

The Science of Racing

No Free Lunch

Activity 3: No Free Lunch,
Additional Assessment:



Assessment:

- What is the difference in work and power?
- How would you describe the relationship between voltage and work for the car you tested? Quantify your answer.
- The car moves 30 ounces of added weight up the ramp at 70 inches per second for the first 10 runs of 120 inches each (total 100 feet). As the voltage dropped, the car moved the same weight at only 50 inches per second.
- Did the amount of work change in the second 10 runs?
- Did the amount of power change in the second 10 runs?
- Sketch a diagram that shows what happened to the voltage with respect to time during the investigation.

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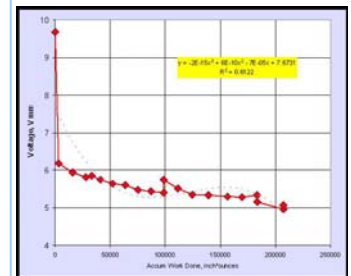
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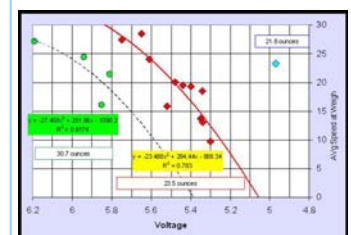
- What is the difference in work and power?
 - *Power is dependent on time. It is work done in some amount of time.*
- How would you describe the relationship between voltage and work for the car you tested? Quantify your answer.
 - *There are several interesting points to note: overall, the voltage declines inexorably with continuing use; if the RC cars are turned off and allowed to “rest” for an hour or two the battery voltage “recovers” slightly (see the jump at 100,000 inch*ounces); and if the cars are left on but not actively used, the voltage decays because the radio part of the RC car system is using electricity as long as the car is turned on (note the drop in voltage in the area of 180,000 inch*ounces).*
 - *In the sample data it was necessary to reduce the weight of the car after the first 5 runs (the RC car would not climb the incline). With the reduced weight it was possible to make numerous runs (dozens).*
- The car moves 30 ounces of added weight up the ramp at 70 inches per second for the first 10 runs of 120 inches each (total 100 feet). As the voltage dropped, the car moved the same weight at only 50 inches per second.
- Did the amount of work change in the second 10 runs?
 - NO
- Did the amount of power change in the second 10 runs?
 - Yes
- Sketch a diagram that shows what happened to the speed of the vehicle with respect to drop in voltage during the investigation.

voltage



work done

speed



voltage