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# INTRODUCTION TO SCIENCE

## SAMPLE TESTS and TEST KEYS

The Oregon Department of Education provides sample tests in science to demonstrate the content and types of questions students who are tested at Grade 5/Benchmark 2, Grade 8/Benchmark 3 and High School might encounter on the Oregon Statewide Assessment called Oregon Assessment of Knowledge and Skills (OAKS). Items on the sample test were taken from earlier years' Statewide Assessments and have been aligned to the 2009 Science Content Standards. These items are no longer secure and have been released for public use. Science assessment items are designed to measure students' knowledge and skills about the physical and living universe in the following categories.

### Structure and Function of

- ▶ Physical Science;
- ▶ Life Science; and
- ▶ Earth and Space Science.

### Interaction and Change of

- ▶ Physical Science;
- ▶ Life Science; and
- ▶ Earth and Space science.

### Scientific Inquiry

### Engineering Design

## WHY PROVIDE SAMPLE TESTS?

Most students feel some anxiety as they approach a test. The more confident students feel about their knowledge of the topic, the less anxious they feel. It also may help students feel comfortable if they are familiar with the test format. Teachers want to know how the state content standards are represented on these tests. This sample test helps teachers see the multiple choice format used for test questions on the OAKS online assessment.

## HOW TO USE THE SAMPLE TEST

The Oregon Department of Education periodically updates paper sample tests and also provides a fully adaptive practice test at <http://www.oaks.k12.or.us/>. To ensure complete readiness for the OAKS online assessment, students are encouraged to access the online practice test.

A list of test-taking tips for students follows this introduction. Teachers may use the tips to:

- ▶ generate individual and class discussion;
- ▶ call attention to helpful strategies students can use to prepare for test questions; and
- ▶ share ideas with parents of ways to help reduce test anxiety and promote good study habits at home.

An answer key for this sample test is provided at the end of this sample test. In addition to the correct answers, the key also identifies which of the reporting categories each question is designed to assess.

A table following the answer key shows how students are likely to perform on the Statewide Assessment given their answers on this sample test. This is only a short practice test. It is not an absolute predictor of how a student will do on the OAKS online assessment.

Teachers may have students take the sample test, score each item, and discuss any or all of the items and answers. Students usually benefit from analyzing both the correct and incorrect answers.

Sample tests also may be shared with parents to help them understand some of the types of questions their child will encounter on the test. Sample test questions may be reprinted in newsletters or shared at community meetings to better understand the state assessment system. Although the sample tests are not as comprehensive as the actual tests, they do provide a sampling of the subject area content and difficulty level students will encounter as part of Oregon's science assessment.

# TEST-TAKING TIPS

Students: Use these tips to help you prepare for the test.

## BEFORE THE TEST

- ▶ Develop a positive attitude. Tell yourself, “I will do my best on this test.”
- ▶ Get a good night’s sleep the night before the test.
- ▶ Get up early enough to avoid hurrying to get ready for school.
- ▶ Eat a good breakfast (and lunch, if your test is in the afternoon).

## DURING THE TEST

- ▶ Stay calm.
- ▶ Listen carefully to directions from the teacher.
- ▶ Ask questions if you don’t understand what to do.
- ▶ Before you read an item on the test, preview the questions that follow for tips to help you focus your reading.
- ▶ After reading an item, read the entire first question and all the answer choices. Stop and think of an answer. Look to see if one of the choices is similar to your answer.
- ▶ Read each test question and all the answer choices carefully. Try to analyze what the question is really asking.
- ▶ Pace yourself. If you come to a difficult question, it may be better to skip it and go on. Then come back and really focus on the difficult questions one at a time.

- ▶ This is *not* a timed test. If you need more time to finish the test, tell your teacher.
- ▶ If you are not sure of an answer to a question, try these tips:
- ▶ Get rid of the answers you know are not correct and choose among the rest.
- ▶ Read through all the answers very carefully, and then go back to the question. Sometimes you can pick up clues just by thinking about the different answers you have been given to choose from.
- ▶ If you get stuck on a question, skip it and come back later.
- ▶ It is OK to guess on this test. Try to make your best guess, but make sure you answer all questions.

## AFTER THE TEST

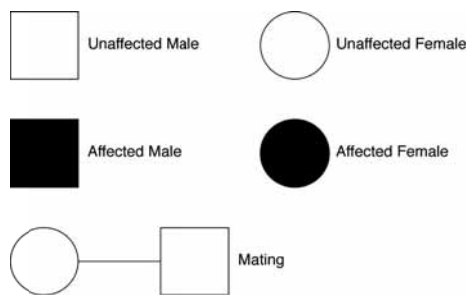
- ▶ Before you submit your test, check it over. Change an answer only if you have a good reason. Generally, it is better to stick with your first choice.
- ▶ Make sure you have marked an answer for every question, even if you had to guess.
- ▶ Don’t worry about the test once it is finished. Go on to do your best work on your other school assignments.

**DIRECTIONS**

Read each of the questions and decide on the BEST answer. There are many different kinds of questions, so read each one carefully before marking an answer on your answer sheet. When there is an introduction to a set of questions, read it carefully, since it will contain important information you may need.

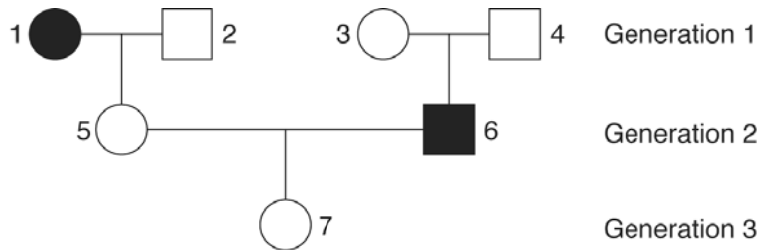
**PEDIGREE ANALYSIS FOR A GENETIC DISORDER**

A pedigree is a diagram that shows how a genetically determined trait is transmitted from generation to generation. In a pedigree, symbols are used to represent the gender of a family member and to tell whether or not the family member expresses the trait under study. The following symbols will be used:



The genotypes of individuals may also be shown on the pedigree. (A genotype is the gene pair [allele combination] for the trait under study. In this exercise, “A” represents the dominant gene and “a” represents the recessive gene.)

*Note that the genetics of the following pedigree follow basic Mendelian laws of inheritance.*



**1**

Which of the following terms best describes the genetic disorder?

- A. Dominant
- B. Incomplete dominance
- C. Recessive
- D. Sex-linked

**2**

Which is the genotype of individual 7?

- A. Aaa
- B. Aa
- C. aaa
- D. AA

## ▼ Science

**3**

Which of the following statements about cell membranes is NOT true?

- A. They are barriers between the inside and outside of the cell.
  - B. They contain proteins which perform a variety of transport functions.
  - C. They are composed of phospholipids.
  - D. They allow DNA to move in and out of the cell.
- 
- 

**4**

The process of diffusion occurs when

- A. all molecular movement stops.
  - B. molecules move from areas of lesser concentration to areas of greater concentration.
  - C. sugar molecules move into a cell.
  - D. molecules move from areas of greater concentration to areas of lesser concentration.
- 
- 

**5**

Several species of extinct giant tortoise lived on different islands in the Indian Ocean. One species is still alive on Aldabra Island. The shells and skins of the extinct tortoises are in museums and can be studied. What is the most accurate way to find out how closely related the living one is to the extinct ones?

- A. Search the history records of what the extinct turtles looked like.
  - B. Compare the bones and shells of the extinct tortoises to each other.
  - C. Measure the distance between Aldabra and the islands on which each species lived.
  - D. Compare the DNA sequence of all the tortoise species, extinct and living.
- 
-

**VINEGAR AND BAKING SODA EXPERIMENT**

Sam and Jordan are studying the reaction between vinegar and baking soda. They already know that when vinegar and baking soda are mixed a vigorous reaction produces a lot of bubbles and that the baking soda seems to disappear during the reaction. During a class discussion, the students figured out that the equation for the reaction is:



Sam and Jordan measure 50 mL of vinegar and pour it into a flask. Then they weigh out 10 g of baking soda. Sam starts the stopwatch when Jordan dumps the baking soda into the flask, then Jordan gently swirls the flask while Sam watches to see when the last bubbles are given off by the reaction. They have determined that the reaction takes 30 sec. under these conditions.

**6**

If Sam adds 5 g of baking soda, rather than the 10 g that was used in the first trial, the change in the experiment will

- A. decrease the reaction time, and the bubbles will stop in less than 30 seconds.
- B. increase the reaction time and the bubbles will continue for more than 30 seconds.
- C. have NO effect on the speed of the reaction and the bubbles will stop in 30 seconds.
- D. be impossible to be predicted, given this information.

**7**

A solid lump of baking soda weighing 10 g is used in place of the 10 g of powdered baking soda. The change will

- A. decrease the reaction time, and the bubbles will stop in less than 30 seconds.
- B. be impossible to predict, given this information.
- C. have NO effect on the speed of the reaction, and the bubbles will stop in 30 seconds.
- D. increase the reaction time, and the bubbles will continue for more than 30 seconds.

## ▼ Science

**8**

The force exerted on a cart is constant. On a frictionless surface, if the cart's mass is increased, the acceleration will

- A. increase only.
  - B. decrease only.
  - C. increase, then decrease.
  - D. decrease, then increase.
- 
- 

**9**

Which of the following aspects of electromagnetic radiation best explains why electromagnetic radiation is both useful and harmful to humans?

- A. Electromagnetic radiation travels at the speed of light.
  - B. Electromagnetic radiation can travel through a vacuum.
  - C. Electromagnetic radiation is energy and can interact with matter.
  - D. Electromagnetic radiation can be described in terms of both wavelength and frequency.
- 
- 

**10**

Which of the following BEST describes how most substances change from a solid to a liquid state?

- A. Molecules move closer together.
  - B. Molecules move farther apart.
  - C. Molecules lose energy.
  - D. Molecules slow down.
- 
- 

**11**

Some scientists have suggested that growing more trees will help to slow down the process of global warming. Why might this be true?

- A. Trees remove excess carbon from the soil.
  - B. Trees absorb excess carbon dioxide (CO<sub>2</sub>) from the atmosphere.
  - C. Trees remove excess water from the soil.
  - D. Trees stabilize soil and prevent erosion.
- 
-



**12**

The likely effect of an increased amount of ozone in Earth's atmosphere is

- A. an increase in the global temperature.
  - B. a decrease in the global temperature.
  - C. an increase in the amount of ultraviolet (UV) radiation at the surface.
  - D. a decrease in the amount of ultraviolet (UV) radiation at the surface.
- 
- 

**13**

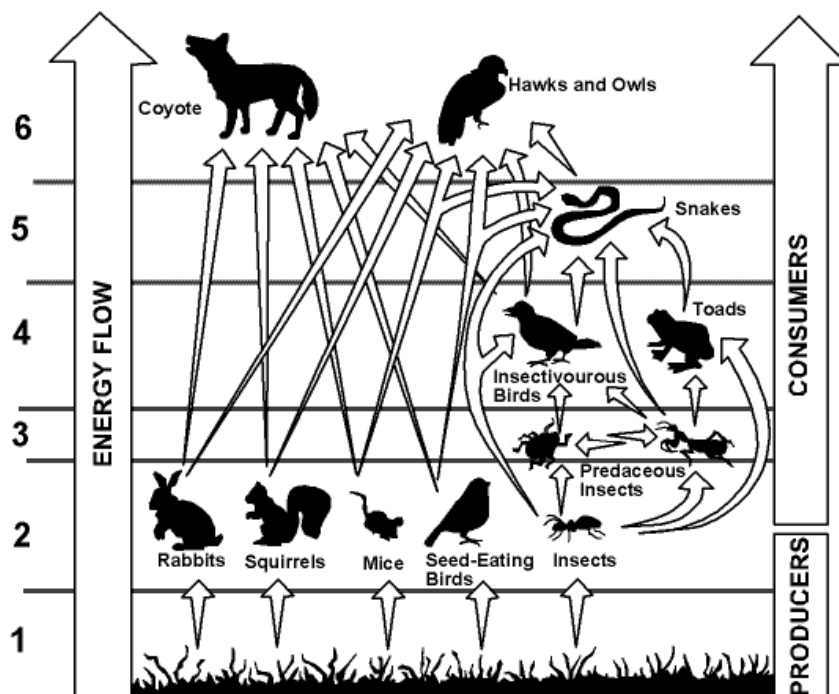
Mountains occur mostly where

- A. there is a lot of water erosion.
  - B. glaciers move boulders into piles.
  - C. sinkholes cause surrounding land to collapse.
  - D. two plates collide causing land to fold or rise.
- 
-

# ▼ Science

## FOOD WEB SYSTEM

The food web shown in the diagram can be thought of as a system. The arrows in the diagram indicate the flow of energy. For example, the arrow from the squirrel to the coyote indicates that coyotes get energy by eating squirrels. Use the diagram to answer the question below.



**14**

The greatest total amount of food energy is found in the organisms at level

- A. 1.                      B. 2.                      C. 4.                      D. 6.

**15**

In which population would you expect the most rapid evolutionary change?

- A. A small population with a high mutation rate in a changing environment  
B. A small population with a low mutation rate in a stable environment  
C. A large population with a high mutation rate in a changing environment  
D. A large population with a low mutation rate in a stable environment

**SURFER**

---

A surfer paddles out from shore in search of the perfect wave. The surfer has a weight of 500 N and the surfboard weighs 100 N.

**16**

When the surfer is on a surfboard floating on calm water, what is the buoyant force pushing up on the board?

- A. 100 Newtons
- B. 400 Newtons
- C. 500 Newtons
- D. 600 Newtons

**17**

As the surf gets rougher, the surfer estimates that she is bobbing up and down once every two seconds. What is the frequency of the water waves that are passing her?

- A. 0.5 Hertz
- B. 1.0 Hertz
- C. 2.0 Hertz
- D. 3.0 Hertz

**18**

As a large wave reaches the surfer, she is pushed forward and upward. Which statement about her kinetic and potential energy is correct?

- A. There is an increase in her kinetic energy only.
  - B. There is an increase in her potential energy only.
  - C. There is an increase in both her potential and kinetic energy.
  - D. There is no change in her potential or kinetic energy.
- 
-

## ▼ Science

**19**

Which of the following is a scientifically accepted theory of Earth's origin?

- A. Solid pieces of debris from the Big Bang became rounded due to wind erosion.
  - B. The sun and planets were condensed from parts of the same spinning cloud of dust and gas.
  - C. The planets were large asteroids captured by the sun and pulled into its orbit.
  - D. Cooling debris from the sun was thrown off and began to orbit the sun.
- 
- 

**20**

The reason that sea and land breezes form is

- A. the land heats and cools more slowly than the water.
  - B. the land heats and cools more quickly than the water.
  - C. air moves more easily over water than over land.
  - D. air moves more easily over land than over water.
- 
-

PERIODIC TABLE OF THE ELEMENTS

1 1 <b>H</b> 1.008																	18 2 <b>He</b> 4.003
3 <b>Li</b> 6.941	4 <b>Be</b> 9.012											5 <b>B</b> 10.81	6 <b>C</b> 12.01	7 <b>N</b> 14.01	8 <b>O</b> 16.00	9 <b>F</b> 19.00	10 <b>Ne</b> 20.18
11 <b>Na</b> 22.99	12 <b>Mg</b> 24.31											13 <b>Al</b> 26.98	14 <b>Si</b> 28.09	15 <b>P</b> 30.97	16 <b>S</b> 32.07	17 <b>Cl</b> 35.45	18 <b>Ar</b> 39.95
19 <b>K</b> 39.10	20 <b>Ca</b> 40.08	21 <b>Sc</b> 44.96	22 <b>Ti</b> 47.88	23 <b>V</b> 50.94	24 <b>Cr</b> 52.00	25 <b>Mn</b> 54.94	26 <b>Fe</b> 55.85	27 <b>Co</b> 58.93	28 <b>Ni</b> 58.69	29 <b>Cu</b> 63.55	30 <b>Zn</b> 65.39	31 <b>Ga</b> 69.72	32 <b>Ge</b> 72.58	33 <b>As</b> 74.92	34 <b>Se</b> 78.96	35 <b>Br</b> 79.90	36 <b>Kr</b> 83.80
37 <b>Rb</b> 85.47	38 <b>Sr</b> 87.62	39 <b>Y</b> 88.91	40 <b>Zr</b> 91.22	41 <b>Nb</b> 92.91	42 <b>Mo</b> 95.94	43 <b>Tc</b> (98)	44 <b>Ru</b> 101.1	45 <b>Rh</b> 102.9	46 <b>Pd</b> 106.4	47 <b>Ag</b> 107.9	48 <b>Cd</b> 112.4	49 <b>In</b> 114.8	50 <b>Sn</b> 118.7	51 <b>Sb</b> 121.8	52 <b>Te</b> 127.6	53 <b>I</b> 126.9	54 <b>Xe</b> 131.3
55 <b>Cs</b> 132.9	56 <b>Ba</b> 137.3	57 <b>La</b> 138.9	72 <b>Hf</b> 178.5	73 <b>Ta</b> 180.9	74 <b>W</b> 183.9	75 <b>Re</b> 186.2	76 <b>Os</b> 190.2	77 <b>Ir</b> 192.2	78 <b>Pt</b> 195.1	79 <b>Au</b> 197.0	80 <b>Hg</b> 200.5	81 <b>Tl</b> 204.4	82 <b>Pb</b> 207.2	83 <b>Bi</b> 208.9	84 <b>Po</b> (209)	85 <b>At</b> (210)	86 <b>Rn</b> (222)
87 <b>Fr</b> (223)	88 <b>Ra</b> (226)	89 <b>Ac</b> (227)	104 <b>Rf</b> (257)	105 <b>Db</b> (260)	106 <b>Sg</b> (263)	107 <b>Bh</b> (262)	108 <b>Hs</b> (265)	109 <b>Mt</b> (266)	110 <b>Ds</b> (271)	111 <b>Uuu</b> (272)	112 <b>Uub</b> (277)	114 <b>Uuq</b> (289)		116 <b>Uuh</b> (293)		118 <b>Uuo</b> (?)	

58 <b>Ce</b> 140.1	59 <b>Pr</b> 140.9	60 <b>Nd</b> 144.2	61 <b>Pm</b> (147)	62 <b>Sm</b> (150.4)	63 <b>Eu</b> 152.0	64 <b>Gd</b> 157.3	65 <b>Tb</b> 158.9	66 <b>Dy</b> 162.5	67 <b>Ho</b> 164.9	68 <b>Er</b> 167.3	69 <b>Tm</b> 168.9	70 <b>Yb</b> 173.0	71 <b>Lu</b> 175.0
90 <b>Th</b> (232.0)	91 <b>Pa</b> (231)	92 <b>U</b> (238)	93 <b>Np</b> (237)	94 <b>Pu</b> (242)	95 <b>Am</b> (243)	96 <b>Cm</b> (247)	97 <b>Bk</b> (247)	98 <b>Cf</b> (249)	99 <b>Es</b> (254)	100 <b>Fm</b> (253)	101 <b>Md</b> (256)	102 <b>No</b> (254)	103 <b>Lr</b> (257)

# Oregon Science Sample Test

Use number 2 pencil.  
Do NOT use ink or ball point pen.  
Make heavy dark marks that completely fill the circle.  
Erase completely any marks you wish to change.

Name of Student  
\_\_\_\_\_

Name of Teacher  
\_\_\_\_\_

Name of School  
\_\_\_\_\_

- |    |     |     |     |     |    |     |     |     |     |
|----|-----|-----|-----|-----|----|-----|-----|-----|-----|
| 1  | (A) | (B) | (C) | (D) | 12 | (A) | (B) | (C) | (D) |
| 2  | (A) | (B) | (C) | (D) | 13 | (A) | (B) | (C) | (D) |
| 3  | (A) | (B) | (C) | (D) | 14 | (A) | (B) | (C) | (D) |
| 4  | (A) | (B) | (C) | (D) | 15 | (A) | (B) | (C) | (D) |
| 5  | (A) | (B) | (C) | (D) | 16 | (A) | (B) | (C) | (D) |
| 6  | (A) | (B) | (C) | (D) | 17 | (A) | (B) | (C) | (D) |
| 7  | (A) | (B) | (C) | (D) | 18 | (A) | (B) | (C) | (D) |
| 8  | (A) | (B) | (C) | (D) | 19 | (A) | (B) | (C) | (D) |
| 9  | (A) | (B) | (C) | (D) | 20 | (A) | (B) | (C) | (D) |
| 10 | (A) | (B) | (C) | (D) |    |     |     |     |     |
| 11 | (A) | (B) | (C) | (D) |    |     |     |     |     |

## HIGH SCHOOL SCIENCE SAMPLE TEST KEY, 2011-2012

Item	Key	Score Reporting Category
1	C	Structure and Function/Life
2	B	Structure and Function/Life
3	D	Structure and Function/Life
4	D	Structure and Function/Life
5	D	Interaction and Change/Life
6	A	Interaction and Change/Physical
7	D	Interaction and Change/Physical
8	B	Interaction and Change/Physical
9	C	Interaction and Change/Physical
10	B	Interaction and Change/Physical
11	B	Interaction and Change/Earth and Space
12	D	Structure and Function/Earth and Space
13	D	Interaction and Change/Earth and Space
14	A	Interaction and Change/Life
15	A	Interaction and Change/Life
16	D	Interaction and Change/Physical
17	A	Interaction and Change/Physical
18	C	Interaction and Change/Physical
19	B	Interaction and Change/Earth and Space
20	B	Interaction and Change/Earth and Space

### CONVERTING TO A RIT SCORE

Number Correct	RIT Score	Number Correct	RIT Score
1	205	11	243
2	214	12	245
3	219	13	248
4	223	14	251
5	227	15	254**
6	230	16	257
7	233	17	261
8	235	18	266
9	238	19	274
10	240*	20	282

\* Likely to **Meet** HS standard

\*\* Likely to **Exceed** HS standard

Note: This sample test is for practice only; scores may not be substituted for the Oregon Statewide Assessment.

**Oregon Department of Education**

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