

2023 MCAS Sample Student Work and Scoring Guide

Grade 5 Science and Technology/Engineering Question 5: Constructed-Response

Reporting Category: Technology/Engineering

Practice Category: Evidence, Reasoning, and Modeling

Standard: [3.ETS.1.4](#) - Gather information using various informational resources on possible solutions to a design problem. Present different representations of a design solution.

Item Description: Compare two diagrams of a design solution, explain why one diagram is better for building a prototype, and describe design changes given the outcomes from testing the prototype.

[View item in MCAS Digital Item Library](#)

Scoring Guide

Select a score point in the table below to view the sample student response.

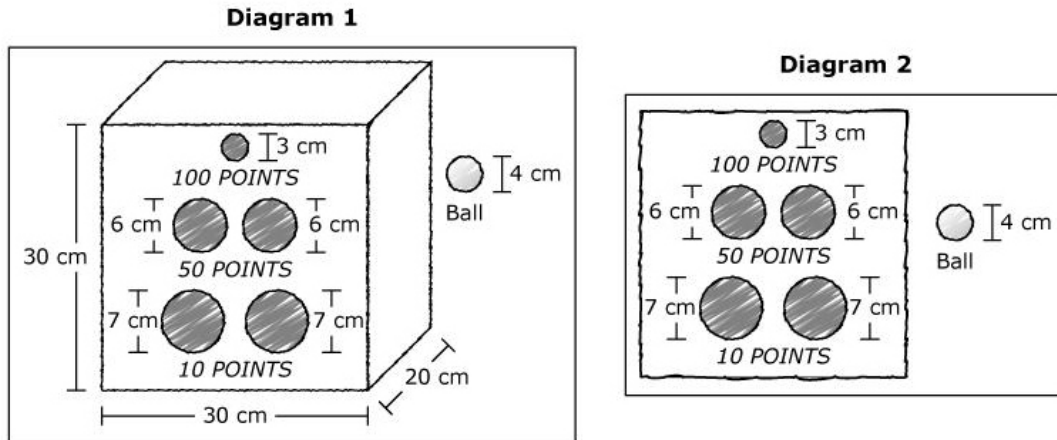
Score*	Description
3A	The response demonstrates a thorough understanding of analyzing different representations of a design solution. The response correctly identifies the best diagram for the students to use to build the prototype and clearly explains why the students should use this diagram. The response clearly describes one change to the game design that could be made to correct the mistake. The response also clearly describes one change to the design that would stop balls from falling on the floor.
3B	
2	The response demonstrates a partial understanding of analyzing different representations of a design solution.
1	The response demonstrates a minimal understanding of analyzing different representations of a design solution.
0	The response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.

*Letters are used to distinguish between sample student responses that earned the same score (e.g., 3A and 3B).

Score Point 3A

This question has three parts.

Two students designed a game that involves throwing balls into holes in a box to earn points. The students drew two diagrams to represent the game design, as shown. One of the balls from the game is also shown in each diagram.



Part A

The students will build a prototype of the game.

Identify the **best** diagram for the students to use to build the prototype. Explain why the students should use this diagram.

If the students were to build a prototype of their game, I think they should use diagram 1. I think this because not only does this prototype show what the area you throw the ball into is like, but it also shows the dimensions of the box the game is being played on.

Part B

The students tested the prototype and realized they had made a mistake in their design. Players were supposed to be able to earn 10, 50, or 100 points with a single throw of the ball, but this was not possible.

Describe one change to the game design that could be made to correct this mistake. Be sure to use specific details of the change to the design in your answer.

The mistake they made was that the hole where you could score 100 points was smaller than the actual ball. If I were to fix this mistake, I would make the hole where you can score 100 points 4.5 cm in diameter so the ball will fit (the ball is 4 cm in diameter), but it will still be challenging to score using that hole.

Part C

After the students corrected the mistake, they decided to test the game. The students placed the prototype on a table and played the game. They found that balls that did not go through the holes fell on the floor during the game.

Describe one change to the prototype that would stop balls from falling on the floor.

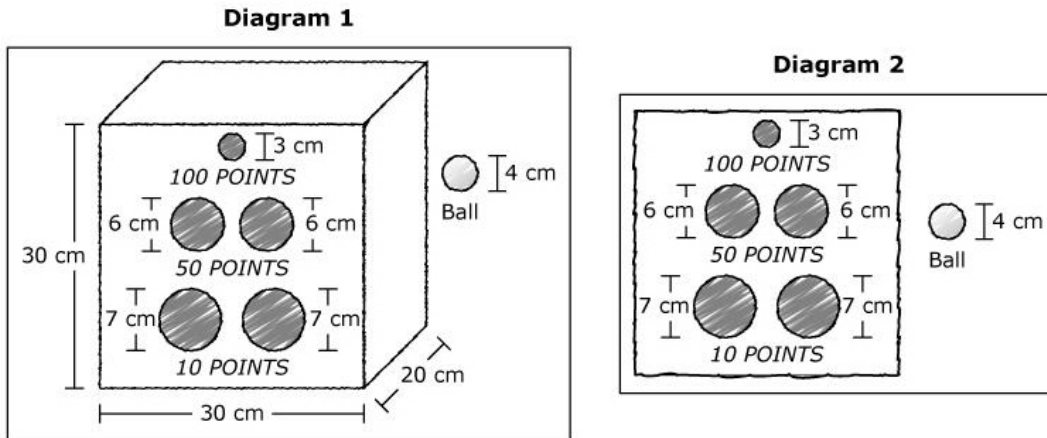
I think to stop balls from being on the floor, they could add a basket or a box underneath the game. Doing so will mean that any missed throws that bounce off the game will land in the box or basket under the game so there won't be any balls on the ground.

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Score Point 3B

This question has three parts.

Two students designed a game that involves throwing balls into holes in a box to earn points. The students drew two diagrams to represent the game design, as shown. One of the balls from the game is also shown in each diagram.



Part A

The students will build a prototype of the game.

Identify the **best** diagram for the students to use to build the prototype. Explain why the students should use this diagram.

The best diagram for students to use is Diagram 1 because it has the length, width, and height.

Part B

The students tested the prototype and realized they had made a mistake in their design. Players were supposed to be able to earn 10, 50, or 100 points with a single throw of the ball, but this was not possible.

Describe one change to the game design that could be made to correct this mistake. Be sure to use specific details of the change to the design in your answer.

The one change is the size of the 100 hole because it's 3cm and the ball's 4cm so the hole needs to be 5cm wide.

Part C

After the students corrected the mistake, they decided to test the game. The students placed the prototype on a table and played the game. They found that balls that did not go through the holes fell on the floor during the game.

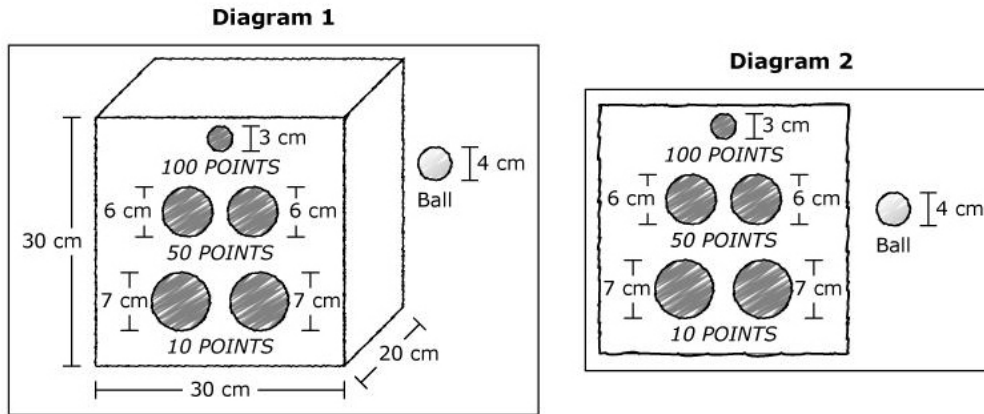
Describe one change to the prototype that would stop balls from falling on the floor.

One prototype is a net around it so the balls don't fall off.

Score Point 2

This question has three parts.

Two students designed a game that involves throwing balls into holes in a box to earn points. The students drew two diagrams to represent the game design, as shown. One of the balls from the game is also shown in each diagram.



Part A

The students will build a prototype of the game.

Identify the **best** diagram for the students to use to build the prototype. Explain why the students should use this diagram.

The best diagram for the students to use to build a prototype is Diagram 1 because its shows the cm of length,width and height.

Part B

The students tested the prototype and realized they had made a mistake in their design. Players were supposed to be able to earn 10, 50, or 100 points with a single throw of the ball, but this was not possible.

Describe one change to the game design that could be made to correct this mistake. Be sure to use specific details of the change to the design in your answer.

One change that the students can do to correct this mistake is make the ball 2cm so the students can score on 100 points because if the ball is 4cm and the 100 points is 3cm it would not be able to go in the hole for the 100 points one.

Part C

After the students corrected the mistake, they decided to test the game. The students placed the prototype on a table and played the game. They found that balls that did not go through the holes fell on the floor during the game.

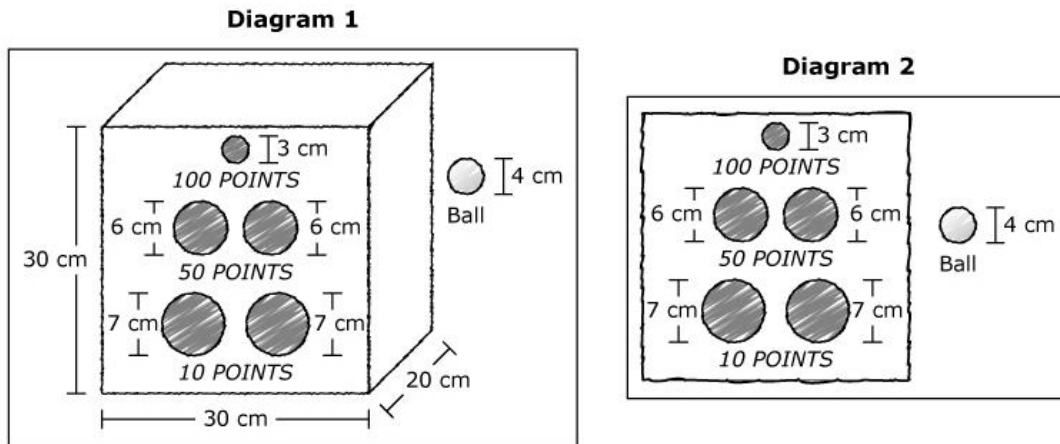
Describe one change to the prototype that would stop balls from falling on the floor.

One change to the prototyle that would stop balls from falling on the floor is making a table to stop the balls from going on thr floor.

Score Point 1

This question has three parts.

Two students designed a game that involves throwing balls into holes in a box to earn points. The students drew two diagrams to represent the game design, as shown. One of the balls from the game is also shown in each diagram.



Part A

The students will build a prototype of the game.

Identify the **best** diagram for the students to use to build the prototype. Explain why the students should use this diagram.

diagram 1 because it has all the dimensions.

Part B

The students tested the prototype and realized they had made a mistake in their design. Players were supposed to be able to earn 10, 50, or 100 points with a single throw of the ball, but this was not possible.

Describe one change to the game design that could be made to correct this mistake. Be sure to use specific details of the change to the design in your answer.

Make sure that they calculated right.

Part C

After the students corrected the mistake, they decided to test the game. The students placed the prototype on a table and played the game. They found that balls that did not go through the holes fell on the floor during the game.

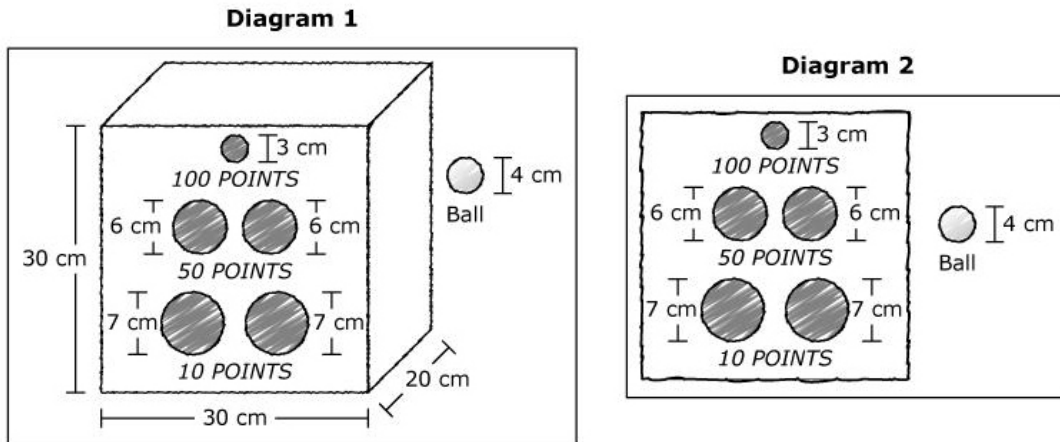
Describe one change to the prototype that would stop balls from falling on the floor.

Make sure there are no holes in the structure.

Score Point 0

This question has three parts.

Two students designed a game that involves throwing balls into holes in a box to earn points. The students drew two diagrams to represent the game design, as shown. One of the balls from the game is also shown in each diagram.



Part A

The students will build a prototype of the game.

Identify the **best** diagram for the students to use to build the prototype. Explain why the students should use this diagram.

the box needs holes so the ball could get in

Part B

The students tested the prototype and realized they had made a mistake in their design. Players were supposed to be able to earn 10, 50, or 100 points with a single throw of the ball, but this was not possible.

Describe one change to the game design that could be made to correct this mistake. Be sure to use specific details of the change to the design in your answer.

the points 10,50,100 it could be more high

Part C

After the students corrected the mistake, they decided to test the game. The students placed the prototype on a table and played the game. They found that balls that did not go through the holes fell on the floor during the game.

Describe one change to the prototype that would stop balls from falling on the floor.

if get the ball and throw it so hard it will fall