

## Important Questions for the FTCE Competencies

### LANGUAGE ARTS COMPETENCY 1

*1. Identify concepts of print (e.g., parts of books, directionality of print and voice-to-print match).*

#### **What is voice to print match?**

When a student understands that the print on the page is what needs to be read and not the pictures. For example, a first grade student begins the school year picture reading a book, but by the middle of the school year begins pointing to the words and vocalizing the words he/she knows.

For more information about voice to print matching or other concepts of print, please visit:

<http://teams.lacoe.edu/documentation/classrooms/patti/k-/teacher/assessment/print/concepts.html>

*2. Identify strategies for developing concepts of print (e.g., shared reading, environmental print, and language experience).*

*3. Identify strategies for teaching phonological awareness, phonics, word structure, and context clues.*

#### **What is the difference between phonemes, phonics, phonologic awareness, and phonemic awareness?**

Phonemes- the smallest units of sounds in spoken words

Phonics: the study of how spellings represent sounds; phonics also involves an instructional approach that focuses on how sounds in spoken language are represented by letters in the written language

Phonological awareness: the knowledge about the sound structure of language, which includes the ability to distinguish parts of speech by hearing the words. It includes the ability to identify syllables and phonemes, to blend and segment phonemes, and the development of decoding and spelling skills. Phonological awareness is a reliable predictor of a student's ability to read later on. People often confuse phonological awareness with "phonics" but in reality, phonological awareness is a precursor to phonics. A good way for children to develop phonological awareness is through verbal communication, such as songs and nursery rhymes.

Phonemic awareness: most complex level of phonological awareness and involves blending, segmentation, and manipulating individual phonemes. Phonemic awareness and phonological awareness are interdependent. "Phonemic awareness" refers to the knowledge that words are made up of sounds, syllables, 'onsets and rimes,' and

phonemes. "Phonological awareness" is the ability to hear the sounds and distinguish between them.

For further information:

<http://en.wikipedia.org/wiki/Phonics>

[http://en.wikipedia.org/wiki/Phonological\\_awareness](http://en.wikipedia.org/wiki/Phonological_awareness)

[http://en.wikipedia.org/wiki/Phonemic\\_awareness](http://en.wikipedia.org/wiki/Phonemic_awareness)

## LANGUAGE ARTS COMPETENCY 2

*1. Demonstrate knowledge of the developmental stages of reading.*

### **What are the developmental stages of reading?**

1. EMERGENT STAGE: Children in the emergent stage are just entering the world of reading and writing. Children at this stage are beginning to learn basic print concepts and simple reading strategies. They often engage in "pretend" reading. Children at this stage need books with text that possess repetition and predictability. The illustrations in these books should support the text, so that the child can follow the storyline.

2. EARLY STAGE: Children in the early stage will understand the basic concepts of print. They are learning more sight words, and will begin to employ various problem-solving strategies while reading. The books children read at this stage should assist in building vocabulary, and contain more advanced language structures. At this stage, it is appropriate for the illustrations to be less leading and supportive of the text.

3. FLUENCY STAGE: Children in the fluency stage have mastered various reading strategies, and concepts of print. Books given to children in this stage should promote independent reading, aim at allowing the child to derive meaning through more complex stories, and encourage the child's enjoyment of reading.

\*Some other suggestions include a pre-reading/pre-emergent stage as well\*

For further information:

[http://teachers.eusd.k12.ca.us/dsauer/developmental\\_stages\\_of\\_reading.htm](http://teachers.eusd.k12.ca.us/dsauer/developmental_stages_of_reading.htm)

<http://www.ansb-es.eu.dodea.edu/Developmental%20Stages%20of%20Reading.htm>

*2. Demonstrate knowledge of strategies (activating prior knowledge, predicting, confirming, reflecting) used as part of the reading process.*

*3. Demonstrate knowledge of syntactic, semantic, and graphophonemic cueing systems.*

**Know the three cuing systems:**

1. **Syntactic:** The syntactic cuing system focuses on the structure of the sentence. It also relates to how language works... If you were using the syntactic cuing system you would want to make sure that the student could identify if the sentence sounded correct.

2. **Semantic:** The semantic cuing system focuses on any meaning a student derives from a sentence that is primarily based on prior knowledge or previous experiences ... If you were using a semantic cuing system, you would want to make sure that the student can identify sentences that make sense and those that do not.

3. **Graphophonemic:** The graphophonemic cuing system focuses on various visual cues and knowledge about the relationship between sounds and symbols, for example: **Letter/sound recognition.** The student's phonological awareness is very important for this cuing system. If you were using the graphophonemic cuing system, you would want to investigate how the reader applies their knowledge about phonology as they read. When using this system, you may want to assess if the child can distinguish between sentences that look right, and those that do not.

For more help please visit:

<http://www.didaxo.net/cueingsystems.htm>

### LANGUAGE ARTS COMPETENCY 3

*1. Identify essential comprehension skills (main idea/essential message, supporting details and facts, author's purpose, fact and opinion, point of view, inference, and conclusion).*

*2. Identify strategies to determine meaning and increase vocabulary.*

*3. Identify strategies to teach a variety of informational and literary text structures (cause and effect, compare and contrast, chronological order, and problem and solution)*

#### **What transition words should a student use when writing about cause and effect?**

Because, consequently, therefore, as a result of, etc.

For more about clue words in the different areas of reading, please visit:

<http://www.cobbk12.org/~murdock/ILT/Stevens/Teacher%20Resources/TestingTipsBookmark.pdf>

*4. Identify appropriate uses of multiple representations of information (charts, tables, graphs, pictures, and print and non-print media) for a variety of purposes.*

*5. Identify strategies for developing critical thinking skills (analysis, synthesis, evaluation).*

#### **What are the different strategies for developing critical thinking skills?**

Competence	Skills Demonstrated
<b>Knowledge</b>	<ul style="list-style-type: none"> <li>• observation and recall of information</li> <li>• knowledge of dates, events, places</li> <li>• knowledge of major ideas</li> <li>• mastery of subject matter</li> <li>• <i>Question Cues:</i> list, define, tell, describe, identify, show, label, collect, examine, tabulate, quote, name, who, when, where, etc.</li> </ul>
<b>Comprehension</b>	<ul style="list-style-type: none"> <li>• understanding information</li> <li>• grasp meaning</li> <li>• translate knowledge into new context</li> <li>• interpret facts, compare, contrast</li> <li>• order, group, infer causes</li> <li>• predict consequences</li> <li>• <i>Question Cues:</i> summarize, describe, interpret, contrast, predict, associate, distinguish, estimate, differentiate, discuss, extend</li> </ul>
<b>Application</b>	<ul style="list-style-type: none"> <li>• use information</li> <li>• use methods, concepts, theories in new situations</li> <li>• solve problems using required skills or knowledge</li> <li>• <i>Questions Cues:</i> apply, demonstrate, calculate, complete, illustrate, show, solve, examine, modify, relate, change, classify, experiment, discover</li> </ul>
<b>Analysis</b>	<ul style="list-style-type: none"> <li>• seeing patterns</li> <li>• organization of parts</li> <li>• recognition of hidden meanings</li> <li>• identification of components</li> <li>• <i>Question Cues:</i> analyze, separate, order, explain, connect, classify, arrange, divide, compare, select, explain, infer</li> </ul>
<b>Synthesis</b>	<ul style="list-style-type: none"> <li>• use old ideas to create new ones</li> <li>• generalize from given facts</li> <li>• relate knowledge from several areas</li> <li>• predict, draw conclusions</li> </ul>

	<ul style="list-style-type: none"> <li>• <i>Question Cues:</i> combine, integrate, modify, rearrange, substitute, plan, create, design, invent, what if?, compose, formulate, prepare, generalize, rewrite</li> </ul>
<b>Evaluation</b>	<ul style="list-style-type: none"> <li>• compare and discriminate between ideas</li> <li>• assess value of theories, presentations</li> <li>• make choices based on reasoned argument</li> <li>• verify value of evidence</li> <li>• recognize subjectivity</li> <li>• <i>Question Cues</i> assess, decide, rank, grade, test, measure, recommend, convince, select, <b>judge</b>, explain, discriminate, support, conclude, compare, summarize</li> </ul>

Chart is taken from the following website: please refer to it for further information...

<http://www.coun.uvic.ca/learn/program/hndouts/bloom.html>

#### LANGUAGE ARTS COMPETENCY 4

*1. Identify characteristics and elements of a variety of literary genres (short stories, poetry, plays, and personal narratives).*

#### **What is a primary source?**

A primary source is a document or piece of work, which was actually written, recorded, or created during the specific time under study. Primary sources are important for data collection and research because it allows the researcher to get as close as possible to the actual feelings and events of a given time. For a document to be considered a primary sources, it must have either been created during the time period under studied, or created later date by someone who actual experienced or witnessed the time and events being studied (as in the case of memoirs). Examples include: Books from the time period you're writing about, Memoirs, letters, interviews, autobiographies, diaries, magazines or journal articles from the time period you're writing about, newspaper articles from the time period you're writing, manuscript collections, speeches, photographs, audio recordings, video recordings, public opinion polls, fiction from a particular time period, and/or movies from a particular time period

Please refer to the following website for more information:

<http://www.princeton.edu/~refdesk/primary2.html>

2. Identify terminology and appropriate use of literary devices.

**What are the different literary devices?**

Allegory- A story that explains or teaches something (The three little pigs teach about hard work)

Alliteration- a string of words or syllables that start with the same letter (*Ex. Billy Bob bought bulbs.*)

Allusion- A reference to a famous person or event in life of literature

Analogy- A more complex comparison of two ideas or situations that does not use “like” or “as” (*I named the cat Snowball because it was white. It reminded me of how light and white snow is.*)

Climax- A series of events that become more intense, the peak of a story

Homophone- Two words that sound alike but have different meanings (*There, Their, and They're*) *There are two parks in that state. Their dog ran away. They're home sick with the flu.*

Hyperbole- An exaggerated statement that should not be taken literally (*Ex. She must have weighed 10,000 pounds.*)

Irony- Saying one thing, but meaning just the opposite

Metaphor- A comparison in which one thing is said to be another (*Ex. My father's anger was a dark think cloud that loomed over me all day.*)

Onomatopoeia- The word itself sounds imitates the sound the word makes (*Ex. squash, kerplunk, buzz*)

Oxymoron- A conflicting phrase that often includes opposites, but is true (*He is the dumbest genius I know*)

Paradox- A statement that presents two opposite ideas but still yields truth. (*Ex. Bad things happen to good people.*)

Personification- Giving abstract ideas or inanimate objects, traits that living things possess (*The clock threw its hands around to noon*)

Pun- Emphasizes a word that has two meanings, intending to be funny (*You know, I get a real kick out of playing soccer*)

Sarcasm- A type of humor that is intended to poke fun and be cutting (*Well, aren't you just the nicest person...*)- when the person is really mean!

Simile- A comparison using like or as (*He is a fat as an elephant.*)

Understatement- Expressing something in a way that is less strong than it should be (When Paul fell asleep while taking his exam, his teacher said, “It appeared that you might have been a little but sleepy.”)

For more examples or further information please visit:

<http://bcms.leesummit.k12.mo.us/7-3bcms/la/poetry/literary%20devices.htm>

3. Identify and apply professional guidelines for selecting multicultural literature.

**What source would you use to get a Multi-cultural library?**

The school library would probably be the best place to create a multicultural library because it contains a variety of texts and mediums (books, videos, magazines, etc.)

4. Identify appropriate techniques for encouraging students to respond to literature in a variety of ways.

#### LANGUAGE ARTS COMPETENCY 5

1. Demonstrate knowledge of the developmental stages of writing.

2. Demonstrate knowledge of the writing process.

3. Identify the conventions of standard American English. (See Shannon Black)

#### **Know the common homophones, such as:**

##### **The difference between accept and except?**

Accept is a verb meaning to take something offered. (*I accepted the flowers from him.*)

Except is a verb meaning to leave out. (*I want all of those except the blue one.*)

##### **The difference between effect and affect?**

Effect is a **noun** that means purposeful or intent (*The effect of their statement was to make her angry.*), when something is caused by something else (*Ozone depletion is an effect of pollution.*)

Affect is a **verb** meaning to bring about a response, influence (*Paralysis affected his limbs.*)

\*The biggest difference between these two is that EFFECT is a NOUN and AFFECT is a VERB.

##### **The difference between dessert and desert?**

Dessert refers to a snack after dinner. (*I want cake for dessert.*)

Desert refers to a dry, sandy plain. **Or** to leave. (*There is not a lot of water in the desert.*) (*My father deserted my family when I was a baby.*)

Any easy way to remember this is that you would rather have more DESSERT (cake) than DESERT (sand)... so since you would rather have more dessert there are more "S"s in the word.

##### **When do you capitalize words in sentences? (Not in study guide)**

Words are only capitalized at the beginning of a sentence or if it is a proper noun (specific name of a person, place, or thing). Words that identify people such as mom (in the middle of a sentence) are NOT capitalized. Words that are names of specific people (such as George Washington) or places (such as a Boulder Laboratory or Redwood Park), are always capitalized and BOTH names are capitalized if there is more than one (like the examples show).

4. *Identify characteristics of the modes of writing (e.g., narrative, descriptive, expository, and persuasive).*

### **What is descriptive writing?**

Descriptive writing uses words to paint a picture. It describes a person, place, thing, or idea.

The following website discusses descriptive writing. I noted some of the main points below from this website, but feel free to visit it for more information on this type of writing and other types as well.

<http://www.longleaf.net/ggrow/modes.html>

-Often requires a record of detailed REAL observations. What you see/saw should not be left up to the reader's imagination!

-Describe action using sensory language. Do not use too many adjectives or adverbs.

-Use a strategy to make your description flow: for example you can describe something from far to near, left to right, or old to new.

5. *Select the appropriate mode of writing for a variety of occasions, purposes, and audiences.*

## LANGUAGE ARTS COMPETENCY 6

1. *Identify the appropriate uses of formal and informal reading assessments (informal reading inventory, running records, story telling, and other formative classroom assessments).*

### **What are the different reading assessments?**

Informal Reading Inventory- Include word lists and books to assess the children's reading abilities from pre-primer to eighth grade. Each book level has two or three selections. These selections are meant to assess the child in both their oral and silent reading comprehension. Therefore, one book is designated for each type of reading. The Informal Reading Inventory also allows the teacher to assess the child's listening comprehension, word recognition, and reading strategies.

Refer to this websites for more information on the Informal Reading Inventory:

<http://www.eduplace.com/rdg/res/begin/usinginformal.html>

<http://www.pampetty.com/420iriadminister.htm>

And for other types of reading inventories, please visit:

<http://departments.weber.edu/teachall/reading/inventories.html>

Running Records- A teacher can also use running records to assess a child's reading level. The teacher chooses a book that is close the developmental level of that child, and instructs the child to read aloud. As the students read, the teacher must record each miscue and self-correction. The teacher then uses a specific scoring system to analyze the results.



For more information please visit:

<http://www.readinga-z.com/newfiles/levels/runrecord/runrec.html>

Story Telling- This assessment is accomplished by having the student read a story and then instructing the student to recount the story. The child can tell the story either orally or in writing. The teacher should instruct the child to include the story's sequence, important characters, the main settings, and any other details that are pertinent.

Anecdotal Notes- The teacher observes the students working, and takes notes about he/she sees right then. At a later time, the notes are gathered, reviewed, and studied to examine trends in the student's work habits, behaviors, and possible problem areas during class time.

The following website lists and explains other reading assessments such as a reading portfolio and reading logs:

<http://www.howard.k12.md.us/langarts/Curriculum/readassess.htm#ASSESSMENTS>

### **How is FCAT scored?**

FCAT math and reading is scored on a scale of 100 to 500. These scores are then expressed as a category from 1-5 (1 being the lowest, and 5 being the highest)- these are called achievement levels. FCAT writing is scored on a 6 point scale (1-6), with 1 being the lowest score and 6 being the highest. If a student either did not respond to the prompt or wrote in a foreign language, they would receive a "U" for unscorable, so a zero is not really a choice.

*2. Analyze and interpret the results of formal and informal assessments to influence literacy instruction for diverse populations.*

*3. Demonstrate knowledge of the definition, elements, and use of rubrics to assess writing.*

### **MATH COMPETENCY 1**

*1. Associate multiple representations of numbers using word names, standard numerals, and pictorial models for real numbers (whole numbers, decimals, fractions, and integers).*

*2. Compare the relative size of integers, fractions, and decimals, numbers expressed as percents, numbers with exponents, and/or numbers in scientific notation.*

### **What number is the largest?**

- a)  $.2 \div .06$
- b)  $.2 \div 6$
- c)  $.02 \div .06$
- d)  $.02 \div 6$

**Answer: a)  $.2 \div .06$**

The first way to do this problem is to move the decimal place to the right in each number so that all numbers are whole numbers. Then set them up the numbers using the division bar and divide to find which number is smallest.

a)  $.2 \div .06$  (and move the decimal place over two places in each number)

So, you then have 20 divided by 6. When you put 6 into 20 and divide, you will find the answer is **3.3** or **20/6**.

b)  $.2 \div 6$  (you only need to move the decimal one place in each number to make them whole numbers)

So you then have 2 divided by 60. When you put 60 into 2, you get  $2/60$ , which equals **1/30** (and if you divided using long division you would get **.03**)

c)  $.02 \div .06$  (again move the decimal place two spaces to the right for each number)

So, you then have 2 divided by 6. When you divide 6 into 2, you get  $2/6$ , or **1/3**, or **.33**

d)  $.02 \div 6$  (you have to move the decimal 2 places to the right to make both numbers whole)

So, then you have 2 divided by 600. This can be shown by  $2/600$ , or **1/300**.

**Answer:  $.2 \div .06$  because the answer is 3.3**

The other way to do this problem is to make each number a fraction and divide. To divide fraction you must use the inverse of the second fraction (or flip it upside down). Let's look at how to do this.

a)  $.2 \div .06$

b)  $.2 \div 6$

c)  $.02 \div .06$

d)  $.02 \div 6$

a)  $.2 \div .06$

In fraction form, we would have  $2/10$  divided by  $6/100$ . We would then insert or flip  $6/100$  to  $100/6$  and change the division to multiplication

The new expression would be  $2/10 \times 100/6 = (2)(100) / (10)(6) = 200/60$   
This can be reduced to **100/3** or **30 1/3**.

b)  $.2 \div 6$

In fraction form we would have  $2/10$  divided by  $6/1$ . We would flip  $6/1$  to  $1/6$  and multiply.

This can be viewed as  $2/10 \times 1/6 = (2)(1) / (10)(6) = 2/60 = \mathbf{1/30}$

\*(c) and (d) will yield the same results as we saw above and the answer will still be (a).

**It is important to know the concept of scientific notation. For example, how does 3,200,000 look in scientific notation?**

Scientific notation is shown by having one number to the left of the decimal point, while the rest of the numbers are to the right. Zeros are never shown past the numbers on the right unless they are followed by other whole numbers. So you would never see  $3.287000000 \times 10^2$ .

, when we start with a number like 3,200,000, we want to put the 3 to the left of the decimal place... so we say

$$3.2 \times 10 \text{ (to the something number).}$$

Now we have to think about how many places we need to move the decimal place to reflect 3,200,00 and in which direction the decimal place should be moved. Since 3,200,000 has its decimal place after the last zero (3,200,000), we can count and see that the decimal place must be moved 6 places to the right (from 3.2 to 3,200,000) to achieve our number.

We reflect this by writing:  $\mathbf{3.2 \times 10^6}$

If we wanted to move the decimal place to the left, to achieve a number less than zero such as .0000032, then we would express the number in scientific notation as  $3.2 \times 10^{-6}$

*3. Apply ratios, proportions, and percents in real-world situations.*

**A sweater is \$235. There is a markdown of 25%. What will be the correct statement?**

You want to find what 25% of 235 is. This can be done by multiplying  $235(.25)$ . Then to find out the price after discount, subtract that number from the original price of \$235.

$$\text{The statement is: } 235 - 235(.25)$$

*4. Represent numbers in a variety of equivalent forms, including whole numbers, integers, fractions, decimals, percents, scientific notation, and exponents.*

**In a multiple-choice test, there is a 20% chance of guessing. What are the odds that you may get a correct guess?**

Answer- 1:5

This can be demonstrated by viewing 1:5 as a fraction, or  $1/5$ . If you do not automatically know that  $1/5$  is equal to 20% you can either...

a). Divide 5 into 1 by putting a decimal point above the 1, adding a zero next to the 1. 5 goes into, 2 times so you put a 2 next to the decimal on the answer line. 5 times 2 is 10, so you put that under the 10 under the division sign and subtract.  $10-10$  is zero, and 2 goes into zero, zero times, so the answer is .20, which is 20%.

b) Make  $1/5$  equal to a  $100^{\text{th}}$ .  $(1/5 \times 2)$  equals  $2/10$ , because 1 times 2 is 2, and 5 times 2 is 10. Therefore,  $(2/10 \times 2)$  equals  $4/20$ . And  $(4/20 \times 5)$  equals  $20/100$ , which equals 20%.

*5. Recognize the effects of operations on rational numbers and the relationships among these operations (i.e., addition, subtraction, multiplication, and division).*

**Be able to identify the quotient, divisor, and dividend in a division.**

$80 / 8 = 10$      $80 = \text{dividend}$      $8 = \text{divisor}$      $10 = \text{quotient}$

*6. Select the appropriate operation(s) to solve problems involving ratios, proportions, and percents and the addition, subtraction, multiplication, and division of rational numbers.*

**There are 105 cases in a truck. Each case contains 12 boxes of candles. It took the person 1.5 hours to load the truck. How many boxes of candles did the person loaded per minute?**

Answer- 14 boxes per minute

Ok, first you want to look at what they are asking you to find. That is BOXES OF CANDLES and MINUTES. So we want to know how many boxes of candles there were all together, and how many total minutes were spent loading them.

-First, we will find how many total boxes of candles there were in the truck. This is found by multiplying 105 cases times 12 boxes of candles.

$$\begin{array}{r} 105 \\ \times \quad 12 \\ \hline 210 \\ +1050 \\ \hline 1260 \end{array}$$

***So, we have 1,260 boxes of candles!***

Now, we need to find how many total minutes were spent loading these boxes. They told us it took 1 ½ hours. We can convert this into minutes by first taking the whole number (1). 1 hour equals 60 minutes. Next, we look at the ½ hour. One ½ hour equals 30 minutes. And  $60 + 30 = 90$  minutes.

*So, we have a total of 90 minutes!*

The last step is to divide. They asked us “how many boxes did the person load per minute”. This can be calculated by finding boxes per minute OR boxes/minutes. For this question, we will set up a proportion, and cross multiply:

a.)

$$\frac{1,260 \text{ boxes}}{90 \text{ minutes}} = \frac{(x) \text{ boxes}}{1 \text{ minute}}$$

To **cross** multiply we will set it up as follows:

b.)

$$1,260 (1) = 90 (x)$$

c.)

$$\text{So... } 1,260 = 90x$$

Then, divide both sides by 90...

$1260/90$  can be done by dropping the zero on both numbers and simplifying to  $126/9$ ...then divide 9 into 126... the answer is 14. So (x) equals 14, and that is our answer.

*The person loaded 14 boxes per minute!*

Here is another example:

**There are 60 boxes in a library. Each box contains 20 books. It took the librarian 2.5 hours to unpack the boxes. How many books did the librarian unpack per minute?**

**Answer: 14 books per minute**

Ok, first you want to look at what they are asking you to find. That is NUMBER OF BOOKS and MINUTES. So we want to know how many boxes of books there were all together, and how many total minutes were spent unpacking them.

-First, we will find how many total books there were in the library. This is found by multiplying 60 boxes times 20 books.

$$\begin{array}{r}
 60 \\
 \times 20 \\
 \hline
 00 \\
 +1200 \\
 \hline
 \end{array}$$

1200

***So, we have 1,200 books!***

Now, we need to find how many total minutes were spent unpacking these books. They told us it took 2 ½ hours. We can convert this into minutes buy first taking the whole number (2). 2 hours equals 120 minutes. Next, we look at the ½ hour. One ½ hour equals 30 minutes. And  $120 + 30 = 150$  minutes.

***So, we have a total of 150 minutes!***

The last step is to divide. The question asks us “*How many books did the librarian unpack per minute*.” This can be calculated by finding books per minute OR another way to write it is: boxes/minutes. For this question, we will set up a proportion, and cross multiply:

a.)

$$\frac{1,200 \text{ books}}{150 \text{ minutes}} = \frac{(x) \text{ books}}{1 \text{ minute}}$$

To **cross** multiply we will set it up as follows:

b.)

$$1,200 (1) = 150 (x)$$

c.)

$$\text{So... } 1,200 = 150x$$

Then, divide both sides by 150...

$1200/150$  can be done by dropping the zero on both numbers and simplifying to  $120/15$ ...then divide 15 into 120... the answer is 8. So (x) equals 8, and that is our answer.

***The librarian unpacked 8 books per minute!***

7. Use estimation in problem-solving situations.

8. Apply number theory concepts (e.g., primes, composites, multiples, factors, number sequences, number properties, and rules of divisibility).

**Prime numbers:** A prime number is a number with only two factors, itself and 1.

Examples are 2, 3, 5, 7, 11, 13, 17

**\*2 is the only even prime number and 1 and 0 are not considered prime numbers!**

**Know how to find multiples and factors. For example... What is the smallest multiple of 12, 15 and 20? Or what is the largest factor of 100?**

Answer: 60, then 50

Factors are the smallest number that can be multiplied into the larger number. For example, 2 is a factor of 4, 4 is a factor of 16 and 2, 20 is a factor of 100.

Multiples are numbers that are created from those factors when they are multiplied. For example, 4 is a multiple of 2. 16 and 20 are multiples of 4, 100 is a multiple of 20.

For the factor problem, start with the largest number, 20...

a) Do 12 and 15 go into 20 evenly?

NO! They each go in once with a remainder!

b) So, we go to the next multiple of 20, which is 40.

Do 12 and 15 go into 40 evenly?

NO! 12 goes in three times with a remainder, and 15 goes in twice with a remainder.

c) So, we go to the next multiple of 20, which is 60.

Do 12 and 15 go into 60 evenly? YES! 12 goes into 60, five times and 15 goes into 60, four times.

**SO THE ANSWER IS 60.**

For the factor problem, we will make a “factor tree”. The factor tree begins with the biggest number and branches down into the factors for each number in the tree until you reach a prime number (can only be multiplied by 1 and itself).

$$\begin{array}{r}
 \underline{\underline{100}} \\
 \underline{50} \quad \times \quad \underline{2} \\
 \underline{25} \quad \times \quad \underline{2} \\
 \underline{5} \quad \times \quad \underline{5} \quad \times \quad \underline{2} \quad \times \quad \underline{1} \\
 \underline{5} \quad \times \quad \underline{1} \quad \underline{5} \quad \times \quad \underline{1}
 \end{array}$$

So once the tree is complete, we can see that 50 is the largest factor of 100.

**There may be some questions on patterns. Make sure to look for some common patterns such as:**

\*Patterns that are multiplied or divided by a number such as 2, 4, 6, 8, 10... (X2) or 1, ¼, ½, (divided by 2).

\*Patterns that may be added to the number before it such as, 1, 2, 3, 5, 8, 13 (1 + 2 = 3, 3 + 5 = 8).

\*Patterns may consist of prime numbers such as 1, 2, 3, 5, 7, 11.

\*Patterns that reflect the adding of a string of numbers, such as 1, 4, 6, 8, 10 (adding the numbers to each other 1+1 = 1, 2+2 = 4)

\*Patterns that include letters and count off a certain amount of letters such as **CGKO...** Each letter is 4 letters away from the one before it... **CdefGhijKlmnO...S**

**What is the Commutative Property?**

*Commutative Property of Addition and Multiplication*

Addition and Multiplication are commutative: this means that switching the order of two numbers being added or multiplied does not change the result. Examples...

$$250 + 10 = 10 + 250$$

$$250 \times 10 = 10 \times 250$$

**What is the Associative Property?**

*Associative Property*

Addition and multiplication are associative: the order that numbers are grouped in addition and multiplication does not affect the result. Examples...

$$(6 + 4) + 10 = 6 + (4 + 10) = 20$$

$$6 \times (4 \times 10) = (6 \times 4) \times 10 = 240$$



For more information about these properties, and others, please visit:  
<http://www.mathleague.com/help/wholenumbers/wholenumbers.htm#commutativeproperty>

9. *Apply the order of operations.*

## MATH COMPETENCY 2

1. *Apply given measurement formulas for perimeter, circumference, area, volume, and surface area in problem situations.*

2. *Evaluate how a change in length, width, height, or radius affects perimeter, circumference, area, surface area, or volume.*

**Know how to find the perimeter! For example, if you are given an octagon with a number on one of the sides (5 in). The question may ask you, if each side is increased by 2, what is the total perimeter?**

Since an octagon had 8 sides, and each side is equal, and they tell you that one side is 5in. Then you would multiply  $5 \times 8$  and see that the perimeter is 40 without the increase. If you increase each side by two then each side will be 7in. and then you will multiply 7 times 8. The answer will be 56 inches. And if they ask for the difference between the original octagon and the increased one, you subtract the new one from the old one ( $56 - 40 = 16$ ).

3. *Within a given system, solve real-world problems involving measurement, with both direct and indirect measures, and make conversions to a larger or smaller unit (metric to customary).*

**Know how to set up proportions to do conversions. For example, how many millimeters (mm), centimeters (cm), inches (in) are in a 6-ft tall man?**

The FTCE offers conversions for most things, so you do not need to memorize every conversion. You only need to learn how to convert them. So, the FTCE will tell you that...

12 inches = 1 foot

3 feet = 1 yard

2.54cm = 1 inch

100cm = 1 meter

39.37 inches = 1 meter

Ok, so to find out how many inches are in 6 feet, we will set up a proportion:

$$\frac{12}{1} = \frac{X}{6}$$

This shows that there is 12 inches in 1 foot, so there are X inches in 6 feet. Then you CROSS MULTIPLY!!!  $(12)(6) = (X)(1)$   $72 = X$  So there are 72 inches in 6 feet.

Since we now know that the man is equal to 72 inches, and the test will tell us that there is 39.37 inches in 1 meter, we can find how many meters he is by....

$$\frac{39.37}{1} = \frac{72}{X}$$

Again, this says that there is 39.37 inches in 1 meter, so there are 72 inches in X meters. Again, you CROSS MULTIPLY!!!  $(39.37)(X) = (72)(1)$

$39.37X = 72$  Then you will do long division to see that it  $X = 1.828$  so, 6 feet is also equal to 1.828 meters....

From here you can just move the decimal to get the centimeters and millimeters.

There is a good pneumonic device for this:

**King Henry Died By Drinking Chocolate Milk**

It stands for...

**Kilo Hecto Deca Base Deci Centi Milli**

(Base stands for whatever you are converting whether it is liters, meters, grams, etc)

We will use our original problem as an example...

**K H D B D C M**

Kilometer, Hectometer, Decameter, Meter (Base), Decimeter, Centimeter, Millimeter

We know we have **1.828 meters**... and we want to see how many centimeters that will be... So, we begin at the **meters (base)** point on the chart and follow the chart two spaces to the right to centimeters, moving our decimal point two places to the right also... giving us 182.8 centimeters. To get *millimeters*, we would move one more place to the right on the chart and so our decimal will also move one more place to the right on the chart, giving us *1828 millimeters*.

6-ft= 72 inches, 2 yards, 1.828meters, 182.88cm, 1828.8mm

4. *Solve real world problems involving estimates and exact measures.*

5. *Select appropriate units to solve problems.*

**Know different ways to measure different things... Think of the best way to express something, the way something is expressed in the real world. The most realistic. These questions are not there to be tricky. For example:**

\*You measure a pool in gallons.

\*You would measure body warmth with temperature (or degrees Fahrenheit).

\*You would measure the amount of medicine you are taking using Milliliters (mL).

\*You would measure a pencil using inches or centimeters.

\*You would measure height in feet (except a baby, in inches) and weight in pounds.

### MATH COMPETENCY 3

1. *Identify angles or pairs of angles as adjacent, complementary, supplementary, vertical, corresponding, alternate interior, alternate exterior, obtuse, acute, or right.*

2. *Identify lines and planes as perpendicular, intersecting, or parallel.*

3. *Apply geometric properties and relationships, such as Pythagorean Theorem, in solving problems.*

**Know the properties of triangles!!! Some examples of questions are as follows:**

**They give you two triangles. One has the sides 6, 2 and 4. The other has only one number in one of the sides 10. You need to find out the numbers for the other 2 sides.**

The sides are relative to one another, which mean that they are not equal, but are corresponding. It depends on which side the pictures shows as equal. For example, if side (2) is the same as side (10) then to find all sides of the larger triangle, you need to multiply all sides by 5. So, the side (6) would turn into (30) and the side (4) would turn into (20).

**They show you an equilateral triangle and tell you that one of the angles measures  $60^\circ$  what's going to be the total amount of the angles?**

No matter what kind of triangle it is, the angles will always add up to 180 degrees!!! That is a rule for all triangles. However, if we want to work it out mathematically then here it is...

Since the question tells you that the triangle is equilateral, then all angles are equal, and since we know that a triangle has three angles we can say  $60 \times 3 = 180!!!$

For more information on triangles (specifically the other types, such as isosceles, right, and scalene, please refer to the following website:

<http://www.icteachers.co.uk/children/sats/triangles.htm#The%20answer%20is>

**It is important to know the total angle amounts for different geometric shapes:  
( The \* Below stands for a degrees sign)**

-Triangle (3 sides)  $180^*$  - so in an equilateral triangle, each angle is  $60^*$  ( $180/3$ )

-Square (four sides)  $360^*$  - so each angle is  $90^*$  ( $360/4$ )

-Pentagon (5 sides)  $540^*$  - so each angle is  $108^*$  ( $540/5$ )

-Hexagon (6-sided figure)  $720^*$  - so each angle is  $120^*$  ( $720/6$ )

-Heptagon (7-sides)  $900^*$  - so each angle is  $128.57^*$  ( $900/7$ )

-Octagon (8-sides)  $1080$ , etc. – so each angle is  $135^*$  ( $1080/8$ )

They give you the shape, and all of the angles except for one, and if you know the total, you can figure it out. If you don't want to memorize a million totals, you can use this formula to figure it out:

$$180^\circ \times (n - 2) \text{ degrees. (n= number of sides)}$$

*4. Identify the basic characteristics of, and relationships pertaining to, regular and irregular geometric shapes in two and three dimensions.*

*5. Apply the geometric concepts of symmetry, congruency, similarity, tessellations, transformations, and scaling.*

*6. Determine and locate ordered pairs in all four quadrants of a rectangular coordinate system.*

#### MATH COMPETENCY 4

*1. Extend and generalize patterns or functional relationships.*

*2. Interpret tables, graphs, equations, and verbal descriptions to explain real-world situations involving functional relationships.*

*3. Select a representation of an algebraic expression, equation, or inequality that applies to real world situations.*

#### MATH COMPETENCY 5

1. Apply the concepts of range and central tendency (mean, median, and mode).
2. Determine probabilities of dependent or independent events.

**There are 2 blue marbles and 5 red marbles. If you pick one marble without replacement, what's the probability that you will get a red marble and then a red again?**

This is what we call a dependent event, because picking the red marble the second time is dependent upon picking the red marble the first time. The probability of picking the first red marble is  $\frac{5}{7}$  because 5 out of the 7 marbles are red. Since we are not replacing the marble, then the probability of picking a red marble again will be  $\frac{4}{6}$ . This is because we already took out one red marble, so now instead of 5 red marbles we have four red marbles, and we also no longer have 7 marbles we are choosing from, but now we have 6.

The last step is to multiply the two probabilities together since we want to find the probability of them occurring together. So, we set up  $\frac{5}{7} \times \frac{4}{6}$ , and get  $\frac{20}{42}$ . ( $4 \times 5 = 20$ , and  $7 \times 6 = 42$ )

$\frac{20}{42}$  can be simplified into  $\frac{10}{21}$ !

For more information on dependent and independent events, please visit:

[http://www.learningwave.com/chapters/probability/dependent\\_independent.html](http://www.learningwave.com/chapters/probability/dependent_independent.html)  
<http://www.800score.com/guidec8bview1a.html>

3. Determine odds for and odds against a given situation.
4. Apply fundamental counting principles such as combinations to solve probability problems.

**If you are ordering an enchilada and you can have chicken or meat, lettuce, tomato, or onion, and either cheddar or American cheese...how many different combinations can you make if you can only pick one thing from each category?**

**2 (chicken or meat) X 3 (lettuce, tomato, or onion) X 2 (American or Cheddar) = 12!**

For any questions about permutations and combinations, or to practice some problems, please visit:

[http://www.usca.edu/free/mmp\\_counting/combinations.html](http://www.usca.edu/free/mmp_counting/combinations.html)  
<http://www.themathpage.com/aPreCalc/permutations-combinations-2.htm#combProb>

5. Interpret information from tables, charts, line graphs, bar graphs, circle graphs, box and whisker graphs, and stem and leaf plots.

**What is the range of average temperature in Nevada between April and November? Here they give a graph. The y-axis has the temperatures and the x-axis has the months. The highest temperature gets to 20. (Line graph)**

**Answer: 60 degrees**

For this question, you want to find the temperature in April and the temperature in November. You want to subtract the lowest month from the highest month. Then answer will be the range. For example, if the temperature in April is 85 degrees, and the temperature in November is 25 degrees, then  $85 - 25 = 60$ . So the answer would be 60 degrees.

**A family has a budget of \$45,000. How much did they spend in clothing and food? There will probably be a pie chart with percentages. For example, one section says: food 30%, another one Clothing 10%, another one mortgage 20% and so on. (Pie chart)**

For this question, you will need to find the percentages of 45,000 that they ask for. 10% can be found by removing the zero at the end of 45,000. When you take away the last zero, 45,000 turns into 4,500. So, 10% of 45,000 is 4,500.

**Answer: Clothing (10%): \$4,500**

Then, to find 20 percent, you can either double the 10%, since 10% plus 10% is 20%, and 10% was equal to 4,500, then 4,500 plus 4,500 (9,000) equals 20%. OR you can multiply  $45,000 \times .20$ .

$$\begin{array}{r} 45,000 \\ \times \quad .20 \\ \hline 00000 \\ + 900000 \\ \hline \end{array}$$

900000.0, and then move the decimal place TWO spaces to the left because it is TWO spaces to the left of (.20). So, the answer is 9,000, as we said before.

**Answer: Mortgage (20%): \$9,000**

6. Make accurate predictions and draw conclusions from data.

*EXTRA MATH:*

**What did the students do wrong in this subtraction problem?**

$$\begin{array}{r} 895 \\ -255 \\ \hline 655 \end{array}$$

He/She has not mastered the skill yet... He/She just does not understand how to subtract numbers. It has nothing to do with regrouping or directionality (subtracting from right to left).

#### FTCE PHYS ED, HEALTH, MUSIC, VISUAL ARTS 1

- 1. Demonstrate knowledge of the interrelatedness of physical activity, fitness, and health.*
- 2. Demonstrate basic knowledge of nutrition and its role of promoting health.*

#### **What three vitamins do children lack?**

Vitamins A, C, and D.

- 3. Identify the process of decision making and goal setting in promoting individual health and wellness.*
- 4. Demonstrate knowledge of common health problems and risk behaviors associated with them.*

#### FTCE PHYS ED, HEALTH, MUSIC, VISUAL ARTS 2

- 1. Identify the structure and function and interrelatedness of the systems of the human body.*
- 2. Identify the principals of sequential progression of motor skill development.*

#### **Which is more advanced... Skipping, galloping, or balance?**

Skipping

- 3. Demonstrate knowledge of human growth and development and its relationship to physical, social, and emotional well-being.*
- 4. Identify major factors associated with social and emotional health (e.g., communication skills, self-concept, fair play, conflict resolution, character development, and stress management).*
- 5. Identify problems associated with physical, social, and emotional health.*
- 6. Identify factors related to responsible sexual behavior.*

#### FTCE PHYS ED, HEALTH, MUSIC, VISUAL ARTS 3

- 1. Identify factors contributing to substance use and abuse and identify signs, symptoms, effects, and prevention strategies.*

2. *Demonstrate knowledge of resources from home, school, and community that provide valid health information, products, and services.*

3. *Identify appropriate safety and injury prevention strategies in the home, school, and community.*

**If you are working with acid in a science lab where should you store it?**

As close to the floor as possible

**FTCE PHYS ED, HEALTH, MUSIC, VISUAL ARTS 4**

1. *Distinguish between developmentally appropriate and inappropriate instructional practices that consider the interaction of cognitive, affective, and psychomotor domains.*

2. *Identify various factors (environment, equipment, facilities, space, safety, and group diversity) to consider when planning physical activities.*

3. *Analyze the influence of culture on, media, technology, and other factors when planning health and wellness instruction.*

**FTCE PHYS ED, HEALTH, MUSIC, VISUAL ARTS 5**

1. *Identify appropriate vocal literature (age-appropriate range, and vocal ability, diverse cultures, genres, and styles)*

***Bach and Handel were part of what period?***

*Baroque*

2. *Identify developmentally appropriate singing techniques (posture, breath support, tone quality, and vocal range).*

**What is correct posture for sitting in a chair?** – Feet on floor, back against the back of chair, legs uncrossed. (*not in study guide*)

3. *Identify correct performance techniques for rhythmic and melodic classroom instruments (ex. non-pitched percussion, recorder, and autoharp).*

**What is an autoharp?**

A harp-like instrument with a wooden sound board under the strings and bars across them. The bars are pressed down, with felt pads damping out the unwanted strings to form a chord. It can be played flat on a tabletop or held vertically against the chest. Either flat-picking or finger picking can be used.





**If a child is playing an autoharp and it makes a dissonant sound what's wrong?**

They are strumming too hard

*4. Read and interpret simple, traditional and non-traditional music notation (melodic, rhythmic, and harmonic)*

**On a treble clef staff what are the notes on lines?**

EGBDF (the spaces are FACE) (see music study guide)

*5. Select safe and developmentally appropriate media, techniques, and tools to create both two-dimensional and three-dimensional works of art.*

*6. Identify appropriate uses of art materials and tools for developing basic processes and motor skills.*

**FTCE SOCIAL SCIENCE COMPETENCY 1**

*1. Identify major historical events that are related by cause and effect.*

*2. Evaluate examples of primary source documents for historical perspective.*

**What is a primary source?**

A primary source is a document or piece of work, which was actually written, recorded, or created during the specific time under study. Primary sources are important for data collection and research because it allows the researcher to get as close as possible to the actual feelings and events of a given time. For a document to be considered a primary sources, it must have either been created during the time period under studied, or created later date by someone who actual experienced or witnessed the time and events being studied (as in the case of memoirs). Examples include: Books from the time period you're writing about, Memoirs, letters, interviews, autobiographies, diaries, magazines or journal articles from the time period you're writing about, newspaper articles from the time period you're writing, manuscript collections, speeches, photographs, audio recordings, video recordings, public opinion polls, fiction from a particular time period, and/or movies from a particular time period

Please refer to the following website for more information:

<http://www.princeton.edu/~refdesk/primary2.html>

*3. Identify cultural contributions and technological developments of Africa; the Americas; Asia, including the Middle East; and Europe.*

### **Who was Leonardo de Medici?**

He was born in Florence Italy and became known as a patron of the arts. He came from a banking family and was called “Lorenzo the Magnificent”.

For more about Leonardo de Medici, please visit:

<http://www.lucidcafe.com/library/96jan/lorenzo.html>

### **Who was Andrew Carnegie?**

Andrew Carnegie is a true rags-to-riches story as he immigrated to America in 1848 and began working in a factory at the age of 12. He continued to attend school at night and eventually made great investments in the growing steel industry. He opened the Carnegie Steel Company which was later purchased by J.P Morgan and made into the U.S. Steel Corporation. Andrew Carnegie is often known as the **father of steel**.

For more information on Andrew Carnegie, please visit:

<http://www.spartacus.schoolnet.co.uk/USAcarnegie.htm>

### **Who was George Washington Carver?**

He was an African American man who rose out of slavery to become a botanist and inventor. He is credited with inventing the concept of crop rotation, where the farmers utilize different parts of their land at different times of the year, so that the nutrients in the soil are spared and the land stays fertile for the next growing season. In addition, he suggested new uses for crops such as peanuts, sweet potatoes, and pecans, and convinced farmers to grow these crops instead of cotton to provide for new sources of income.

To learn more about George Washington Carver, please visit:

<http://www.ideafinder.com/history/inventors/carver.htm>

*4. Relate physical and human geographic factors to major historical events and movements.*

*5. Identify significant historical leaders and events that have influenced Eastern and Western civilizations.*

### **Who is Nelson Mandela?**

Nelson Mandela is a great moral and political leader. He has spent his life fighting against racial oppression in South Africa, which won him the Nobel Peace Prize and the

presidency of his country. He served as head of South Africa's **antiapartheid** movement, and worked hard to move the nation toward multiracial government and majority rule.

For more about Nelson Mandela please visit:

<http://www.christian-books-and-more.com/bk-pages/2242487.html>

### What is apartheid?

An official policy of racial segregation formerly practiced in the Republic of South Africa, involving political, legal, and economic discrimination against nonwhites.

The above definition was taken from the following website. This website also provides historical information about the apartheid in South Africa:

<http://www.mtholyoke.edu/~rtschnei/>

### Who was Julius Caesar?

Julius Caesar was a ruler of the Roman Empire. Caesar **got the throne from Pompey the Great**, and was named dictator of Rome for life. However, the following year, a group led by Marcus Brutus stabbed him to death.

For more on Julius Caesar, please visit:

<http://www.vroma.org/~bmcmanus/caesar.html>

6. Identify the causes and consequences of exploration, settlement, and growth.

Date	Explorer	Nationality	Achievement
1492-1504	Christopher Columbus	Italian	Made 4 voyages to West Indies and Caribbean Islands
1497-1503	Amerigo Vespucci	Italian	Sailed to West Indies and South America
1497-1498	John Cabot	Italian	Explored the shores of Newfoundland, Nova Scotia, and Labrador
1498	Vasco Da Gama	Portuguese	First to travel to West Indies around Africa
1513	Vasco de Balboa	Spanish	Led expedition across Panama and found the Pacific Ocean
1513	Juan Ponce de Leon	Spanish	Explored Florida looking for the Fountain of Youth
1520-1521	Ferdinand Magellan	Portuguese	Commanded first globe circling voyage
1519-1521	Hernando Cortez	Spanish	Conquered Aztecs in Mexico
1523-1535	Francisco Pizarro	Spanish	Conquered Peru

1534-1542	Jacques Cartier	French	Traveled St. Lawrence River
1539-1541	Hernando De Soto	Spanish	Explored American Southeast- Discovered the Mississippi River
1540-1542	Francisco Vazquez de Coronado	Spanish	Explored American Southwest
1577-1580	Sir Frances Drake	English	First English to sail around the world-Defeated the Spanish Armada- Claimed California for England
1603-1616	Samuel de Champlain	French	Explored eastern coast of North America and the coast of the St. Lawrence River to Lake Huron- Reached Lake Champlain
1609-1611	Henry Hudson	English	Explored Hudson Bay, Hudson River, and Hudson Strait

The above information can be found at the following website:

<http://www.mce.k12tn.net/explorers/explorers.htm>

### **Who were the Rough Riders?**

They were a cavalry set up by Theodore Roosevelt that was made of cowboys, scholars, land speculators, Native Americans and African Americans. They fought in the Spanish American War.

*7. Identify individuals and events that have influenced economic, social, and political institutions in the United States.*

### **Who was Daniel Boone?**

Daniel Boone was a hunter and explorer who became one of the most famous American frontiersmen. More specifically he explored and settled Kentucky.

For more on Daniel Boone, please visit:

<http://www.americanwest.com/pages/boone.htm>

### **Who was James Oglethorpe?**

James Oglethorpe colonized Georgia. He planned on Georgia serving as a barrier from the Spaniards, and a place of refuge for the British people who owed money. He envisioned Georgia as a place where these people could thrive and improve their lifestyles. In order to establish such a vision, he enlisted the help of **prisoners and poor men to help him colonize Georgia**. Savannah was the first settlement.

For more on James Oglethorpe, please

visit:<http://www.harcourtschool.com/activity/biographies/oglethorpe/>

### **Who was John Jay?**

John Jay is one of America's founding fathers and was appointed by George Washington, as the first chief justice of the Supreme Court. **In addition, he is credited with writing the Federalist Papers.** The Federalist Papers were a series of essays that set out to explain the new constitution.

For more information on John Jay:

<http://www.leftjustified.com/leftjust/lib/sc/ht/fed/jbio.html>

### **Who wrote the Declaration of Independence?**

Thomas Jefferson

### **Who wrote the Constitution?**

There were seventy individuals chosen to go to Philadelphia to attend the Constitutional Convention, fifty-five who attended most of the meetings, and thirty-nine who actually signed the Constitution. Of the thirty-nine who actually signed the finished document, only fifteen to twenty actually played an instrumental role in either the founding philosophy or fight for ratification! Thomas Jefferson and John Adams are considered to be two of our founding fathers even though they were not at the Constitutional Convention. But the answer to this question is **James Madison**, because he is called "the Father of the Constitution."

### **Who was the first to sign the Declaration of Independence?**

John Hancock

### **Who was the first to sign the Constitution?**

It is assumed that George Washington signed first, but it is not certain

### **Know general information about the Declaration of Independence:**

The Declaration of Independence declared that the 13 original North American colonies were no longer under Great Britain's Rule. **The Declaration of Independence was written by Thomas Jefferson**, and ratified on July 4, 1776. **However, the first person to sign the document was John Hancock**, the President of the Continental Congress.

For more about the Declaration of Independence, please visit:

[http://en.wikipedia.org/wiki/United\\_States\\_Declaration\\_of\\_Independence](http://en.wikipedia.org/wiki/United_States_Declaration_of_Independence)

*8. Identify immigration and settlement patterns that have shaped the history of the United States.*

### **What are the 13 colonies?**

South Carolina

Rhode Island

North Carolina

New Jersey

New York

Virginia (**JOHN SMITH** was one of the founders and leaders of the Jamestown, Virginia, settlement.) <http://www.enchantedlearning.com/history/us/bios/index.shtml>

Pennsylvania

New Hampshire Maryland

Massachusetts

Georgia (**JAMES OGLETHORPE** established the colony of Georgia by allowing poor men and prisoners to help build the colony. He also believed in equal rights for the Native Americans.)

<http://www.enchantedlearning.com/history/us/bios/index.shtml>

Delaware

Connecticut

For dates and details about 13 colonies, please visit:

<http://www.wintektx.com/freeman/13colonies.htm>

*9. Identify how various cultures contributed to the unique social, cultural, economic, and political features of Florida.*

## FTCE SOCIAL SCIENCE COMPETENCY 2

*1. Identify the five themes of geography, including the specific terms for each theme.*

**What is a Delta?** *(Not in study guide)*

The fan-shaped area at the mouth, or lower end, of a river, formed by eroded material that has been carried downstream and dropped in quantities that can not be carried off by tides or currents.

The above definition was taken from the following website. This website can be very useful to define other geographic terms:

<http://www.ed.gov/pubs/Geography/glossary.html>

*2. Interpret maps and other graphic representations and identify tools and technologies to acquire, process, and report information from a spatial perspective.*

*3. Identify the factors that influence the selection of a location for a specific activity.*

*4. Identify the relationship between natural physical processes and the environment.*

*6. Identify how conditions of the past, such as wealth and poverty, land tenure, exploitation, colonialism, and independence, affects present human characteristics of places.*

*7. Identify ways in which people adapt to an environment through the production and use of clothing, food, and shelter.*

*8. Identify how tools and technology affect the environment.*

*9. Identify physical, cultural, economic, and political reasons for the movement of people in the world, nation, or state.*

*10. Identify how transportation and communication networks contribute to the level of economic development in different regions.*

*11. Compare and contrast major regions of the world.*

**Where do most people live in Canada? And why do so many people want to live in Canada?** *(Not in study guide)*

Most people live in **Quebec** because it is near the Great Lakes and St. Lawrence River. It is an ideal location for industry, mining, and growing of crops. So many people want to live in Canada because it has set up a system of tax sheltering to attract new residents. People who plan correctly, can move to Canada to avoid income and capital gain tax. In addition, if one owns a passport from Canada, they enjoy visa-free traveling to most countries and can live and work in the U.S. as per the North American Free Trade Agreement. Lastly, the recent decline in the Canadian dollar, allows people to live in at almost two thirds of the cost in America. (So it's cheaper to live there!)

For more about Canada's people and culture, please visit:

<http://www.thecanadapage.org/Regions.htm>

**What countries possess the coolest winters?** *(Not in study guide)*

Countries located in the arctic, which is located north of the Arctic Circle, experience the coolest winters. Some of these countries are: Greenland, Baffin Island, other smaller northern islands, and the far northern parts of Europe, Russia (Siberia), Alaska and Canada.

Antarctica is the coldest and windiest continent on the planet. In fact, the lowest temperature ever recorded on Earth was recorded in Antarctica ( $-129.3^{\circ}F$ ). Since this continent is not made up of any countries, make sure you read the question carefully and notice if they want the coldest country or continent?

**Why have many people in Columbia and Venezuela moved from rural to urban areas?** *(Not in study guide)*

Many people have moved to urban/city areas because they were very poor and could not make enough money in a rural setting. Millions and millions of poor people have moved from rural farm areas to the city to try to make more money

**What countries have warm summers and mild winters?** *(Not in Study guide)*

Warm summers and mild winters can be found in either temperate continental climates or sub Mediterranean climates. Mediterranean climates are often found on the western part of a continent or country. Some examples of such countries are as follows (note how many of the countries lie on the western part of their continent):

Italy, Belgium, Germany, Greece, Spain, France, Monaco, Uruguay, Moldova, Portugal

**Where did block printing originate from?** *(Not in study guide)*

China

To read about the process of block printing, please visit:

[http://en.wikipedia.org/wiki/Block\\_printing](http://en.wikipedia.org/wiki/Block_printing)

**How did the Romans mark themselves in history?** *(Not in study guide)*

Architecture... Although they did not invent arches in buildings; the Romans were the first people to use them to construct bigger, wider buildings without having lots of rows



of pillars to hold the roof up. They also invented sewers and the best drainages in the world.

## FTCE SOCIAL SCIENCE COMPETENCY 3

*1. Identify the structure, functions, and purposes of government.*

### **What is the history of democracy?**

Democracy originated in **Athens, Greece** around 400-300 B.C. They invented the democratic concept of allowing the citizens and councils to make decisions about government. However, it was much different then, than it is today. For example only free men were considered citizens, and therefore, women, children and slaves could not vote.

For more on the history of democracy, please visit:

<http://www.chinooksedge.ab.ca/projects/hum/six/greece/democracy.html>

*2. Demonstrate knowledge of the rights and responsibilities of a citizen in the world, nation, state, and/or community.*

*3. Identify major concepts of the U.S. Constitution and other historical documents.*

### **What document was the constitution based on?**

The United States Constitution was modeled after The Magna Carta. The Magna Carta was written in 1215 as an agreement between King John and his barons. It ensured civil rights for the barons; much like our constitution ensures civil rights for America's people.

For more information on the Magna Carta and the Constitution, please visit the following websites:

[http://www.puhsd.k12.ca.us/chana/staffpages/eichman/Adult\\_School/us/fall/Founding/constitution.htm](http://www.puhsd.k12.ca.us/chana/staffpages/eichman/Adult_School/us/fall/Founding/constitution.htm)

<http://www.usconstitution.net/magna.html>

### **What is the 14<sup>th</sup> Amendment?**

Granted citizenship to all persons born or naturalized in U.S. Also, can't deny any person life, liberty, or property, without due process.

### **What is the 19<sup>th</sup> amendment?**

Women's right to vote

### **Know general knowledge about the constitution:**

There were seventy individuals chosen to go to Philadelphia to attend the Constitutional Convention, fifty-five who attended most of the meetings, and thirty-nine who actually signed the Constitution. **It is assumed that George Washington signed first**, but it is not certain.

Thomas Jefferson and John Adams are considered to be two of our founding fathers even though they were not at the Constitutional Convention, and **James Madison, is considered "the Father of the Constitution"** because of his hard work spent ratifying it.

The Preamble: Identifies the purpose of the Constitution, and begins with "We the People"

The Bill of Rights: Articles 1-10 of the Constitution. They spell out the rights of the individual citizen.

1<sup>st</sup> amendment: Freedom of religion, speech, press, and to peaceably assemble

2<sup>nd</sup> amendment: *The right to bear arms*

3<sup>rd</sup> amendment: No soldier shall be quartered in any house, w/o consent from the owner

4<sup>th</sup> amendment: *Protection against search and seizure*

5<sup>th</sup> amendment: Cannot take away the right to life, liberty and property w/o due process of the law. Shall not be a witness against oneself.

6<sup>th</sup> amendment: *Speedy and public trial*

7<sup>th</sup> amendment: Trial by jury

8<sup>th</sup> amendment: *Protection against cruel and unusual punishment*

9<sup>th</sup> amendment: Cannot impose excessive bail/fines or give cruel or unusual punishment

10<sup>th</sup> amendment: *"The powers not delegated to the United States by the Constitution, nor prohibited by it to the states, are reserved to the states respectively, or to the people."*

13<sup>th</sup> amendment: Formally abolished slavery in the United States.

14<sup>th</sup> amendment: *granted citizenship to "all persons born or naturalized in the United States," which included former slaves recently freed.*

15<sup>th</sup> amendment: Granted African American men the right to vote by declaring that the "right of citizens... to vote shall not be denied or abridged...on account of race, color, or previous condition of servitude."

16<sup>th</sup> amendment: *Right of the government to collect income taxes.*

19<sup>th</sup> amendment: Women's right to vote.

The above information can be found at the following website:

<http://www.law.cornell.edu/constitution/constitution.table.html#amendments>

### **Declaration of Independence:**

Drafted by Thomas Jefferson between June 11 and June 28, 1776, the Declaration of Independence expressed the convictions in the minds and hearts of the American people. The political philosophy of the Declaration was not new; its ideals of individual liberty had already been expressed by John Locke and the Continental philosophers. What Jefferson did, was to summarize this philosophy in "self-evident truths" and set forth a list of grievances against the King (George of England) in order to justify before the world the breaking of ties between the colonies and the mother country.

The above information can be found at the following website:

<http://experts.about.com/q/General-History-674/Declaration-Indapendence.htm>

### **The Federalist Papers:**

The Federalist Papers are a series of 85 articles arguing for the ratification of the United States Constitution. They were first published serially from October 1787 to August 1788 in New York City newspapers. The Federalist Papers serve as a primary source for interpretation of the Constitution, as they outline the philosophy and motivation of the proposed system of government. The authors of the Federalist Papers wanted to both influence the vote in favor of ratification and shape future interpretations of the Constitution. The articles were written by Alexander Hamilton, James Madison, and John Jay.

The above information can be found at the follwonig website:

[http://en.wikipedia.org/wiki/Federalist\\_Papers](http://en.wikipedia.org/wiki/Federalist_Papers)

*4. Identify how the legislative, executive, and judicial branches share powers and responsibility.*

What are the powers of the Senate and House of Representatives?

Senate:

**-Helps the president appoint nominees**

House of Representatives:

- Start all bills pertaining to money
- Voice of the states
- Tries cases of impeachment
- Checks president by approving/or not his treaties
- Impeach civil officers
- Elect a president if no one wins by the majority of electoral votes

For more about the Senate, please visit:

[http://www.trumanlibrary.org/whistlestop/teacher\\_lessons/3branches/12.htm](http://www.trumanlibrary.org/whistlestop/teacher_lessons/3branches/12.htm)

For more about the House of Representative, please visit:

[http://www.trumanlibrary.org/whistlestop/teacher\\_lessons/3branches/14.htm](http://www.trumanlibrary.org/whistlestop/teacher_lessons/3branches/14.htm)

### **What is a line item veto?**

A line item veto is the power of an executive to cancel specific parts of a bill, without having to reject the entire proposal. This unique power is held by the STATE GOVERNOR.

For more information about line item vetoes, please visit:

[http://en.wikipedia.org/wiki/Line-item\\_veto](http://en.wikipedia.org/wiki/Line-item_veto)

## Who can impeach the president?

Congress

*5. Demonstrate knowledge of the U.S. electoral system and the election process.*

## What are electoral votes?

After each person in a state casts their vote for president, the state determines which candidate won by popular vote. At that point, the state casts its electoral votes for that candidate. Each state gets a certain amount of electoral votes based on the number of people they have representing them in the House of Representatives and the Senate. There is a total of 538 electoral votes, so a candidate needs 270 electoral votes to win the election.

For more information on electoral votes, please visit:

<http://www.govspot.com/ask/electoral.htm>

## How many electoral votes does Florida have?

27

*6. Identify the structures and functions of U.S. federal, state, and local governments.*

## What rights do the states have?

The tenth amendment grants the states any power not explicitly stated as a federal power. There has been much debate over exactly what powers the state will have, but some decided on powers are as follows. **The state courts have the right to change a state law.** To ratify a state law, the federal courts do not need to be involved. States also control the funding for their education system, the types of punishment in their correctional facilities (death penalty or not), decisions about marriage and medical treatments (medically assisted suicide).

For more information on states rights, please visit:

[http://en.wikipedia.org/wiki/States'\\_rights](http://en.wikipedia.org/wiki/States'_rights)

*7. Identify the relationships between social, economic, and political rights and the historical documents that secure these rights.*

*8. Demonstrate knowledge of the processes of the U.S. legal system.*

## State and local court are fighting over an issue-what court does it go to?

The organization of state courts varies from state to state. There are three types of courts found in most states. They are a trial court, an appellate court, and a state supreme court. A case is first heard in a trial court. If the decision is unsatisfactory, it may be appealed in the **state appellate** court. If the case is still unresolved it can be bound over to the state supreme court. There are two courts a litigant can take his case after the state supreme court. They are the U.S. Court of Appeals and the U.S. Supreme Court.

**Who consents the Presidents approval for Supreme Court justices?**

Senate

**How many judges sit on the Supreme Court?**

Nine

**Know general knowledge about the Supreme Court:**

The United State’s Supreme Court is established in the Constitution. It is the highest judicial body in America, and heads the judicial branch of government. **There are nine judges that sit on the Supreme Court** (one Chief Justice and eight associate justices). Each of these nine justices are appointed by the President, confirmed by the senate, and appointed to serve life terms.

For more information about the Supreme Court, please visit:

[http://en.wikipedia.org/wiki/Supreme\\_Court\\_of\\_the\\_United\\_States](http://en.wikipedia.org/wiki/Supreme_Court_of_the_United_States)

*9. Identify the roles of the United States in international relations.*

**FTCE SOCIAL SCIENCE COMPETENCY 4**

*1. Identify ways that limited resources affect the choices made by governments and individuals.*

*2. Compare and contrast the characteristics of different types of economic institutions.*

**Know general information about loans:**

Local banks or Credit Unions have the right to give people personal loans, which are paid back with an annual interest rate. When a person takes out a loan, their first payment goes toward the interest they are paying.

*3. Identify the role of markets from production, through distribution, to consumption.*

*4. Identify factors to consider when making consumer decisions.*

*5. Identify the economic interdependence among nations (e.g. trade, finance, and movement of labor)*

*6. Identify human, natural, and capital resources and how these resources are used in the production of goods and services.*

**OTHER STUFF:**

**How do farmers decrease water run off on land? (Not in study guide)**

Water run off can cause erosion and the washing away of minerals, resulting in less fertile soil and a loss of crops. Therefore, many farmers work hard to reduce such run off.

Many farmers use the strategy of plant vegetation to decrease the run off because the bulk of the plants and intricate rooting system keeps the soil and nutrients in place.

**Where is the most likely place that a medieval king would build his castle?** *(Not in study guide)*

Most kings in the medieval times had a mote around their castle, with the only entrance being a draw bridge. This helped to keep out intruders and enemies, as they would not cross the water and attempt to climb up the steep castle walls. In addition, many kings also built their castles on top of a hill as high up as possible, so that the knights could watch from the top for intruders who might be climbing the mountain or hill toward the castle. The height and seclusion at the top of the hill or mountain meant that the only way to get to the castle would be to climb the steep slopes, making it more likely that the knights on guard could attack and keep the king safe.

**Why is Tarpon Springs, Florida an important area?** *(Not in study guide)*

It is known for the mass production of sponges

**Know general facts about Indians:** *(Not in study guide)*

The Indians were the first people to settle in America. Therefore, they were America's very first inhabitants. More specifically, the first documented Indians are called the Paleo-Indians. The Paleo Indians are also often called the "Chickasaws".

**What is the Berlin Airlift?** *(Not in study guide)*

Post war Germany was divided into three sections--the Allied part was controlled by the United States, Great Britain and France and other part by the Soviet Union. The city of Berlin, although located in the eastern Soviet half, was also divided into four sectors -- West Berlin occupied by Allied interests and East Berlin occupied by Soviets. In June 1948, the Soviet Union attempted to control all of Berlin by cutting surface traffic to and from the city of West Berlin. Starving out the population and cutting off their business was their method of gaining control. The Truman administration reacted with a continual daily airlift which brought much needed food and supplies into the city of West Berlin. This Airlift to Berlin lasted until the end of September of 1949---although on May 12, 1949, the Soviet government yielded and lifted the blockade.

**Housing acronym- what government housing organization has this acronym?** *(Not in study guide)*

**(HUD)** [Department of Housing and Urban Development](#)

**(FHFB)** Federal Housing Finance Board

**(OFHEO)** Office of Federal Housing Enterprise Oversight

**(FHA)** The federal agency in the Department of Housing and Urban Development that insures residential mortgages - Federal Housing Administration

**How were African Americans treated during WWII?** *(Not in study guide)*

They were segregated in the military. There was much prejudice and hatred.

**How come Quebec and Ontario are booming economic centers? (Not in study guide)**

St. Lawrence River

**What was the Cuban Missile Crisis? (Not in study guide)**

The Cuban Missile Crisis was a time during the Cold War when America came very close to entering into a nuclear war with the Soviet Union, who was depolying nuclear weapons in Cuba. **The crisis occurred on October 16, 1962**, and lasted for 13 days.

For more information on the Cuban Missile Crisis, please visit:

[http://en.wikipedia.org/wiki/Cuban\\_Missile\\_Crisis](http://en.wikipedia.org/wiki/Cuban_Missile_Crisis)

FTCE SCIENCE AND TECHNOLOGY 1

*1. Identify the physical and chemical properties of matter (e.g., mass, volume, density, and chemical change).*

**How is a chemical reaction different from and a physical reaction?**

1. A physical change is reversible, a chemical change is not. For example, the freezing of water would be a physical change because it can be reversed, whereas the burning of wood is a chemical change - you can't 'unburn' it

2. A physical change is a change in which no new substance is formed; a chemical change results in the formation of one or more new substances. Again, consider the previous examples: Freezing water into ice just results in water molecules which are 'stuck' together - it's still H<sub>2</sub>O. Whereas burning wood results in ash, carbon dioxide, etc, all new substances which weren't there when you started.

The above examples were taken from the following website:

<http://www.physlink.com/Education/AskExperts/ae244.cfm>

*2. Identify the characteristics of elements, compounds, and mixtures and distinguish among the states of matter (solids, liquids, and gases).*

**What is the difference between an element, a compound, and a mixture?**

An element is made up only one kind of atom, and cannot be broken down into simpler substances by chemical reactions Examples: oxygen, carbon, sulfur, zinc, hydrogen

A compound is made up of two or more elements that have chemically combined and cannot be separated easily. Examples: water (H<sub>2</sub>O - hydrogen, oxygen) or Table Salt (NaCl – Sodium, Chloride)

A mixture is a combination of two or more materials that does not include a chemical reaction and all materials keep their properties. Examples: **air**, sand, muddy water, blood

For more information on differentiating elements, compounds, and mixtures, please visit:

<http://www.school-for-champions.com/science/chemixtures.htm>

**What is the difference between a solute and a solvent?**

Solute - the dissolved substance in a solution (*ex. sugar, salt*)

Solvent - a liquid substance capable of dissolving other substances (*ex. water*)

Definitions were taken from:

<http://dictionary.laborlawtalk.com/Solvent>

<http://dictionary.laborlawtalk.com/Solute>

3. *Identify the basic components of the atom (i.e., electrons, neutrons, protons).*

**Know the parts of an atom:**

Proton – positively charged particle

Electron – negatively charged particle (when they move they cause heat)

Neutron – neutral particle

\*Atoms of the same element with a different number of neutrons are called Isotopes

**FTCE SCIENCE AND TECHNOLOGY 2**

1. *Apply knowledge of temperature and heat.*

**How do you convert Celsius to Fahrenheit and vice versa?**

Celsius to Fahrenheit is calculated by multiplying by 1.8 and then adding 32 degrees!

Fahrenheit to Celsius is calculated by subtracting 32 degrees and then dividing by 1.8!

2. *Identify the types and characteristics of contact forces (mechanical) and at a distance forces (magnetic, gravitational, and electrostatic).*

**Know the different types of forces of motion:**

Mechanical- forces that relate to machines, include actions performed or worked by machinery

<http://www.ecosa.org/csi/glossary.nsf/0/8006D51819EA5AF0C1256B98003F3B3D>

Magnetic- forces that electrical charges experience while moving in a magnetic field

<http://www.physics.unc.edu/~rowan/phys25/CHAP19B.html>

Gravitational- forces of attraction between all objects in the universe

<http://www.ask.com/reference/dictionary/wordnet/76630/gravitational%20force>

**Electrostatic- forces that exist between two charged particles (like charges repel and unlike charges attract)**

[http://orac.sunderland.ac.uk/~hs0bcl/gg/electrostatic\\_forces.htm](http://orac.sunderland.ac.uk/~hs0bcl/gg/electrostatic_forces.htm)

3. *Apply knowledge of simple machines to solve problems involving work.*



**Know general information about simple machines:**

Simple machines make work easier and include few or no moving parts. Examples include pulleys, levers, incline planes, wheel and axle, wedge, or a screw.

A pulley consists of a wheel with a groove in which a rope can run to change the direction or point of application of a force applied to the rope- pulley-block. So if you were choosing a pulley, you would want to choose an object that would keep the rope in place, and that contains a groove, so that the rope could not fall or slide off the pulley.

A lever is a bar or board that rests on a turning point. **An example is a screw driver** (It can be stuck under a paint can's lid and used to pry off the lid. The turning point would be your hand.)

For information on the others types of simple machines, please visit:

[http://www.coe.uh.edu/archive/science/science\\_lessons/scienceles1/finalhome.htm](http://www.coe.uh.edu/archive/science/science_lessons/scienceles1/finalhome.htm)

*4. Identify the properties and characteristics of sounds as they apply to everyday situations.*

**What is the Doppler Effect?**

The Doppler Effect is a theory that explains the change in frequency of a wave of either sound or light, in relation to the distance between the source and the observer. The frequency will increase (growing brighter or louder) as the observer moves closer to the source, and will decrease (growing more dull or more quiet) as the observer moves farther away from the source.

Adapted from the definition listed on the following website:

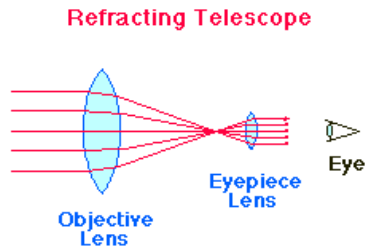
<http://www.ask.com/reference/dictionary/ahdict/168956/doppler+effect>

*5. Apply knowledge of light and optics to practical applications (i.e., reflection, refraction.)*

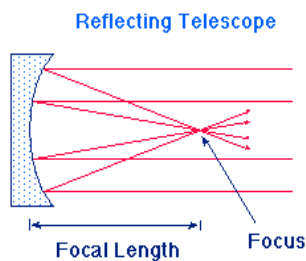
**How do telescopes work?**

There are two basic types of telescopes, refracting and reflecting.

**Refracting** telescopes use lenses to focus the light. **In fact, the word refraction means to bend light.** They use two lenses to focus the light and make it look like the object is closer to you than it really is. Both lenses are in a shape that's called 'convex'. Convex lenses work by bending light inwards. This is what makes the image look smaller.



**Reflecting** telescopes, on the other hand, don't use lenses at all. Instead, they use mirrors to focus the light together. In this case, the type of mirror that they use is a concave mirror. Mirrors of this shape also accomplish the goal of bending light together, except that they do it by reflecting the light instead of bending it as it passes through (like lenses do). The concave mirror is also used to make objects appear smaller and to correct near-sightedness.



The above information and pictures were taken from the following website; please refer to this website for more information:  
[http://van.hep.uiuc.edu/van/qa/section/Light\\_and\\_Sound/Telescopes\\_Binoculars\\_Camera/20010329041649.htm](http://van.hep.uiuc.edu/van/qa/section/Light_and_Sound/Telescopes_Binoculars_Camera/20010329041649.htm)

6. Identify the regions of the electromagnetic spectrum and the relative wavelengths and energy associated with each region.

7. Identify characteristics and examples of static energy.

8. Apply knowledge of currents, circuits, conductors, and insulators to everyday situations.

**What does it mean if all bulbs go out in a series?**

One bulb is bad, (or many bulbs are bad, but it only takes one)

9. Identify types of magnets, their characteristics, and their applications to everyday situations.

10. Identify types of energy (i.e., chemical, electrical, nuclear, mechanical, magnetic, radiant, and solar).

**What is chemical energy?**

Chemical energy is a type of potential energy. Potential energy is energy that is stored relative to an energy field, and is stored by doing work against a force. For example, a book sitting on a table is not moving because the table is in the way of the gravitational pull. If you moved the table, the book would fall. Chemical energy is a type of potential energy that relates to the breaking and forming of chemical bonds. When **Chemical energy** causes a chemical reaction, **it can either release energy or absorb it. When the energy is released, it can be released in the form of heat, light, and (pressure volume) work.**

For more information on chemical energy and reactions, please visit:

[http://en.wikipedia.org/wiki/Potential\\_energy](http://en.wikipedia.org/wiki/Potential_energy)

OR

[http://www.webguru.com/wiki/Endothermic\\_Chemical\\_Reaction](http://www.webguru.com/wiki/Endothermic_Chemical_Reaction)

### FTCE SCIENCE AND TECHNOLOGY 3

*1. Identify characteristics of geologic formations, the mechanisms by which they were formed, and their relationship to the movement of tectonic plates.*

#### **How were the islands of Hawaii formed?**

Each Hawaiian island is made up of at least one volcano. These islands were formed by The Hawaiian Hotspot. A **hot spot** is an area of persistent volcanic activity. They are called hot spots because they usually form over extremely hot parts of the mantle-core boundary.

For more information on Hawaii's formation or hotspots, please visit:

[http://www.soest.hawaii.edu/GG/HCV/haw\\_formation.html](http://www.soest.hawaii.edu/GG/HCV/haw_formation.html)

[http://visearth.ucsd.edu/VisE\\_Int/platetectonics/hot\\_spot.html](http://visearth.ucsd.edu/VisE_Int/platetectonics/hot_spot.html)

#### **Who is Alfred Wegener?**

Alfred Wegener is often known as “father of the continental drift” because he is credited with creating a theory that all landmasses were originally one big mass, and after time, it separated into seven different continents. We called that original landmass “Pangaea”.

For more on Alfred Wegener or continental drift, please visit:

[http://en.wikipedia.org/wiki/Alfred\\_Wegener](http://en.wikipedia.org/wiki/Alfred_Wegener)

*2. Identify fossil formation and its use in interpreting the past and extrapolating to the future.*

*3. Interpret geologic maps, including topographic and weather maps that contain symbols, scales, legends, directions, latitudes, and longitudes.*

*4. Identify the major groups of rocks, examples of each, and the processes of their formation.*

### **What type of rock is granite?**

Granite forms as magma cools far under the earth's surface. Because it hardens deep underground it cools very slowly. Granite is an igneous rock that is composed of four minerals.

For more information on granite, please visit:

<http://volcano.und.nodak.edu/vwdocs/vwlessons/lessons/Slideshow/Igrocks/Igrock3.html>

### **What is the difference between quartz and quartzite?**

*Quartzite* is a metamorphic rock because it is metamorphosed sandstone. It comes from sandstone, and is only formed after contact with magma.

*Quartz* is a mineral that is found in many rocks. Quartz can be easily identified by its hexagonal crystals, and can be broken down into sand.

For more on Quartzite:

<http://volcano.und.nodak.edu/vwdocs/vwlessons/lessons/Slideshow/Merocks/Merock6.html>

For more on Quartz:

<http://volcano.und.nodak.edu/vwdocs/vwlessons/lessons/Slideshow/Show1/Show1-6.html>

### **What is an igneous rock?**

A rock formed by the solidification of molten magma. Igneous rocks are often called fire rocks and are formed either underground or above ground. Underground, they are formed when the melted rock, called magma, deep within the earth becomes trapped in small pockets. As these pockets of magma cool slowly underground, the magma becomes igneous rocks. Igneous rocks are also formed when volcanoes erupt, causing the magma to rise above the earth's surface. When magma appears above the earth, it is called lava. Igneous rocks are formed as the lava cools above ground.

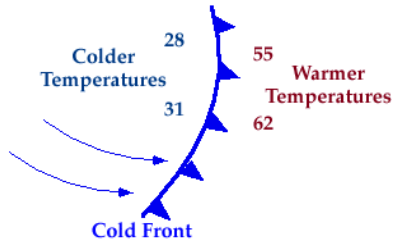
The above definition was taken from the following website, please refer to it for more information:

<http://www.fi.edu/fellows/payton/rocks/create/igneous.htm>

*5. Identify atmospheric conditions (e.g., air masses, wind patterns, cloud types and storms) and properties of air.*

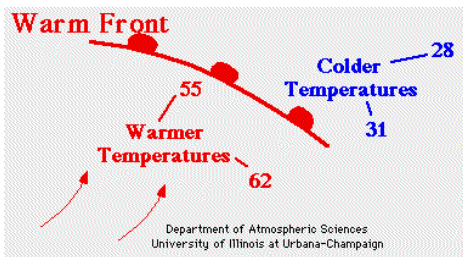
### **Know general information about clouds, cold fronts and warm fronts.**

\*A cold front is designated by a blue line with triangles on it...as pictured below... it is called a cold front because a cold mass is moving toward a warm mass:



Picture taken from:  
[www2010.atmos.uiuc.edu/.../guides/gifs/cfdef.gif](http://www2010.atmos.uiuc.edu/.../guides/gifs/cfdef.gif)

\*A warm front is shown using a red line with half circles on top of it, as shown below. It is called a warm front because a warm air mass is moving toward a cooler air mass.



Picture taken from:  
[www.ecn.ac.uk/Education/images/warm.gif](http://www.ecn.ac.uk/Education/images/warm.gif)

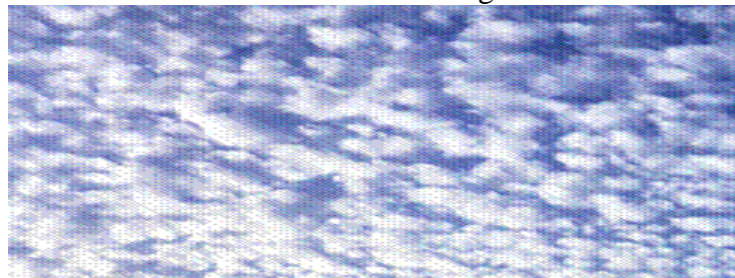
\*Cold fronts usually have high pressure and less precipitation, and warm fronts usually have lower pressure and more precipitation. If there is a rapid change in pressure over a short distance, strong winds will result.

The above information was taken from the following website. Please visit it for more information:

[http://atm.geo.nsf.gov/instruction/forecast\\_contest.html](http://atm.geo.nsf.gov/instruction/forecast_contest.html)

**\*Clouds:**

A cloud is a collection of water and ice droplets. When the drops cling together they can get very heavy. When their weight gets too heavy, they fall from the cloud, and down to earth as rain or snow, or sometimes hail. If there is a thunderstorm coming the weather will cool down...and the clouds are as follows... It will also bring an occluded front.



**Altocumulus Clouds**

**Altocumulus clouds often come before a thunderstorm in**

**the summer. They look a bit like cotton balls.**

**Low**

**Nimbostratus Clouds**



**Nimbostratus clouds are clouds that contain large amounts of rain. These are dark, low-level clouds from which come thunderstorms, hail, and lightning.**

The above pictures were taken from the following website; please refer to it for more information:

<http://www.esu3.org/districts/bellevue/curriculum/technology/jones/thirdgrade/cloudsandweather/clouds.htm>

6. *Identify the movement of water in the water cycle, including types of precipitation and causes and condensation.*

7. *Identify ways in which land and water interact (e.g., soil absorption, runoff, leaching, percolation, sinkholes, aquifers, and reservoirs).*

#### FTCE SCIENCE AND TECHNOLOGY 4

1. *Identify the components of Earth's solar system and compare their individual characteristics.*

**Know general information about stars, the moon and sun:**

*A star's surface temperature determines its color. Cool stars are red/orange. Mid-temperature stars are yellow, and hot stars range from white to blue (hottest). The sun is a white star (the sun is not a planet). The sun and moon affect the ocean tides. Just because a star appears brighter than another star, does not mean that it really is, because that star might be closer to earth than the other one. So in order to measure "absolute brightness" scientists calculate each star's magnitude if it were 32.6 light years away. This way all stars are being measured on the same scale (using the magnitude system).*

2. *Demonstrate knowledge of space exploration (e.g., history, purposes, and benefits).*

3. *Identify the phases of the Moon and the Moon's effect on Earth.*

**The moon's waxing and waning affects the Earth's tides:** The word "tides" is a generic term used to define the alternating rise and fall in sea level, produced by the gravitational attraction of the moon and the sun.

**What are Lunar Tides?** Tides are created because the Earth and the moon are attracted to each other, just like magnets are attracted to each other. The moon tries to pull at anything on the Earth to bring it closer. But, the Earth is able to hold onto everything except the water. Since the water is always moving, the Earth cannot hold onto it, and the moon is able to pull at it. Each day, there are two high tides and two low tides.

*4. Identify Earth's orbital pattern and its effect on the seasons.*

**What happens when the Earth's axis is tilted?**

When Earth's axis is tilted, different sides of earth experience different seasons.

Summer- Earth is tilted towards the sun

Winter- Earth is tilted away from the sun

Fall and Spring- Vernal equinox and autumnal equinox

The distance from the sun also contributes to the changing of seasons because the Earth's orbit is not a circle. It is elliptical. The earth's orbit around the sun is not the only elliptical orbit. Other planets also have this shaped orbit. **Kepler's law is a theory comprised of three laws that describe the planetary movement around the sun.**

For more information on stars, please visit:

<http://members.ncats.net/astro/reference/types.html>

For more information on Kepler's laws of motion, please visit:

[http://en.wikipedia.org/wiki/Kepler's\\_laws\\_of\\_planetary\\_motion](http://en.wikipedia.org/wiki/Kepler's_laws_of_planetary_motion)

FTCE SCIENCE AND TECHNOLOGY 5

*1. Compare and contrast living and nonliving things.*

**Are Crystals living? Why or Why not?**

Crystals are nonliving organisms. In order for an organism to be considered living it must possess ALL of the 6 main characteristics.

1. Living things are made up of cells.
2. Living things obtain and use energy.
3. Living things grow and develop.
4. Living things reproduce.
5. Living things respond to stimuli in their environment.
6. Living things adapt to their environment.

The above information was taken from the following website:

<http://www.usoe.k12.ut.us/curr/science/sciber00/7th/classify/living/2.htm>

Therefore, even though crystals possess some of these characteristics, **they are non-living because** they do not respond the stimuli in their environment.

2. *Distinguish among microorganisms (i.e., viruses, bacteria, and protozoans).*

### **What are decomposers?**

Decomposers break down dead plants and animals, as well as the feces of other animals. They are very important to the ecosystem because they help supply plants with the proper nutrients and they help reduce the pile up of garbage. There are two types of decomposers:

1. Scavengers: Who eat dead plants and animals and break them into smaller pieces.
2. Decomposers: Break down those smaller pieces. These decomposers are often microscopic. Two examples of these types of decomposers are **bacteria and fungi**.

For more information on decomposers, please visit:

<http://www.qrg.northwestern.edu/projects/marssim/simhtml/info/whats-a-decomposer.html>

### **Know general information about algae and mold:**

Algae have many of the same characteristics as plants, such as having cell walls, containing chlorophyll, and manufacturing their own food through photosynthesis. Algae usually live in the water or other moist areas, but have been seen in extreme areas as well, such as deserts or arctic snow. **Some algae are also found under the roots of trees.**

**When this occurs, it is likely that the algae are taking nutrients away from the tree.**

There are many different types of algae, including blue - green algae, euglenids, yellow - green and golden - brown algae, dinoflagellates, red algae (**scientific name- Karenia Brevis**), green algae, and brown algae. Sometimes, people confuse mold with algae.

Mold's main responsibility in the ecosystem is to break down dead materials. **Mold can be very toxic, or it can be very helpful, as it can be used to make antibiotics or cheese.** Mold can grow anywhere on earth, not just moist places (indoors or outdoors).

For more about the different types of algae, please visit:

<http://www.poolsetc.com/public/adviser/Algae.html>

For more information about mold, please visit:

<http://www.qualityenviro.net/mold-info/whatmold.shtml>

3. *Differentiate structures and functions of plant and animal cells.*

Know the parts of cell and their functions:

The following information and pictures were taken from this website. It is an excellent source for more information!

[http://www.fortbend.k12.tx.us/mastersonline/Ft\\_Bend\\_ISD/6306/qvms/johnson/cell\\_part.htm](http://www.fortbend.k12.tx.us/mastersonline/Ft_Bend_ISD/6306/qvms/johnson/cell_part.htm)

Cells include various parts as listed below. Reference the picture to see which goes with which cell:



*Cell Membrane* - forms the outer boundary of the cell and allows only certain materials to move into or out of the cell

*Cytoplasm* - a gel-like material inside the cell; it contains water and nutrients for the cell

*Nucleus* - directs the activity of a cell; it contains chromosomes with the DNA

*Nuclear Membrane* - separates the nucleus from the cytoplasm

*Endoplasmic Reticulum* - moves materials around in the cell

*Ribosomes* - make protein for the cell

*Golgi Bodies* - are used for packaging and secreting of energy

*Mitochondria* - break down food and release energy to the cell

*Lysosomes* - are chemicals used to digest waste

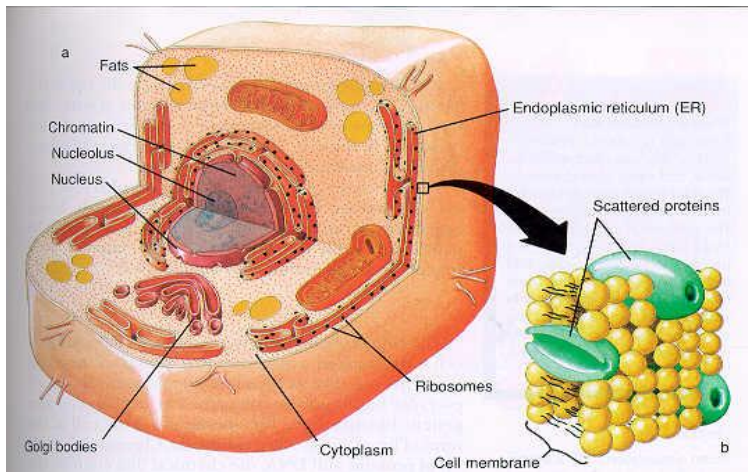
*Vacuoles* - are storage areas for the cell

Some organelles are found only in Plant cells. These organelles are:

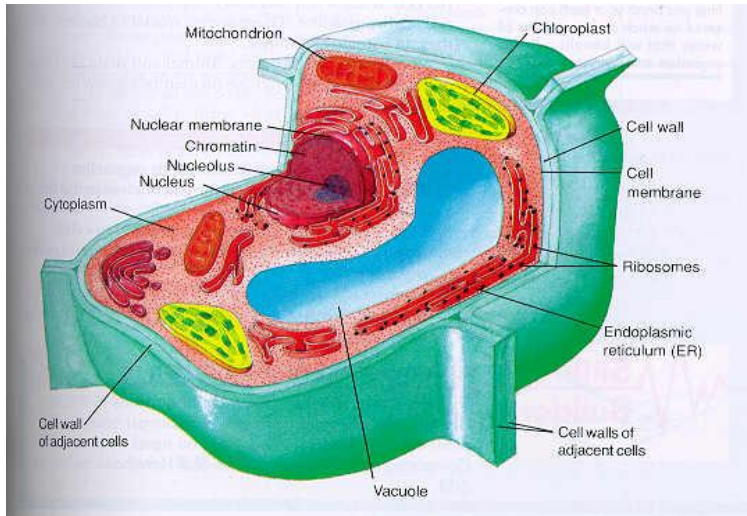
*Cell Wall* - provides structure to the plant cell

*Chloroplasts* - contain chlorophyll that is make food for the plant cell

This is a picture of a cell in an animal!



This is a picture of a cell in a plant!



4. Identify the major steps of the plant physiological processes of photosynthesis, transpiration, reproduction, and respiration.

**Know general information about photosynthesis and plants:**

\*In order for a plant to grow it must come from a seed, and be supplied with air/carbon dioxide, water, and sunlight. Remember that plants breathe carbon dioxide, NOT oxygen. They create oxygen through photosynthesis.

\*Photosynthesis is the process where sunlight is converted into chemical energy. It occurs mostly in plants, bacteria and some protists and uses carbon dioxide and water reactions to form glucose and oxygen. The glucose (or sugar) is then converted into ATP by cellular respiration. ATP is the fuel used by all living things. Chlorophyll and sunlight are essential components to this process. If there is no sunlight, no food can be made.

For more diagrams and more information on photosynthesis, please go to:

- <http://www.unc.edu/~zacharyw/index2.html>
- [www.emc.maricopa.edu/faculty/farabee/BIOBK/BioBookPS.html](http://www.emc.maricopa.edu/faculty/farabee/BIOBK/BioBookPS.html)

**What is the Greenhouse Effect?**

The greenhouse effect is the rise in temperature that the Earth experiences because certain gases in the atmosphere (water vapor, carbon dioxide, nitrous oxide, and methane, for example) trap energy from the sun. Without these gases, heat would escape back into space and Earth's average temperature would be about 60°F colder. Because of how they warm our world, these gases are referred to as greenhouse gases.

Definition taken from:

- <http://www.epa.gov/globalwarming/kids/greenhouse.html>

5. Identify the structures and functions of organs and systems of animals, including humans.

Mitochondria

6. Identify the major steps of the animal physiological processes (e.g., respiration, reproduction, digestion, and circulation).

### **What are the properties of blood?**

Red blood cells travel through the blood delivering oxygen and removing waste. Red blood cells are red because they contain hemoglobin, which is red in color.

The white blood cells watch for and attack germs and diseases. If an infection continues to fight back, the white cell count will increase dramatically. Antibodies are produced here!

Plasma, which is made of 90% water, is important because it carries the blood's cells and platelets to different areas of the body.

Platelets gather at the site of a wound and help clot the blood if there is a sudden loss.

For more information on the parts of blood, please visit:

<http://sln.fi.edu/biosci/blood/blood.html>

### **Explain the path of blood flow through the heart**

Deoxygenated blood comes through the superior and inferior vena cava to the right atrium of the heart. From the right atrium, it travels to the right ventricle. Then it travels through the pulmonary arteries to the lungs where it becomes oxygenated blood. The oxygenated blood then travels to the left atrium, to the left ventricle, and finally to the arteries throughout the body. So the veins carry deoxygenated blood and arteries carry oxygenated blood.

### **Know the main parts of the brain and what they affect:**

Frontal Lobe: Concerned with reasoning, planning, parts of speech and movement (motor cortex), emotions, and problem-solving

Occipital Lobe: Concerned with many aspects of vision.

Parietal Lobe: Concerned with perception of stimuli related to touch, pressure, temperature and pain

Temporal Lobe: Concerned with perception and recognition of auditory stimuli (hearing) and memory (hippocampus)

The above explanations come from the following website; please refer to it for more information and for pictures of the brain:

<http://faculty.washington.edu/chudler/lobe.html>

#### FTCE SCIENCE AND TECHNOLOGY 6

- 1. Identify parts and sequences of biogeochemical cycles of common elements in the environment (e.g. carbon, oxygen, hydrogen, and nitrogen).*
- 2. Identify causes and effects of pollution.*

#### **How does pollution affect coral reefs?**

1. Raises the carbon dioxide level, making it harder for living these to breathe
2. People are dumping oil, gas, fertilizer, pesticides and human waste into our oceans. These poisons increase the nitrogen level of the water around the reefs which causes an overgrowth of algae. Algae grow over the coral and block out the sunlight.

The above information was taken from the following website; please refer to it for more information:

<http://eagle1.american.edu/~sb3854a/page8.html>

- 3. Identify the living and nonliving factors that influence population density (e.g. food, space, predators, climate).*
- 4. Analyze various conservation methods and their effectiveness in relation to renewable and nonrenewable natural resources.*

#### FTCE SCIENCE AND TECHNOLOGY 7

- 1. Demonstrate knowledge of basic science processes (e.g., observing, classifying, communicating, quantifying, inferring, and predicting).*
- 2. Apply knowledge of the integrated science processes of manipulating variables, defining operationally, forming hypotheses, measuring (metric) and graphing, and interpreting data.*

Know about the scientific method. The steps and components:

1. Observation
2. Question
3. Hypothesis
4. Experiment
5. Analysis
6. Repeat

\*Make sure to state a purpose with the question and to define the variables and how data will be collected and analyzed!

Steps taken from the following website:

[http://koning.ecsu.ctstateu.edu/Plants\\_Human/scimeth.html](http://koning.ecsu.ctstateu.edu/Plants_Human/scimeth.html)

In addition, every experiment should have three types of variables- dependent, independent, and a control.

The *dependent* variable is the variable that is being measured, and that will be affected. It is dependent on the other variables.

The *independent* variable is the variable that changes during the experiment. It affects the dependent variable.

The *control* variable is the variable that is held constant throughout the experiment.

If you were doing an experiment about where a plant grows best, the variables could be as follows:

Dependent- plant growth (this is dependent upon what the plant is growing in)

Independent- the different mediums the plants are growing in (for example, three seeds may be planted in soil, three in sand, three in just water, and three in rocks)

Control- the plant itself because you would only use one type of plant (you would not put a rose in soil, a coffee plant in sand, a lima bean plant in rocks, and so on. You would use the same plant the whole time).

Definitions taken from:

<http://www.an.psu.edu/jxm57/irp/var.htm>

*3. Apply knowledge of inquiry approaches to learning science concepts.*

*4. Identify the appropriate laboratory equipment for specific activities.*

*5. Identify state safety procedures for teaching science, including the care of living organisms and the accepted procedures for the safe preparation, use, storage, and disposal of chemicals and other materials.*

### **Where should chemicals be stored in a classroom?**

In a locked cabinet close to the floor.

### FTCE SCIENCE AND TECHNOLOGY 8

*1. Identify the interrelationship of science and technology.*

*2. Identify the tools and techniques of science and technology used for data collection and problem solving.*

### FTCE SCIENCE AND TECHNOLOGY 9

*1. Identify the purposes and functions of common computer software. (word processor, spreadsheet, database, multimedia, communication, and publishing.)*

### **What is a spreadsheet?**

A spreadsheet is a rectangular table that utilizes columns and rows to show a large amount of data at one time. **Many children use spreadsheets to show their data for the science fair.** These students may use Microsoft Excel to create these spreadsheets, as it is a very efficient program for design such tables.

*2. Identify ways technology can be used by students to represent understanding of scientific concepts.*

*3. Identify telecommunications terminology, processes, and procedures.*

*4. Demonstrate knowledge of legal and ethical practices as they relate to information and technological systems. (copyright, privacy, and plagiarism)*

### **OTHER TOPICS:**

### **What should a teacher do if a student brings an excellent software program to school that the teacher would like to use for the whole class?**

The teacher cannot be sure that the software is free of all viruses, so he/she would not want to allow her students to just put it directly into the classroom computers. In addition, it would not be legal to make copies of the software without reading the copyright and reproduction laws, even if the software was free of viruses. The best thing to do in a situation such as this, would be to ask the technology coordinator to look at the software, and if they approve it, to ask them to send it through the network.

### **Why is Email a valuable resource for schools and teachers?**

Email can help people far away keep in touch with one another. For example students can have email pen pals in a different country or state. Email is also an excellent way for teachers in different schools, counties, states, or countries to keep in touch and share their ideas. Email is also a great way to reach many people simultaneously, so that your ideas can be shared with a mass group instead of only one person.

### **What is litmus paper and how does it change in color?**

Litmus paper is a special type of filter paper that is used to test for acids or alkalies. Litmus is used as a dye, and when applied to the filter paper, will turn the paper **red to indicate an acid** and can then restored back to its **blue color by alkalies.**

For more information on litmus paper and testing, please visit:

[http://en.wikipedia.org/wiki/Litmus\\_test\\_\(chemistry\)](http://en.wikipedia.org/wiki/Litmus_test_(chemistry))

**What is a Geiger counter?**

A Geiger counter is a machine that is used to measure radiation. It helps scientists and surveyors detect the presence and intensity of radioactivity by measuring alpha and beta radiation.

For a picture of a Geiger counter and more information, please visit:

[http://encarta.msn.com/media\\_461536698/Geiger\\_Counter.html](http://encarta.msn.com/media_461536698/Geiger_Counter.html)

**What is metamorphosis?**

Metamorphosis is the process an insect goes through to become an adult. A complete metamorphosis is made up of four stages: the egg, the larva, the pupa, and lastly, the adult. There is also something called an incomplete metamorphosis. An incomplete metamorphosis is made up of only three stages the egg, the nymph, and the adult. Complete metamorphosis can be observed in butterflies or meal worms, while incomplete metamorphosis can be observed in grasshoppers and dragonflies.

For more information:

[http://www.uen.org/utahlink/activities/view\\_activity.cgi?activity\\_id=2024](http://www.uen.org/utahlink/activities/view_activity.cgi?activity_id=2024)

Other Questions or Topics:

**Typical electrical service to a house in the US is...**

Alternating current (A/C) because the flow of electrons constantly changes direction

**If you find many sea shells on a mountain valley what can you assume?**

The ocean once covered that area

**Speed of light is the same as...**

Universal constant

**What makes a bungee cord work?**

They are made with rubber, which allows the rebound