

THE HULA HOOP EXPERIMENT

(Going Around in Circles)

INSTRUCTION SHEET

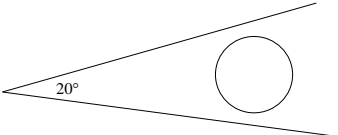
In this activity, one of your group will walk around a hula hoop(circle) in front of a CBR. Before each walk, your group will predict what the graph will look like.

Equipment

- CBR/CBR2 and TI83+/84 graphing calculator
- piece of cardboard or Bristol board
- measuring tape or metre stick
- hula hoop or masking tape

Setup

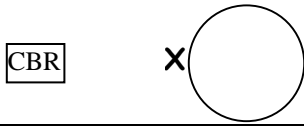
- Work in groups of three. The three jobs are

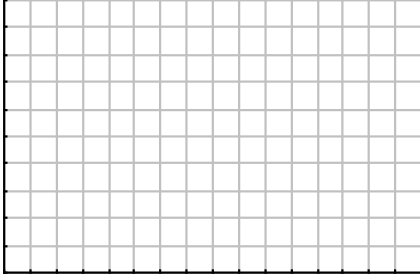
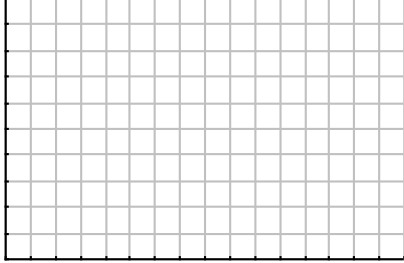
Walker	Circle Counter/Recorder	Equipment Operator
<ul style="list-style-type: none"> • Use the hula hoop to be sure that you walk in a circle • Hold a piece of cardboard stiffly, in front of you, so that the CBR has a hard surface to track. • Walk at a steady rate around the circle; face the CBR at all times.  <p>Remember not to get closer than 0.5 m.</p>	<ul style="list-style-type: none"> • Measure the diameter of the circle, and the distance from the circle to CBR. • Sketch the group's prediction for the graph. • Count the total number of circles walked for each walk. • Copy the graph from the calculator to graph paper. 	<ul style="list-style-type: none"> • Run the Ranger program and set the CBR to run for 15 seconds <p>OR</p> <ul style="list-style-type: none"> • Use EasyData with the CBR2, under Setup choose 2: Time Graph..., then choose 0.05 s for the sample interval and 300 for the number of samples (= 15 seconds) • Ensure that the path of the walker is within the cone that the CBR can track

Perform different walks according to the directions on the recording sheet. Remember to sketch your prediction for the graph before each walk and then copy the graph from the calculator after each walk.

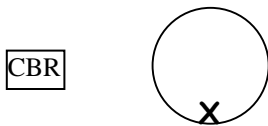
Hula Hoop Recording Sheet

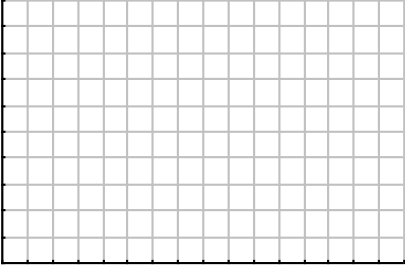
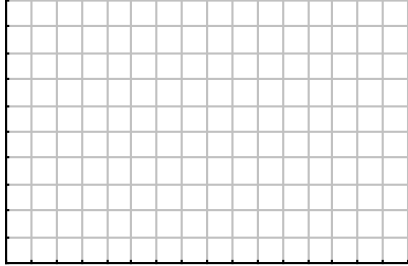
1. a) Walk in a circle around the outside of the hula hoop at a steady rate, starting at the "X" position.

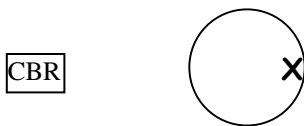


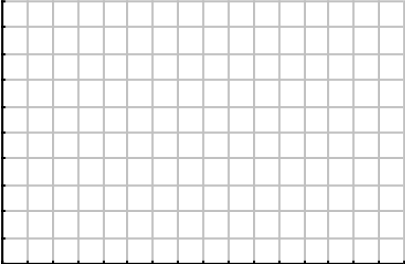
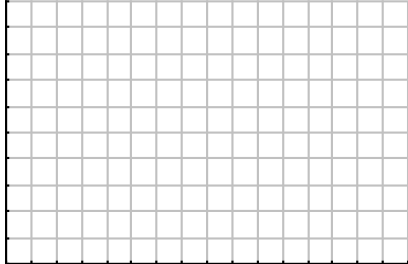
Prediction	Actual
	

b) Repeat the experiment starting at different locations, as shown below.

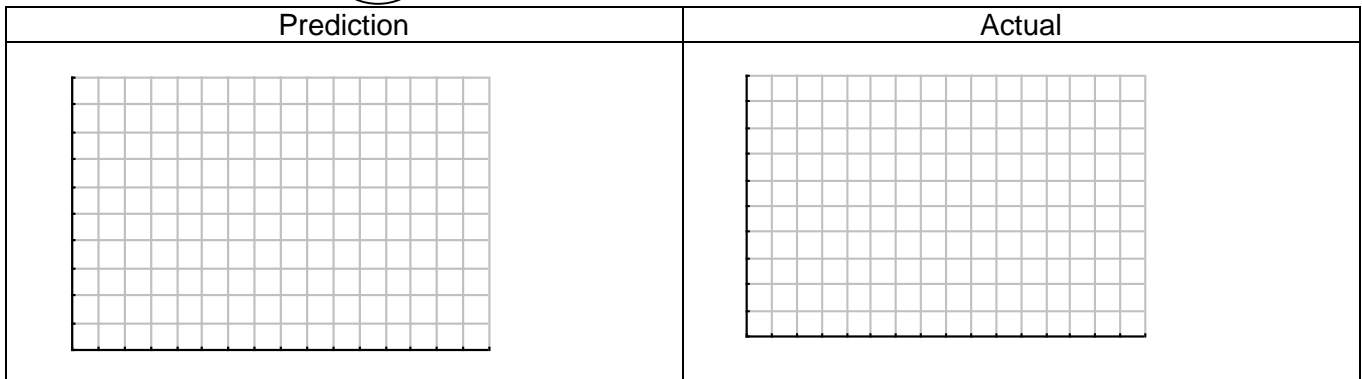
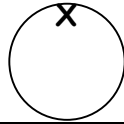


Prediction	Actual
	



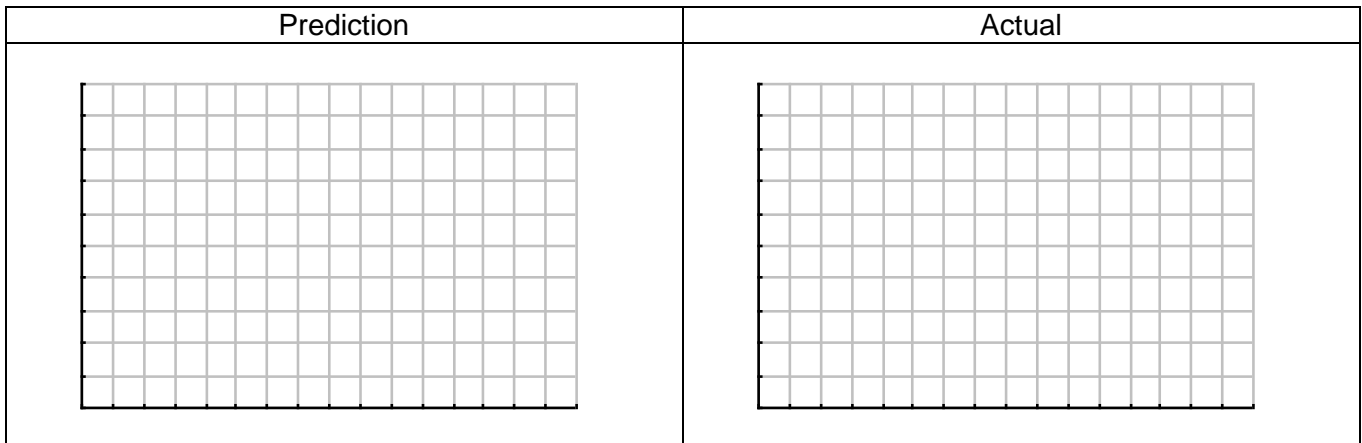
Prediction	Actual
	

CBR



c) Compare these graphs to the graph in the first experiment.

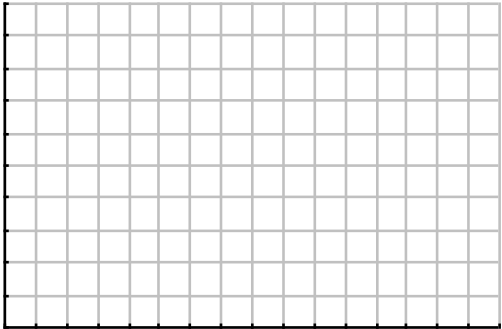
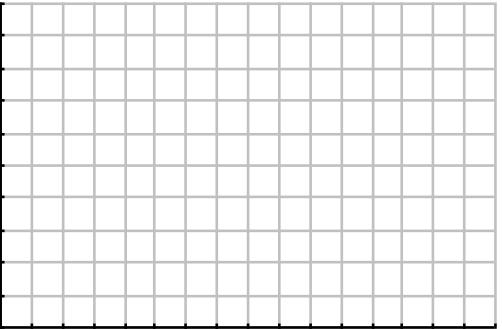
2. Repeat the experiment walking at a faster steady rate.



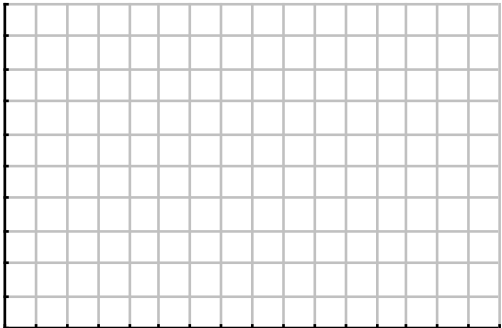
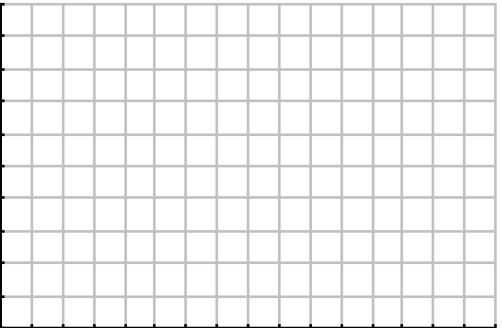
3. a) How would you walk to stretch the graph out? Explain your thinking.

b) How would you walk to compress the graph? Explain your thinking.



4. Perform the walk going in the opposite direction.

Prediction	Actual
	

5. Walk on the outside of the hula hoop.

Prediction	Actual
	

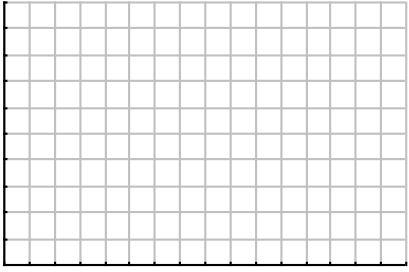
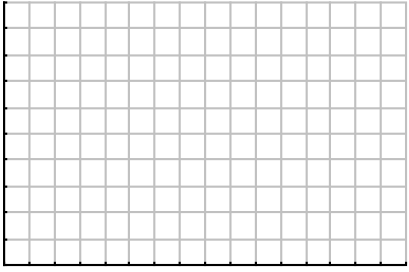
6. Change the distance between the circle and the CBR. Don't forget to measure the new distance.

Prediction	Actual
	

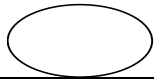
7. (Time permitting) Change the walk to an elliptical pattern. Note: This will work better if the person walking holds the CBR and faces a wall. Predict how the graph will change.

CBR



Prediction	Actual
	

CBR



Prediction	Actual
