The Car: A Build Project

SPH4C

Individually or with a partner, you are to construct a vehicle powered by a DC motor, which should be powered by a maximum of 12V. (You may not use chemical power!)

Evaluation Checklist

For a mark of 100%, your vehicle must:

____ be designed by you and not pre-constructed
(using components like K-NEX wheels is acceptable, however)
____ have an on/off switch connected to the motor
____ have a power supply that can be replaced if necessary
(i.e. you have to be able to easily change the batteries)
____ move forward continuously when the motor is switched on
____ be sufficiently durable to work reliably (i.e. every time it is turned on)

FAQ: Does the motor have to power the wheels directly?
Answer: No, you may use the motor to power a fan or similar device instead.

10%/each bonus will be awarded for the cars:

- with the fastest straight-line acceleration, as determined in a short-distance race
- that can climb the steepest 1-m slope
- that can carry the most weight over a 3-m distance

You will have to consider many practical physics questions when designing your vehicle such as:

- How can you reduce internal frictions and maximize the friction between the wheels and the ground?
- How can you sufficiently power your vehicle and yet still keep the mass low to maximize acceleration?
- How can you most efficiently convert the rotational kinetic energy of the motor to the linear kinetic energy of the car?

It is strongly recommended that you consider (and possibly research) all questions of the design *before* you begin construction.

You are to bring your vehicle or all materials you will need to construct your vehicle to class on Monday next week. Students that do not have materials in class will be assigned other work. The vehicle is to be ready for presentation on Wednesday of the same week.

<u>If you work with a partner:</u>
Both partners must make a significant contribution to the final product.
Partners may or may not receive the same mark, at the discretion of the teacher.

The Plan:

Where are you going to acquire your motor? _____

Where are you going to acquire your switch? _____

Where are you going to acquire your wiring? _____

What type of batteries are you going to use? Will you need a case for the batteries?

_____

What are you going to use for the car body? _____

_____

What are you going to use for wheels? _____

What are you going to use for axles? _____

How is the motor going to make your car move? (Be specific.)

_____

_____

_____

When do you plan to do the construction? _____

Draw an label a diagram of your planned vehicle:

Teacher's Initials: _____