

*February 2000*

*Nevada High School  
Proficiency Examination*

**PRACTICE TEST IN  
SCIENCE**



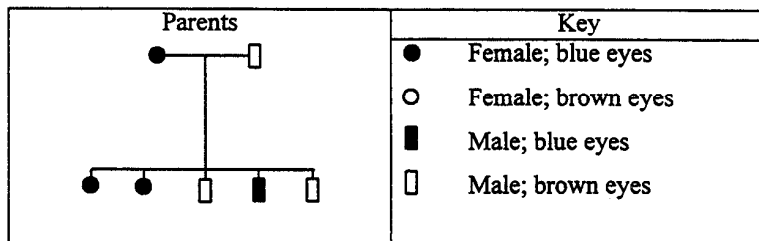
**FORM B**

**DO NOT OPEN BOOKLET UNTIL INSTRUCTED TO DO SO.**

Nevada Dept. of Education

Mary L. Peterson  
*Superintendent of Public Instruction*

1. Students looking at a fish tank in their classroom found water, fish, plants and gravel. Which of these objects are made of cells?
  - A. water and fish only
  - B. fish and plants only
  - C. plants and gravel only
  - D. water, fish, plants and gravel
  
2. A 10 gram sugar cube and a 10 gram sample of powdered sugar are placed in two cups with the same volume of water at the same temperature. Which of the following statements is true?
  - A. The sugar cube dissolves faster because it has fewer molecules.
  - B. The powdered sugar dissolves faster because it has more surface area.
  - C. The sugar cube dissolves faster because of more surface area.
  - D. The powdered sugar dissolves faster because it has more volume.
  
3. If a species of insect lacks the variations needed to adapt to a changing environment, it will most likely
  - A. acquire them through evolution.
  - B. evolve into a lower form.
  - C. become extinct.
  - D. evolve into a higher form.
  
4. In estimating the age of fossil specimens, an important concept is that
  - A. in undisturbed layers of the Earth's crust, the oldest layers are the deepest, and each succeeding layer is younger than the one below it.
  - B. the structures of animal fossils found in different countries cannot be compared.
  - C. in undisturbed layers of the Earth's crust, the older layers are nearer the surface.
  - D. fossil animals must have skin attached to the bones in order to determine the age of the fossil.
  
5. What would be the appropriate device to measure out a gram of sugar?
  - A. a ruler
  - B. a graduated cylinder
  - C. a beaker
  - D. a balance
  
6. Atoms of elements form molecules using bonds created by transferring or sharing
  - A. protons.
  - B. electrons.
  - C. neutrons.
  - D. magnetism.
  
7. Two parents, one with blue eyes and one with brown eyes, have five (5) children. Some of the children have blue eyes and some have brown eyes, as shown in the diagram below.



- Why don't all the children have the same eye color?
- A. Eye color is determined by one parent only.
  - B. Eye color is determined by the sex of the child.
  - C. Eye color is determined by a combination of both parents.
  - D. Eye color is completely random in humans.

# Nevada High School

## Proficiency Examination—Practice Test In Science

48 multiple-choice questions and 2 written-response questions

### General Directions

All multiple-choice answers must be indicated on the separate answer document. After you have decided which of the answer choices is best, fill in the corresponding lettered space on the answer document. **Be sure that each mark is heavy and dark, and completely fills the answer space.** Light or partial marks may not be read by the scoring machine.

**Example:**

**Sample Answer:**

Which of the following is the capital of the United States?

- A. New York, NY
- B. Washington, DC
- C. Chicago, IL
- D. Sacramento, CA

(A) ● (C) (D)

Give only one answer to each question. If you change an answer, be sure that the previous mark is erased **completely**. Incomplete erasures may be read as intended answers.

Work as rapidly as you can without making errors. Do not spend too much time on a question that seems too difficult. Answer the easier questions first; then return to the harder ones. **Try to answer every question, even if you have to guess.**

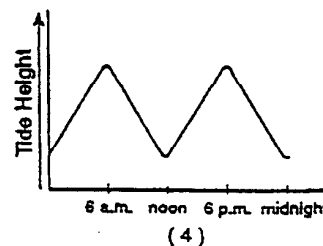
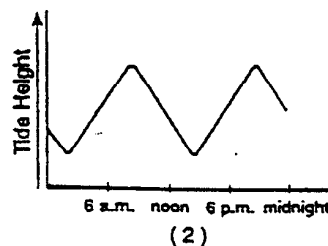
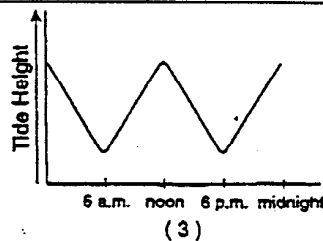
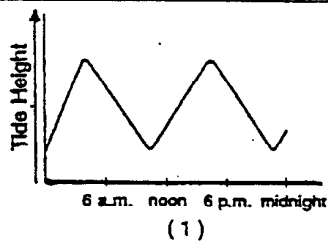
**DO NOT CONTINUE UNTIL YOU ARE TOLD TO DO SO.**

8. Color, odor, density, specific heat and boiling point are examples of
- A. chemical properties of matter.
  - B. physical properties of matter.
  - C. physical changes in matter.
  - D. chemical changes in matter.
9. One reason for organizing, analyzing and classifying data is
- A. so that computers can be used.
  - B. to prove a law.
  - C. to find relationships among the data.
  - D. to separate qualitative and quantitative data.
10. After several years in a new mountain range pasture, the number of deer had doubled. Which example below indicates that they had exceeded the carrying capacity of that area?
- A. The herd continued to grow in number.
  - B. The range became overgrazed and barren.
  - C. The range became green and fertile.
  - D. All the deer had twins the next spring.
11. A camper near the top of the Sierra Nevada Mountains would find that water boils at a lower temperature than it does at sea level because
- A. there is greater atmospheric pressure at that elevation than at sea level.
  - B. the flames are hotter at that elevation than at sea level.
  - C. there is less atmospheric pressure at that elevation than at sea level.
  - D. the atmosphere has more moisture at that elevation than at sea level.
12. In the nucleus of a cell, the DNA molecule functions most like
- A. a pair of scissors.
  - B. a computer memory chip.
  - C. a ballpoint pen.
  - D. a zipper.
13. Did early cave dwelling humans ever see a dinosaur?
- A. Yes, they lived near where dinosaurs lived.
  - B. No, they lived near the seashore and dinosaurs lived inland.
  - C. No, earlier humans hunted the dinosaurs to extinction.
  - D. No, the dinosaurs were extinct before humans appeared.
14. The desert conditions in most of Nevada are most likely related to
- A. cold ocean currents along the California coast.
  - B. Nevada's location near the equator.
  - C. the rain shadow of the Sierra Nevada Mountains.
  - D. quick runoff of rainwater.
15. When a fast moving car is brought to a stop, the brakes become hot. Which of the following statements **BEST** explains this?
- A. Energy of rest is changed to energy of motion.
  - B. Energy of motion is changed to resting energy.
  - C. Energy of motion is changed to heat energy.
  - D. Energy of rest is changed to heat energy.

16. A class investigated the effectiveness of commercial mouthwashes by placing discs soaked in various brands on saliva-streaked petri dishes. Three of the four lab groups found brand A to be the most effective and brand C the least. The other group found the opposite to be true. Which suggestion below would be best to follow?
- Ignore the fourth group's findings, since the other three groups agree.
  - Ignore all the findings since there wasn't total agreement.
  - Have all four groups repeat the lab to see if they get the same results.
  - Have all four groups vote on which results are correct.
17. In Geology, "uniformitarianism" means that processes occurring now on earth (erosion, glaciers) happened the same way in the past. Given the overwhelming evidence of this concept, scientists have come to believe it is true. Therefore, "uniformitarianism" can best be described as a scientific
- opinion.
  - hypothesis.
  - theory.
  - law.
18. Why do we experience summer in the months June through September here in Nevada?
- The Sun is farther from the Earth.
  - The Sun is closer to the Earth.
  - The calendar tells us it is summer.
  - The angle of the Earth's axis.

The Bay of Fundy, located on the east coast of Canada, has the highest ocean tides in the world. The St. John River enters the Bay of Fundy at the city of St. John, where the river actually reverses direction twice a day at high tides. Data for the famous "Reversing Falls" of St. John River are given below for high and low tides on June 26 through 28, 1994. Use the information in the following table to answer questions 19 and 20.

Tidal Record for Reversing Falls, St. John River				
Date	Time of first high tide	Time of first low tide	Time of second high tide	Time of second low tide
June 26	2:25 a.m.	8:45 a.m.	2:55 p.m.	9:05 p.m.
June 27	3:15 a.m.	9:35 a.m.	3:45 p.m.	9:55 p.m.
June 28	4:05 a.m.	10:25 a.m.	4:35 p.m.	10:45 p.m.



19. Which graph above best represents the tides recorded on June 28?
- graph #1
  - graph #2
  - graph #3
  - graph #4

20. Tides in the Bay of Fundy could best be described as
- predictable and noncyclic.
  - predictable and cyclic.
  - unpredictable and noncyclic.
  - unpredictable and cyclic.
21. Which of the following statements can **NOT** be tested by scientific study?
- Nuclear power plants release fewer pollutants into the air than coal burning power plants.
  - The burning of fossil fuels releases carbon dioxide into the air.
  - Solar energy panels release fewer pollutants into the air than fossil fuels.
  - Fossil fuels should be avoided because it is wrong to pollute the air.
22. Which of these characteristics is found in birds, reptiles and mammals?
- They all have warm body temperatures.
  - They all lay eggs to reproduce.
  - They all have internal skeletons.
  - They all eat other animals for food.
23. The moon has a greater effect on the Earth's ocean tides than the Sun has because?
- the Sun has a higher density than the Moon.
  - the Sun has a higher temperature than the Moon.
  - the Moon has a greater mass than the Sun.
  - the Moon is closer to the Earth than the Sun.
24. Which of the following meanings of "theory" best fits the meaning scientists use when they refer to "Cell Theory", "Atomic Theory" or the "Theory of Evolution"?
- possible but untested ideas about how or why something happened.
  - an idea someone has about how or when or why something happened.
  - a fact or bit of evidence available to explain an event or observed phenomena.
  - a set of tested explanations and concepts that explain and predict an event or observed phenomena.

Melting and Boiling Points of Common Substances

Substance	Melting Point (°C)	Boiling Point (°C)
Water	0	100
Alcohol	-117	78
Nitrogen	-210	-196
Oxygen	-218	-183

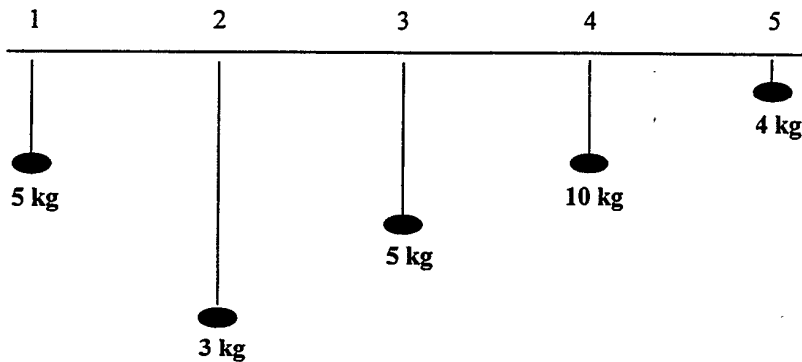
25. Which substance should be a liquid at  $-90^{\circ}\text{C}$ ?
- water
  - alcohol
  - nitrogen
  - oxygen
26. The physical laws discovered by Issac Newton appear to apply
- only on the Earth's surface.
  - only in our Solar System.
  - most of the time.
  - always and everywhere in the Universe.
27. If you wished to test the hypothesis that atomic radiation slows down the rate of radish seed germination, which of the following experimental designs would you use?
- Use 25 radish seeds and 25 bean seeds and compare results.
  - Plant 50 irradiated seeds and note the effects of the radiation.
  - Plant 25 irradiated seeds and 25 normal seeds at the same time and compare results.
  - Plant 25 normal seeds, note the results; then plant 25 irradiated seeds, compare results.

Look carefully at the chart of Solar System data below before responding to questions 28 & 29.

Planet	Mean Distance from Sun (millions of km)	Period of Revolution	Period of Rotation	Equatorial Diameter (km)	Density (g/cm <sup>3</sup> )
Mercury	57.9	88.0 days	59 days	4,880	5.4
Venus	108.2	224.7 days	243 days	12,104	5.2
Earth	149.6	365.26 days	23 hours, 56 min.	12,756	5.5
Mars	227.9	687.0 days	24 hours, 37 min.	6,787	3.9
Jupiter	778.3	11.86 years	9 hours, 50 min.	142,800	1.3
Saturn	1,427.0	29.46 years	10 hours, 14 min.	120,000	0.7
Uranus	2,869.0	84.0 years	11 hours	51,800	1.2
Neptune	4,496.0	164.8 years	16 hours	49,500	1.7
Pluto	5,900.0	247.7 years	6 days, 9 hours	2,300	2.0

28. The period of time a planet takes to make one revolution around the Sun is most dependent on the planet's average?
- rotation rate.
  - mean distance from the Sun.
  - mass.
  - equatorial diameter.
29. If you had a large enough container of water, which planet would float?
- Pluto
  - Uranus
  - Saturn
  - Jupiter
30. What cell structure makes it possible for the internal environment of a cell to be different from the external environment?
- nucleus
  - cell wall
  - cell membrane
  - ribosomes
31. Scientists have been able to produce mutations in plants by irradiating their seeds with gamma rays. The result of one of the mutations was a plant that could not produce flowers. Because of this lack of flowers, the plant would **NOT** be able to
- carry out photosynthesis.
  - transport water.
  - produce seeds.
  - grow more than a few inches tall.
32. What would happen if the object floating in container A which contains distilled water were placed in container B which contains oil?
- The object would float higher.
  - The object would float lower.
  - The object would stay at the same level.
  - The object would bob up and down.

Use the data from the following diagram of a set of pendulums to answer questions 33 & 34.



33. If you wanted to do an experiment to find out if changing the length of a pendulum changed the amount of time it takes to swing back and forth, which pendulums would you use for the experiment?
- A. 1 and 4
  - B. 2 and 4
  - C. 1 and 3
  - D. 2 and 5
34. Suppose you wanted to do an experiment to find out if changing the weight on the end of the string changed the amount of time the pendulum took to swing back and forth. Which pendulums would you use for the experiment?
- A. 1 and 4
  - B. 2 and 4
  - C. 1 and 3
  - D. 2 and 5
35. Mountains that had jagged, sharp peaks at an earlier time, now have rounder, smoother tops. Which processes probably account for most of this change?
- A. faulting and folding
  - B. weathering and erosion
  - C. volcanic eruptions and lava flows
  - D. fossilization and hardening
36. The purpose of including a control in a scientific investigation is to provide
- A. a basis for comparison.
  - B. a correction for experimental errors.
  - C. a preliminary trial of the methods.
  - D. an opportunity for repetition of the experiment.
37. A theory differs from a hypothesis in that a theory is
- A. an educated guess that can be tested by experiments.
  - B. a general statement supported by many scientific observations.
  - C. an experiment designed to prove a prediction.
  - D. a scientific fact that needs no supporting evidence.
38. When you hold an ice cube, your hand feels cold because
- A. the cold flows from the ice cube to your hand.
  - B. heat flows from your hand to the ice cube.
  - C. ice is a poor conductor of heat.
  - D. your hand is a better conductor of heat than the ice cube.



39. After owls eat, they bring back up the indigestible remains of their meals. These regurgitated “pellets” contain the fur and skeletal parts of their prey. A student plans to examine an owl pellet as part of a class project. What type of information might the student learn from this investigation?
- A. how old the owl is
  - B. how many worms the owl eats in a day
  - C. what kinds of small animals live in the owl’s hunting area
  - D. how successful the owl was in raising a family last year
40. Historically, what has typically happened when human populations increase?
- A. The number of species in an area has decreased.
  - B. Non-native species have been introduced.
  - C. Ecosystems have been simplified to increase farm production.
  - D. All of the above have occurred.
41. Radium, a radioactive element, decays over time. How much would remain of 20 grams of radium after two half-lives have passed?
- A. 0 grams
  - B. 5 grams
  - C. 7 grams
  - D. 10 grams
42. One characteristic of all living things is that they
- A. have eyes.
  - B. have legs.
  - C. inhale and exhale.
  - D. eliminate waste products.
43. The long necks of a giraffe may best be explained by
- A. giraffes constantly stretching their necks over time.
  - B. short-necked giraffes being less able to compete for food.
  - C. the theory of use and disuse of organs.
  - D. the extinction of other long-necked animals due to climate change.
44. The burning of fossil fuels may contribute to all of the following **EXCEPT**
- A. global warming.
  - B. acid rain.
  - C. the Coriolis effect.
  - D. pollution.
45. A student has written the following hypothesis:  
As more salt is added to a container of ice, the temperature of the mixture will become lower. What are two factors that need to be kept constant to test this hypothesis?
- A. amount of salt and amount of ice
  - B. type of salt and amount of ice
  - C. size of container and amount of time
  - D. amount of salt and amount of time
46. How does the total amount of matter before a chemical reaction compare to the total amount of matter after the reaction?
- A. The amount of matter is greater before the reaction.
  - B. The amount of matter is greater after the reaction.
  - C. The amount of matter before and after the reaction is the same.
  - D. There is no relationship between the amount of matter before and after the reaction.

47. If you get vaccinated against chicken pox when you are young, you are not likely to get the disease. One reason for this is that
- A. the virus that causes chicken pox cannot enter your body after vaccination.
  - B. the medicine in the vaccination is stored in your body.
  - C. the chicken pox virus is not harmful to you when you are older.
  - D. the vaccination causes your body to form antibodies against the virus.
48. What is the best policy towards nature to enable the ultimate survival of humans?
- A. Coexist with nature by understanding and preserving it.
  - B. Immediately place all suitable land under cultivation and eliminate all competition for humans and their animals.
  - C. Maximize production through use of irrigation, pesticides, herbicides and fertilizers.
  - D. Remove all living things except humans and their cultivated crops and domesticated animals.