STEM Club
Challenge 2

Design, build, and animate a Centripetal Ride similar to the Carousel at Busch Gardens Williamsburg.

- Centripetal means 'center-seeking' and is the force that is acting on the carousel. The platform upon which the horses and people are riding is the centripetal force that keeps them traveling in circular motion. As long as the ride is moving slowly enough, the centripetal force of the platform can keep everyone and everything on board. In theory, if the carousel starts moving really fast, centrifugal force* ('center-fearing') takes over and breaks the hold the platform (centripetal force) has on the riders and the riders will fly off. (Amusement Park Rides & Physics, 2015)

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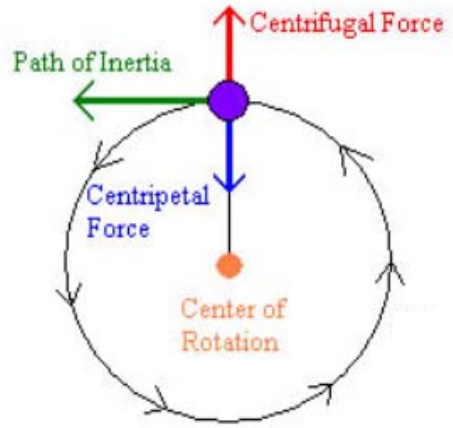


Lesson Contributed by: M. Weidinger

Funded through a 2015 State Council of Higher Education for Virginia (SCHEV) grant, PISTEM II.

Considerations:

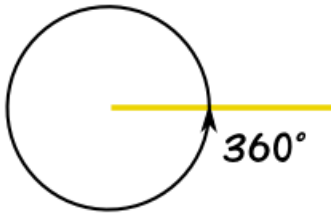
Size of Model

The ride model, without the que area (the area where riders line up and wait to get on the ride), must be at least 10 inches in diameter but may not exceed a 15 inch by 15 inch footprint.

There are no height restrictions.

Animation:

The motion of the centripetal ride will be accomplished using the Motor



Which offers 360 degree continuous movement.

A centrally located, vertically mounted motor will require the ride to be balanced and symmetrical.

Structure Requirements:

The outside structure of the ride, for safety considerations, must be stationary. The ride itself must revolve within this solid structure but must be completely visible from all views.

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Structure Considerations:

If additional functions such as lights, vibration, or sensors are used, you must consider that wires will twist if these functions are incorporated in the moving component of the ride. Consideration should be given to mounting these to the outside stationary structure.

Sound Requirements:

Ride must have a musical component to entice younger riders to ride.

Aesthetic Requirements:

All motors and wires, other than the main feed wires to the circuit board must be concealed.

In an effort to track the amount of supplies and robotic components we are using, (solely for the purpose of making sure we do not run out) please track all supplies used or wasted on the following tally sheet.

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Centripetal Ride Material List

ITEM	TALLY	TOTAL USED
Hot Glue Sticks		
Craft Sticks		
Construction Paper (full sheets used)		
Pipe Cleaners		
PomPoms (each)		
Googley Eyes (x2)		
Pencil		
String/wire (1 foot)		
Duct Tape (1 foot)		
Scotch Tape (1 foot)		
Zip Tie		
Styrofoam Ball		
Toilet Paper Roll		
Cardboard (by approx. square foot		
Servo		
Motor		
LED light		
TriColored LED light		
Vibration Motor		
Sensor		

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Centripetal Ride Design

Group Number: _____

CATEGORY	4	3	2	1
Completion	The entire project is complete.	Most of the project is complete.	Half of the project is complete.	Less than half of the project is complete.
Measurements	In the dormant (ride not running) position, the ride model does not exceed the 15 inch by 15 inch footprint. (225 square inches)	In the dormant (ride not running) position, the ride mode slightly exceeds the 15 inch by 15 inch footprint. (225 square inches)	In the dormant (ride not running) position, the ride model exceeds an 18 inch by 18 inch footprint. (More than 324 square inches)	In the dormant (ride not running) position, the ride model exceeds an 19 inch by 19 inch footprint (More than 361 square inches)
Use of Hummingbird Robotics	Robotic accessories used in a proper fashion. More accessories were used than just a motor or a servo.	Robotic accessories used in a proper fashion. Accessories used were just a motor or a servo.	Robotic accessories used in a proper fashion. Programming was done but motors and servos not attached.	Did not have an opportunity to program the robotics.
Design	Ride is well organized and attractive to the eye. All wires, motors, servos, and circuit board are not visible.	Ride is organized and attractive to the eye. Most of the wires, motors, servos, and circuit board are not visible.	Ride is somewhat organized. Many of the wires, motors, servos, and circuit board used are visible.	Ride still in basic construction phase.
Planning Document	Every step was planned and document was completed.	Every step was planned, document was not completed	All steps were not planned and document was partially completed.	No planning was done and document was not utilized
Use of Music	Music starts when ride commences and ends appropriately. Appropriate type of music used.	Music starts when ride commences but does not end at the appropriate time.. Appropriate type of music used.	Music does not starts when ride commences and does not end at the appropriate time.. Appropriate type of music used.	No attempt to use music was made.
Supply Tracking	All materials including waste was tracked, tallied and totaled on tracking sheet.	Materials were tracked, tallied and totaled on tracking sheet but waste was not accounted for.	Not all materials were tracked, tallied and totaled on the tracking sheet.	Tracking sheet not utilized.

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