



# Sock It To 'Em - Bumper Cars



## Activity Purpose

With bumper cars, it is all about the collisions! In this activity, you will look at the design features of this ride and use math and science to figure out what factors maximize the ride's most endearing quality – the 'bounce!'

## Ride Data

- Car length
- Car width
- Car height with pole
- Car horsepower
- Riding area (Both inside dimensions and outside dimensions)

## Materials Needed

- calculator
- pencil or pen

## Before You Ride

Make and record some observations about how this ride is set up; specifically:

- What do you notice about the bumper car arena? What features does it have?

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- What is the shape of the riding area?

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- What are the dimensions of the space?

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- How many bumper cars occupy the arena?

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How much driving space is available? Use the information in the data bank to estimate the percentage of space not occupied by cars and 'undrivable' areas.

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## Use the space below to make a quick sketch of a bumper car.

- What design features do the cars have to make the ride exciting for the riders?

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- What design features does it have to keep riders safe?

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## As You Ride

Pay attention to what it feels like when you engage in different kinds of collisions.

What happens to you and your car when your car is hit head on, on the side, and from the back?

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What factors determine the differences you feel when a collision occurs? Specifically, how do differing masses and velocities affect the 'bounce' passengers experience?

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## After You Ride

Observe what happens to a 'bumped' car when it is hit; notice the distance and direction the car moves.

When one car collides with another, momentum is transferred by impulse from one car to another. Why is there no damage to the bumper car?

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Besides limiting damage, why is it important for bumpers to be soft? Use your understanding of impulse and transfer of momentum to explain.

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## In Summary

Imagine someone interested in designing bumper cars approached you for advice on how to design a bumper car that was both fun and safe. What three recommendations would you make? Use findings from this activity to support your recommendations.