**Transportation Fuels Debate Worksheet**

| **Gasoline** | | **Fact** | **Pro** | **Con** |
| --- | --- | --- | --- | --- |
| 1 | Gasoline is a petroleum-based fossil fuel made of hydrogen and carbon. |  |  |  |
| 2 | The chemical formula for gasoline is C8H15-18. |  |  |  |
| 3 | Petroleum is a nonrenewable source of energy. |  |  |  |
| 4 | About forty-two percent of crude oil is refined into gasoline in the U.S. |  |  |  |
| 5 | The octane rating for gasoline is 84 to 93. |  |  |  |
| 6 | Gasoline has a high energy content of 116,000 Btu/gallon. |  |  |  |
| 7 | More than 99 percent of the vehicles in the U.S. use petroleum-based fuels. |  |  |  |
| 8 | The U.S. has a vast infrastructure of refineries, pipelines, and filling stations to distribute gasoline efficiently and conveniently. |  |  |  |
| 9 | The U.S. imports about one-half of the crude oil it uses from other countries. |  |  |  |
| 10 | There are about 159,000 gasoline fueling stations in the U.S. |  |  |  |
| 11 | There are about 246 million cars in the U.S. that use gasoline. |  |  |  |
| 12 | The average gasoline-powered vehicle travels 12,000 miles per year. |  |  |  |
| 13 | Vehicles that use petroleum-based fuels emit air pollutants. |  |  |  |
| 14 | In the last 50 years, gasoline-powered vehicle emissions have decreased an average of 95 percent. |  |  |  |
| 15 | In many metropolitan areas, vehicles contribute about half of the air pollution. |  |  |  |
| 16 | Almost half of the people in the U.S. live in areas that do not meet air quality  standards. |  |  |  |

| **Hybrid Electric** | | **Fact** | **Pro** | **Con** |
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| 1 | Hybrid vehicles have two power sources—an energy conversion unit (such as an internal combustion engine) and an energy storage device (such as a battery). |  |  |  |
| 2 | The typical hybrid on the market today has a gasoline-powered engine and an electric motor with a battery. |  |  |  |
| 3 | Hybrid electric vehicles (HEVs) can have either a series or parallel design. |  |  |  |
| 4 | In a parallel design, the engine and motor are connected directly to the vehicle’s wheels. The primary engine is used for highway driving; the electric motor provides added power during periods of high demand. |  |  |  |
| 5 | In a series design, the primary engine is connected to a generator that produces electricity. The electricity charges the batteries and drives a motor that powers the wheels. |  |  |  |
| 6 | HEVs can function as purely electric vehicles for short trips, using the internal combustion engine only when longer range or more power is required. |  |  |  |
| 7 | HEVs can get 1.5 times the fuel economy of comparable conventional vehicles. |  |  |  |
| 8 | HEVs have generators powered by the internal combustion engines to recharge the batteries when they are low. |  |  |  |
| 9 | HEVs have regenerative braking systems that capture excess energy when the brakes are engaged. This recovered energy is also used to recharge the batteries. |  |  |  |
| 10 | HEVs reduce air pollutants by one-third to one half over gasoline-powered vehicles. |  |  |  |
| 11 | HEVs have a higher purchase price than comparable gasoline-powered vehicles. |  |  |  |
| 12 | Tax incentives and superior fuel economy produce savings over the life of the vehicles to make them competitive with gasoline-powered vehicles. |  |  |  |
| 13 | Today, there are over 30 hybrid models available to consumers, from many of the major auto manufacturers. Hybrid vehicles range from 2-seats, 4 and 5 seat sedans, SUVs, and even light duty trucks. |  |  |  |
| 14 | HEVs on the market today average 40-60 mpg and can travel 500-700 miles on one tank of gasoline. |  |  |  |
| 15 | Plug-in hybrid vehicles used in an urban setting may allow people to make their daily commute using electricity. |  |  |  |
| 16 | Hybrids use established gasoline fueling stations. |  |  |  |

| **Electricity** | | **Fact** | **Pro** | **Con** |
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| 1 | Electricity can be produced by many sources of energy. |  |  |  |
| 2 | Electric vehicles must have batteries that can be discharged and recharged  repeatedly. |  |  |  |
| 3 | Most batteries cannot store large amounts of electricity, so electric vehicles must carry several batteries. |  |  |  |
| 4 | In some electric vehicles, the batteries constitute half the weight of the vehicle. |  |  |  |
| 5 | The batteries in electric vehicles must be replaced every three–six years. |  |  |  |
| 6 | A typical electric vehicle can travel 50-130 miles between charges. |  |  |  |
| 7 | Weather conditions, terrain, and accessory use can reduce the range of an electric vehicle. |  |  |  |
| 8 | Electric vehicles are best suited for neighborhood vehicle use, for consumers going short distances at 35 mph or less. |  |  |  |
| 9 | Extensive research is ongoing to develop longer-lived batteries that will also extend the range of electric vehicles. |  |  |  |
| 10 | Electric vehicles produce no tailpipe emissions. |  |  |  |
| 11 | Some power plants—such as coal-fired plants—that generate electricity produce air pollution and emit carbon dioxide. |  |  |  |
| 12 | It is easier to control the emissions from power plants than from vehicles. |  |  |  |
| 13 | Electric vehicles are low maintenance; they require no tune-ups, oil changes, water pumps, radiators, injectors, or tailpipes. |  |  |  |
| 14 | Electric vehicles can be recharged at home at night when electricity rates and demand are low. |  |  |  |
| 15 | Today, there are 9,980 electric charging units at publc electric refueling stations. |  |  |  |
| 16 | Consumers who drive electric vehicles often receive tax incentives. |  |  |  |