Washington Office of Superintendent of
PUBLIC INSTRUCTION

Washington Comprehensive Assessment of Science
Paper-Pencil Booklet

Grade 8

Training Test

This training test paper-pencil booklet is intended to provide students who are administered paper-pencil versions of the Washington Comprehensive Assessment of Science (WCAS) with the opportunity to become familiar with the format of the assessment.

DO NOT WRITE ON THIS PAGE.

Question 1

The following question has two parts. First, answer part A. Then, answer part B.

Part A

Titan is one of Saturn's moons. Scientists have gathered information about Titan using a variety of technologies. Views from some of these technologies are shown in the Images of Titan diagram.

Images of Titan

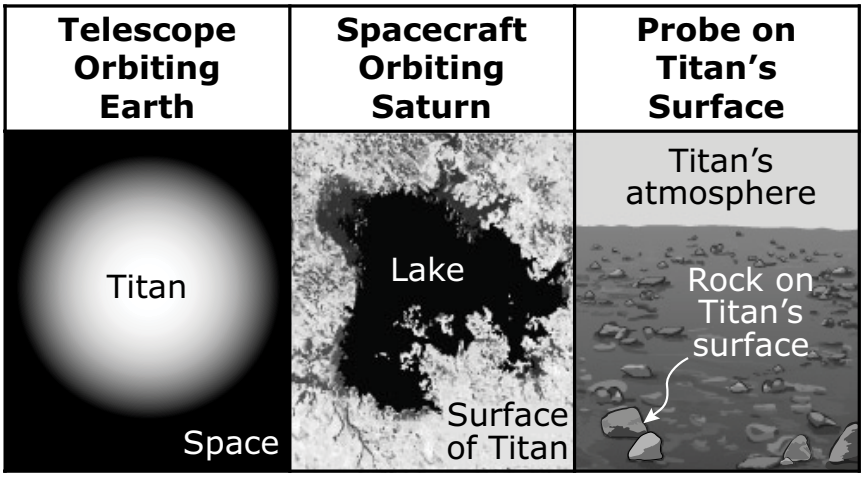

Diagram not to scale

Fill in a circle for rows 1 through 5 to order the properties from the smallest scale to the largest scale. Fill in **one** circle for each row.

Properties of Titan

Smallest scale	**1**	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ
	2	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ
	3	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ
	4	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ
Largest scale	**5**	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ

Property:

A Diameter of Titan

B Distance between Titan and the sun

C Minerals in the rocks on Titan

D Shape of large landforms

E Titan’s orbital path around Saturn

GO ON

Part B

Fill in a circle to identify the technology that is **most** appropriate for observing each property of Titan. Fill in **one** circle for each row.

Property of Titan	Telescope Orbiting Earth	Spacecraft Orbiting Saturn	Probe on Titan's Surface
Diameter of Titan	○	○	○
Distance between Titan and the sun	○	○	○
Minerals in the rocks on Titan	○	○	○
Shape of large landforms on Titan	○	○	○
Titan's orbital path around Saturn	○	○	○

GO ON

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GO ON

Question 2

The following question has two parts. First, answer part A. Then, answer part B.

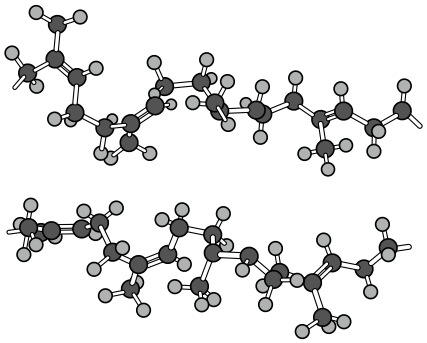
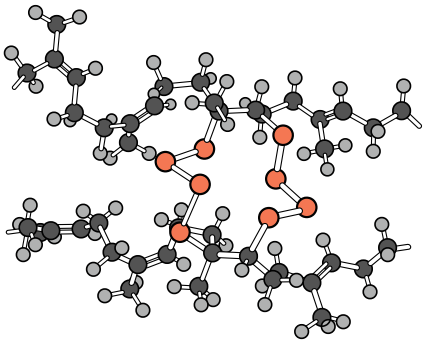
Part A

Natural rubber is a material that is made from the sap of rubber trees. Natural rubber is easy to bend into different shapes, but becomes stiff at winter temperatures and melts at summer temperatures.

Charles Goodyear developed a chemical process that made natural rubber more temperature-resistant. Using the process, Goodyear made modified rubber by adding sulfur to natural rubber. During one trial, the modified rubber accidentally fell out of his hands and landed on a hot stove. When he examined the modified rubber, he noticed there was no melting. Goodyear also noticed that the modified rubber was easy to bend into different shapes, just like natural rubber. Goodyear's discovery led to important advances in the manufacture of shoes, umbrellas, sports equipment, and tires.

The Rubber Molecules diagram shows how the structure of natural rubber molecules changed after the sulfur was added.

Rubber Molecules

Before Adding Sulfur	After Adding Sulfur
	

Key

- represents a hydrogen (H) atom
- represents a carbon (C) atom
- represents a sulfur (S) atom
- represents a chemical bond

Which statement describes a change in the rubber molecules that was caused by the chemical process?

Ⓐ Rubber molecules changed from the liquid phase to the solid phase.

Ⓑ Carbon (C) atoms changed into sulfur (S) atoms in the rubber molecules.

Ⓒ Chemical bonds in the rubber molecules were broken, releasing thermal energy.

Ⓓ Chemical bonds formed with sulfur (S) atoms, linking rubber molecules together.

Part B

Which statement describes a benefit of chemically modifying natural rubber by adding sulfur?

Ⓐ Items made from modified rubber cost more than items made from natural rubber.

Ⓑ Items made from modified rubber last longer than items made from natural rubber.

Ⓒ Items made from modified rubber are recycled less often than items made from natural rubber.

Ⓓ Items made from modified rubber contain more natural resources than items made from natural rubber.

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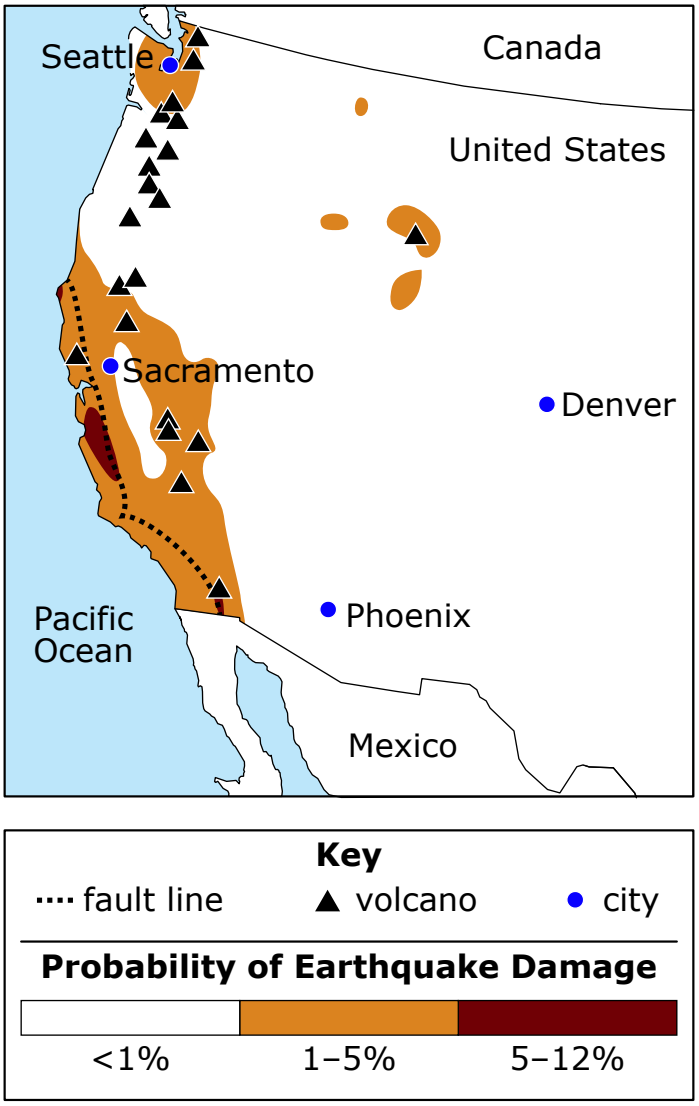
Question 3

The Potential Earthquake Damage diagram shows the probability of earthquake damage occurring at several locations in the western United States during the next year.

Potential Earthquake Damage



Select **two** claims that are supported by the information in the diagram. Fill in **only** two circles.

- ○ The areas closest to the fault line have the highest probability of earthquake damage.
- ○ The cities marked on the map each have the same probability of earthquake damage.
- ○ The areas farthest from a volcano have the highest probability of earthquake damage.
- ○ The areas that border the Pacific Ocean have the highest probability of earthquake damage.
- ○ The cities marked on the map have a lower probability of earthquake damage than other locations on the map.

Sea Star Reproduction—Section 1

Read the information and answer the questions.

Sea stars reproduce both asexually and sexually.

Asexual reproduction requires a single parent sea star. The parent sea star splits into two parts and each part develops into an offspring sea star. The Asexual Reproduction in Sea Stars diagram models this process.

Asexual Reproduction in Sea Stars

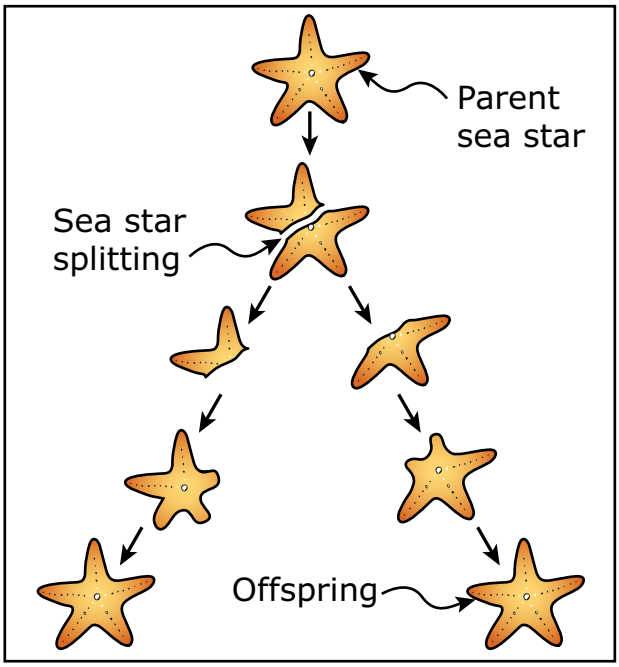


Diagram not to scale

Sexual reproduction requires two parent sea stars. The male parent releases sperm cells and the female parent releases egg cells into the water. The egg and sperm cells unite to form an embryo which develops into an adult sea star. The Sexual Reproduction in Sea Stars diagram models this process.

Sexual Reproduction in Sea Stars

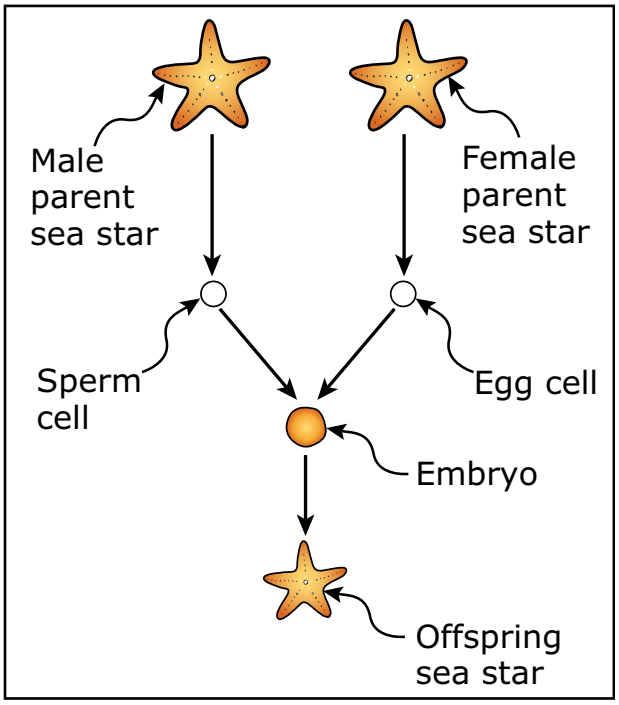


Diagram not to scale

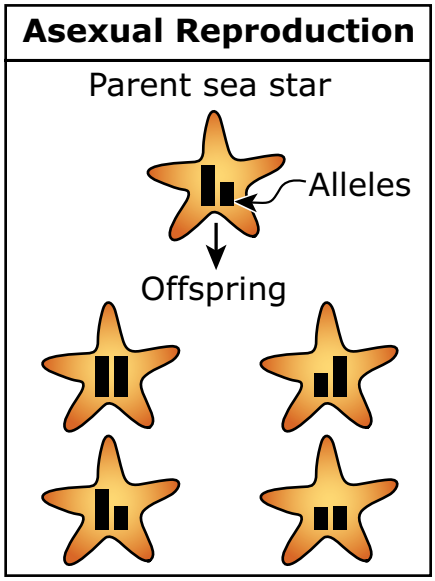
Question 4

The following question has two parts. First, answer part A. Then, answer part B.

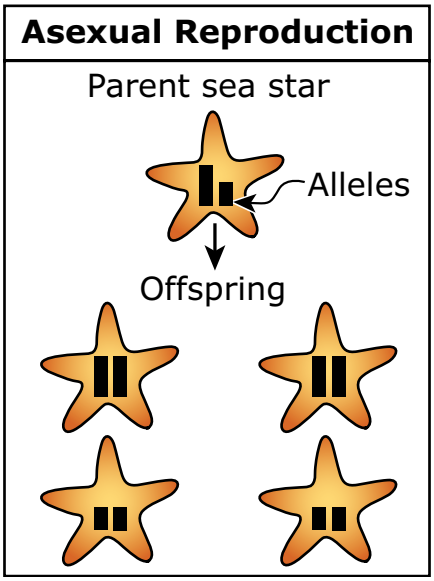
Part A

Which Asexual Reproduction model shows **all** possible allele combinations in sea star offspring when two alleles are passed to offspring during asexual reproduction?

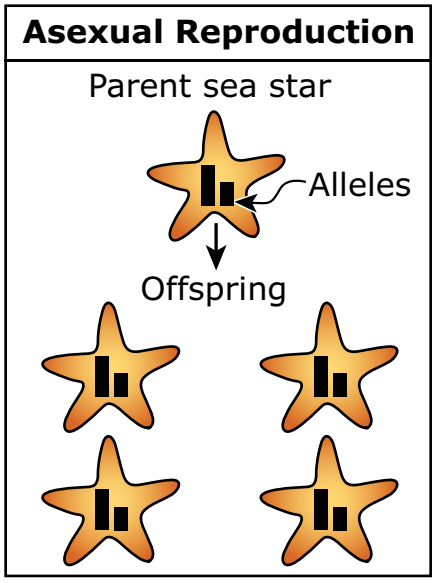
Ⓐ



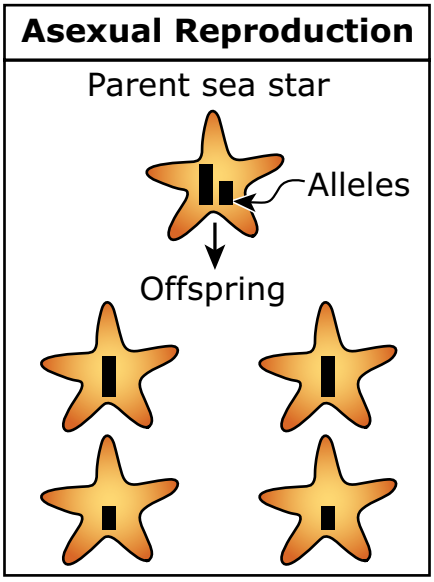
Ⓑ



Ⓒ



Ⓓ



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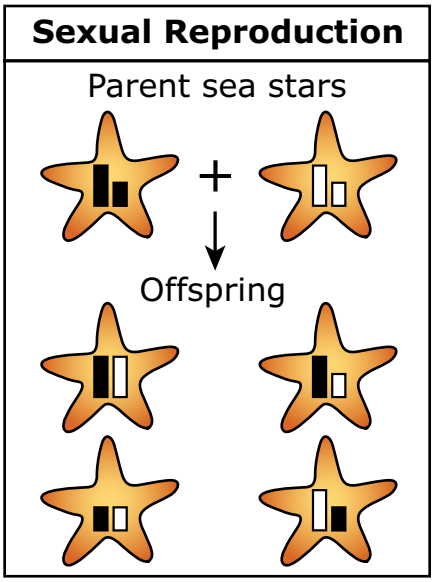
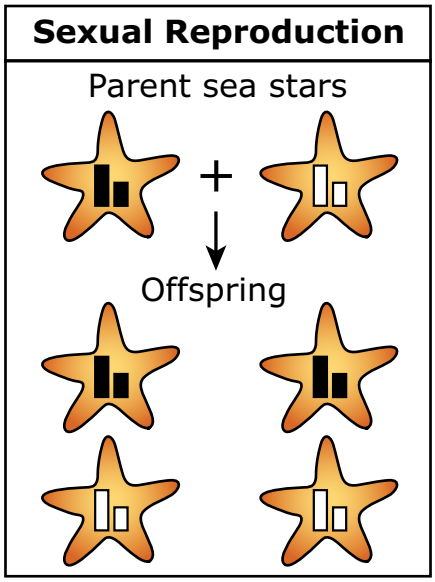
Part B

Which Sexual Reproduction model shows **all** possible allele combinations in sea star offspring when two alleles are passed to offspring during sexual reproduction?

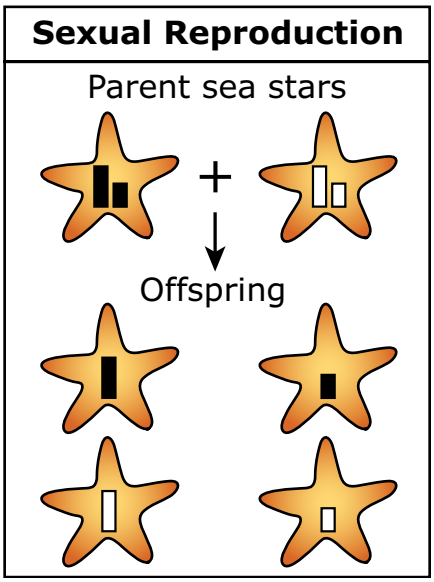
Ⓐ



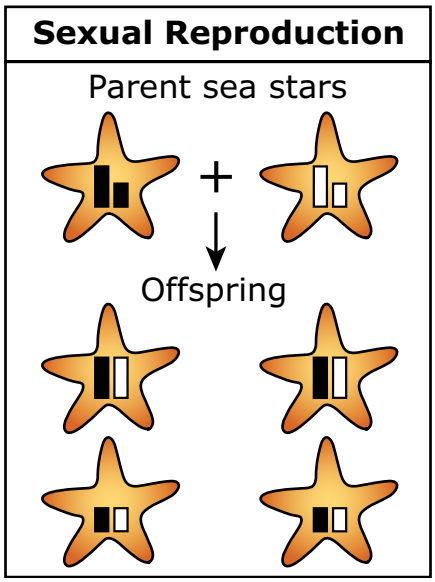
Ⓑ



Ⓒ



Ⓓ



THIS QUESTION WILL BE LOCKED AFTER COMPLETION.

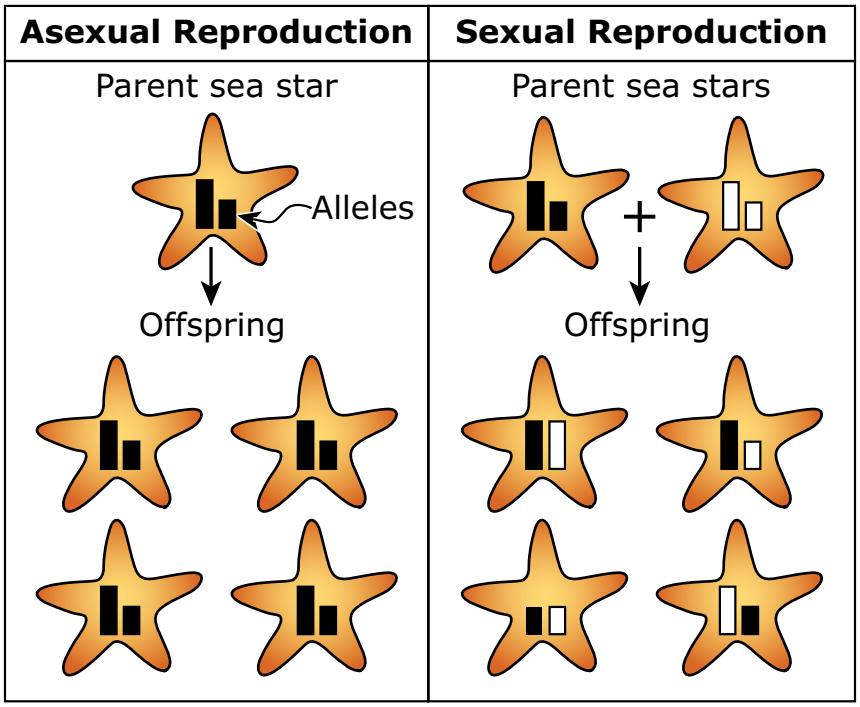
You must answer this question before moving on to the next question.
After you move to the next question, you cannot change your answer to this question.

GO ON

Sea Star Reproduction—Section 2

The Sea Star Offspring Allele Combinations model shows the possible allele combinations in the sea star offspring for asexual reproduction and sexual reproduction.

Sea Star Offspring Allele Combinations



Question 5

The following question has two parts. First, answer part A. Then, answer part B.

Part A

Based on the Sea Star Offspring Allele Combinations model, fill in a circle to identify whether each statement describes asexual reproduction, sexual reproduction, or both. Fill in **one** circle for each row.

Statement	Asexual Reproduction	Sexual Reproduction	Both
All offspring have the same traits.	○	○	○
Genetic information is transferred to the offspring.	○	○	○
Different combinations of genetic information in the offspring are possible.	○	○	○
Each offspring has two alleles for every trait.	○	○	○

Part B

Which statement describes a reason for the sexual reproduction answers in part A?

Ⓐ The two alleles are identical in every offspring.

Ⓑ Offspring can inherit alleles from either of two parents.

Ⓒ There is a single source of genetic information for all offspring.

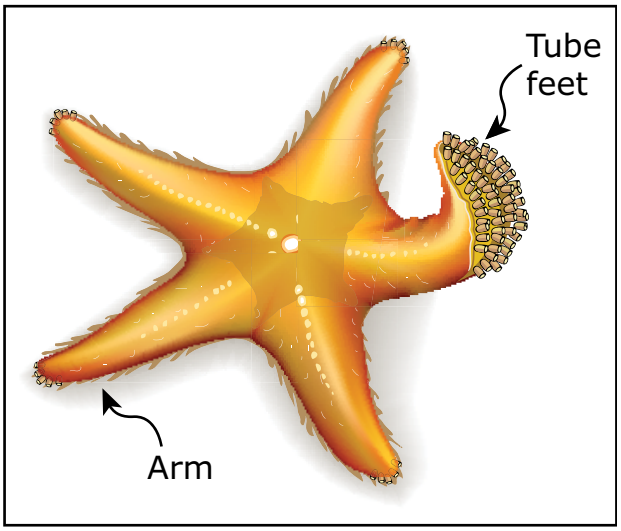
Ⓓ The genetic information in offspring depends on their environment.

GO ON

Sea Star Reproduction—Section 3

Sea stars have tube feet for walking, climbing, and grasping. The Sea Star External Anatomy diagram shows the appearance and location of tube feet on a sea star.

Sea Star External Anatomy



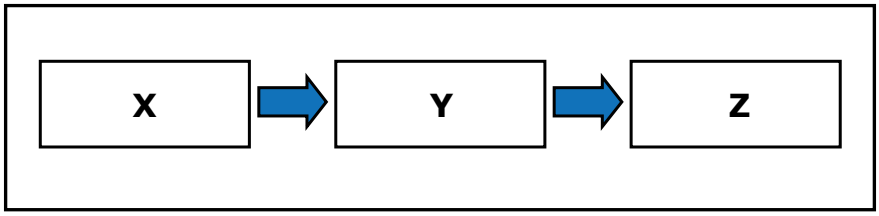
There are cells in the tube feet of sea stars that produce a protein that acts like glue. The protein makes the tube feet sticky.

Question 6

The Genetic Information Model can be used to show the flow of genetic information in the tube feet cells.

Fill in circles in the table to identify the label represented by each letter in the model. Fill in **one** circle for each label.

Genetic Information Model



Label	X	Y	Z
Sticky foot trait	○	○	○
Sticky foot protein	○	○	○
Sticky foot gene	○	○	○

THIS QUESTION WILL BE LOCKED AFTER COMPLETION.

You must answer this question before moving on to the next question.
After you move to the next question, you cannot change your answer to this question.

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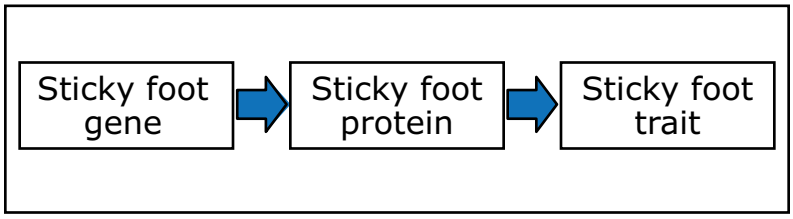
Question 7

The Genetic Information Model diagram shows how information in genes results in traits like the sticky foot trait in sea stars.

Genetic Information Model



Choose a word in **each** box to describe how a mutation could result in a change to the sticky foot trait.

A mutation changes the structure of the
- ○ gene
- ○ protein
- ○ trait

, which can change the structure and function of the
- ○ gene
- ○ protein
- ○ trait

.

THIS QUESTION WILL BE LOCKED AFTER COMPLETION.

You must answer this question before moving on to the next question.
After you move to the next question, you cannot change your answer to this question.

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Question 8

A mutation occurs that causes the sticky foot protein to become less sticky. Describe how this mutation could affect the sea star.

Choose **one** mutation by filling in a circle:

○ Harmful mutation
○ Beneficial mutation

Describe how **that** mutation could affect the sea star.

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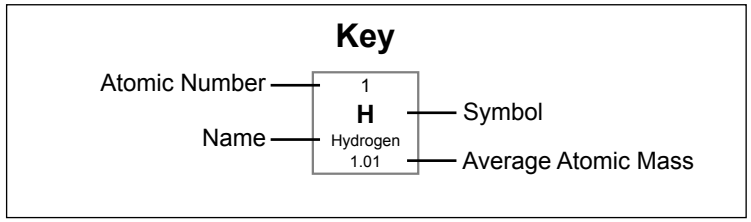
You have reached the end of the test.

PERIODIC TABLE

This periodic table is a state approved non-embedded universal tool for students in grades 8 and 11 taking the paper-pencil science assessment, only.
Use of other periodic tables is prohibited. TAs must collect and account for this sheet when provided during state testing.



	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	1 **H** Hydrogen 1.01																	2 **He** Helium 4.00
2	3 **Li** Lithium 6.94	4 **Be** Beryllium 9.01											5 **B** Boron 10.81	6 **C** Carbon 12.01	7 **N** Nitrogen 14.01	8 **O** Oxygen 16.00	9 **F** Fluorine 19.00	10 **Ne** Neon 20.18
3	11 **Na** Sodium 22.99	12 **Mg** Magnesium 24.30											13 **Al** Aluminum 26.98	14 **Si** Silicon 28.09	15 **P** Phosphorus 30.97	16 **S** Sulfur 32.06	17 **Cl** Chlorine 35.45	18 **Ar** Argon 39.95
4	19 **K** Potassium 39.10	20 **Ca** Calcium 40.08	21 **Sc** Scandium 44.96	22 **Ti** Titanium 47.87	23 **V** Vanadium 50.94	24 **Cr** Chromium 52.00	25 **Mn** Manganese 54.94	26 **Fe** Iron 55.85	27 **Co** Cobalt 58.93	28 **Ni** Nickel 58.69	29 **Cu** Copper 63.55	30 **Zn** Zinc 65.38	31 **Ga** Gallium 69.72	32 **Ge** Germanium 72.63	33 **As** Arsenic 74.92	34 **Se** Selenium 78.97	35 **Br** Bromine 79.90	36 **Kr** Krypton 83.80
5	37 **Rb** Rubidium 85.47	38 **Sr** Strontium 87.62	39 **Y** Yttrium 88.91	40 **Zr** Zirconium 91.22	41 **Nb** Niobium 92.91	42 **Mo** Molybdenum 95.95	43 **Tc** Technetium (98)	44 **Ru** Ruthenium 101.07	45 **Rh** Rhodium 102.91	46 **Pd** Palladium 106.42	47 **Ag** Silver 107.87	48 **Cd** Cadmium 112.41	49 **In** Indium 114.82	50 **Sn** Tin 118.71	51 **Sb** Antimony 121.76	52 **Te** Tellurium 127.60	53 **I** Iodine 126.90	54 **Xe** Xenon 131.29
6	55 **Cs** Cesium 132.91	56 **Ba** Barium 137.33	57–71	72 **Hf** Hafnium 178.49	73 **Ta** Tantalum 180.95	74 **W** Tungsten 183.84	75 **Re** Rhenium 186.21	76 **Os** Osmium 190.23	77 **Ir** Iridium 192.22	78 **Pt** Platinum 195.08	79 **Au** Gold 196.97	80 **Hg** Mercury 200.59	81 **Tl** Thallium 204.38	82 **Pb** Lead 207.21	83 **Bi** Bismuth 208.98	84 **Po** Polonium (209)	85 **At** Astatine (210)	86 **Rn** Radon (222)
7	87 **Fr** Francium (223)	88 **Ra** Radium (226)	89–103	104 **Rf** Rutherfordium (267)	105 **Db** Dubnium (268)	106 **Sg** Seaborgium (269)	107 **Bh** Bohrium (270)	108 **Hs** Hassium (269)	109 **Mt** Meitnerium (278)	110 **Ds** Darmstadtium (281)	111 **Rg** Roentgenium (282)	112 **Cn** Copernicium (285)	113 **Nh** Nihonium (286)	114 **Fl** Flerovium (289)	115 **Mc** Moscovium (289)	116 **Lv** Livermorium (293)	117 **Ts** Tennessine (294)	118 **Og** Oganesson (294)

57 **La** Lanthanum 138.91	58 **Ce** Cerium 140.12	59 **Pr** Praseodymium 140.91	60 **Nd** Neodymium 144.24	61 **Pm** Promethium (145)	62 **Sm** Samarium 150.36	63 **Eu** Europium 151.96	64 **Gd** Gadolinium 157.25	65 **Tb** Terbium 158.93	66 **Dy** Dysprosium 162.50	67 **Ho** Holmium 164.93	68 **Er** Erbium 167.26	69 **Tm** Thulium 168.93	70 **Yb** Ytterbium 173.05	71 **Lu** Lutetium 174.97
89 **Ac** Actinium (227)	90 **Th** Thorium 232.04	91 **Pa** Protactinium 231.04	92 **U** Uranium 238.03	93 **Np** Neptunium (237)	94 **Pu** Plutonium (244)	95 **Am** Americium (243)	96 **Cm** Curium (247)	97 **Bk** Berkelium (247)	98 **Cf** Californium (251)	99 **Es** Einsteinium (252)	100 **Fm** Fermium (257)	101 **Md** Mendelevium (258)	102 **No** Nobelium (259)	103 **Lr** Lawrencium (266)