

Practice  
Assessment  
Administration  
Manual

SCIENCE

G R A D E

8

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# Maine Science Assessment Practice Test

## Supplemental Materials and Resources

### Grade 8

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 Grade 8 [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): SPTGR8
- Text-to-speech (TTS) enabled: SPTGR8T

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\*](#).

Grade 8 Practice Test Table of Rationales and Exemplars

Item Number	Part	ACO A	ACO B	ACO C	ACO D	ACO E	Rationale	Exemplar
Chicken Egg								
1	N/A	This is incorrect because having unique methods of locomotion is not evidence of common ancestry.	This is incorrect because using oxygen as a primary means of respiration is not evidence of common ancestry.	This is incorrect because eyes adapted to the environment is not evidence of common ancestry.	This is correct because embryological development is evidence of common ancestry.	N/A	N/A	N/A
2	N/A	This is incorrect because according to the cladogram, multiple organisms between the frog and the chicken have legs. Therefore, the chicken's legs did not directly evolve from frogs.	This is correct because the cladogram shows modern day organisms that are connected by recent common ancestors. Therefore, the chicken and frog share a recent common ancestor.	This is incorrect because the cladogram does not show characteristics of social behavior. It only shows evolutionary relationships between organisms.	This is incorrect because according to the cladogram, crocodiles, snakes, and lizards are located between the chicken and frog. This means that even though these organisms have scales, they are more closely related	N/A	N/A	N/A

Item Number	Part	ACO A	ACO B	ACO C	ACO D	ACO E	Rationale	Exemplar
					to the chicken than the frog that does not have scales.			
3	A	N/A	N/A	N/A	N/A	N/A	The egg should be placed in the drop box between the frog and the turtle because the turtle lays shelled eggs on land and the frog lays unshelled eggs in the water. Therefore, evolutionarily, the shelled eggs appeared before the turtle.	N/A
3	B	N/A	N/A	N/A	N/A	N/A	N/A	The organisms that branched out below that point in the cladogram are aquatic animals. Those animals lay unshelled eggs because they don't have to worry about the eggs drying out.

Item Number	Part	ACO A	ACO B	ACO C	ACO D	ACO E	Rationale	Exemplar
4	A	This is incorrect because the egg existed in many organisms before the chicken existed.	This is correct because the egg existed in many organisms before the chicken existed.	N/A	N/A	N/A	N/A	N/A
4	B	N/A	N/A	N/A	N/A	N/A	N/A	The egg came first because it existed in different forms prior to the evolution of the chicken.
Popping Tire								
5	A	This is incorrect because removing air molecules would not result in an inflated tire.	This is correct because pumping air into a tire means that you are adding more air molecules.	This is incorrect because to inflate a tire, you have to add more air molecules. Not changing the number of air molecules would mean the tire is still flat.	N/A	N/A	N/A	N/A

Item Number	Part	ACO A	ACO B	ACO C	ACO D	ACO E	Rationale	Exemplar
5	B	N/A	N/A	N/A	N/A	N/A	Both pressure and volume should be marked as Increased on the chart. This is because when you add more air molecules to a closed system, the molecules will expand, increasing pressure. And, since the tire is elastic, it will expand in volume.	N/A
6	N/A	This is incorrect because the number of air molecules does not determine humidity. The amount of water in the air does.	This is correct because as the thermal energy increases, the energy of the gas molecules also increases, and the gas molecules move faster and farther apart.	This is incorrect because when thermal energy is added to air molecules in the atmosphere, the speed and position of the molecules, not their chemical composition, are affected.	This is incorrect because when air molecules gain thermal energy, their motion increases as does the spacing between molecules. For the molecules to move closer together, thermal energy must decrease.	N/A	N/A	N/A



Item Number	Part	ACO A	ACO B	ACO C	ACO D	ACO E	Rationale	Exemplar
7	N/A	This is incorrect because the warmer air in the atmosphere will transfer thermal energy to the air in the tire, causing the air molecules in the tire to gain energy.	This is incorrect because the warmer air in the atmosphere will transfer energy to the air molecules inside the tire, causing the molecules to move faster and farther apart, and expand. This increases the volume of the tire instead of decreasing it.	This is correct because the warmer air in the atmosphere will transfer energy to the air molecules inside the tire, causing the molecules to move faster and farther apart, thus increasing the pressure in the tire.	This is incorrect because the warmer air transfers energy to the air molecules inside the tire; it does not transfer more air particles.	N/A	N/A	N/A

Item Number	Part	ACO A	ACO B	ACO C	ACO D	ACO E	Rationale	Exemplar
8	N/A	N/A	N/A	N/A	N/A	N/A	The ‘Inside the Tire’ drop box should include: Kinetic energy of air molecules increases/Pressure increases. This is because when temperature increases, kinetic energy increases. The pressure will increase as well because the particles are trying to expand in a closed container. The ‘In the Atmosphere’ drop box should include: Kinetic energy of the air molecules increases/Pressure decreases. This is because when temperature increases, kinetic energy increases. Pressure will decrease in the atmosphere because the particles will have more room to expand. The numbers of air molecules will not change inside the tire or in the atmosphere.	N/A

Item Number	Part	ACO A	ACO B	ACO C	ACO D	ACO E	Rationale	Exemplar
9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	The tire popped because the pressure inside the tire was much greater than the pressure outside the tire. The temperature increase caused the pressure inside the tire to increase to greater than what the tire could hold, causing the tire to pop.
10	N/A	This is incorrect because speed was not the cause of the tire popping. The scenario does not give evidence of the speed at which Leo was riding the bike.	This is incorrect because the terrain was not the cause of the tire popping. The scenario does not give evidence that Leo was riding the bike on rocky trails.	This is incorrect because Leo's weight was consistent both times he rode the bike, therefore weight was not the cause of the tire popping.	This is correct because when the tire was flat in the morning, the air particles were closer together, decreasing the volume. When Leo filled the tire, more air molecules were added. When the temperature in the tire increased, the increased air particles created more pressure than	This is correct because releasing some of the added air particles would reduce the pressure on the tire and prevent it from popping.	N/A	N/A

Item Number	Part	ACO A	ACO B	ACO C	ACO D	ACO E	Rationale	Exemplar
					the tire could handle. Filling tires in cold temperatures can result in adding too many air particles for when outside air temperatures become warmer.			
Colorado								
11	A	N/A	N/A	N/A	N/A	N/A	The layers Z1 and Z2 should be dragged to the drop boxes, because layer Z1 shares the same fossils as G8 and layer Z2 shares the same fossils as G9.	N/A
11	B	This is incorrect because the fossils found in the layers G8, G9, Z1, and Z2 contain the	This is correct because the fossils found in G8, G9, Z1, and Z2 contain the same type of index fossils.	This is incorrect because there is no evidence that tectonic movement separated	This is incorrect because the layers in both the Grand Canyon and Zion National	N/A	N/A	N/A

Item Number	Part	ACO A	ACO B	ACO C	ACO D	ACO E	Rationale	Exemplar
		same type of fossils, indicating that they were formed at the same time.	Since these organisms only existed at a certain time in Earth's history, the rock layers must have been formed at the same time.	these landforms.	Park had to have been formed in similar environments because the fossils are aquatic organisms.			
12	N/A	This is correct because the common rock layer for Grand Canyon and Zion National Park is G8 and Z1. According to the Law of Superposition, layers of rock get older towards the bottom of the rock strata. Since G4 is below G8 it is older than G8. Since Z4 is above Z1, it is younger than Z1. Therefore,	This is incorrect because the number of fossils does not determine the age of the rock layer.	This is incorrect because although the number of rock layers beneath Z4 and G4 are the same, the fossils within those layers are older under G4 than under Z4. Therefore, they cannot be the same relative age.	This is incorrect because rock strata in different locations can be compared with each other to determine relative ages of an area.	N/A	N/A	N/A

Item Number	Part	ACO A	ACO B	ACO C	ACO D	ACO E	Rationale	Exemplar
		G4 is older than Z4.						
13	N/A	This is incorrect because there are no common fossils between the Grand Canyon and Bryce Canyon National Park.	This is incorrect because there are no common fossils between the Grand Canyon and Bryce Canyon National Park.	This is correct because there are shared fossils between the Grand Canyon and Zion National Park, as well as Zion National Park and Bryce Canyon National Park. This means that Zion National Park can provide the missing information	This is incorrect because the majority of the fossil layers in Bryce Canyon National Park are younger than the layers in Zion National Park, and all of them are younger than the layers in the Grand Canyon.	N/A	N/A	N/A

Item Number	Part	ACO A	ACO B	ACO C	ACO D	ACO E	Rationale	Exemplar
				between the Grand Canyon and Bryce Canyon National Park.				
14	N/A	N/A	N/A	N/A	N/A	N/A	Rock layer B9 contains the youngest fossil, is a true statement because if all the layers are stacked in the order of time that they were formed, it is the top layer. Rock layer Z4 is younger than rock layer B4, is a false statement because Z4 is below the common layer Z6 and B1. There is some overlap in the age of rock layers found at both locations, is a true statement because G8 and G9 are common layers to Z1 and Z2. Z6 and Z7 are	N/A

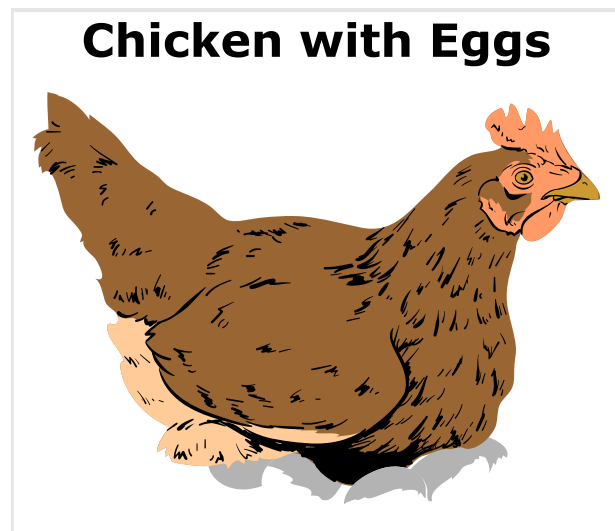
Item Number	Part	ACO A	ACO B	ACO C	ACO D	ACO E	Rationale	Exemplar
							common layers to B1 and B2. There are similar fossils found in common layers at both locations, is a true statement because of the fossils found in Z7 and B2.	
15	N/A	N/A	N/A	N/A	N/A	N/A	Grand Canyon should be at the bottom because it is the oldest. Zion National Park should be in the middle because it is younger than the Grand Canyon and older than Bryce Canyon National Park. Bryce Canyon National Park should be at the top because it is the youngest.	N/A



## Rubrics

### Item 03 Part B - Which Came First?

Satomi has heard the familiar question, “Which came first, the chicken or the egg?” She understands that a chicken is needed to lay an egg, and also that chickens come from eggs. So, which came first, the chicken or the egg? Satomi wants to investigate.

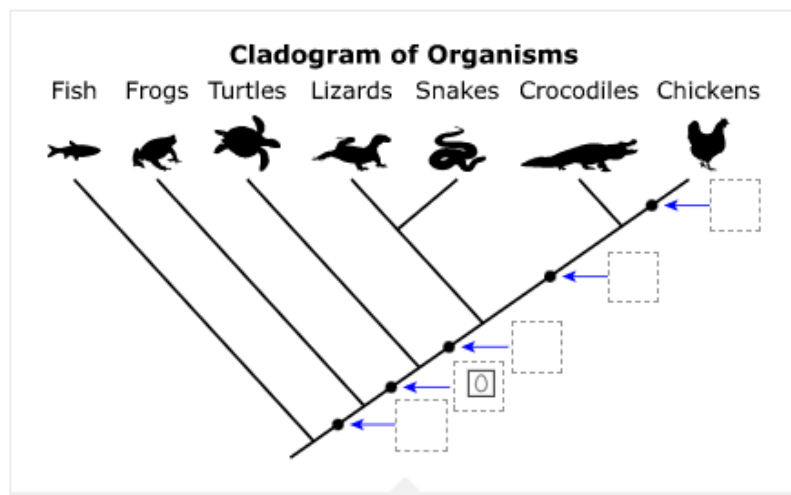


To better understand the evolution of shelled eggs, such as the type chickens lay, Satomi wants to determine where in evolution shelled eggs first appeared.

Satomi will use the cladogram to identify the point throughout the evolution of organisms that shelled eggs likely first appeared.

#### Part A

At which point on the cladogram did shelled eggs likely first appear?



## Part B

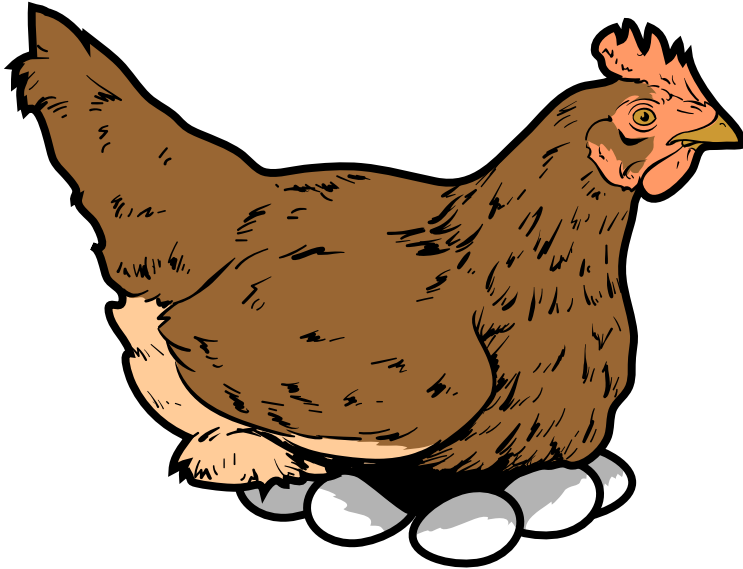
Why do the organisms below where the egg was placed in Part A produce soft, unshelled eggs? Provide an explanation.

Points	Qualities of the Student Response
2	<p>The response must state that the organisms that branched out below that point in the cladogram are aquatic animals that lay unshelled eggs because they lay their eggs in the water. Animals that lay shelled eggs lay their eggs on land.</p> <p><b><u>Example Student Response:</u></b> The organisms that branched out below that point in the cladogram are aquatic animals. Those animals lay unshelled eggs because they lay their eggs in the water, and thus a shell is not needed to prevent the eggs from drying out.</p> <p><b><u>Note:</u></b> 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"><li>• that the animals below that point in the cladogram are aquatic animals OR</li><li>• that the animals above that point in the cladogram are terrestrial animals OR</li><li>• that animals which lay unshelled eggs lay their eggs in the water OR</li><li>• that animals that lay shelled eggs lay their eggs on land.</li></ul>
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 04 Part B - Which Came First?

Satomi has heard the familiar question, “Which came first, the chicken or the egg?” She understands that a chicken is needed to lay an egg, and also that chickens come from eggs. So, which came first, the chicken or the egg? Satomi wants to investigate.

### Chicken with Eggs

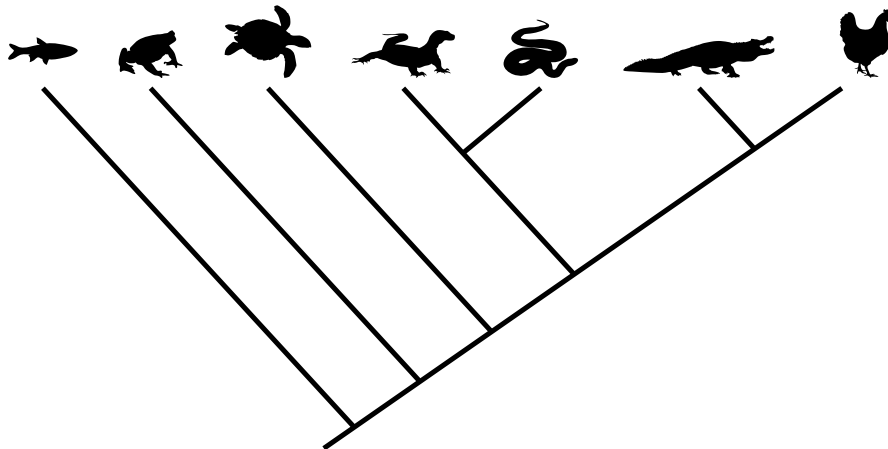


#### Part A

Which came first, the chicken or the egg?

#### Cladogram of Organisms

Fish   Frogs   Turtles   Lizards   Snakes   Crocodiles   Chickens



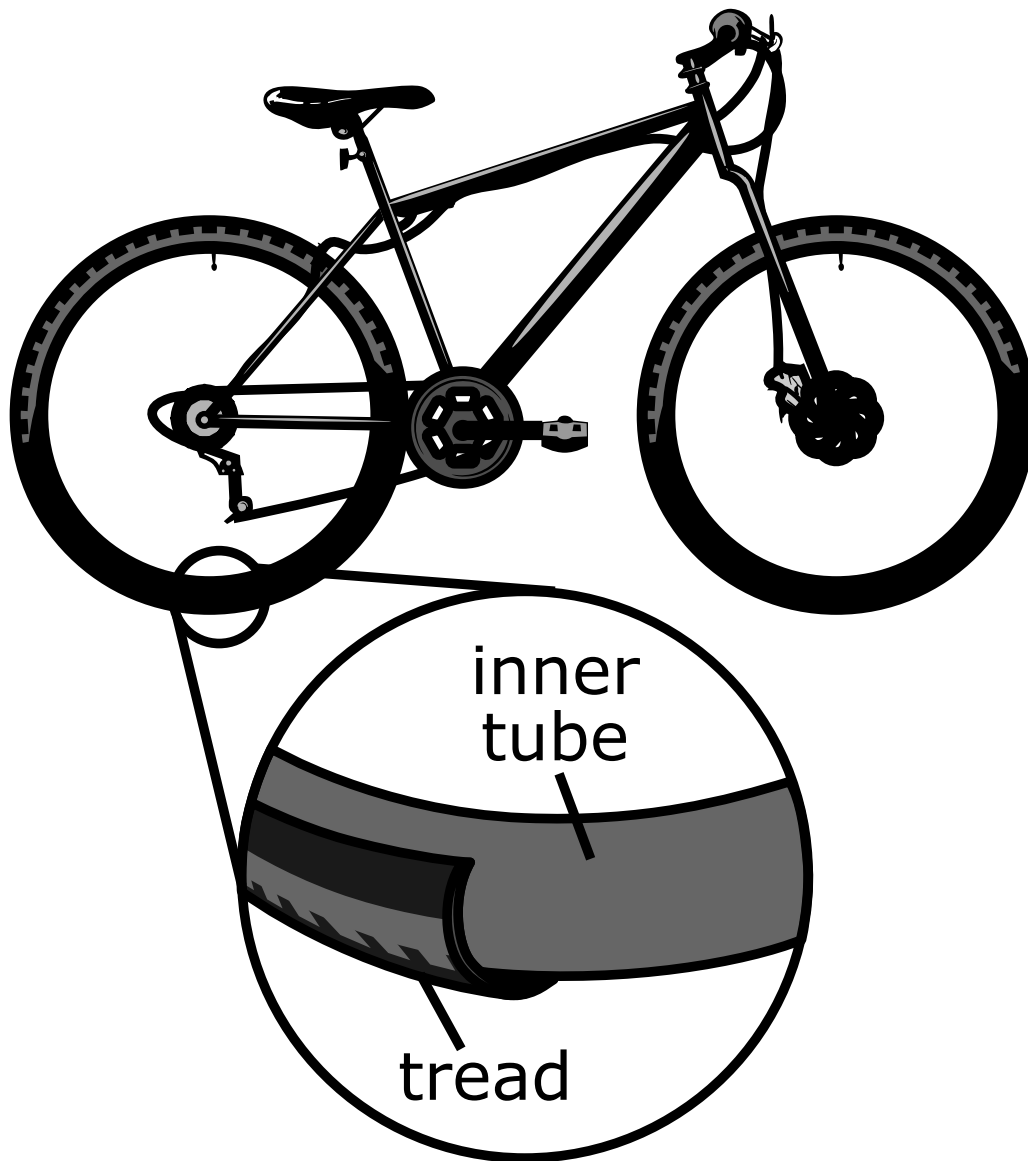
## Part B

What evidence in the cladogram supports the answer to Part A? Provide an explanation.

Points	Qualities of the Student Response
2	<p>The response must state that the egg came first because it existed in different forms prior to the evolution of chickens.</p> <p><b><u>Example Student Response:</u></b> Fish laid unshelled eggs and turtles laid shelled eggs before the evolution of chickens. The egg existed before the evolution of chickens.</p> <p><b><u>Note:</u></b> 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 state that the egg evolved before the chicken.</p>
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 09 - Popping Bike Tire

Leo lives in the desert, where outdoor temperatures can vary greatly from morning to night. Early one morning, Leo notices that his bicycle tire is flat, so he pumps air into both tires until they feel hard when he squeezes. He then goes for a ride although it is cold outside ( $-3.9^{\circ}\text{C}$ ). Later that afternoon, Leo takes another ride with his friend, Juan. The day is now much warmer ( $38^{\circ}\text{C}$ ). Part of the way through this ride, Leo hears a loud pop and sees that one of his tires has gone flat.



Why did the bicycle tire pop? Explain, based on the conditions both inside and outside the tire.

Points	Qualities of the Student Response
2	<p>For full credit, the response must state that the increase in temperature outside of the tire causes the temperature inside the tire to increase. This increase in temperature inside the tire causes the pressure inside the tire to increase. When the pressure inside the tire is too great for the tire to hold, it will pop the tire.</p> <p><b><u>Example Student Response:</u></b>  The tire popped because the pressure inside the tire was much greater than the pressure outside the tire. The temperature increase caused the pressure inside the tire to increase to greater than what the tire could hold, causing the tire to pop.</p> <p><b><u>Note:</u></b> 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"> <li>• that the increase in temperature outside the tire causes the temperature inside the tire to also increase OR</li> <li>• that the temperature inside the tire increases, which causes the pressure inside the tire to increase OR</li> <li>• that the pressure inside the tire increases to greater than what the tire can hold, which causes the tire to pop.</li> </ul>
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