

Student Name: _____



ALASKA
SCIENCE
ASSESSMENT



Science
Test Booklet
Grade 10

Paper-Based Item Sampler

Alaska Department of Education & Early Development



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Science

Directions: Now you will be taking the Alaska Science Assessment. This test has one part that contains different types of questions.

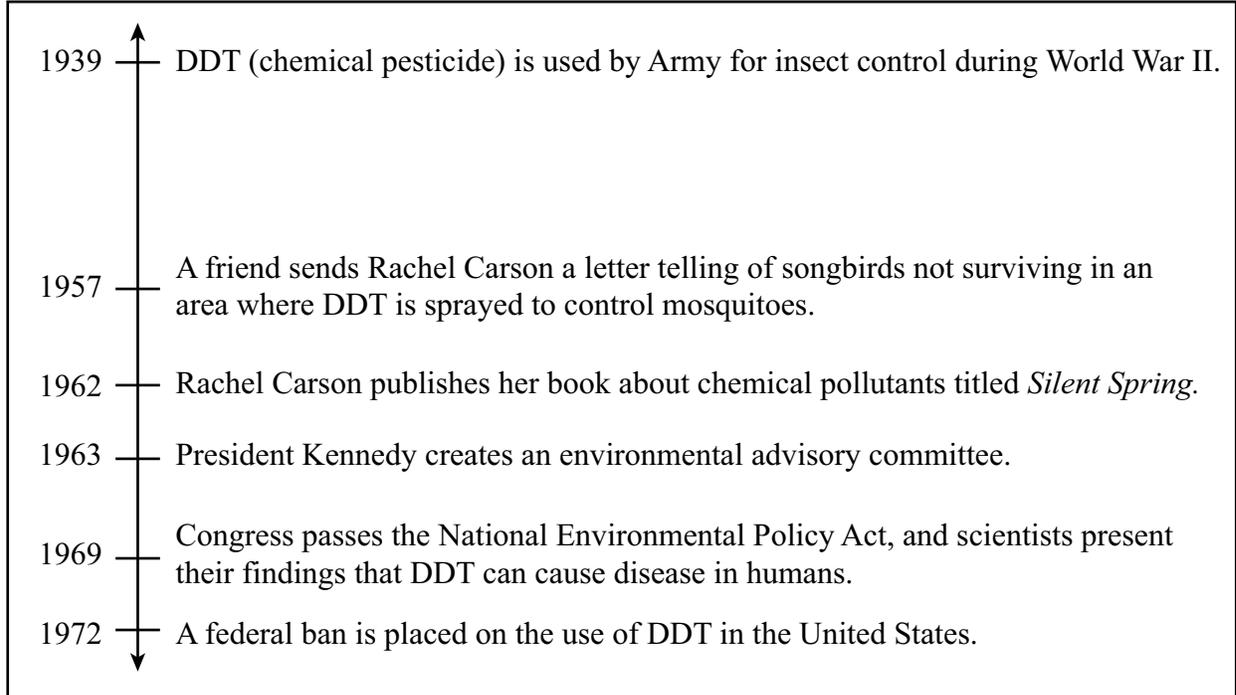
The test will include questions that will ask you to provide your answer in a variety of ways.

- Most of the questions will have four answer choices and only one correct answer.
- Some questions will ask you to write your answer to provide your response.
- You may also use your Periodic Table of Elements to assist you during the test.

When you come to the word STOP, you have finished the assessment. Make sure you have marked all of your answers clearly and that you have completely erased any marks you do not want. When you are finished, close your test booklet.

1. A biologist captured and identified young lobsters. Once a lobster was captured, a tag was attached, and information about the individual was entered into a database to learn more about the life cycle of lobsters. Which scientific processes does the tagging of lobsters **best** represent?
- Ⓐ observing and measuring
 - Ⓑ inferring and hypothesizing
 - Ⓒ classifying and experimenting
 - Ⓓ communicating and predicting
2. Which statement **best** describes a black hole?
- Ⓐ A black hole is a cloud of gas and dust in space where new stars are being formed from the remains of other stars.
 - Ⓑ A black hole is the final stage of all stars when they have exhausted their supply of hydrogen and no longer produce light.
 - Ⓒ A black hole is a star system typically made up of two stars that orbit around the center of an extremely concentrated mass of material.
 - Ⓓ A black hole is the remains of a massive star that collapsed inward and increased in density, causing a strong gravitational field that traps light.

3. Use the timeline below to answer the question.

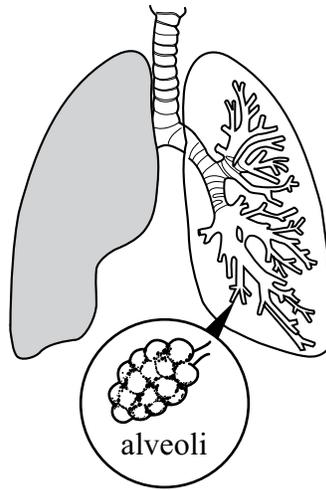


Rachel Carson is credited by many for starting the modern environmental movement. Which statement describes how her efforts impacted the advancement of science?

- Ⓐ Rachel Carson organized marches and town hall meetings to have pesticides banned throughout the United States.
- Ⓑ The publication of Rachel Carson's book made people aware of chemicals that could harm mosquitoes, and the use of DDT increased.
- Ⓒ Rachel Carson's work promoted the development of microscopes, which were used to study chemicals like DDT and their effects on insects.
- Ⓓ After Rachel Carson's book was published, political action encouraged discussion and the study of environmental issues like chemical pollution.

This question is worth 2 points.

4. The diagram shows a basic structure of human lungs.



A. Describe how the structure of the alveoli assists in the function of a lung.

B. Identify another organ in the human body that has a similar structure and function relationship as the alveoli inside the lungs.

5. Based on the periodic table, how many neutrons are **most likely** in a neutral atom of potassium (K)?

- (A) 19 neutrons
- (B) 20 neutrons
- (C) 39 neutrons
- (D) 58 neutrons

6. Ringed seals have life cycles that are critically linked to sea ice. The list below shows some information about the relationships between ringed seals and sea ice.

Ringed Seals and Sea Ice Information

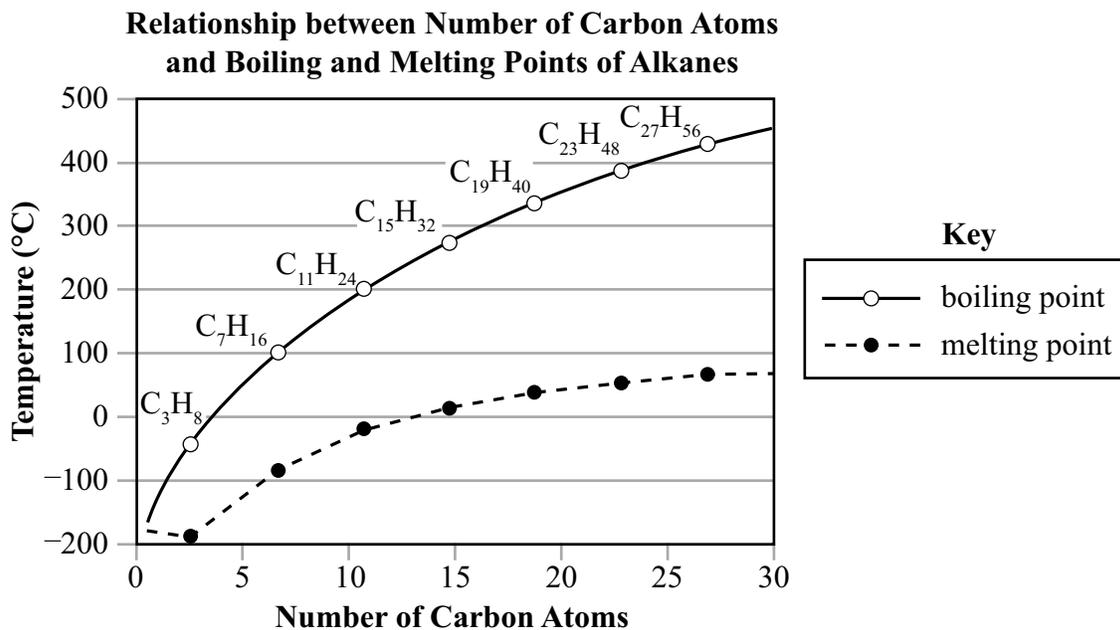
- decreases in sea ice reduce the habitat area for ringed seals
- female ringed seals make dens with snow and ice to use for giving birth
- the seal pups need to remain on the ice with their mothers before they are able to catch food on their own
- polar bears and arctic foxes prey on seal pups while the pups are near their snow dens

Which hypothesis would **most likely** be supported by the information?

- (A) If the amount of sea ice decreases, then ringed seal populations will decrease.
- (B) If the amount of sea ice decreases, then ringed seals will face greater rates of predation.
- (C) If the amount of sea ice increases, then ringed seal pups will learn to catch food at a faster rate.
- (D) If the amount of sea ice increases, then ringed seals will have to travel greater distances to reproduce.

This question is worth 4 points.

7. Alkanes are chemical compounds that contain only carbon (C) and hydrogen (H) atoms. These atoms are connected only by single bonds and form long chains of atoms. The graph shows the boiling points and melting points of several different alkane compounds.



- A. Describe the relationship between the number of carbon atoms in an alkane compound and its boiling and melting points.

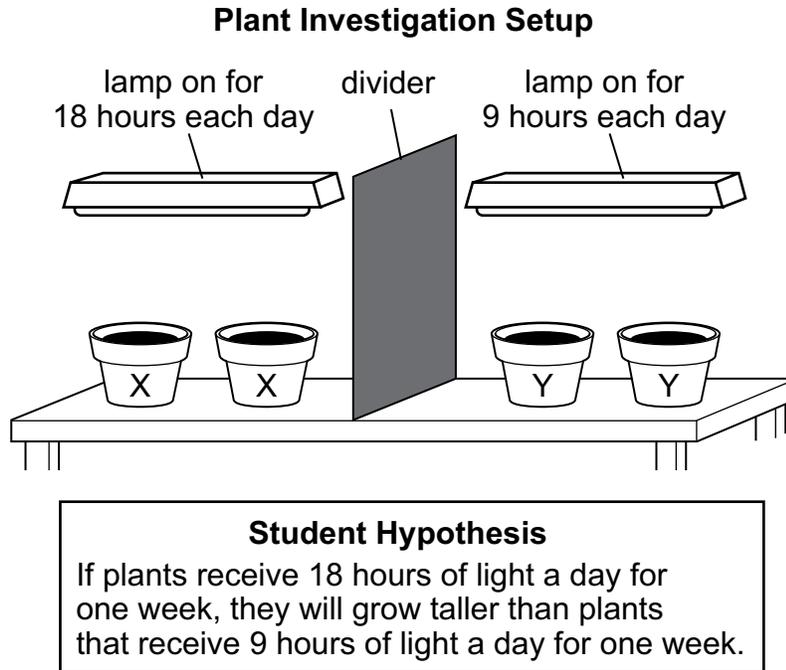
B. Predict the boiling point of $C_{29}H_{60}$.

C. Identify an alkane compound that can be classified as a liquid at $25^{\circ}C$, and explain the reason for choosing this alkane compound.

Alkane Compound: _____

Explanation: _____

8. A student is investigating the effect of different amounts of light on plant growth. The student sets up an investigation using one species of plant and the same size of container, amount of soil, amount of water, and number and depth of seeds in each container.



Which set of data would **best** support the student's hypothesis?

(A)

Average Plant Height	
Container X	Container Y
10 cm	10 cm

(B)

Average Plant Height	
Container X	Container Y
4 cm	7 cm

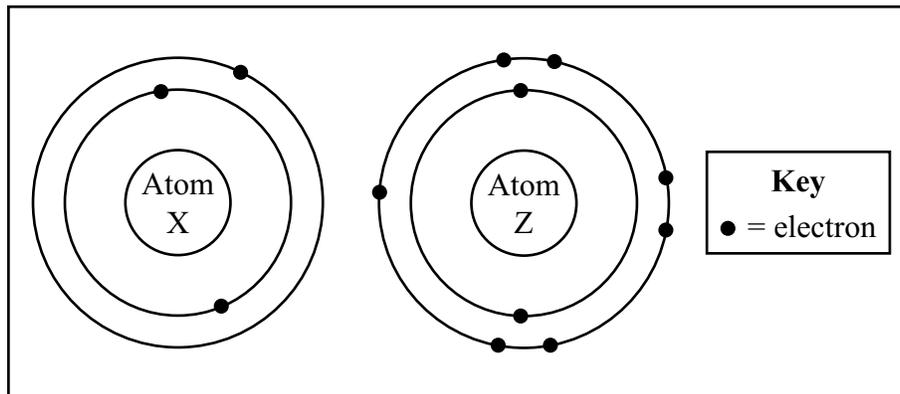
(C)

Average Plant Height	
Container X	Container Y
5 cm	2 cm

(D)

Average Plant Height	
Container X	Container Y
0 cm	0 cm

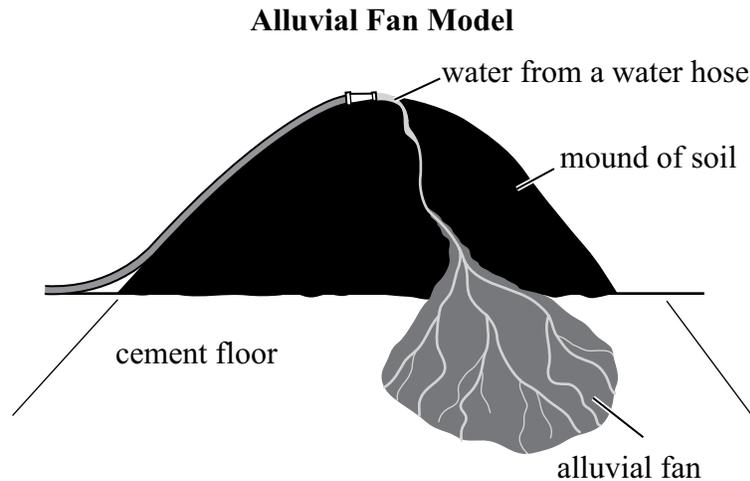
9. The diagrams below show the electron configurations of two atoms.



Which movement of electrons will **most likely** occur when Atom X and Atom Z form a chemical bond?

- (A) Atom X will transfer one electron to Atom Z.
 - (B) Atom Z will transfer seven electrons to Atom X.
 - (C) Three electrons will be shared between both atoms.
 - (D) Nine electrons will be shared between both atoms.
10. Which statement explains why animals are unable to directly use sunlight to produce food?
- (A) Sunlight damages animal cells before they are able to convert the sunlight into sugar.
 - (B) Animal cells lack chloroplasts, which are needed for capturing the energy of sunlight to make sugar.
 - (C) The energy demands of animal cells are too high to allow for the conversion of light energy into sugar molecules.
 - (D) Vacuoles in animal cells are very small, making them unable to absorb light energy used to make sugar molecules.

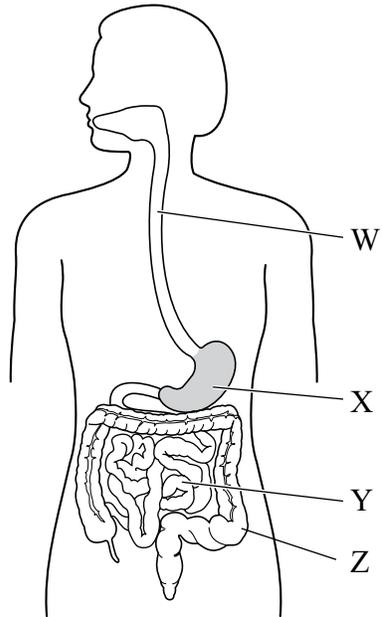
11. The model below shows how an alluvial fan can form.



Alluvial fans are common in Alaska. They can form when streams transporting loose material from a mountain flow onto a valley floor. Which two processes **most likely** caused the alluvial fan to form on the cement floor?

- (A) erosion and deposition
 - (B) heating and compaction
 - (C) dissolving and compaction
 - (D) evaporation and deposition
12. Which statement **best** describes how a tree contributes directly to the cycling of materials within an ecosystem?
- (A) During transpiration the tree absorbs water from the ground and releases nitrogen into the air.
 - (B) During transpiration the tree absorbs nitrogen from the ground and releases water into the air.
 - (C) During photosynthesis the tree absorbs carbon dioxide from the air and releases oxygen into the air.
 - (D) During photosynthesis the tree absorbs oxygen from the air and releases carbon dioxide into the air.

13. Part of the human digestive system is shown in the diagram.



Which set of labels would **best** complete this diagram?

(A)

W	esophagus
X	stomach
Y	small intestine
Z	large intestine

(B)

W	esophagus
X	liver
Y	large intestine
Z	small intestine

(C)

W	trachea
X	liver
Y	small intestine
Z	large intestine

(D)

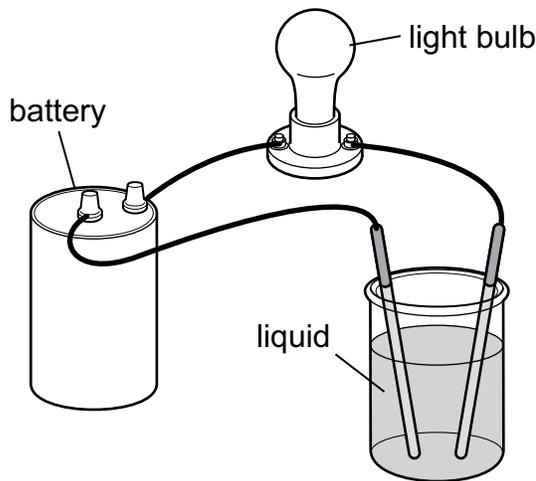
W	trachea
X	stomach
Y	large intestine
Z	small intestine

14. Which statement **best** explains why some mountain ranges similar to the Alaska Range will continue to increase in height over time?

- (A) Earth’s landmasses, such as continents and islands, drift on the oceans.
- (B) Earth’s crust is broken into plates that move on a subsurface called the mantle.
- (C) Ocean currents continually wash sediments onto the shores of Earth’s landmasses.
- (D) Continental plates that are fused together release magma onto Earth’s crust when they separate.

15. A student is investigating whether two different liquids in a setup will cause a light bulb to turn on. The student records the results in the data table shown below.

Investigation Setup



Results

Liquid	Observation
X	light bulb turns on
Y	light bulb does not turn on

Which statement **best** describes the type of liquid in one of the investigation setups?

- (A) Liquid X is an insulator.
- (B) Liquid X is a conductor.
- (C) Liquid Y is magnetic.
- (D) Liquid Y is non-magnetic.



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