

Robot Physics Training Timeline

MVRT
2011 – 2012 Season

Set Up

Set up the projector and the tables should be set up as stated below. (10 minutes)

Presentation

There are 9 slides in the presentation about robot physics as well as activities that go with it. Do the activities as you go through the concepts. The activities are also included in the Power-Point. (60 minutes)

Activity

There are multiple activities, one for each of the main concepts.

Activity 1: Torque + COG

Activity: Have students lift up PVC pipes of different sizes and at different points to see the difference in the amount of force it takes to make the PVC pipe from horizontal to vertical

Points to review:

- Low COG is important for balance because it moves forward as weight moves forward
- Torque makes it difficult to push up so pivot your hands to make it easier to push up
- Tradeoff are important— A longer piece is harder to manipulate but it can be lifted higher

Activity 2: Friction + Inertia

Activity: Move two objects across the gravel outside and on the tile floor

Points to review:

- Gravity and friction prevent you from moving the boxes
- Inertia—Larger box stays in motion for greater time, especially when there is a lot of speed
- Friction—If you were to move the box outside it would be harder

Activity 3: Bike

Activity: Put a bike upside down and demonstrate a bike in low and high gear and show that one pedal in low gear means few rotations and a pedal in high gear means more rotations

Points to review:

- A higher gear creates more torque and less speed, meaning it takes less time to reach the destination but greater energy
- In lower gears there is more torque so it is easier to travel uphill

Clean Up

Answer any last minute questions and put everything back where it came from. (10 minutes)