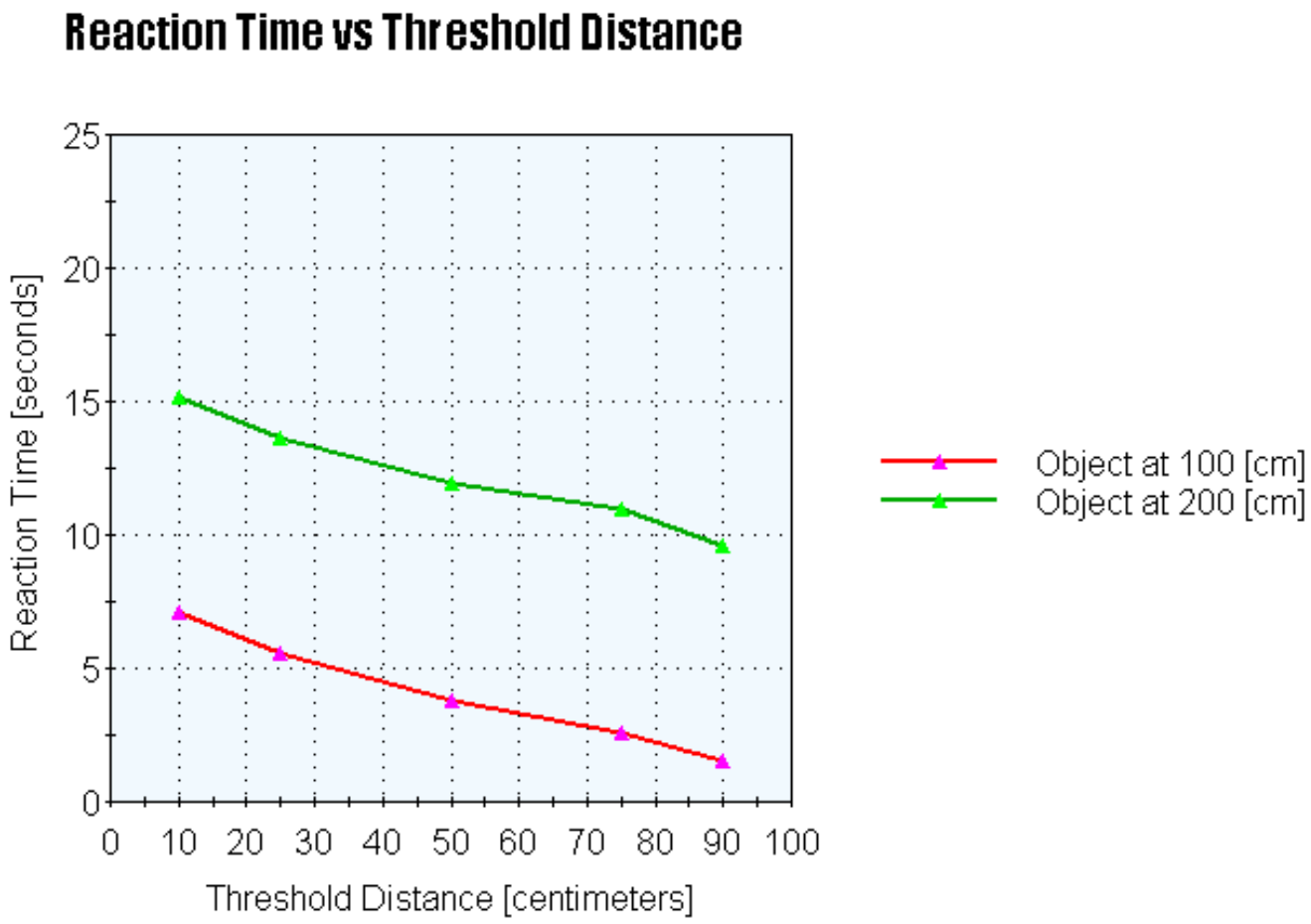
Name: _____ Date: _____ Class: _____

Echolocation Activity Datasheet Example Answers

Original Design—Data Gathering 1

Threshold	Reaction time for object at 100 cm	Reaction time for object at 200 cm
10 cm	7.1 secs	15.2 secs
25 cm	5.6 secs	13.6 secs
50 cm	3.8 secs	11.9 secs
75 cm	2.6 secs	11.0 secs
90 cm	1.5 secs	9.6 secs

Where is your ultrasonic sensor attached on the robot? Circle one: **rear** **middle** **front**



Analysis Notes

After your analysis of the gathered data from your team and other teams, what redesign adjustments will you make to optimize the robot's ability to avoid the obstacle?

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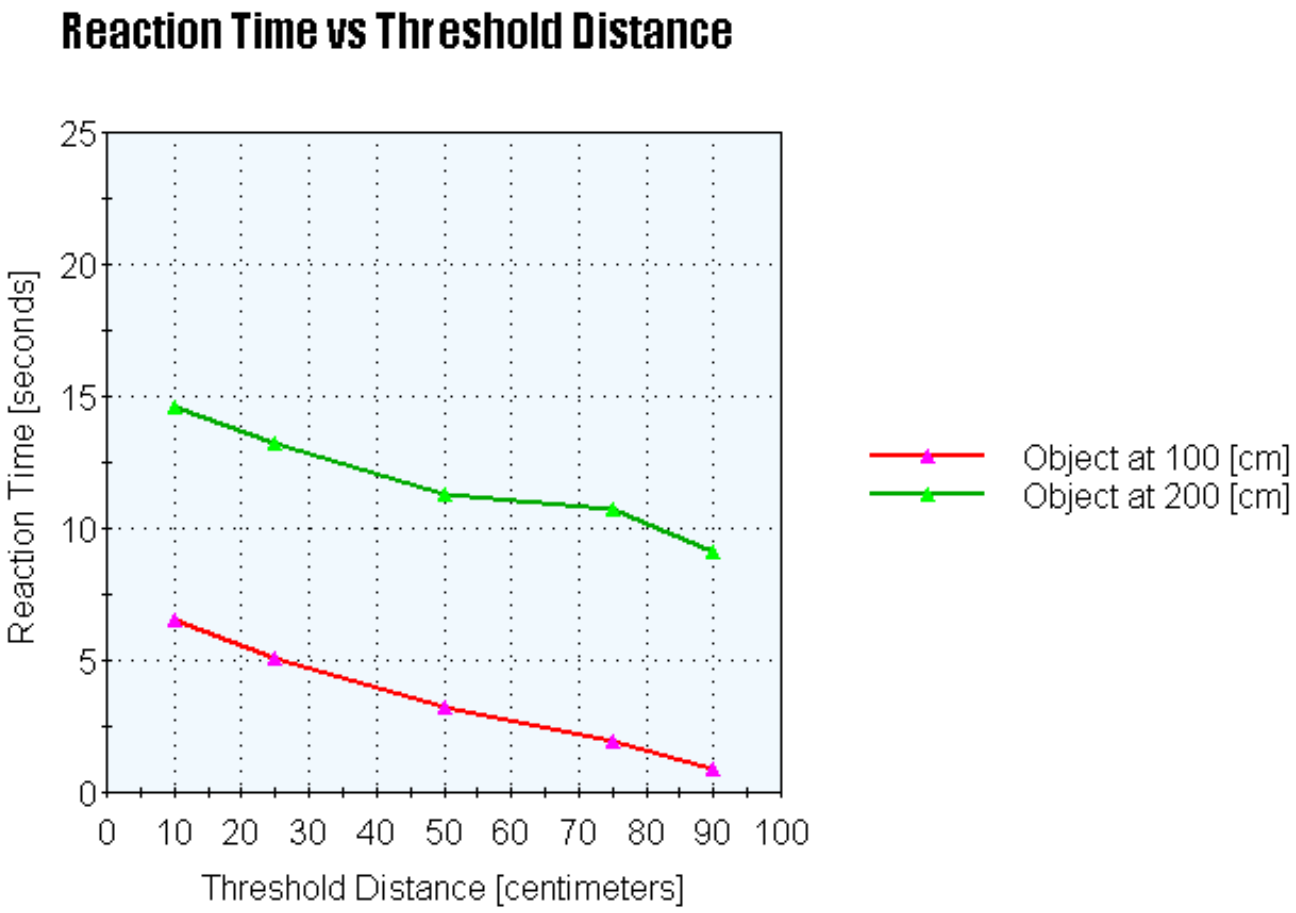
Redesign—Data Gathering 2

Threshold	Reaction time for object at 100 cm	Reaction time for object at 200 cm
10 cm	6.5 secs	14.6 secs
25 cm	5.1 secs	13.2 secs
50 cm	3.2 secs	11.3 secs
75 cm	1.9 secs	10.7 secs
90 cm	0.9 secs	9.1 secs

Where is your ultrasonic sensor attached on the robot? Circle one: **rear** **middle** **front**



Evaluation Notes

Look at the new data gathered. What changed? What conclusions can you draw?

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Evaluation Questions

1. Do the redesign results show faster or slower response times than the original design response times?

   Example answer: The redesign results show faster response times than the original design response times. The amount is small, but still noticeable.

2. Please justify your answer as to why the response time was faster or slower with reference to what may have changed with the robot.

   Example answer: I believe the response time was faster in the redesign because the ultrasonic sensor was closer to the object, thus allowing it to detect the obstacle sooner than the original design.

3. You have two bats. Bat 1 has the response times listed in the original design data table and Bat 2 has the response times listed in the redesign data table. Assuming the object is a predator, which bat has a higher chance of survival and why?

   Example answer: Bat 2 would have a greater chance of survival because it would be able to react to a predator more quickly than Bat 1.