words below. You will use these vocabulary words in today's activity.

- **Aftershock**: A less powerful earthquake that follows a more forceful one.
- **Magnitude**: A measure of the total amount of energy released by an earthquake.

Directions:
Continue the *Geology* activity you began on Day 1. Below is a sample schedule of how you might complete this assignment over the four days.

- Day 1: Research the history of seismographs from early Chinese cultures to the present day technological design**.** Utilize www.crustal.ucsb.edu/ics/understanding/
- **Day 2: Identify problems past scientists have confronted when attempting to measure earthquake location and intensity. Utilize** www.crustal.ucsb.edu/ics/understanding/
- Day 3: Design a simple seismograph that will track a simulated earthquake and complete a set of blueprints. Then write and "produce" a 3-5 minute informative commercial for your home seismograph.

Suggested Additional Resources:

- www.crustal.ucsb.edu/ics/understanding/ - Complete the quiz, and read of famous Earthquake accounts
- http://pubs.usgs.gov/gip/earthq1/ - Measure earthquakes, research how earthquakes happen, examine "science fair project" and read how to build a seismometer.

Source: This activity is from Glencoe NY Science, Grade 7, Unit 1: Geology
http://glencoe.mcgraw-hill.com/sites/0078778646/student_view0/unit1/unit_project_3.html

Day 3 Schedule

Subject	Minutes Per Day (At Least!)	Assignments	What Did I Learn Today?
English Language Arts	45	☐ Activity 1: Reading ☐ Activity 2: Identifying Context Clues ☐ Activity 3: Identifying similes and metaphors	☐
Math	45	☐ Activity 1: Application Problem	☐
Science	45	Complete at least one of the following activities: ☐ Activity 1: *Tsunami Warning System Does its Job (English or Spanish)* ☐ Activity 2: Continue *Geology* activity by designing a simple seismograph	☐
Fitness and Health	30	☐ Exercise for 30 minutes. Choose from the Activity Calendars at the back of this booklet.	☐
Arts	30	☐ Choose one or two activities from Theater Activities at the back of the booklet	☐
Educational TV Shows	30	☐ Choose TV shows to further your learning at home	☐

Day 3 English Language Arts

Activity 1: *Reading*

- Continue reading a chapter in the book of your choice.

Activity 2: *Identifying Context Clues*

- Today you will practice using context clues to determine meaning of unfamiliar words. Often you can figure out the meaning of unfamiliar words if you pay close attention to clues in the text, such as:
  - the overall meaning of the surrounding sentence or paragraph
  - the word's position in the sentence
  - how the word is used in the sentence

Steps:

1. Identify an unfamiliar word.
2. Look for clues in the text that hint at the meaning of the unfamiliar word.
3. Analyze these context clues to try to figure out the meaning of the unfamiliar word.
4. Use a dictionary to check on the guess you made.

- As you read, fill in the Reading Log below.

Text page	What I understood	New or difficult vocabulary	Questions I have

Day 3 Mathematics

Activity 1: Application Problem

Comparing Freezing Points (http://illustrativemathematics.org/standards/k8)

Ocean water freezes at about -2 ½ °C. Fresh water freezes at 0°C. Anrifreeze, a liquid used to cool most car engines, freezes at -64°C.

Imagine that the temperature is exactly at the freezing point for ocean water. How many degrees must the temperature drop for the antifreeze to turn to ice?

See Comparing Freezing Points Solution

Day 3 Science

Complete Activity 1 or 2 below:

Activity 1: *Tsunami Warning System Does Its Job*

- Read the article below and answer the questions that follow.
- Para Espanol, prime aquí: http://schools.nyc.gov/Documents/teachandlearn/LearnatHome/ELL/7day3sp.pdf

Vocabulary
Learn the vocabulary words below. You will use these vocabulary words in today's activity.

- **dispatch** (verb): to send off or away with speed
- **meteorologist** (noun): a person who studies the earth's atmosphere, especially its patterns of climate and weather
- **prone** (adjective): likely to do or be affected by something
- **Richter scale** (noun): a scale from one to 10 used to measure how strong an earthquake is
- **sparsely** (adverb): few and widely separated

Tsunami Warning System Does its Job

TOKYO, Japan (Achieve3000, November 17, 2006). A powerful undersea earthquake near Japan on November 15 led officials to issue tsunami warnings. After the danger passed, officials were relieved. There had been no major damage, and the episode had given them a chance to test tsunami warning systems.

Officials became concerned about possible tsunamis after an earthquake measuring 8.1 on the Richter scale struck in the northern Pacific Ocean. Major ocean earthquakes can cause tsunamis thousands of miles away. The quake was located 275 miles north-northeast of the Kuril Islands, which are east of Hokkaido, Japan's northernmost island. Based on this location, officials issued alerts for the sparsely populated, Russia-governed Kuril Islands and for parts of Japan and the U.S.

In Japan, officials directed warnings at Hokkaido. Several thousand people on the coast of the island fled to higher ground after officials predicted a 6.5-foot tsunami. The coastal city of Nemuro dispatched about 20 firetrucks and cars after the warning. City official Masayuki Kikuchi said that the proceedings went smoothly; that is probably because residents of the earthquake-prone region live with the possibility of tsunamis every day.

"There was no panic," Kikuchi said. "Residents made their way to higher ground, just like they do in our annual tsunami drill."

As it turned out, residents did not need to be too concerned. The highest wave measured only 16 inches, and the sea remained fairly calm.

In the U.S., the Pacific Tsunami Warning Center issued alerts for Hawaii and the western U.S. and Canadian coasts. Some areas experienced minor tsunamis, but nothing major occurred. Officials kept the warnings in effect until they could be sure that the danger was over.

Day 3 Science (continued)

"It went very smoothly, and there weren't any major problems at all," said Brian Shiro, a scientist at the center. "We issued a warning for 1,000 kilometers (621 miles) surrounding the earthquake and an advisory for the rest of the Pacific Ocean."

In Crescent City, California, harbor workers noticed an unusual, fast-moving current, which destroyed two floating docks. Another surge followed, damaging a third dock. Several vessels tied to the docks pulled out of their anchorage and likely suffered damage.

"It wasn't wave action," said meteorologist Dave Reynolds. "It was the current that caused the damage. This is almost like a fast-moving river of water that is coming in, so . . . it's the currents that toss the boats around."

Several small tsunamis struck Hawaii. Just before the waves arrived, an undertow developed in the water. One swimmer was pulled through an opening in the seawall, resulting in minor injuries. One 2.5-foot surge flooded a harbor but caused no serious damage. After officials canceled the alerts, local authorities warned people to stay out of the water in case of unusual currents.

Officials have been particularly concerned about tsunamis since 2004. In December of that year, a major quake off the coast of Indonesia caused a 33-foot tsunami. The wall of water killed 213,000 people in 11 countries. Most people had little or no warning about the approaching wave.

The response to this latest quake indicates that tsunami warning systems can be effective.

The Associated Press contributed to this story.

Instructions:

Select the correct answer.

Question 1:
The author probably wrote this article to __________.
1. Show that tsunami warning systems can work and can save lives
2. Explain the difference between an earthquake and a tsunami
3. Show how to prepare for earthquakes and tsunamis
4. Explain the way of life in Japan and Indonesia

Question 2:
The reader can tell from the article that the residents of Nemuro, Japan, were probably __________.
1. Upset that they were not warned ahead of time about a possible tsunami
2. Prepared to leave their homes since they live in an area that is prone to tsunamis
3. Upset about having to leave their homes for the first time because of a possible tsunami
4. Prepared to stay in their homes since they live in an area that is safe from tsunamis

Day 3 Science (continued)

Question 3:
Imagine that someone made the following statements:
"I saw a few small waves, so I thought it was safe to swim. Then, the current was so strong that I got hurt!"
Which person from the article would most likely say this?
1. Dave Reynolds
2. An official from Nemuro
3. Masayuki Kikuchi
4. The swimmer in Hawaii

Question 4:
The reader can tell from the article that at the time of the 2004 tsunami, __________.
1. There must have been a few small towns along the coasts.
2. The tsunami warning system must have been very helpful.
3. There must have been many people living near the coasts.
4. The tsunami warning system must have been brand new.

Question 5:
Based on the article, the reader can predict that __________.
1. People in earthquake-prone areas will continue to resent tsunami warnings.
2. More countries will find ways to stop tsunamis from happening.
3. People in earthquake-prone areas will continue to ignore tsunami warnings.
4. More countries will develop tsunami warning systems.

Question 6:
Why does the author include the quote from the Nemuro city official in the fourth paragraph?
1. To show that tsunami warnings cause stress but at least they save lives
2. To show why tsunami warning systems are not very popular
3. To show that tsunami warnings work well even when they happen regularly
4. To show why tsunami warning systems usually do not work

Question 7:
Which is the closest synonym for the word dispatch?
1. Send out
2. Pull up
3. Drop in
4. Put away

Question 8:
If a town is sparsely populated, this means that __________.
1. There are many people, and they live far apart.
2. There are few people, and they live far apart.
3. There are many people, and they live close together.
4. There are few people, and they live close together.

Day 3 Science (continued)

Additional Question

Explain the value of the tsunami warning systems described in the article. What effect will repeated tsunami warnings have on people over time?

Use supporting evidence and reasons from the article, as well as your own ideas, in your response.

Day 3 Science (continued)

Activity 2: *Science Inquiry Project – Geology (continued): How Seismographs Measure Earthquakes*

Vocabulary
Learn the new vocabulary words below. You will use these vocabulary words in today's activity.

- **Plate Tectonics**: In geology, a theory that the Earth's lithosphere is divided into a number of large, plate-like sections that move as distinct masses.
- **Lithosphere**: The outer part of the Earth, consisting of the crust and upper mantle.

Directions:
Continue the *Geology* activity you began on Day 1. Below is a sample schedule of how you might complete this assignment over the four days.

- Day 1: Research the history of seismographs from early Chinese cultures to the present day technological design. Use www.crustal.ucsb.edu/ics/understanding/
- Day 2: Identify problems past scientists have confronted when attempting to measure earthquake location and intensity.
- **Day 3: Design a simple seismograph that will track a simulated earthquake and complete a set of blueprints.** Use www.crustal.ucsb.edu/ics/understanding/
  Then write and "produce" a 3-5 minute informative commercial for your home seismograph.

Suggested Additional Resources:

- www.crustal.ucsb.edu/ics/understanding/ - Complete the quiz, and read of famous Earthquake accounts
- http://pubs.usgs.gov/gip/earthq1/ - Measure earthquakes, research how earthquakes happen, examine "science fair project" and read how to build a seismometer.

Source: This activity is from Glencoe NY Science, Grade 7, Unit 1: Geology
http://glencoe.mcgraw-hill.com/sites/0078778646/student_view0/unit1/unit_project_3.html

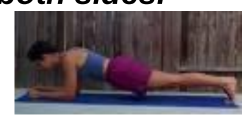
November 2012

Secondary Physical Activity Calendar

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	MilkPEP and the NBA teamed up to launch *Get Fit By Finals*, a new fitness and nutrition education initiative for teens. Visit www.MilkDelivers.org NOW to download a FREE *Get Fit* activation kit that includes a guide to implementing *Get Fit By Finals* in your school -- plus fitness and nutrition tips and tools from the NBA. **Log on by May 1 and tell us how you're getting your students fit and you could be eligible to WIN A GYM MAKEOVER FOR YOUR SCHOOL!** Also, check back to Web site weekly for new NBA player videos you can use in your classroom or gym to help motivate your students to get fit.			***1*** ***25 body squats w/ hands behind your head. Now 3 sets of as many push-ups as you can do.***	***2*** ***4 intervals, 15 min running, walk for 1 min between each interval.***	***3*** ***Get outside today with the family and go fly a kite!***
4 ***3 sets/15 reps bench press; 3 sets/ 15 reps tricep dips.***	***5*** ***Jump rope 2 min, fast walking 2 min, 12 minute run; repeat 3X.***	***6*** ***3 sets/15 reps body squats, then 3 sets/20 reps concentration curls.***	***7*** ***1 mile fitness run, sprint 50 yds, jog 50 yds- do this for 1 mile. Try again for a second fitness mile.***	***8*** ***3 sets /to tolerance, sitting overhead press. 3 sets/15 reps lying hamstring curl.***	***9*** ***4 sets/10 reps lying leg raises; 4 sets/10 reps lifting side plank.***	***10*** ***Go bowling today with friends or family. No lanes? Make pins from old 2 liter bottles filled w/sand or water.***
11 ***3 sets/12 reps inclined push-ups; 3 sets/15 reps tricep extensions.***	***12*** ***Yoga plank position-hold and raise each leg one at a time 10X. Repeat 2 more sets.*** ***3 sets/12 reps toes to ceiling on bench.***	***13*** ***15 squat jumps with a ball extending overhead; 3 sets 15 reps one-arm row to both sides.***	***14*** ***2 min of ab work-basic crunches, crunches with legs up, twisting crunches. Repeat two more times.***	***15*** ***3 sets/15 reps stiff-legged dead lift; 3 sets/20 reps standing lateral raise.***	***16*** ***Speed play today: run, jog, run fast, walk, skip, run for a total of 40 min. Stretch afterward.***	***17*** ***Find 3 friends, go to the park and play 2 v. 2 volleyball.***
18 ***3 sets/12 reps declined push-ups; 3 sets/12 reps flyes.***	***1*** ***3 sets/20 reps knee tucks on a bench; 3 sets/15 reps reverse crunch.***	***20*** ***3 sets/20 reps bicep curl w/resistance; 3 sets/15 reps back extensions.***	***21*** ***Find a basketball and perform 4 sets of 25 crunches with the basketball held under your chin.***	***22*** ***Alternating walking lunges- 3 sets/20 reps; 4 sets/8 reps standing shoulder press.***	***23*** ***Ride a bicycle for one hr-pick a scenic route around town. Wear your helmet! No bike? One hr power walk/jog.***	***24*** ***Find a tennis court, play tennis for 30 minutes or hit against a wall***
25 ***3 sets/10 reps wide arm push-ups; jump rope for 2 min in between each set.***	***26*** ***4 sets/10 reps twisting bench crunch; 10 min power walk in between each set.***	***27*** ***3 sets/15 reps superman; 3 sets/20 reps alternating bicep curls.***	***28*** ***How about some 3 on 3 basketball today?***	***29*** ***3 sets/20 reps calf raises off a step; 3 sets/ 15 reps seated overhead press.***	***30*** ***3 sets/15 reps single leg lift; 10 min. jog in between sets.***	

November 2012

Ten At A Time Physical Activity Calendar

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Need help remembering exercises? Go to http://www.shapefit.com/training.html#8 for demos of exercises.	***Duplicated with permission from the National Association for Sport and Physical Education (NASPE). To assess whether your child is receiving a quality physical education program, visit www.naspeinfo.org/observePE for an observation assessment tool.***			***1*** ***Squats w/ hands behind your head.***	***2*** ***Power-walk 10 min.***	***3*** ***Tricep dips.***
4 ***Bench press.*** 	***5*** ***Jump rope.***	***6*** ***Concentration curls.***	***7*** ***Lying hamstring curl.*** 	***8*** ***Sitting overhead press.***	***9*** ***Lying leg raise.***	***10*** ***Lifting side plank.*** 
11 ***Inclined push-ups.***	***12*** ***Yoga plank position.***	***13*** ***One-arm row to both sides.*** 	***14*** ***Twisting crunches.***	***15*** ***Stiff-legged dead lift.***	***16*** ***Jump rope 10 min.***	***17*** ***Tricep extensions.***
18 ***Declined push-ups.***	***19*** ***Knee tucks on a bench.***	***20*** ***Bicep curl w/resistance.***	***21*** ***Crunches with a basketball held under your chin.***	***22*** ***Alternating walking lunges.***	***23*** ***10 min power walk/jog.***	***24*** ***Toes to ceiling on bench.***
25 ***Wide arm push-ups.***	***26*** ***Twisting bench crunch.***	***27*** ***Superman.***	***28*** ***Standing shoulder press.***	***29*** ***Calf raises off a step.***	***30*** ***Single leg lift.***	*Each day lists one exercise that can be executed "10 at a time." Keep track of each set of 10 reps you accomplish throughout the day, or for cardio, ten minutes of the activity.*

Arts Activities for Grades 6-8

A number of the activities listed reference specific works of art. If you are not familiar with them you may find them on the internet (even the performances). However, these are provided as examples, and you can substitute similar works of art with which you are familiar or to which you have access.

All Arts Activities taken from the *Blueprints for Teaching and Learning in the Arts: Grades PreK-12.*

DANCE

- Create a work using original movement material, devices to manipulate phrases, and a clear choreographic structure.
- Analyze how varying the use of force affects the way a movement feels, is perceived, and is interpreted.
- Maintain a dance journal, including dance research, dance resources and notation.
- Reflect upon personal criteria for evaluating dance, and share in discussion.
- Research the connections between two dance styles.
- Make a "family tree" of a dance form including major artists and dates of significant works.
- Research the period in which a choreographer was working or a dance form arose.
- Choose from a "grab bag of countries," and research the dances of the country chosen.
- Brainstorm the ways in which studying dance affects students' health.

MUSIC

- Listen to the folk song "Shenandoah," and write a private journal entry describing feelings evoked by the music.
- Share a recording or performance of a song from a particular culture that evokes a similar personal response.
- Compare at least two different settings of the same text in a choral work from online resources. Discuss specific similarities and differences in repertoire, such as: "Ave Maria" (Schubert, Byrd, others), "Still Nacht"/"Silent Night"(Gruber; German and English versions), "Anvil Chorus" (Verdi; Italian and English versions), "Toreador Song" (Bizet; French and English versions).
- Compare a jazz song performed by two different soloists— such as "Cherokee" (R. Noble) by Charlie Parker, Ella Fitzgerald, Wynton Marsalis, or others—listening for differences and similarities in "musical voice."
- Create a "Top 10 list" of favorite performers, repertoire representative of classical, world, jazz, and popular music styles and genres. Each item should be supported by a written explanation containing music vocabulary, where appropriate.
- Prepare a historical timeline reflecting world, national, state, or municipal events and their corresponding musical components.

THEATER

- Rehearse and perform a scene in front of others.
- Rehearse and perform the same scene in three distinct styles or genres such as situation comedy, reality show, soap opera, disaster movie.
- Research and portray a character, using at least one appropriate costume piece, prop, gesture, need and physical shape.
- Perform the written word in a reading or memorized presentation.
- Using original writing related to a specified theme, develop it into a monologue.

- Write a scene that has:
  - a plot comprising of a sequence of actions characters with clear intentions/wants
  - obstacles to characters' wants
  - character growth or transformation from overcoming an obstacle or resolving conflict
  - unified and consistent theme
  - written stage directions, including character descriptions and notes
  - clear and articulated choices about dramatic style, structure and convention
- Analyze a dramatic script for elements of structure, character development, conflict and plot.
- Create a marketing poster for a show with an identifiable dominant image.
- Measure a room and create a ground plan including furniture and other elements from the room.
- Make a CD or audio tape to score a scene.

VISUAL ARTS

- Create a painting that demonstrates:
  - the rich use of a specific painting medium such as: watercolor, tempera or acrylic
  - awareness of light, value and contrast
  - strategies to depict the illusion of depth
  - use of prior observational sketches
- Create a pencil, conté, or pen and ink drawing that demonstrates:
  - perspective
  - observation of detail
  - scale of objects and figures
  - a wide range of values
  - a personal view
- Discuss techniques of perspective and scale, artist's choice in degree of detail, artist's message.
- Create a collage that demonstrates:
  - use of a variety of materials and textures
  - unity through color
  - balanced composition

Educational TV Shows

Channel	Show	Subject	Day	Time	Recommended Audience	Description
Discovery	How It's Made	Science, Engineering	Weekdays	6:00-7:00 PM	4-5, 6-8, 9-12	The show is a documentary program showing how common, everyday items (including food products like bubblegum, industrial products such as motors, musical instruments such as guitars, and sporting goods such as snowboards) are manufactured.
Discovery	Mythbusters	Science, Engineering	Weekdays	2:00 PM	4-5, 6-8, 9-12	MYTHBUSTERS mix scientific method with gleeful curiosity and plain old-fashioned ingenuity to create their own signature style of explosive experimentation.
WLIW and WNEW	NOVA	Nature, Science	Thursdays	9:00 PM,	6-8, 9-12	Award winning science show on various subjects from space to evolution to ancient civilizations. Episodes available online with additional resources. http://www.pbs.org/wgbh/nova/

Channel	Show	Subject	Day	Time	Recommended Audience	Description
Discovery	How It's Made	Science, Engineering	Weekdays	6:00-7:00 PM	4-5, 6-8, 9-12	The show is a documentary program showing how common, everyday items (including food products like bubblegum, industrial products such as motors, musical instruments such as guitars, and sporting goods such as snowboards) are manufactured.
Discovery	Mythbusters	Science, Engineering	Weekdays	2:00 PM	4-5, 6-8, 9-12	MYTHBUSTERS mix scientific method with gleeful curiosity and plain old-fashioned ingenuity to create their own signature style of explosive experimentation.
WLIW and WNEW	NOVA	Nature, Science	Thursdays	9:00 PM,	6-8, 9-12	Award winning science show on various subjects from space to evolution to ancient civilizations. Episodes available online with additional resources. http://www.pbs.org/wgbh/nova/
NYC TV - 25	Globe Trekker	Geography	Weekdays	7:30 PM	6-8, 9-12	Globe Trekker transports viewers to unforgettable destinations through its stunning photography, rhythmic indigenous music and spirit of adventure. In each episode, one vibrant young traveler ventures off-the-beaten path to soak up the local culture, sample the cuisine and revel in