

# 2010

Illinois Standards Achievement Test

**Science Samples**

**Form LM**

**Grade 7**

**Illinois State Board of Education**



## Structure of the Grade 7 Science ISAT

ISAT Science testing in spring 2010 will consist of 82 items: 30 norm-referenced, as well as 52 criterion-referenced items. The 30 norm-referenced items are an abbreviated form of the *Stanford 10 Science* assessment, developed by Pearson, Inc. The 52 criterion-referenced items were written by Illinois educators and pilot tested with Illinois students.

### Item Format

All 82 items will be in multiple-choice format. All items are aligned to the *Illinois Science Assessment Framework*, which defines the elements of the Illinois Learning Standards that are suitable for state testing.

### Science Sessions

All standard time administration test sessions are a minimum of 45 minutes in length. Any student who is still actively engaged in testing when the 45 minutes have elapsed will be allowed up to an additional 10 minutes to complete that test session. More details about how to administer this extra time will appear in the *ISAT Test Administration Manual*. This policy does not affect students who already receive extended time as determined by their IEP.

Science ISAT Grade 7	
<b>Session 1</b> <b>45 minutes</b>	41 multiple-choice items (30 of these are an abbreviated form of the <i>Stanford 10</i> .)
<b>Session 2</b> <b>45 minutes</b>	41 multiple-choice items (Some items will be pilot items.)

### Cumulative Knowledge

ISAT tests students on the knowledge and skills that they should have acquired by grade 4 and grade 7. Proper curriculum alignment can establish which assessment objectives are covered at each grade level so that by the spring of any given year, all objectives have been presented. It is not the sole responsibility of a 4th grade teacher or a 7th grade teacher to teach all of the assessment objectives contained within the framework.

The grade 4 ISAT will assess the grade 4 assessment objectives. The grade 7 ISAT will assess the grade 7 assessment objectives but may also include the assessment objectives from grade 4. The sample items within this booklet provide the reader with an opportunity to see the ISAT format and how the items align to the assessment framework.

1

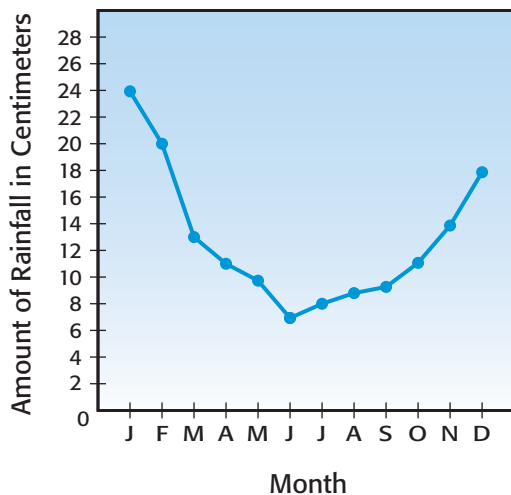
An experiment tests how much water bean plants need for good growth.

Which will be changed for the experiment?

- A The temperature
- B The amount of light
- C The amount of water
- D The amount of soil

2

Average Rainfall in an Area

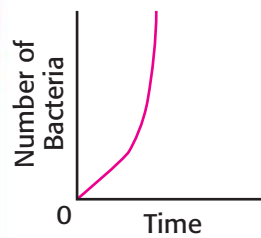


How much more rain fell in February than in November?

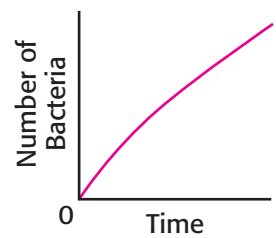
- A 4 centimeters
- B 6 centimeters
- C 14 centimeters
- D 16 centimeters

3

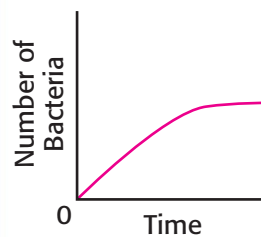
Bacterium 1



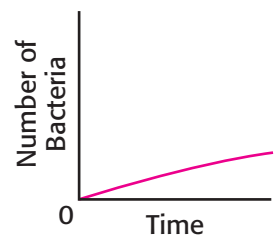
Bacterium 2



Bacterium 3



Bacterium 4



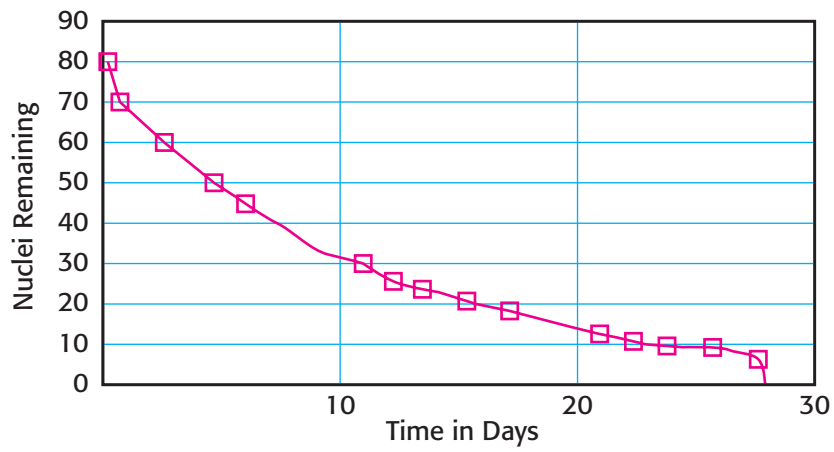
These graphs show how fast four disease-producing bacteria grow.

Which would produce a disease in the shortest amount of time?

- A Bacterium 1
- B Bacterium 2
- C Bacterium 3
- D Bacterium 4

4

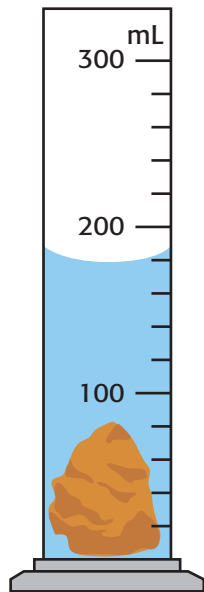
**Radioactive Isotope Decay**



The graph shows how fast decay causes the number of radioactive nuclei in an isotope to decrease. How many days did it take for half of the nuclei to decay?

- A** 8
- B** 10
- C** 15
- D** 20

5



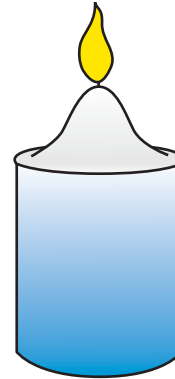
The volume of the rock in the picture is 60 mL.

What will the water level be after the rock is removed?

- A 30 mL
- B 90 mL
- C 120 mL
- D 150 mL

6

Look at this picture of a candle.

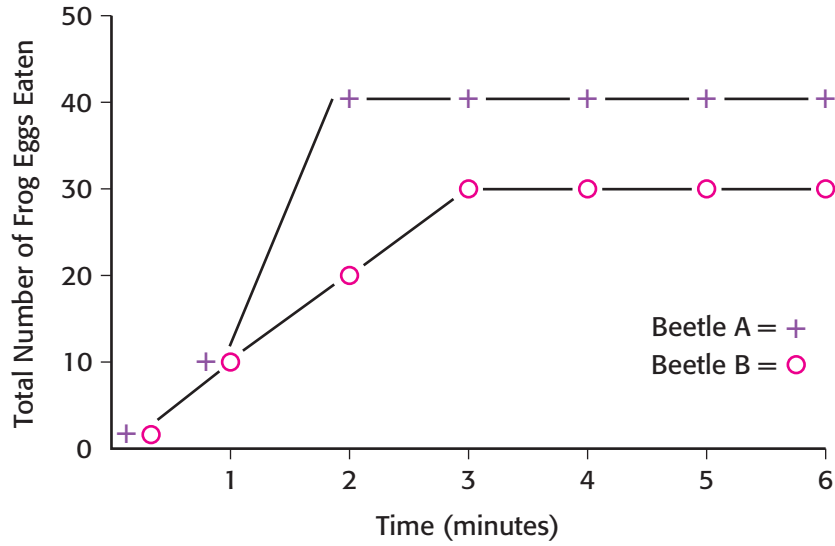


Which statement is a direct visual observation?

- A The candle is heavy.
- B The flame is hot.
- C The candle is lit.
- D The wax is soft.

7

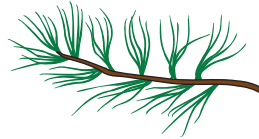
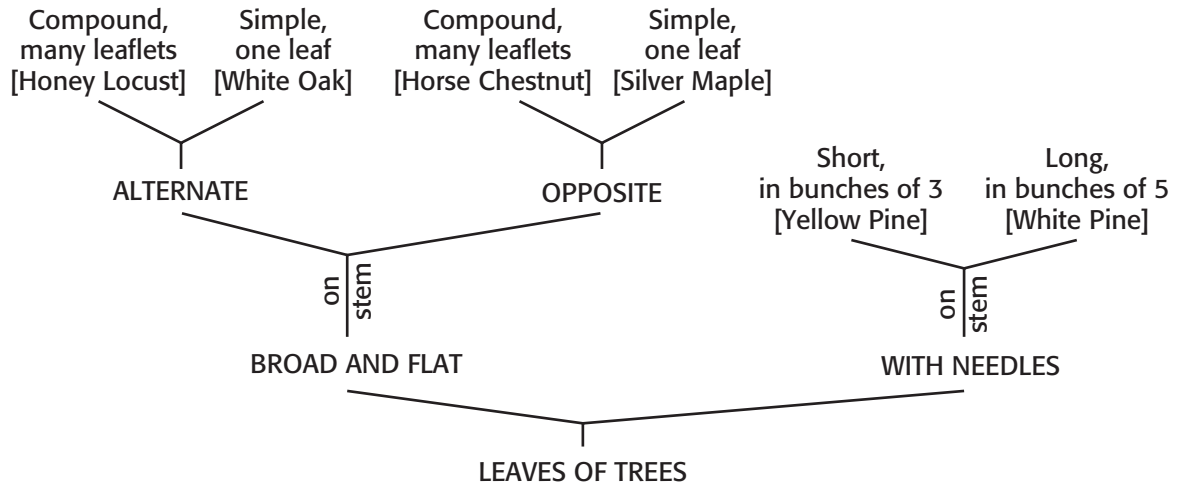
The graph shows how fast two different water beetles eat frog eggs.



How many frog eggs did Beetle B eat in the first 4 minutes?

- A 20
- B 30
- C 60
- D 90

8

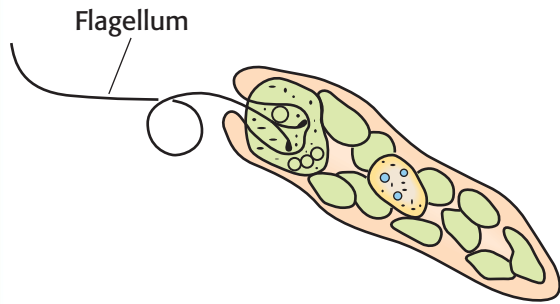


What is the name of this plant?

- A White Pine
- B Honey Locust
- C Silver Maple
- D White Oak

9

A Euglena contains a structure called a flagellum.



What is the function of the flagellum?

- A Reproduction
- B Movement
- C Protection
- D Food gathering

10

An amoeba divides into two identical cells. They have exactly the same characteristics as the parent amoeba. Which *best* describes the amoeba's division?

- A Diffusion
- B Meiosis
- C Mitosis
- D Osmosis

11

	B	b
B	BB	Bb
b	Bb	bb

This is a diagram of a genetic cross. In guinea pigs, black hair color is dominant (B) and white hair color is recessive (b). What hair color are the guinea pigs' offspring?

- A All black
- B All white
- C Mostly black with some white
- D Mostly white with some black

12

Which are the most efficient users of solar energy in a food chain?

- A Herbivores
- B Carnivores
- C Omnivores
- D Parasites

13

Tom lives in Illinois. He can see the constellation Orion on winter nights, but not on summer nights.

Why?

- A Earth is tilted away from the constellation.
- B Earth orbits to the other side of the sun.
- C Brighter constellations block Orion from view in the Northern Hemisphere.
- D The orbit of the moon blocks Orion from view in the Northern Hemisphere.

14

<u>Group A</u>	<u>Group B</u>
Grasshopper	Owl
Deer	Opossum
Robin	Moth
Beaver	Bat

Why are these animals placed into these groups?

- A One group is active during the day; the other group is active at night.
- B One group lives near prairies; the other group lives near forests.
- C One group benefits people; the other group is a pest to people.
- D One group eats only plants; the other group eats only meat.

15

Green plants are important to animals because the plants —

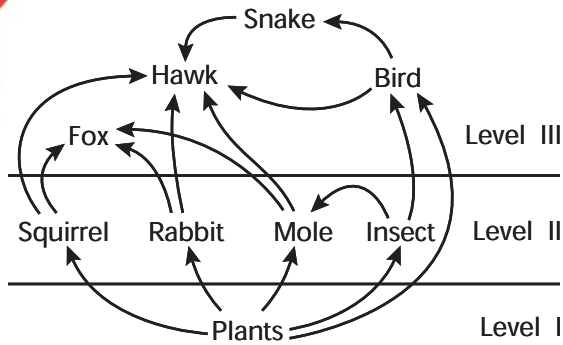
- A consume food and give off oxygen
- B consume food and give off carbon dioxide
- C produce food and give off oxygen
- D produce food and give off carbon dioxide

16

Snakes feed on mice. The mice eat grain crops. What happens when crops increase?

- A The mouse population will decrease.
- B The snake population will increase.
- C The snake population will decrease.
- D The mouse population will not change.

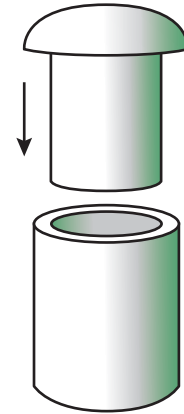
17



What happens if foxes and hawks are removed from this food web?

- A snakes decrease
- B rabbits increase
- C insects increase
- D moles decrease

18



Pam wants to put the metal rod into the metal cylinder. It is too tight. Which is the best way for Pam to make the rod fit?

- A Heat the rod and cylinder.
- B Cool the rod and cylinder.
- C Heat the rod and cool the cylinder.
- D Cool the rod and heat the cylinder.

19

Which method is the best way to find out whether a solution is an acid or a base?

- A Use litmus paper.
- B Taste the solution.
- C Dilute in water.
- D Heat the solution.

21

A nation starts using modern medicine to control disease.

What is the first big change that happens there?

- A People live longer.
- B Fewer babies are born.
- C Fewer people live there.
- D There is more water.

20

Cars burn gasoline to move. Some of the chemical energy in gasoline moves the car.

The rest of the chemical energy turns into \_\_\_\_\_?

- A electricity
- B heat
- C magnetism
- D sound

22

Mary buys a new car battery.

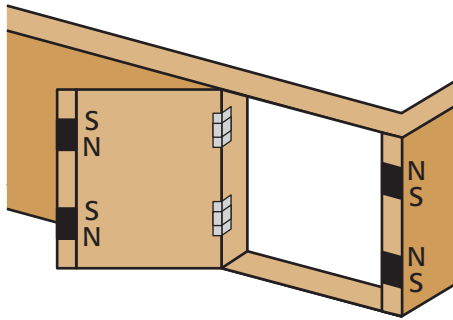
What is the best thing to do with her old battery?

- A Put it in a biodegradable bag, and bury it.
- B Put it in her garbage, so it goes to a landfill.
- C Leave it in an empty field.
- D Let the battery store recycle it.

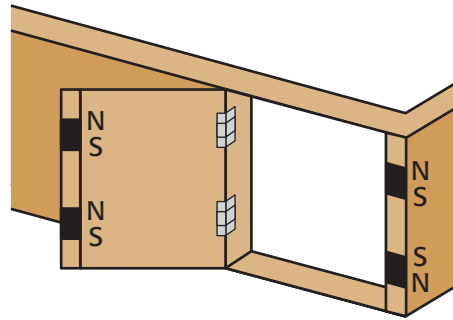
23

Ann put magnets on her cabinet doors to hold them shut. She can change the poles to change the magnetic fields.

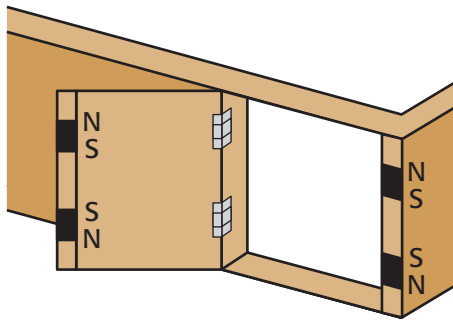
Which door stays shut with the most magnetic pull?



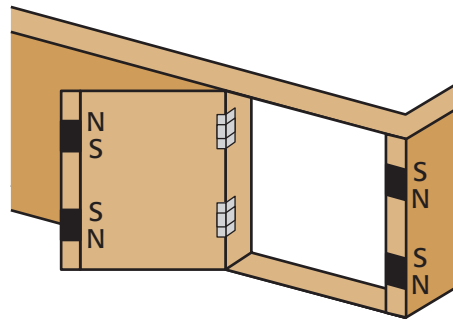
A



C



B

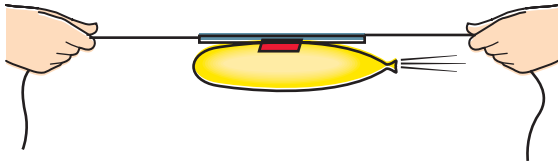


D

24

Mr. Garcia has 4 items.  
5 meters of string  
a straw  
a balloon  
tape

He uses them to show rocket motion.



Which is the best idea to make the balloon rocket go faster?

- A** Hold the string so it is less tight.
- B** Use a wider straw.
- C** Put more air in the balloon.
- D** Put tape all the way around the balloon.

25

Why does Tom see different star constellations at different times of the year?

- A** Earth moves around the sun.
- B** Magnetic poles change and create the northern lights that block the view.
- C** The Milky Way moves to different positions.
- D** Constellations move around the sun.

**Answer Key with Assessment Objective Identified**

Item Number	Correct Answer	Assessment Objective
1	C	<b>11.7.01</b> Understand how to follow procedures relating to scientific investigations including formulating hypotheses, controlling variables, collecting and recording and analyzing data, interpreting results, and reporting and displaying results.
2	B	<b>11.7.02</b> Distinguish among and answer questions about performing the following: observing, drawing a conclusion based on observation, forming a hypothesis, conducting an experiment, organizing data, constructing and reading charts and graphs.
3	A	<b>11.7.02</b> Distinguish among and answer questions about performing the following: observing, drawing a conclusion based on observation, forming a hypothesis, conducting an experiment, organizing data, constructing and reading charts and graphs, and comparing data. Recognize the common units of the metric system.
4	A	<b>11.7.02</b> Distinguish among and answer questions about performing the following: observing, drawing a conclusion based on observation, forming a hypothesis, conducting an experiment, organizing data, constructing and reading charts and graphs.
5	C	<b>11.7.02</b> Distinguish among and answer questions about performing the following: observing, drawing a conclusion based on observation, forming a hypothesis, conducting an experiment, organizing data, constructing and reading charts and graphs, and comparing data. Recognize the common units of the metric system.
6	C	<b>11.7.02</b> Distinguish among and answer questions about performing the following: observing, drawing a conclusion based on observation, forming a hypothesis, conducting an experiment, organizing data, constructing and reading charts and graphs, and comparing data. Recognize the common units of the metric system.
7	B	<b>11.7.02</b> Distinguish among and answer questions about performing the following: observing, drawing a conclusion based on observation, forming a hypothesis, conducting an experiment, organizing data, constructing and reading charts and graphs, and comparing data. Recognize the comon units of the metric system.
8	A	<b>12.7.01</b> Understand how scientists classify organisms. Identify common insects, flowers, birds, reptiles, and mammals using a dichotomous key.
9	B	<b>12.7.04</b> Understand that some organisms are unicellular, others multi-cellular. Understand that some unicellular organisms are like tiny animals; able to propel themselves or change their shape and that they are endowed with sensation.

Item Number	Correct Answer	Assessment Objective
10	C	<b>12.7.06</b> Understand that cells divide to increase their numbers, and the process of cell division called mitosis results in two daughter cells each with identical sets of chromosomes.
11	C	<b>12.7.12</b> Understand that heredity is based on the probability of inheriting a given trait for which one or both of the parents carries a gene, and that this probability can be calculated given the genetic make-up of the parents with regard to that kind of trait (e.g., blue eyes) using a Punnett Square.
12	A	<b>12.4.07</b> Understand the concept of food chains and food webs and the related classifications of plants or animals (e.g., producers, decomposers, consumers, herbivores, carnivores).
13	B	<b>12.4.47</b> Identify the order of planets from the sun, and know that the further planets take longer to go around the sun. Understand that all planets in our solar system revolve around the sun. Because Earth revolves around the sun, objects (e.g., stars, planets, constellations) in the sky appear to change position throughout the year. Know that it takes Earth 365.25 days to revolve around the sun.
14	A	<b>12.4.10</b> Identify the basic classifications of animals based on how they interact with their environment [e.g., (a) Some animals are active in the daytime (diurnal), others in the night time (nocturnal). (b) Some animals have a body temperature that stays the same regardless of significant temperature changes in their immediate environment (warm blooded), others have a body temperature that rises and falls with the temperature changes of their environment (cold blooded). (c) Some animals are herbivores, others are carnivores.
15	C	<b>12.7.25</b> Understand that three important cycles for the survival of living things in Earth's ecosystems are the carbon dioxide-oxygen cycle, the water cycle, and the nitrogen cycle.
16	B	<b>12.7.26</b> Understand that the number of organisms an ecosystem can support depends on the resources available and abiotic factors (e.g., the quantity of light and water, the range of temperatures, soil composition). Know that given adequate biotic and abiotic resources and no disease or predators, populations can increase at rapid rates. Understand that lack of resources and other factors (e.g., predation, climate) limit the growth of populations in specific niches in the ecosystem.
17	B	<b>12.7.28</b> Distinguish the various members of a food web and identify the order of dependence among these members.
18	D	<b>12.4.15</b> Understand that an increase in temperature generally causes things to expand, and that a decrease in temperature generally causes things to contract. Understand that particles move more slowly in a solid than they do in a liquid or a gas.

Item Number	Correct Answer	Assessment Objective
19	A	<b>12.7.47</b> Identify the basic properties of acids and bases. Know the relationship between acids, bases, and indicators (e.g., blue litmus paper changes to red when placed in an acid).
20	B	<b>12.7.49</b> Understand that energy appears in many forms, such as heat, light, sound, chemical, mechanical, solar, nuclear, and electromagnetic energy. Understand the basic characteristics of each of these kinds of energy. Understand the nature of kinetic and potential energy.
21	A	<b>13.7.08</b> Understand that the introduction of a new technology can affect human activities worldwide.
22	D	<b>13.4.13</b> Identify ways to reduce, reuse and recycle materials.
23	A	<b>11.7.07</b> Identify a design problem and establish criteria for determining the success of a solution.
24	C	<b>11.7.08</b> Compare design solutions; select which one is best given certain restrictions on available materials, tools, cost effectiveness, and safety.
25	A	<b>12.4.47</b> Identify the order of planets from the sun, and know that the further planets take longer to go around the sun. Understand that all planets in our solar system revolve around the sun. Because Earth revolves around the sun, objects (e.g., stars, planets, constellations) in the sky appear to change positions throughout the year. Know that it takes Earth 365 $\frac{1}{4}$ days to revolve around the sun.

To view all the science assessment objectives, download the *Illinois Science Assessment Framework* for Grades 4 and 7 online at [www.isbe.net/assessment/IAFindex.htm](http://www.isbe.net/assessment/IAFindex.htm).