Background Research

**Battery Electric Vehicles (BEV):**

BEVs are (generally) referring to vehicles that run entirely on the stored chemical energy in lithium ion batteries. They are sometimes referred to as “all-electric” vehicles. BEVs are increasing in popularity and range while decreasing in price over time. The two most popular models of BEVs are the Nissan Leaf and Tesla Model S. BEVs require the owner to charge the batteries using some sort of external electrical source.

Research the specifications for the Tesla Model S (85 kWh) and the Nissan Leaf and fill-in the table below. Assume a price of $0.10/kWh to calculate the cost of charging.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Model | Base Price | Range (mi/charge) | Battery size (kWh) | Cost to charge |
| Nissan Leaf |  |  |  |  |
| Tesla Model S |  |  | 85 kWh |  |

Find the minimum charging requirements for both models in terms of voltage, amperage and power. This may require that you call one of the dealerships to inquire. Most dealerships are happy to answer questions if you state that you are doing a research project for school.

Questions to ask might include:

1. Can I charge the car using a normal 120 V wall outlet? If so, how long would it normally take?
2. If I use a 240 V wall outlet, how long does it take?
3. What are the voltage and amperage requirements to charge the vehicle?

Note the answers to each of your questions below.

**Hybrid Gas-Electric Vehicles:**

Hybrid vehicles typically run mostly on gasoline but also supplement some power from an electric motor. In the case of hybrid vehicles, though, some of the energy required for braking is used to charge the electric portion as opposed to an outside electrical source.

Research the specifications for the Toyota Prius, and one other hybrid vehicle of your own choosing and fill in the table below.

|  |  |  |  |
| --- | --- | --- | --- |
| Model | Price | Efficiency (mpg) | Range (mi/tank) |
|  |  |  |  |
|  |  |  |  |

**Hydrogen Vehicles:**

Hydrogen fueled vehicles are not yet widely available to consumers. There are no commercially available Hydrogen Internal Combustion Engine Vehicles. Conduct some research to identify some of the proposed uses of hydrogen in vehicles along with some of the pros/cons of using hydrogen as a fuel. Specific things to look up should include the following:

1. Differentiate hydrogen fuel cell vehicles (HFCVs) from hydrogen internal combustion engine vehicles (HICEVs).
2. Describe some of the proposed methods for producing hydrogen fuel. Which are renewable?
3. When was the first commercial release of a hydrogen vehicle. What are some plans you can find for commercial release(s) of other hydrogen vehicles?