

Practice
Assessment
Administration
Manual

Spring 2022

SCIENCE

**HIGH
SCHOOL**

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Maine Science Assessment Practice Test Supplemental Materials and Resources

Grade High School

There are two systems that can be used to help prepare your student for the Maine Science Assessment.

1. The [Maine Science Assessment Tutorial](#) is a set of online questions that allow students to better understand and practice using the tools and response methods they may experience using ADAM, the Maine Science Assessment platform. This tutorial does not provide practice on the content or item types from a content perspective. It will, however, provide exposure to the navigation, tools, accessibility features, and methodology for responding to item types such as drag and drop and other technology-based item types that require manipulation of the mouse.

Tutorial test code:

- No Text-to-speech (TTS): STUTOR
- Text-to-speech (TTS) enabled: STUTORT

2. The High School [Maine Science Assessment Practice Test](#) is an online set of scenarios and items meant to familiarize students with the types of questions they may encounter when they take the Maine Science Assessment. The practice test is not scored, nor are the students' answers retained. Each online question can be answered and checked via the online interface. The students will receive real-time feedback that indicates the accuracy of their answers using the following messages:

- Correct, way to go!
- Incorrect, you may want to try again.

Practice Test code:

- No Text-to-speech (TTS): SPTHSN
- Text-to-speech (TTS) enabled: SPTHST

Each student has up to three (3) attempts to reason through and find the correct answer. The rationales, or reasons why the incorrect answers are wrong, can be found starting on page 5 of this packet and should be used to help explain the error that they likely made that led them to choose that specific wrong answer. The rationales are developed based on the most frequent errors and may not be the exact logic or factual error a student made.

For test questions that are not scored by the system, those that require a written or constructed response, we recommend that students answer these questions on paper so that their responses can be reviewed against the rubric and discussed outside of the system. The rubrics for these questions can be found starting on page 5 of this packet.

While these tools do not take the place of your science instruction, which is the number one preparation that all students should receive, we do recommend that you have students access and take the tutorial (see URL below) to familiarize themselves with the ADAM platform, navigation, and features. Once there is good familiarity with the platform, we recommend that your students work through the practice test (see URL below) to become acquainted with how their science content will be assessed during the Maine Science Assessment.

Links:

- Maine Science Assessment Tutorial: <https://adamexam.com/tester/>
- Maine Science Assessment Practice Test: <https://adamexam.com/tester/>
- Supplemental Materials and Resources: <https://mescience.zendesk.com/hc/en-us/sections/1500001237162-Resources-Document-Downloads>

Universal Features, Designated Supports/Features, and Accommodations

The full list of Universal Features, Designated Supports/Features, and Accommodations for students with disabilities and English learners can be found in Appendix A of the [*Maine Principal and Assessment Coordinator \(PAC\) Manual*](#).

High School Practice Test Table of Rationales and Exemplars

Item Number	Part	ACO A	ACO B	ACO C	ACO D	Rationale	Exemplar
Hawaiian Islands							
1	N/A	N/A	N/A	N/A	N/A	The box in the top left corner of the map, closest to Kaua'i, should be marked. According to the table in the scenario, Kaua'i is the oldest island, and Hawai'i is the youngest.	N/A
2	N/A	This is incorrect because proximity to the oceanic crust is not the determining factor in volcanic activity.	This is incorrect because small islands are also capable of supporting volcanoes.	This is incorrect because although the island of Hawaii is the youngest island of the island chain, there are older islands in the world that have volcanoes.	This is correct because it accurately describes how hot spot volcanoes, like the Hawaiian Islands, are formed.	N/A	N/A
3	N/A	N/A	N/A	N/A	N/A	N/A	The youngest island of the Hawaiian Island chain is still on the hotspot, so it is still being built up by the solidifying lava. Also, the island has not been exposed to weathering and erosion forces for as

Item Number	Part	ACO A	ACO B	ACO C	ACO D	Rationale	Exemplar
							long as the other islands.
4	N/A	N/A	N/A	N/A	N/A	The arrow pointing to the Northwest should be placed in the drop box because that is the direction the tectonic plate is moving. The islands are evidence for this direction of movement since the youngest is in the bottom right (Hawai'i), and the oldest is in the top left (Kaua'i).	N/A
Preserving the Declaration							
5	A	N/A	N/A	N/A	N/A	Oxygen has six electrons. The six electrons should be placed in the drop boxes, in any order, around the oxygen nucleus.	N/A

Item Number	Part	ACO A	ACO B	ACO C	ACO D	Rationale	Exemplar
5	B	N/A	N/A	N/A	N/A	N/A	Oxygen is reactive and tends to gain electrons because its outer shell is not full.

Item Number	Part	ACO A	ACO B	ACO C	ACO D	Rationale	Exemplar
6	A	This is correct because the outer shell of the oxygen atom is not full and will gain two electrons from the iron atom.	This is incorrect because atoms are most stable when their valence electron shell is full. In covalent bonding, both atoms have a full outer shell. If oxygen lost two electrons to the iron atom, neither one would have a full valence electron shell.	This is incorrect because atoms are most stable when their valence electron shell is full. In covalent bonding, both atoms have a full outer shell. If oxygen gave an electron and iron gave an electron, they would have the same number of electrons as when they started.	N/A	N/A	N/A

Item Number	Part	ACO A	ACO B	ACO C	ACO D	Rationale	Exemplar
6	B	This is not correct because oxygen does not replace iron. The oxygen reacts with the iron in the ink, creating iron oxide.	This is incorrect because the iron cannot remove oxygen from the air. The iron reacts with the oxygen in the air, creating iron oxide.	This is incorrect because the iron in the ink does not evaporate. The iron reacts with the oxygen in the air, creating iron oxide.	This is correct because the oxygen in the air reacts with the iron in the ink, chemically changing into iron oxide.	N/A	N/A
7	N/A	N/A	N/A	N/A	N/A	Argon has the atomic number of 18 and helium has the atomic number of 2. They are both found on the far right-hand column of the periodic table. The Only Argon column should include “total of 18 electrons.” The Both column should include “full outer shell,” “nonreactive,” and “noble gas.” The Only Helium column should include “total of 2 electrons.”	N/A
Breeding Cats							

Item Number	Part	ACO A	ACO B	ACO C	ACO D	Rationale	Exemplar
8	N/A	N/A	N/A	N/A	N/A	The Punnett Square should have the genotype Ff for the female and ff for the male. Because the female can contribute a dominant allele and the male can only contribute a recessive allele, the offspring will have the probability of 50% genotype Ff. Therefore, the probability of having a long-haired cat would be 50%.	N/A
9	N/A	N/A	N/A	N/A	N/A	Because the female can contribute a dominant allele and the male can only contribute a recessive allele, the offspring will have the probability of 50% genotype Gg and 50% genotype gg. Therefore, the probability of having a cat with a solid white coat would be 50%.	N/A

Item Number	Part	ACO A	ACO B	ACO C	ACO D	Rationale	Exemplar
10	N/A	This is incorrect because the genes received by offspring are randomly contributed by the male and female cat, regardless of dominance.	This is correct because the genes received by offspring are randomly contributed by the male and female cat, regardless of dominance.	This is incorrect because parents cannot choose which genes to give their offspring. Genes are randomly contributed.	This is incorrect because the genes that are received by offspring are randomly contributed, regardless of desirability.	N/A	N/A
11	N/A	N/A	N/A	N/A	N/A	N/A	Dominant traits can be inherited when one parent carries the allele. Recessive traits can be inherited when both parents carry the allele. In this case, one parent carries both a dominant allele and a recessive allele, all combinations are possible in the offspring.
12	N/A	N/A	N/A	N/A	N/A	The only possibilities would be short fur, in either solid white or grey and white. Both alleles for coat color and fur length are present, but since one parent has two dominant alleles for short fur length, all the offspring will have short fur.	N/A

Item Number	Part	ACO A	ACO B	ACO C	ACO D	Rationale	Exemplar
13	A	This is incorrect because the long-fur trait is recessive, which means that you need to get one recessive trait from each parent. In this case, the male cat has two dominant alleles for short fur and the female has one dominant allele for short fur. The combination would not result in a long-furred cat.	This is correct because the long-fur trait is recessive, which means that you need to get one recessive trait from each parent. In this case, the male cat has two dominant alleles for short fur and the female has one dominant allele for short fur. The combination would not result in a long-furred cat.	N/A	N/A	N/A	N/A

Item Number	Part	ACO A	ACO B	ACO C	ACO D	Rationale	Exemplar
13	B	This is incorrect because although the female cat's genotype for fur length is Ff, the F allele is dominant for short fur, not long fur.	This is incorrect because the female cat's genotype for fur color is Gg, and the G allele is dominant for a solid white coat. Since the male's genotype for fur color is also Gg, there is a possibility that the offspring could have a grey and white coat. However, because both parents have dominant traits for short fur, the offspring would only have short fur. Only one of the desired traits would have been reached.	This is correct because both of the male's alleles are dominant for short fur, so the male can only contribute the allele for short fur. Since they are dominant, they will show regardless of whether the offspring have the recessive allele from the female mother cat.	This is incorrect because the male cat's genotype for fur color is Gg, and the G allele is dominant for a solid white coat. Since the female's genotype for fur color is also Gg, there is a possibility that the offspring could have a grey and white coat. However, because both parents have dominant traits for short fur, the offspring would not have short fur. Only one of the desired traits would have been reached.	N/A	N/A

Rubrics

Item 03 - Hawaiian Islands

Kamalani is visiting relatives on the Hawaiian islands. First, she visits her grandmother on the island of Kaua'i. Next, she visits her sister on the island of Maui. Then, she travels to the big island of Hawai'i to explore Kīlauea, an active volcano.

While visiting her grandmother, Kamalani was told that the island of Kaua'i is one of the oldest inhabited islands in the Hawaiian island chain. This makes Kamalani wonder why the islands are not all the same age.

Kamalani is intrigued about the ages of the different islands. She gathers this information about when the islands were formed and writes it in her journal:

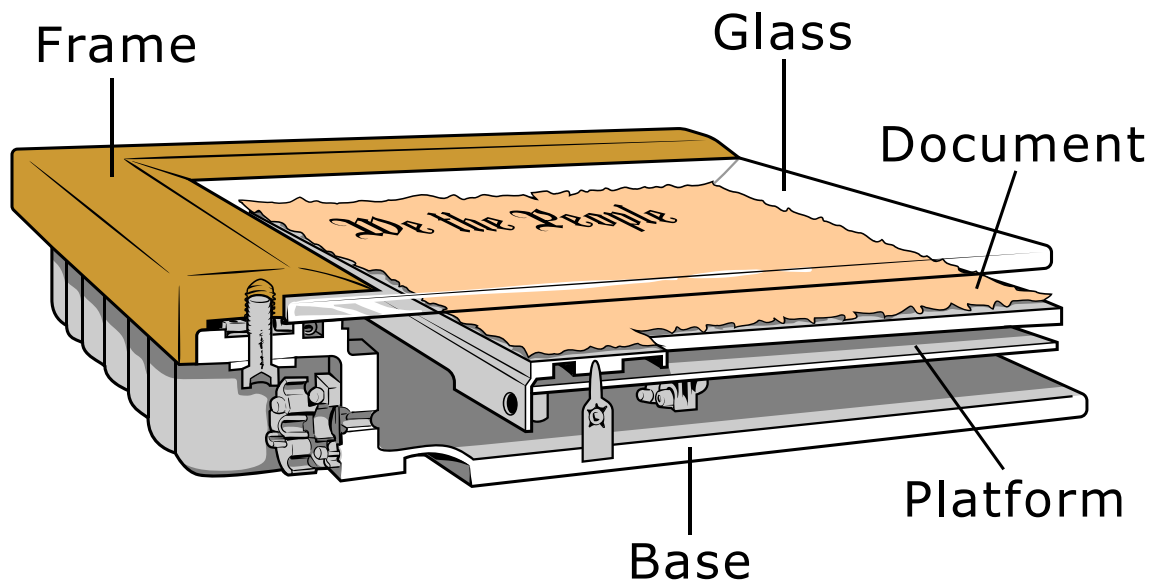
- Kaua'i — 3.8–5.6 million years
- O'ahu — 2.2–3.3 million years
- Moloka'i — 1.3–1.8 million years
- Maui — less than 1 million years
- Hawai'i — 0.7 million years – present day

She finds that the big island of Hawai'i is still being formed today.

Why is the youngest island of the Hawaiian Island chain the largest island? Explain.

Points	Qualities of the Student Response
2	<p>The response must identify the youngest island of the Hawaiian Island chain is still on the hotspot, so it is still being built up by the solidifying lava. It hasn't been exposed to weathering and erosion forces for as long as the other islands, therefore it hasn't worn down as much.</p> <p><u>Example Student Response:</u> The youngest island is still growing because it is on the hot spot. It also hasn't had time to weather away.</p> <p><u>Note:</u> A 2pt response may not include any errors or flawed logic.</p>
1	<p>The response demonstrates a partial understanding of the prompt. The response must identify</p> <ul style="list-style-type: none"> • that the youngest island of the Hawaiian Island chain is still on the hotspot, so is still being built up by the solidifying lava <p>OR</p> <ul style="list-style-type: none"> • that the youngest island hasn't been exposed to weathering and erosion forces for as long as the other islands, so therefore hasn't worn down as much.
0	<p>The response demonstrates minimal understanding of the prompt. The response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.</p>

Item 05 Part B - Preserving the Declaration



Shari visits the National Archives Museum in Washington, DC. Here, she studies the country's founding documents, including the Declaration of Independence which was written in 1776. She learns that the Declaration has been stored in a display case containing atmospheres such as ambient air, humidified helium, and now humidified argon. The table lists the atmospheres used in the display case over three time periods and whether oxygen gas (O_2) was present in each of the atmospheres.

Time Period	Atmosphere in Display Case	Declaration Exposed to Oxygen Gas?
1942-1952	ambient air, unsealed case	yes
1952-2001	humidified helium (He), sealed case	no
2002-2021	humidified argon (Ar), sealed case	no

Shari uses a periodic table to help her understand more about the elements in the atmospheres used inside the display case.

Periodic Table

Metal		Metalloid			Nonmetal												
H																	He
Li	Be										B	C	N	O	F		Ne
Na	Mg										Al	Si	P	S	Cl		Ar
K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr
Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe
Cs	Ba	La	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn
Fr	Ra	Ac															
La	Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu			
Ac	Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr			

She also learns that the Declaration of Independence was written on parchment paper with ink that contains iron (Fe). The ink has begun to fade and flake away from the paper, making it difficult for the text on the document to be read. Shari wonders why the various gases in the atmospheres inside the display case were chosen and how these gases affected the preservation of the document.

Why would a preservation committee choose to remove oxygen from the display case?
Provide an explanation.

Points	Qualities of the Student Response
2	<p>The response must describe that oxygen is reactive and not stable, therefore, it will react with the ink on the paper.</p> <p><u>Example Student Response:</u> Oxygen is reactive and tends to gain electrons because its outer shell is not full.</p> <p><u>Note:</u> A 2pt response may not include any errors or flawed logic.</p>
1	<p>The response demonstrates a partial understanding of the prompt. The response must describe</p> <ul style="list-style-type: none">• that oxygen is reactive and not stable OR• that it will react with the ink on the paper.
0	<p>The response demonstrates minimal understanding of the prompt. The response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.</p>

Item 11 – Breeding Cats

Joshua breeds cats. He has a male cat with long fur (ff) and a grey-and-white colored coat (gg). He also has a female cat that has short fur (Ff) and a solid white coat (Gg). He knows that there is a demand for cats with long fur and a solid white coat.

Parent Cats



Long fur, grey and white



Short fur, solid white

Joshua breeds the same male and female again and the resulting litter produces four different combinations of fur length and fur color.



Long fur, solid white



Long fur, grey and white



Short fur, grey and white



Short fur, solid white

How can all four offspring have different combinations of fur length and fur color?

Points	Qualities of the Student Response
2	<p>Response must include the explanation that dominant traits can be inherited when one parent carries the allele. Recessive traits can only be inherited when both parents carry the allele. All combinations are possible in the offspring because one parent carries both a dominant allele and a recessive allele.</p> <p><u>Example Student Response:</u> One parent carries both a dominant allele and a recessive allele, therefore, all combinations are possible in the offspring.</p> <p><u>Note:</u> A 2pt response may not include any errors or flawed logic.</p>
1	<p>The response demonstrates a partial understanding of the prompt. The response must include reasoning</p> <ul style="list-style-type: none"> • that dominant traits can be inherited when one parent carries the allele OR • that recessive traits can only be inherited when both parents carry the allele.
0	<p>The response demonstrates minimal understanding of the prompt. The response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.</p>



New Meridian

Maine Science Practice Assessment