2004

FCAT

Florida Comprehensive Assessment Test

Student Name

_____

SCIENCE
Sample Test & Answer Book

GRADE 10

FC00000158

FCAT Sample Test Materials

These sample test materials are designed to help you prepare to answer FCAT questions. These materials introduce you to the kinds of questions you will answer when you take FCAT and include hints for responding to the different kinds of FCAT questions. The FCAT Science sample test materials for Grade 10 are composed of the books described below:

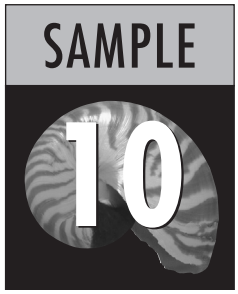
☑ **Sample Test and Answer Book**
Includes a science sample test, a sample answer book, and instructions for completing the sample test. (Copies are available for all students in the tested grade.)

❑ **Sample Answer Key**
Includes answers and explanations for the questions in the sample test. (Copies are available for classroom teachers only.)

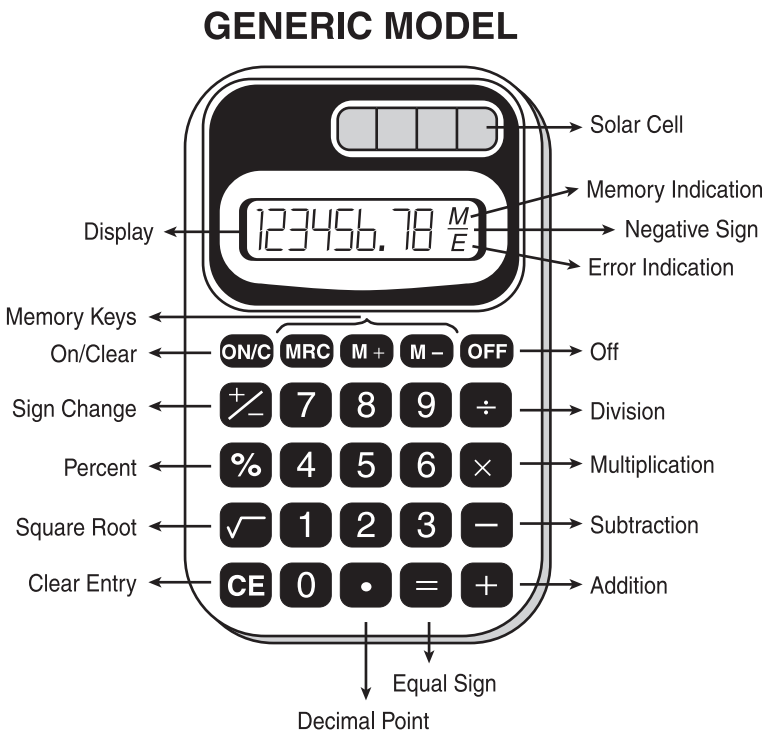
☑ = This book

The Administrator
Assessment and School Performance
Florida Department of Education
Tallahassee, Florida 32399-0400

FCAT Science Sample Test Book



This is a picture of a generic calculator and its parts.



Helpful Hints for Taking the FCAT Science Test

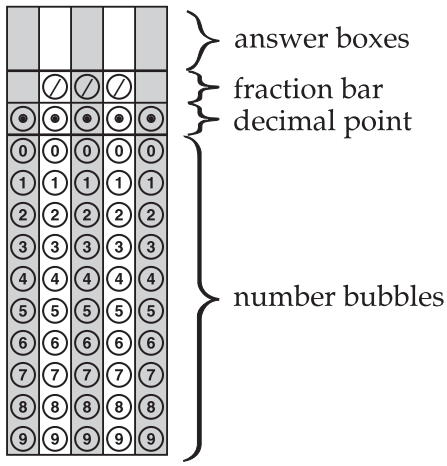
1. Read the problem very carefully. Then decide whether or not you need the calculator to help you solve the problem.
2. When starting a new problem, always clear your calculator by pressing the clear key.
3. If you see an **E** in the display, clear the error before you begin.
4. If you see an **M** in the display, clear the memory and the calculator before you begin.
5. If the number in the display is not one of the answer choices, check your work. Remember that when computing with certain types of fractions, you may have to round the number in the display.
6. Remember, your calculator will NOT automatically perform the algebraic order of operations.
7. Calculators might display an incorrect answer if you press the keys too quickly. When working with calculators, use careful and deliberate keystrokes, and always remember to check your answer to make sure that it is reasonable.
8. Always check your answer to make sure that you have completed all of the necessary steps.

How to Complete the Response Grids

Science test questions with this symbol  require that you fill in a grid in your answer book. There may be more than one correct way to fill in a response grid. This section shows you different ways the response grid may be completed.

Parts of a Response Grid

For Grade 10, response grids have the following parts:



Directions

1. Work the problem and find an answer.

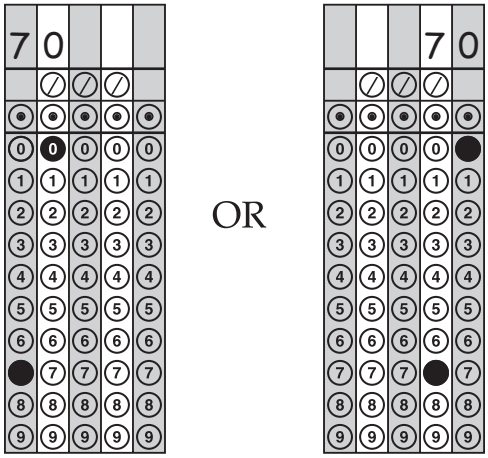
2. Write your answer in the answer boxes at the top of the grid.
   - Print your answer with the first digit in the left answer box, OR with the last digit in the right answer box.
   - Print only one digit or symbol in each answer box. Do NOT leave a blank answer box in the middle of an answer.
   - Be sure to write a decimal point or fraction bar in the answer box if it is a part of the answer.

3. Fill in a bubble under each box in which you wrote your answer.
   - Fill in one and ONLY one bubble for each answer box. Do NOT fill in a bubble under an unused answer box.
   - Fill in each bubble by making a solid black mark that completely fills the circle.
   - You MUST fill in the bubbles accurately to receive credit for your answer.

Examples

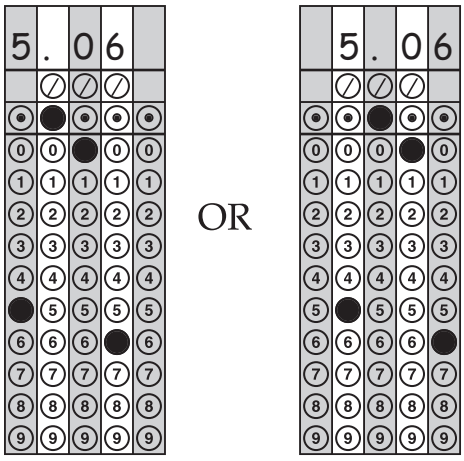
Whole Number

60 + 10 =



Decimal

Show the decimal equivalent of $5\frac{6}{100}$.

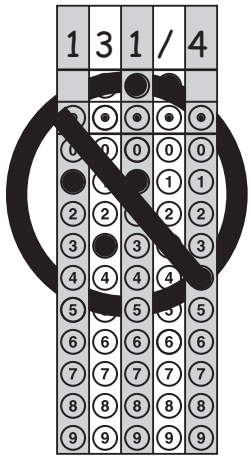


Fraction

NOTE: You may NOT write a **mixed number** such as $13\frac{1}{4}$ in the answer grid. If your answer is a mixed number, you must convert the answer to an improper fraction, such as $\frac{53}{4}$, or to a decimal number, such as 13.25. If you tried to fill in $13\frac{1}{4}$, it would be read as $\frac{131}{4}$ and would be counted wrong.

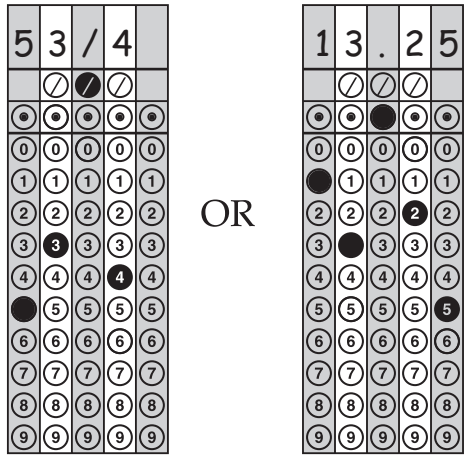
INCORRECT

$12\ \frac{3}{4} + \frac{1}{2} =$



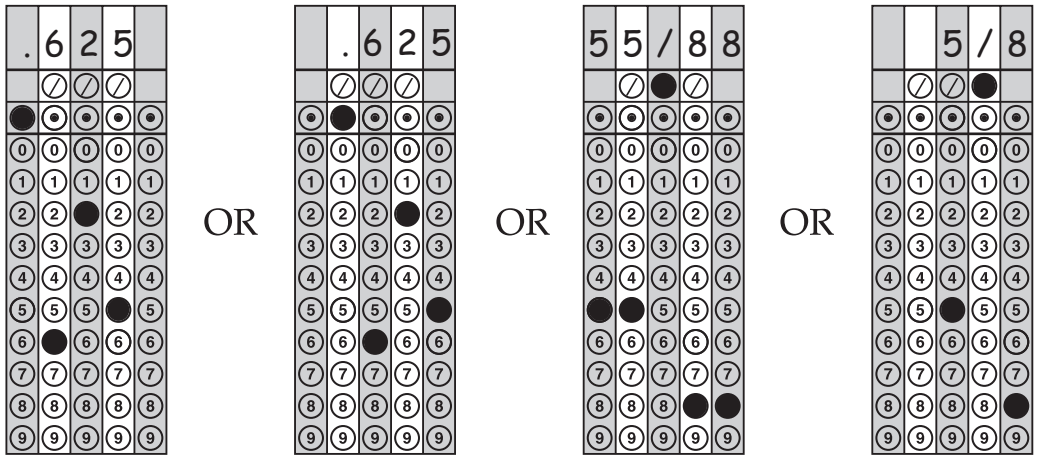
CORRECT

$12\ \frac{3}{4} + \frac{1}{2} =$



Decimal or Fraction

Many answers may be shown as either a decimal or a fraction.

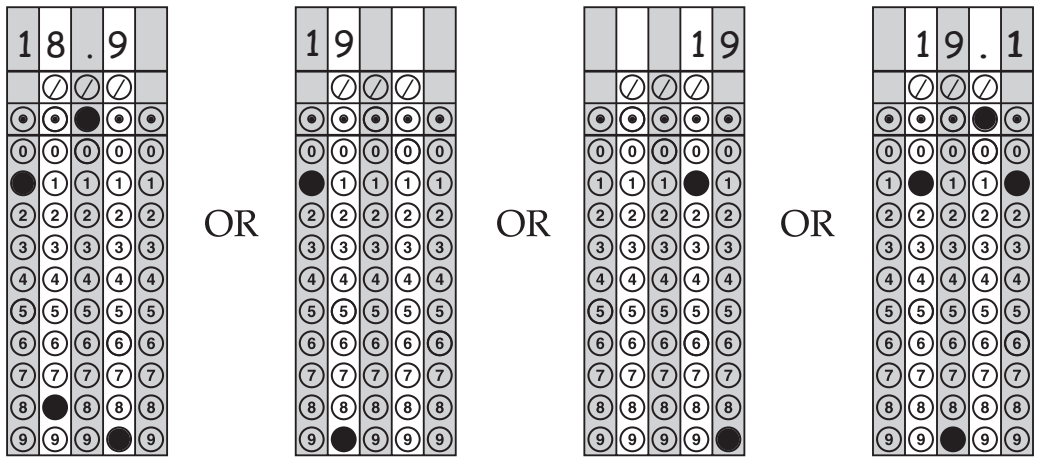


Ranges

A correct answer within a range of values may be represented in various ways. For example, for the inequality

$$18.8 < n < 19.2$$

values of n could be written as shown below.



There are also other correct answers.

Taking the FCAT Science Sample Test

Hints for Taking the FCAT Science Test

Here are some hints to help you do your best when you take the FCAT Science test. Keep these hints in mind when you answer the sample questions.

- ✔ **Learn how to answer each kind of question. FCAT Science tests have four types of questions: multiple-choice, gridded-response, short-response, and extended-response.**
- ✔ **Read each question carefully.**
- ✔ **Check each answer to make sure it is the best answer for the question asked.**
- ✔ **Answer the questions you are sure about first. If a question seems too difficult, skip it and go back to it later.**
- ✔ **Be sure to fill in the answer bubbles correctly. Do not make any stray marks around answer spaces.**
- ✔ **Think positively. Some questions may seem hard to you, but you may be able to figure out what to do if you reread the question carefully.**
- ✔ **When you have finished each question, reread it to make sure your answer is reasonable.**
- ✔ **Relax. Some people get nervous about tests. It's natural. Just do your best.**

How to Answer the "Read, Inquire, Explain" Questions

Answers to the short- and extended-response problems can receive full or partial credit. You should try to answer these questions even if you are not sure of the correct answer. If a portion of the answer is correct, you may get a portion of the points.

- ✔ **Allow about 5 minutes to answer the short "Read, Inquire, Explain" questions and about 10 to 15 minutes to answer the long ones.**
- ✔ **Read each question carefully.**
- ✔ **If you do not understand the question, read it again and try to answer one part at a time.**
- ✔ **Be sure to answer every part of the question.**
- ✔ **Use the information provided to answer the question.**
- ✔ **Write your explanations in clear, concise language. Use only the space provided in the Sample Answer Book.**
- ✔ **Reread your explanation to make sure it says what you want it to say.**

Directions for Taking the Science Sample Test

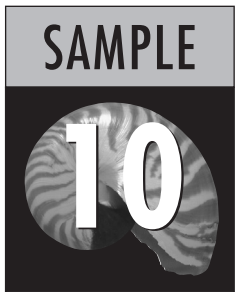
The Sample Test contains the Reference Sheet, the Periodic Table, and 16 questions. It should take about 30 to 45 minutes to answer all the questions. Mark your answers in the Sample Answer Book, which begins on page 23. If you don't know how to answer a question, just ask your teacher to explain it to you. Your teacher has the answers to the sample test questions.

You may need formulas or the Periodic Table to help you answer some of the questions. You may refer to the Reference Sheet (page 11) or the Periodic Table (page 12) as often as you like.

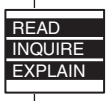
Use the space in your Science Sample Test Book to do your work on the multiple-choice and gridded-response questions, but be sure to put your answers in the Sample Answer Book. For the "Read, Inquire, Explain" questions, write your answers in the Sample Answer Book.

Before you begin, remove the Sample Answer Book by tearing along the dotted line.

FCAT Science Sample Test



FCAT Question Symbols



This symbol appears next to questions that require short written answers. Use about 5 minutes to answer these questions.

A complete and correct answer to each of these questions is worth 2 points. A partially correct answer is worth 1 point.

This symbol appears next to questions that require longer written answers. Use about 10 to 15 minutes to answer these questions.

A complete and correct answer to each of these questions is worth 4 points. A partially correct answer is worth 1, 2, or 3 points.

This symbol appears next to questions that require you to fill in your answer on a grid. There may be more than one correct way to fill in a response grid. You MUST fill in the bubbles accurately to receive credit for your answer.

A correct answer to each of these questions is worth 1 point.

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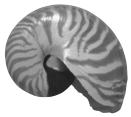
Grade  **FCAT Science Reference Sheet**

Equations

Acceleration ($\bar{a}$)	=	$\frac{\text{change in velocity (m/s)}}{\text{time taken for this change (s)}}$	$\bar{a}$	=	$\frac{v_f - v_i}{t_f - t_i}$
Average speed ($\bar{v}$)	=	$\frac{\text{distance}}{\text{time}}$	$\bar{v}$	=	$\frac{d}{t}$
Density (D)	=	$\frac{\text{mass (g)}}{\text{Volume (cm}^3\text{)}}$	D	=	$\frac{m}{V}$
Percent Efficiency (e)	=	$\frac{\text{Work out (J)}}{\text{Work in (J)}} \times 100$	%e	=	$\frac{W_{out}}{W_{in}} \times 100$
Force in newtons (F)	=	mass (kg) × acceleration (m/s^2)	F	=	ma
Frequency in hertz (f)	=	$\frac{\text{number of events (waves)}}{\text{time (s)}}$	f	=	$\frac{n \text{ of events}}{t}$
Momentum (ρ)	=	mass (kg) × velocity (m/s)	ρ	=	mv
Pressure (p)	=	$\frac{\text{Force (N)}}{\text{area (m}^2\text{)}}$	p	=	$\frac{F}{A}$
Wavelength (λ)	=	$\frac{\text{velocity (m/s)}}{\text{frequency (Hz)}}$	λ	=	$\frac{v}{f}$
Work (W)	=	Force (N) × distance (m)	W	=	Fd

Units of Measure

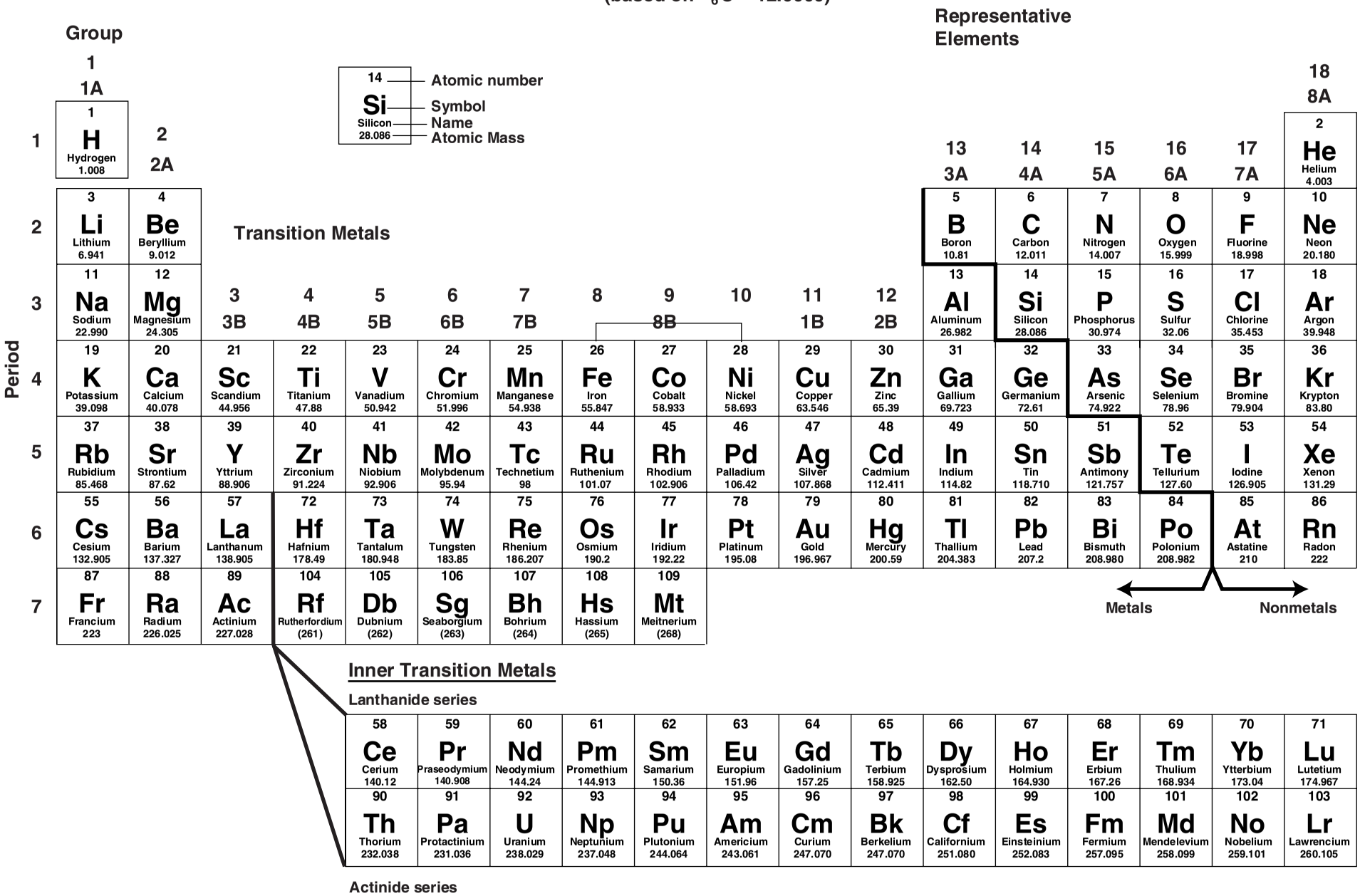
cm = centimeter
g = gram
Hz = hertz
J = joule (newton-meter)
kg = kilogram
m = meter
N = newton
s = second

AU = Astronomical Unit = Distance Between Earth and the Sun (approximately 150 million kilometers)

Fold and Tear Carefully Along Dotted Line

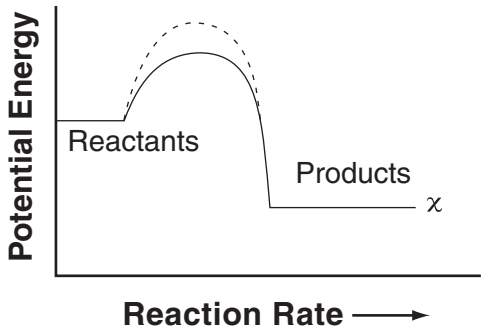
Periodic Table of the Elements

(based on $^{12}_{6}C = 12.0000$)

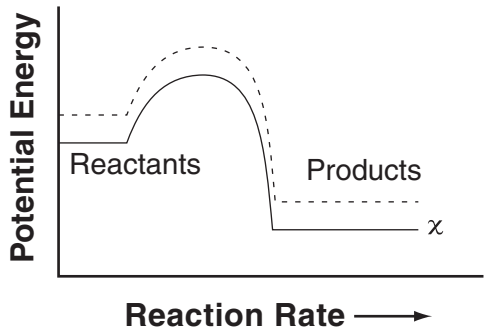


1 Catalysts may reduce the amount of activation energy required for a chemical reaction to occur. Platinum (Pt) is a catalyst that is used in catalytic converters in automobiles. In the graphs below, pathway *x* is a solid line representing the uncatalyzed reaction. The dotted line shows the catalyzed reaction. Which graph **best** illustrates the changes in a reaction when the catalyst reduces the amount of energy required?

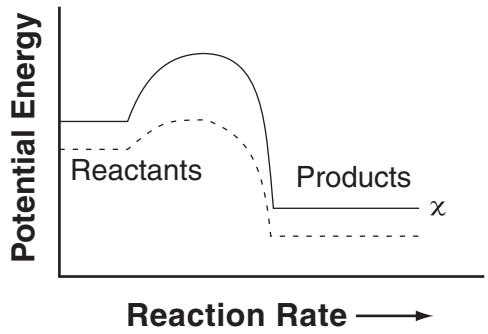
A.



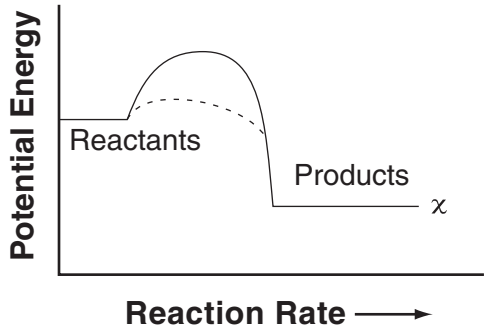
C.



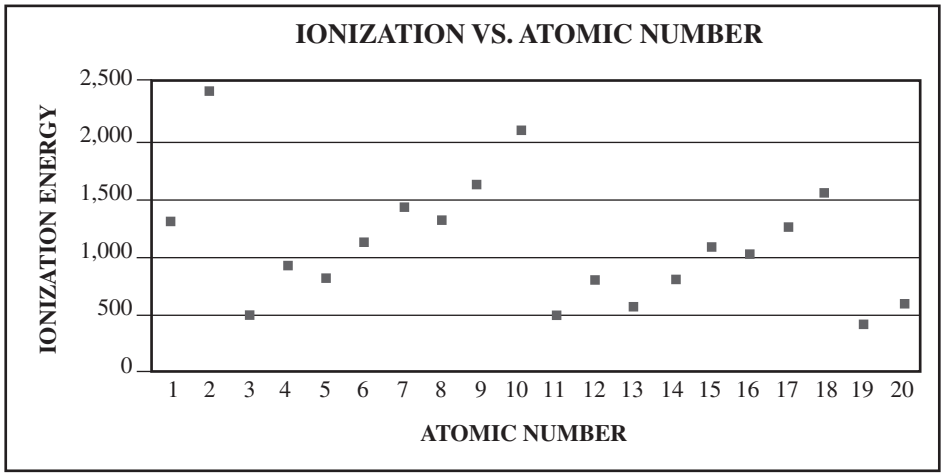
B.



D.



2 Ionization energy is the energy required to remove an electron from an atom in the gas phase. In the graph below, the ionization energy is shown as a function of the atomic number for the first twenty elements in the periodic table.



The elements 3, 11, and 19 require the lowest amount of ionization energy. What do the elements with atomic numbers 3, 11, and 19 have in common?

F. They have one electron in their outer orbital.

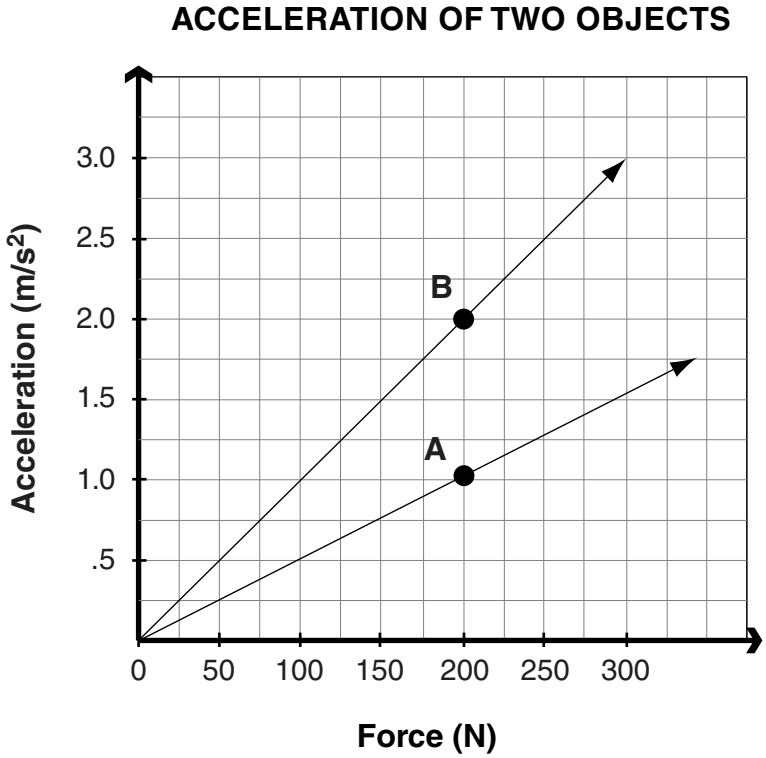
G. They lose a proton, which makes them neutral.

H. They have seven electrons in their outer orbital.

I. They have an extra proton, which makes them neutral.

3 A ball is dropped from a height of 20 meters above the ground. As the ball falls, it increases in speed. At what height above the ground, in meters, are the kinetic and potential energies of the ball equal?

4 The diagram below illustrates the relationship between the net force and resulting acceleration for two objects. Object A has a mass of 200 kilograms.



What is the mass, in kilograms, of Object B?

5 Go to your Sample Answer Book to answer Number 5.

6 Earthquakes occur in many regions of the world. Why are there no major earthquakes in Florida?

A. Earthquakes cannot occur on a peninsula.
B. Florida is over a hot spot where no earthquakes occur.
C. Earthquakes cannot occur in limestone sedimentary rock.
D. There are no tectonic plate boundaries located near Florida.

7 Early astronomers believed that Earth was the center of the universe, and that all planetary bodies revolved around Earth. Copernicus and others provided evidence that Earth revolves in an elliptical orbit around the Sun. Which characteristic makes the Sun **appear** to revolve around Earth by moving from east to west across the sky?

F. Earth's rotation
G. Earth's tilt on its axis
H. Earth's spherical shape
I. Earth's orbit about the Sun

8 The new moon phase is caused by the relative positions of Earth, the Moon, and the Sun. Why is the Moon not visible during the new moon phase?

A. The sunlight is not being reflected off the Moon.

B. The far side of the Moon is the only side visible.

C. The location of the Moon is between Earth and the Sun.

D. The tilt of Earth causes the Moon to be blocked by the Sun.

9 Mike and his lab partner, Maria, collected data on their respiratory rates while performing different activities. The chart below shows their averages.

ACTIVITIES AND RESPIRATORY RATES

Activity	Mike and Maria's Average Respiratory Rate
Sitting quietly	12 Breaths/minute
Walking	25 Breaths/minute
Running	39 Breaths/minute

The data above show a higher respiratory rate for increased activity. Which statement explains this relationship?

F. The muscles require more glucose to be delivered to them as their energy source.

G. The muscles require more hemoglobin to be delivered to them as their energy source.

H. The muscles require a greater amount of oxygen (O_2) in order to break down glucose to do work.

I. The muscles require a greater amount of carbon dioxide (CO_2) to break down glucose to do work.

10 Natural selection acts by taking advantage of natural variations in the traits of organisms within a population. What is the ultimate source of this variation?

A. changes in the environment
B. mutations within the genetic code
C. response to a need of the organism
D. response to the stress of competition for food

11 When brown tree snakes were first introduced to the island of Guam, they had no natural predators. These snakes sought out and ate many of the eggs of insect-eating birds. What probably occurred after the introduction of the brown tree snakes?

F. The bird population increased.
G. The insect population increased.
H. The bird population began to seek a new food source.
I. The insect population began to seek a new food source.

12 Go to your Sample Answer Book to answer Number 12.

13 Carmen conducted an experiment to determine if listening to different types of music would affect a person's pulse. Her hypothesis was that pulse rate would change with different types of music. Each person listened to seven different selections of music for 30 seconds each. Each person's pulse was taken before the music and then after each 30 second interval of music. The pulses were taken again after the music selections were completed. Based on her experiment, Carmen concluded that a person's pulse rate changed when the person listened to different types of music.

Which component is missing from Carmen's experiment?

A. a question
B. a hypothesis
C. a control group
D. a description of the experiment

14 Electromagnets are created by coiling a wire that conducts electricity around a piece of iron and then passing a current through the wire. Below are the results of an investigation to determine the relationship between the number of coils and the strength of an electromagnet.

ELECTROMAGNET EXPERIMENT

Number of Coils	Average Number of Straight Pins Picked Up	Average Number of Metal Screws Picked Up
Five coils	2.7	1.0
Ten coils	7.3	3.0
Twenty coils	11.0	5.7

What can be concluded from the information in the table above?

F. The strength of the electromagnet increases when the current increases.
G. Increasing the number of coils of an electromagnet increases its current.
H. Increasing the number of coils of an electromagnet increases its strength.
I. The strength of an electromagnet does not depend on the number of its coils.

15 Jerry conducted an experiment to determine whether salt added to a cup of water affects its freezing point. Water samples were prepared containing equal quantities of water at the same temperature. Each sample received a different amount of salt and was placed into a freezer. The length of time it took for each sample to freeze was recorded.

EFFECT OF SALT ON THE FREEZING POINT OF WATER

Amount of Salt Added in grams (g)	Freezing Time in minutes (min)
0	48
1.25	68
2.50	75
3.70	88
5.0	(Did not freeze during the time of experiment)

Which conclusion correctly interprets the information from Jerry's table?

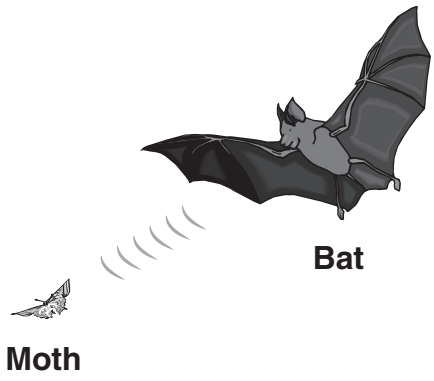
A. A conclusion cannot be made because the last sample did not freeze.

B. Doubling the salt doubled the time needed for the samples to freeze.

C. An increase in the amount of salt lowered the time needed for the samples to freeze.

D. An increase in the amount of salt increased the time needed for the samples to freeze.

16 Bats use high frequency sound waves to locate their prey and to navigate in the dark. As sound waves reflect off an object and back to the bat's ears, the bat is able to determine the precise location of the prey.



Which technological advance was aided by studying how bats locate objects using sound waves?

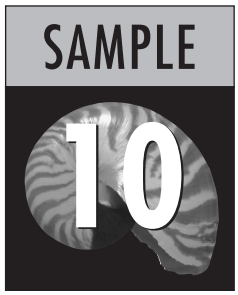
F. 3-D computer modelling
G. sonar navigation for submarines
H. X-rays for analyzing body structures
I. night-vision goggles for military operations

This is the end of the Science Sample Test.

Until time is called, go back and check your work or answer questions you did not complete. When you have finished, close your Sample Test Book and Sample Answer Book.

Name _____

FCAT Science Sample Answer Book



Answer all the questions that appear in the Sample Test in this Sample Answer Book. Answer multiple-choice questions by filling in the bubble for the answer you select. Answer gridded-response questions by filling in the correct bubbles. Write your answers to "Read, Inquire, Explain" questions on the lines provided.

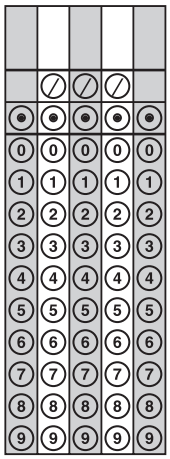
To remove your Sample Answer Book, carefully tear along the dotted line.

Fold and Tear Carefully Along Dotted Line

1 Ⓐ Ⓑ Ⓒ Ⓓ

2 Ⓕ Ⓖ Ⓗ Ⓘ

3



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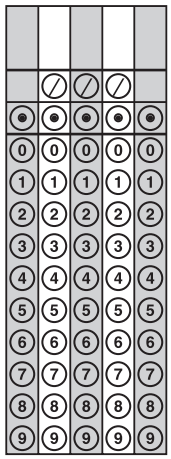


5 Scientists have found that oceans can influence the temperature of nearby landmasses. Coastal landmasses tend to have more moderate temperatures in summer and winter than inland landmasses at the same latitude.

READ
INQUIRE
EXPLAIN

Considering the influence of ocean temperatures, explain why inland temperatures vary in summer and winter to a greater degree than coastal temperatures.

6 Ⓐ Ⓑ Ⓒ Ⓓ

7 Ⓕ Ⓖ Ⓗ Ⓘ

8 Ⓐ Ⓑ Ⓒ Ⓓ

9 Ⓕ Ⓖ Ⓗ Ⓘ

10 Ⓐ Ⓑ Ⓒ Ⓓ

11 Ⓕ Ⓖ Ⓗ Ⓘ

12 Melaleuca is native to Australia, New Caledonia, and New Guinea. It was introduced into south Florida in the early 1900s. It currently grows in south Florida along roadsides and ditches, on lake shorelines, and in marshes. The Melaleuca has reduced the available resources for native plant populations because it quickly spreads and requires large amounts of fresh water. The state of Florida is taking steps to control the invasion of Melaleuca trees. One possible step is to introduce insects that feed on the Melaleuca trees.

READ
INQUIRE
EXPLAIN

Part A Explain how the introduction of the Melaleuca trees has altered the ecosystem.

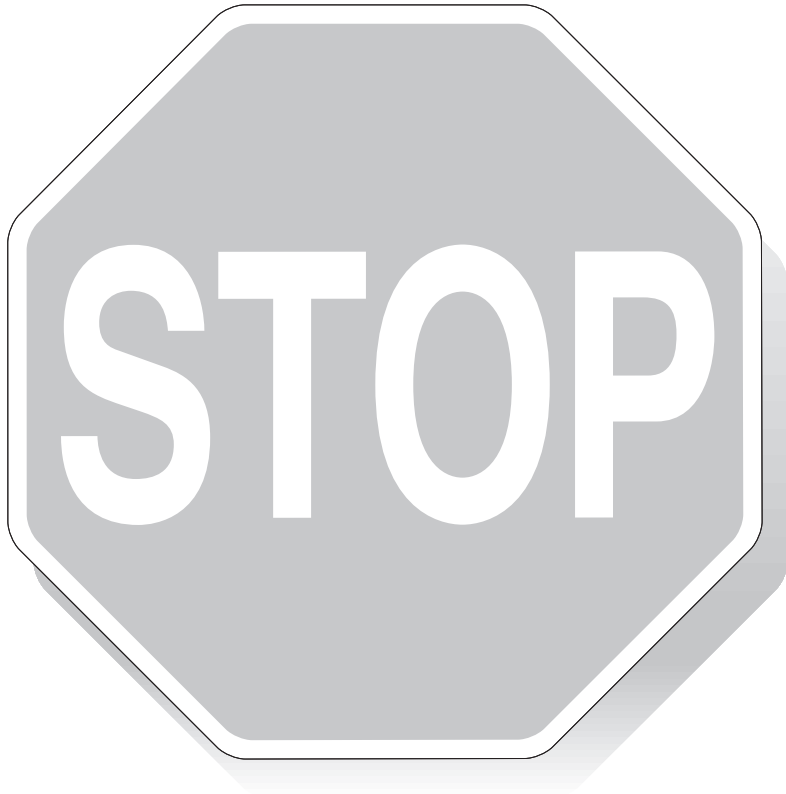
Part B Explain the possible consequences of introducing a new insect to control the growth of Melaleuca trees.

13 Ⓐ Ⓑ Ⓒ Ⓓ

14 Ⓕ Ⓖ Ⓗ Ⓘ

15 Ⓐ Ⓑ Ⓒ Ⓓ

16 Ⓕ Ⓖ Ⓗ Ⓘ



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Notes

FLORIDA DEPARTMENT OF EDUCATION
www.fldoe.org

Assessment and School Performance
Florida Department of Education
Tallahassee, Florida