**The Great Computer Challenge, 2018**

***Desktop Presentations, Level II***

# **Background**

Electric vehicles (EVs) are starting to show up on roadways across the entire globe. Carmakers are working towards an [all-electric, zero-emissions future](https://www.wired.com/tag/electric-vehicles). Some countries plan to [ban the sale of all gasoline and diesel cars](https://www.wired.com/story/frankfurt-motor-show-electric-car-concepts/) in the coming decades. Fortunately, in the next few years there will be dozens of new makes and models available. However, most people need to know much more about EVs before choosing to buy one. That is the challenge and goal of the presentation!

# **Guidelines & Requirements**

1. The presentation must contain a *minimum of five (5) slides*.

2. At least one slide must provide general information about Electric vehicles (EVs).

3. At least one slide must identify *in list format* the specific advantages of EVs.

4. At least one slide must present facts versus common EV myths or misconceptions.

5. At least one slide must include a *graph, chart or table* with statistical or numerical information about EVs.

When creating the slides, try to use the program to its fullest, utilizing as many of the key features of the software as possible. You may use clip art, original drawings, audio or video clips on any of the slides. The design and flow of the slides will count more than special effects or transitions from one slide to another.

Remember that your job is to create a visually appealing and informative presentation. Text layout, font size, and color schemes should be chosen to clearly display information. Pictures, charts, lists and other audiovisual elements should be created for purposes of effectively communicating your points to the reader.

# **Challenge**

Your team has been asked to create a slide presentation to educate the public about the advantages of electric vehicles and dispel common myths and misconceptions that they may have heard, so that they can make an informed decision as to whether they should consider one when they buy their next car. To help you with your presentation, information about electric vehicles is included on the following pages. You may also conduct and organize your own research.

# **Judging Criteria**

* The presentation meets all five (5) requirements.
* Information is organized and clearly displayed.
* Pictures, charts, and lists provide effective communication.
* Slides layouts are visually appealing.

# **SOL Correlation**

Mathematics Standards of Learning for Virginia Public Schools – September 2016

* The student will identify, describe, create, and extend patterns found in objects, pictures, numbers and tables.
* The student will collect, organize, and represent data in bar graphs and line graphs.

English Standards of Learning for Virginia Public Schools – January 2017

The student will demonstrate comprehension of information resources to research a topic and complete a research product.

(a) Construct questions about the topic.

(b) Access appropriate resources.

(c) Collect and organize information about the topic.

(d) Evaluate the relevance of the information.

(e) Avoid plagiarism and use own words.

(f) Demonstrate ethical use of the Internet.

Have fun and thanks for participating in the Great Computer Challenge, 2018!

Source: <http://www.plugincars.com/electric-cars>

An electric car is powered by an electric motor instead of a gasoline engine. The electric motor gets energy from a controller, which regulates the amount of power—based on the driver’s use of an accelerator pedal. The electric car (also known as electric vehicle or EV) uses energy stored in its rechargeable batteries, which are recharged by common household electricity.

EVs have not been widely adopted because of limited driving range before needing to be recharged, long recharging times. As battery technology improved—simultaneously increasing energy storage and reducing cost—major automakers introduced a new generation of electric cars.

In one trip to the gas station, you can pump 330 kilowatt-hours of energy into a tank commonly holding 10 or more gallons. Fortunately, it takes hours and not days to recharge an electric car, because it's much more efficient. Charging up at home means never going to a gas station and electric cars require almost none of the maintenance, like oil changes and emissions checks, that internal combustion cars require.

Electric cars have no tailpipe emissions; gasoline cars produce greenhouse gases and pollution.

Electric cars cost about 2 cents to run and gasoline cars cost 12 cents or more.

Source: https://www.cooltheearth.org/facts/

Today's technology uses electric motors with instant reaction and quick response to changes in traffic.

EVs are smart vehicles. Onboard computers and cameras offer greater safety features than old cars on the road. Autonomous features are many, including blind spot warnings and crash-avoidance. All drivers, new and experienced, deserve such protection.

Range can play a big role in deciding what EV is right for you. For longer trips, some EVs go hundreds of miles without a charge.

EV drivers can enjoy the ease and convenience of charging at home.

Charging stations may not be as visible as gas stations, but there are many.

Driving an EV on green power reduces your carbon footprint by 50%.

**Myth**: Driving my gas car creates less carbon than buying and driving a new EV.
**Fact**: Manufacturing and driving an EV has less, much less, carbon than continuing to drive a gas car.

When it comes to total cost of ownership, EVs come in miles ahead of traditional cars. Electricity rates can be 1/2 of gasoline and historically are more stable than oil. There are few moving parts in EVs resulting in very little maintenance aside from tires and windshield wipers. Most maintenance comes as free software updates.

When charging your EV at home, your electricity cost will likely be only half your current gasoline expense! In addition, electricity prices are much more stable and rooftop solar provides even more savings.

Electric vehicles, also known as “plug-ins,” are either 100% battery or electric combined with a gas range extension. 100% battery vehicles are the most advanced driving solution—they go far and are emissions-free.  If a pure electric vehicle just cannot meet your needs, a plug-in hybrid offers a good option by mixing some electric-only miles with a gas range extender for longer trips.  When car shopping, always ask for the vehicles that plug in.

**How much will it cost to buy and drive an EV?** The total cost of ownership of an EV is lower than a similar model of gas car. When you purchase or lease an EV you can claim federal tax credits as well as state and utility rebates, often amounting to $10,000. Maintenance on an EV is significantly less because EV motors have few moving parts. No oil changes ever again! Fueling your EV with 100% renewable energy, costs about 60% less than gasoline.

**Is it better for the environment to keep driving a gas-powered car or drive a newly manufactured EV?** Driving an EV matters, really matters! EV driving is the single most important action you can take to reduce your carbon footprint, smog levels, and respiratory issues. No refineries, no pipelines.Drive an EV and breathe easy.

**How far can I travel?** EVs now offer a wide choice of how far you can on one charge. Battery prices have dropped a staggering 80% in the past six years resulting in a longer range and a lower price. Consider one of the models has over 200-mile range without charging if you travel far regularly.

If your EV is primarily for around the town, nearly any EV will meet your needs. In addition, all EVs allow you to breeze through in the HOV lane.

If you want to charge while on the road, tens of thousands of charging stations can be found in many areas and beyond. Bet you didn’t even know they were there!

**How long will the battery last?** Most EV manufacturers provide a 100,000 warranty on the lithium ion battery Tens of thousands of drivers are reaching 150,000 miles with their original battery.

Every maker of plug-in electric cars has a program to take back batteries when they have exceeded their useful life. Used batteries can be repurposed for secondary uses, such as storing energy for buildings, homeowners, and utilities.

Do not let battery worries stop you from driving electric. Lease an EV and know that the battery will have a long life powering your car.

Source: <http://evadoption.com/ev-statistics-of-the-week-phevs-by-the-numbers/>

Period of January 2011 to August 2017 Sales Volume of Electric Vehicles Per State

California (153,613), New York (18,813), Michigan (12,217), Florida (12,041), New Jersey (9419),

Texas (9,066), Washington (8,082), Massachusetts (7,429), Pennsylvania (7,184), Maryland (6,441)

Illinois (6,351), Oregon (5,625), Virginia (5,267), Ohio (4,805), Colorado (4,578)

Period of January 2013 to August 2017 Sales Percentage of Electric Vehicles Per State

California (1.55%), Vermont (0.76%), Oregon (0.64%), Washington (0.54%), District of Columbia (0.44%), Connecticut (0.43%), Hawaii (0.43%), Massachusetts (0.38%), Michigan (0.37%), New York (0.36%)

Maine (0.34%), Maryland (0.33%), Colorado (0.32%)

Source: http://evadoption.com/future-evs/

Future Electric Vehicles by [Make], [Type], [Range in Miles], [Year Available]

[Aston Martin], [Sedan], [200 mi], [2019]

[BMW, Coupe], [311 mi], [2020]

[BMW], [Mini], [100 mi], [2019]

[Bollinger Motors], [Pickup Truck], [200 mi], [2019]

[Mercedes-Benz], [SUV], [310 mi], [2020]

[Mercedes-Benz], [Sedan], [310 mi], [2021]

[Mercedes-Benz], [Sedan], [31 mi], [2018]

[Ford Motor Co.], [SUV], [20-30 mi], [2019]

[Ford Motor Co.], [SUV], [300 mi], [2020]

[Fisker], [Inc.], [Sedan], [400 mi], [2020]

[Volvo], [SUV], [250 mi], [2019]

[General Motors], [SUV], [238 mi], [2019]

[Hyundai Motor Group], [SUV], [250 mi], [2018]

[Lucid Motor], [Sedan], [240 mi], [2019]

[Renault-Nissan], [Hatchback], [225 mi], [2019]

[Tesla], [CUV], [250 mi], [2020]

[Tesla], [Roadster], [620 mi], [2020]

[Toyota Motor Corp.], [Sedan], [186 mi], [2020]

[Audi], [CUV], [275-310 mi], [2019]

[Audi], [SUV], [310 mi], [2018]

[Audi], [Sedan], [310 mi], [2020]

Source: <https://auto.howstuffworks.com/myths-electic-cars-vehicles1.htm>

**MYTH:** EVs don't have enough range. You'll be stranded when you run out of electricity.

**FACT**: Americans drive an average of 40 miles per day, according to the U.S. Department of Transportation. Most new Battery Electric Vehicles (BEV) have a range of at least double that and can be charged at any ordinary electrical outlet (120V) or publicly accessible station with a faster charger. At present, all it takes is planning for Electric Vehicle (EV) owners, who can travel up to 120 miles on a single charge, to use their cars on heavy travel days.

**MYTH:** EVs are good for short city trips only.

**FACT:** Consumers have owned and driven EVs for seven years or more and regularly use them for trips of up to 120 miles.

**MYTH:** The charging infrastructure must be built before people will adopt EVs.

**FACT:** Most charging will be done at home, so a public charging infrastructure isn't a prerequisite.

**MYTH:** EVs take too long to charge.

**FACT:** The most convenient place and time to charge is at home while you sleep. Even using the slowest 120-volt outlet, the car can be left to charge overnight, producing about 40 miles of range. Most new EVs will charge from 240-volt outlets providing double or triple the charge in the same amount of time. Charging stations that reduce charging time, even more are beginning to appear.

**MYTH:** Plug-ins are too expensive.

**FACT:** New technologies are typically costly. Remember when cell phones and DVDs were introduced? Also, the government stimulus package includes a $2,500 to $7,500 tax credit for EVs. Some states are considering additional incentives ($5,000 in California and Texas). In addition, the purchase and lifetime operating cost of an EV is on par with or less than its gas-powered equivalent because EVs require almost no maintenance or repair; no oil or filter changes, no tune-ups, no smog checks.

**MYTH:** Batteries will cost $15,000 to replace after only a few years.

**FACT:** The battery is the priciest part of a plug-in, but costs will drop as production increases and the auto industry is expected to be [purchasing up to $25 billion](http://www.reuters.com/article/idUSTRE5A604B20091107) in advanced batteries annually by 2015.Some car makers plan to lease their batteries, so replacement won't be an issue.

**MYTH:** There isn't enough lithium in the world to make all the new batteries.

**FACT:** Existing lithium stores will be sufficient for projected EV production for the next 75 years. Also, lithium comes from many countries (24 percent is found in the United States), so we won’t be dependent on any one global region.

**MYTH:** Lithium batteries are dangerous and can explode.

**FACT:** Among the many kinds of lithium-ion batteries, lithium-cobalt batteries found in consumer electronics can pose a fire risk in certain circumstances. Most plug-in vehicle makers are working with other battery types (such as lithium-iron-phosphate and lithium-manganese) which have inherent safety advantages and provide more years of service.