

HYBRID VEHICLE



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HYUNDAI MOTOR COMPANY

The car company Hyundai is extremely devoted to finding the most cost efficient and environmentally friendly cars as possible. The industry is now holding an open call for submissions to find a proposal that will follow their priorities, as well as being innovative in the design. Hyundai is requesting help to create the company's new vehicle that will have a physical energy storage system to move the car, other than electricity. Hyundai believes that one of our cars will win.

REQUIREMENTS AND OBJECT OF THE PROJECT

- Design, build and present a proposal for a mechanism that can store energy and move similarly to a vehicle
- Transfers and converts stored PE into forward motion of KE
- PE can be any source of energy besides chemical and nuclear
- Travels as close to 5 meters as possible on a smooth linoleum floor without modification to the floor
- How easily and quickly the car can carry 100 pennies (250 g)
- Cost efficient

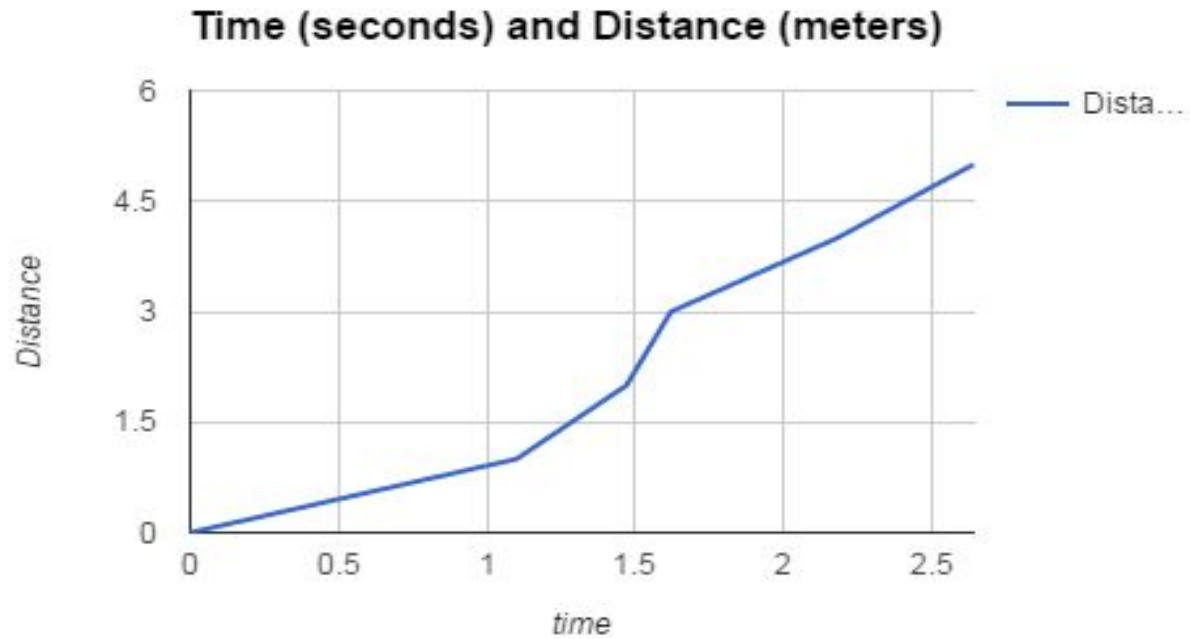
MATERIALS

- 4 CD's
- 10 wood planks of a variety of size
- 16 rubber bands
- Several nails
- 3 wood pegs
- 4 bumpers
- Power tools
- Hot glue

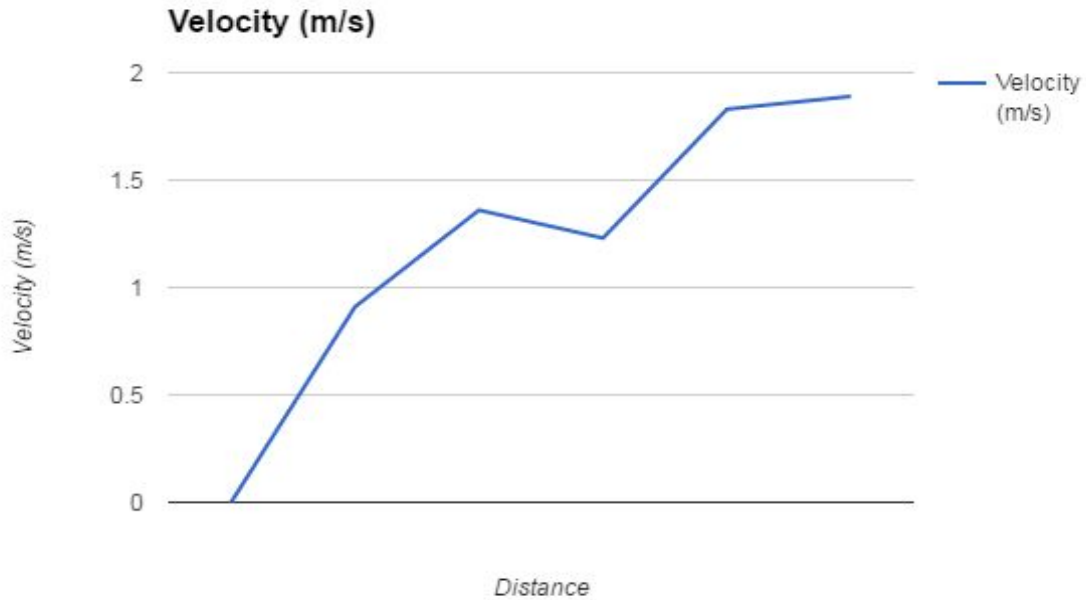
TIMELINE

11/1	11/2-11/3	11/4	11/7-11/11	11/14-11/16	11/17-11/18
Learned about project's objective and requirements for Hyundai	Had final plan for proposal and begin blueprints	Had blueprints for all three sides of vehicle and began planning for building process	Found all materials and began trying to create a rough vehicle	Finished all parts of car and began test runs Created proposal and short presentation	Finished project and presented

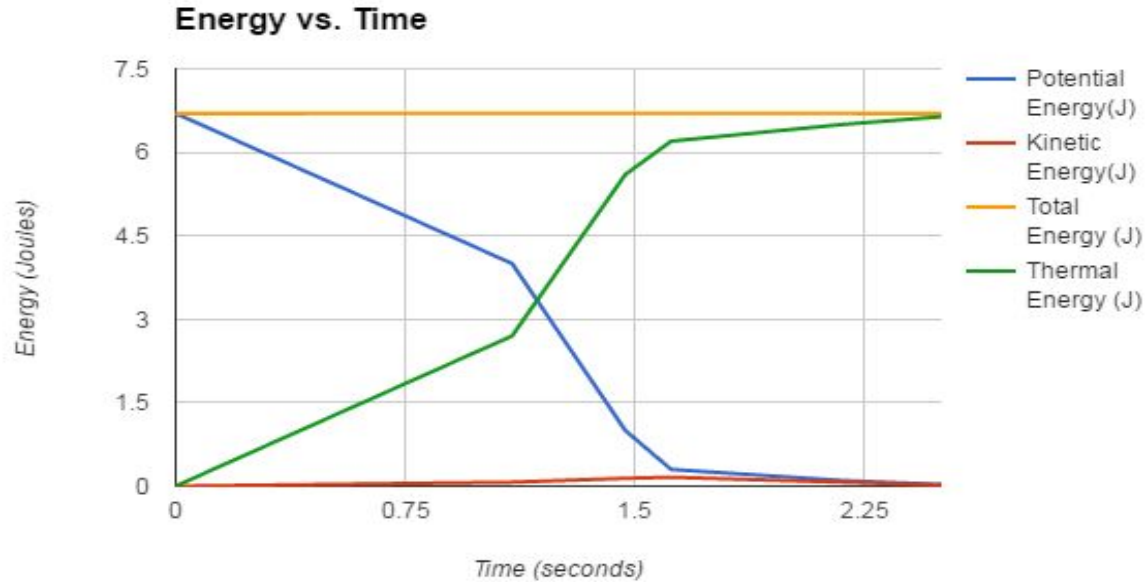
DISTANCE VS. TIME



TIME VS. VELOCITY



ENERGY VS. TIME



COST

With all new materials created across the globe, the car will be around \$25 for the prototype size total, no money needed for gas and free repair!



WEIGHT

With the top of the brand materials we used, the car prototype only weighs 0.7 kilograms, or 1.54 pounds.

WHY YOU SHOULD BUY OUR CAR

- Environmentally friendly (no fossil fuel emission)
- Can be used by anyone (simple to use)
- Cheap price of only \$25
- Aesthetically pleasing
- Easy to control and accelerate/brake
- Extremely entertaining for all
- No battery/engine that is ridiculously expensive to refill
- Made from durable materials and fantastic technology

CALCULATIONS

$$C = \frac{0.08}{0.11}$$

$$C = 0.7m$$

~~Worked~~ ~~Work~~

air compressed = 0.46m
 compressed = 1.89m
 $\Delta = 1.41m$

$$k = \frac{9.8N}{1.41m}$$

$$k = 6.95 \frac{N}{m}$$

PE spring = $\frac{1}{2} k x^2$
 PE spring = $\frac{1}{2} \times 6.95 \times 1.89^2$
 $PE_{spring} = 12.35$

~~V = 0.0~~
~~V = 0.0~~
~~V = 0.0~~

PE spring = $\frac{1}{2} k x^2$
 PE spring = $\frac{1}{2} \times 6.95 \times 1.4^2$
 $PE_{spring} = 6.7J$

$$V = 0.6m/s$$

$$a = \frac{\Delta V}{\Delta t}$$

$$a = \frac{0.6m/s}{9.0s}$$

$V = \frac{\Delta D}{\Delta t}$ velocity

$$a = \frac{\Delta V}{\Delta t} \quad a = \frac{0.53m/s}{9.0s}$$

$$V_{initial} = \frac{1}{1.6} = 0.6m/s$$

$$a = 0.06m/s^2$$

$$V_{final} = \frac{1}{2.01} = 0.37m/s$$

SPRING CONCEPT (k)

$c=0.7$ m

Uncompressed spring=0.48 meters

Compressed spring=1.89 meters

1.89 m - 0.48 m = 1.41 m

$K = \text{Force} / \text{distance}$

$K = 9.8$ N / 1.41 m

$K = 6.9$ N/m

POTENTIAL ENERGY OF THE SPRING

$$PE_{\text{spring}} = \frac{1}{2}(\text{spring constant})(\text{elastic PE})^2$$

$$PE_{\text{spring}} = \frac{1}{2} kx^2$$

$$PE_{\text{spring}} = \frac{1}{2} (6.9 \text{ N/m})(1.4 \text{ m})^2$$

$$PE_{\text{spring}} = 6.7 \text{ J}$$

VELOCITY

Velocity=change in distance/change in time

$$V=d/t$$

$$V=5\text{m}/9.01\text{ s}$$

$$V=0.6\text{ m/s}$$

ACCELERATION

acceleration=change in velocity/change in time

$$a=v/t$$

$$a=0.6\text{meters per second}/9.01\text{ s}$$

$$a=0.06\text{ m/s}^2$$

WATCH IT WORK

