

Module 3: Motion in Two Dimensions

Module 3 Assessment

Imagine that an entertainment company is coming to Hampton Roads to build the latest in family-friendly theme parks. Along the main street in Physics Land, they intend to have an arcade containing unique new games to entertain and challenge visitors. (These are the types of attractions that normally reward successful guests with stuffed animals or inflatable toys, but here in Physics Land, the winners will receive scientific calculators instead!) You have been hired by the company to develop two physics-based games at least one of which involves circular motion and at least one involves projectile motion (they can include both).

For each game, you must include:

1. An original name for the game/challenge.
2. A clearly labeled diagram or illustration, with dimensions (measurements) of relevant features.
3. A description of the objective of the game and the physics principles involved.
4. A mathematical analysis of how a guest will successfully complete the challenge and beat the game.

Remember, you are not to simply copy something you've seen, but instead must come up with two original physics-based ideas.

Follow the rubric below to help you complete the assignment and to understand how your work will be graded.

Complete your project and submit electronically to your instructor.

Rubric

Points	5	4	3	2	1
Overall originality of concept	Two games that integrate both circular and projectile motion and which both demonstrate creativity and engage the reader	Two games that integrate both circular and projectile motion, which are mildly creative or engaging.	Two games that partially integrate circular and projectile motion, or which are not overly creative or engaging.	Project contains only one fully-developed game that covers both circular and projectile, or two games that are missing either circular or projectile motion.	Games clearly copied and lacking originality. Games fail to demonstrate both circular and projectile motion. Concepts not fully developed.
Diagrams and illustrations	Diagrams and illustrations are neat, effectively present the game and its functions, and include all relevant	Diagrams and illustrations present the game and its functions, and include most relevant dimensions, but would	Diagrams and illustrations are mostly complete, but contain some confusion and/or are missing some relevant	Diagrams and illustrations are somewhat unorganized and are missing key dimensions and are not effective in	Diagrams and illustrations missing or completely failing to present the game and its functions.

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	dimensions and measurements. Could be directly handed over to a carpenter to produce a completed attraction.	need additional development before handing over to a builder.	dimensions. Not ready for build team.	representing the game and its functions.	
Descriptions of objectives and physics principles	Descriptions clearly present objectives of game and physics principles involved and demonstrate that game makes excellent use of projectile and circular motion concepts.	Descriptions mostly clear in presenting objectives of game and physics principles involved and demonstrate that game makes sufficient use of projectile and circular motion concepts	Descriptions lacking one or more key aspects of situation, but do provide mostly accurate discussion of objectives of game and physics principles involved	Descriptions demonstrating some understanding of projectile and circular motion, but missing key aspects.	Descriptions not included or lacking in demonstrating knowledge of relevant physics
Analysis and Calculations	Analysis clearly presented and includes detailed calculations of projectile and circular motion	Analysis presented mostly clearly with acceptable calculations of projectile and circular motion of somewhat reasonable magnitudes	Analysis contains one or more minor errors, yet mostly presents projectile and circular motion of reasonable magnitude	Analysis not clearly presented, but projectile and circular motion represent unreasonable magnitudes	Analysis missing or resulting in unreasonable projectile and circular motion