POINT OF VIEW

Presenting the task: The teacher should spend a brief period of time in an activity that involves imagining objects from different points of view. Three students (A, B, and C) should stand in the middle of the classroom while the other children stand around the edges of the room. A, B, and C should be separated from each other by a few feet. Some of the children on the outside then should be asked to describe the order in which they see the three children, from left to right. Mary, for example, might see them as B, A, C, while Altoria, on the opposite side of the room, might see them as C, A, and B. Then everyone (including A, B, and C) should be asked to describe what Manuel, another child on the outside, sees. The teacher can conclude with questions like, "Who are the children who see C in the middle?" "Who sees B directly in front of C?", etc.

Student assessment activity: The teacher should distribute the questions along with the playground map, which is on a separate page. He or she should read the story on the students' sheet as the students read it, being sure that everyone realizes that the story refers to the map. The students will record responses both on the map and on the instruction sheet, so both pieces of paper should be collected at the end.

Variants and Extensions: By adding more pieces of playground equipment or changing their relative positions, many variants of the task can be derived.

Another set of tasks can be created by asking the students to locate pieces of equipment on the playground so that certain views are possible. The teacher would say to the students, "As James rows around on the lake, he can see these views of the playground. Show where the fort, umbrella, merry-go-round, and tree might be so that these views would be possible."

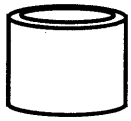
An extension suggested by the discussion of task design considerations above would be to put some identifying marks on the playground equipment so that one or more of the pieces would look different from different directions. For instance, one could put a single access door on the base of the fort.

[Source: Measuring Up Prototypes for Mathematics Assessment, Mathematical Sciences Education Board National Research Council]

POINT OF VIEW

Name _____ **Date** _____

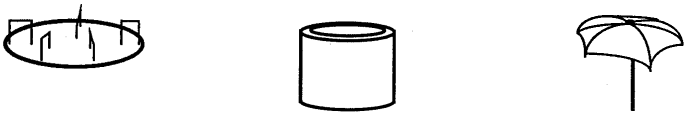
James has rented a rowboat to row in the pond around the playground. On the playground there are three pieces of equipment:

a play fort: 

an umbrella

and a merry-go-round:

Look at the map. Find James in his boat. Imagine how the playground looks to James. From where James was, the playground looked like this:



The merry-go-round was on the left, the umbrella was on the right, and the fort was in the middle.

1. James rowed in the pond for a while. When he looked at the playground a second time, this is what it looked like:

Figure out where James was when he saw the playground this way. Draw a dot there and label it **A**.

[Source: Measuring Up Prototypes for Mathematics Assessment, Mathematical Sciences-Educational Board National Research Council]

2. Then James rowed some more. He came to another spot, and stopped. When he looked at the playground from this spot, it looked different. From here, the playground looked like this:

Where was James now? Please draw another dot on the map to show where James was and label it **B**.

3. James really enjoyed rowing, so he rowed some more and explored some more. After a while he was at the spot marked **C**.

   Please draw the fort, the umbrella, and the merry-go-round in the space below, to show the way the playground looked to James when he looked at it from the spot marked **C**.

4. It was a warm, pleasant day, and James thought that maybe he would keep on rowing all afternoon. He rowed to a new spot on the pond. When he looked toward the playground, he was suddenly surprised. He could no longer see the umbrella! All he could see was the fort on the left, and the merry-go-round on the right.

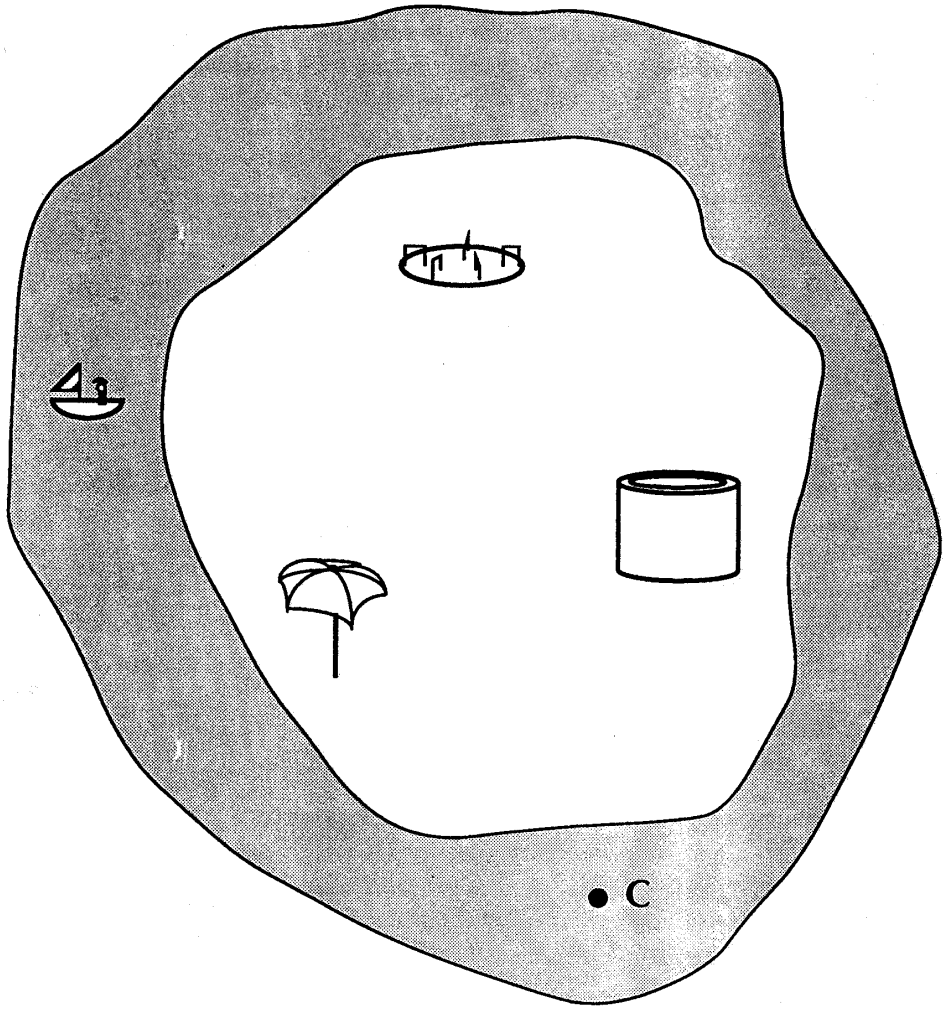
   Please draw a dot on the map to show where James was when he discovered that he could not see the umbrella. Label it **D**.

5. Do you think that James could row to a spot on the pond where he sees the fort on his left and the umbrella on his right, but he can't see the merry-go-round? _____ Please explain how you know.

[Source: Measuring Up Prototypes for Mathematics Assessment, Mathematical Sciences-Educational Board National Research Council]

Name _____ **Date** _____

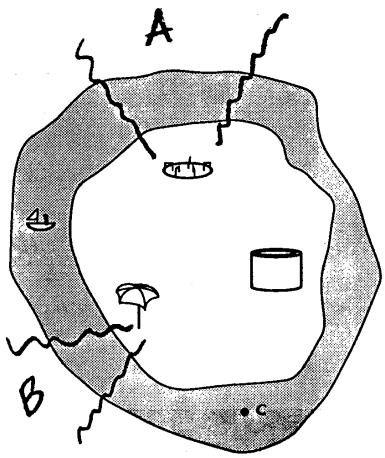
Map of the Playground

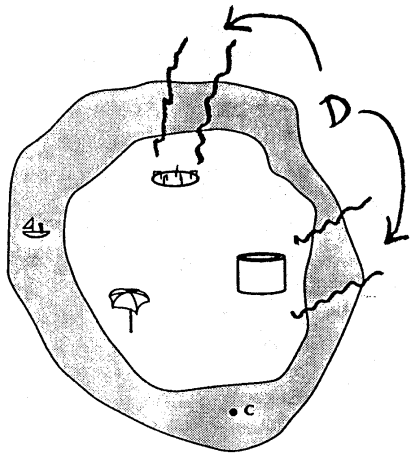


[Source: Measuring Up Prototypes for Mathematics Assessment, Mathematical Sciences-Educational Board National Research Council]

Protorubric

The pictures below show where the dots for A, B, and D could be placed. See the following pages for additional details.



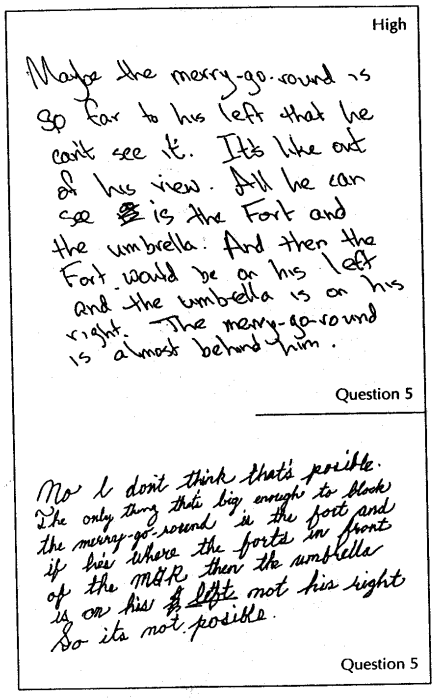


Characteristics of the high response:

The response shows that there is a firm connection between the playground map representation of the situation and the pictures from James' viewpoint.

The dots are all labeled within the limits indicated in the answer key above. (Note that a location for D in which the fort blocks the umbrella is preferable to one in which the merry-go-round is not tall enough.) The pictures in question 3 are drawn in the correct order, although the individual drawings can be just good enough to be recognizable.

The explanation for question 5 is well reasoned. Ordinarily, in a high response, the child says "No," and explains that if the fort is on the left and the umbrella on the right, then the merry-go-round has to be in front of both of them.



High

Maybe the merry-go-round is so far to his left that he can't see it. It's like out of his view. All he can see is the Fort and the umbrella. And then the Fort would be on his left and the umbrella is on his right. The merry-go-round is almost behind him.

Question 5

No I dont think that's posible. The only thing that big enough to block the merry-go-round is the fort and if his where the forts in front of the M&R then the umbrella is on his ~~left~~ not his right So its not posible.

Question 5

[Source: Measuring Up Prototypes for Mathematics Assessment, Mathematical Sciences-Educational Board National Research Council]

Other high responses will be more inventive: "If the boat is where the view of the merry-go-round is blocked by the fort, then James will see the fort on his left and the umbrella on his right if he stands on his head." An unanticipated response like this shows a mature ability to visualize!

Characteristics of the medium response:

The response shows an overall grasp of the situation; at most, one of the responses to questions 1 through 4 is incorrect.

The response to question 5 is correct, (No), but the explanation is inadequate. For example, "I couldn't find a place where that would happen."

Characteristics of the low response:

Low

I DONT KNOW - JAMES SEES 3 THINGS ALL THE TIME. HE ROWS AROUND AND AROUND.

Question 5

There is some understanding of the relationship between the playground map and the views that James sees from various places on the lake, but it is tenuous.

At least one of the answers to questions 1, 2, and 4 are within the bounds specified at the beginning of the protorubric.

[Source: Measuring Up Prototypes for Mathematics Assessment, Mathematical Sciences-Educational Board National Research Council]