

Data on new vehicles for the 2004 model year are given in the December 2003 issue of *Kiplinger's Personal Finance*. A random sample of 100 vehicles (Sedans, Sports Cars, SUVs, Wagons and Minivans) was selected. Using these data we wish to predict the Highway MPG of the vehicles. The explanatory variables are listed below. The JMP data set is posted on the course web site.

- Sports Car = 1 if vehicle is a sports car, = 0 otherwise
- SUV = 1 if vehicle is a sport utility vehicle (SUV), = 0 otherwise
- Wagon = 1 if vehicle is a station wagon, = 0 otherwise
- Minivan = 1 if vehicle is a minivan, = 0 otherwise

Note: If a vehicle is not a Sports Car nor an SUV nor a Wagon nor a Minivan it is a Sedan.

- All-Wheel = 1 if vehicle has all-wheel drive, = 0 otherwise
- Rear-Wheel = 1 if vehicle has rear-wheel drive, = 0 otherwise

Note: If a vehicle does not have all-wheel drive nor does it have rear-wheel drive it has front-wheel drive.

- Engine – size of the engine in liters (Min = 1.5, Max = 6)
- Cylinders – number of cylinders in the engine (Min = 4, Max = 8)
- Horsepower (Min = 100, Max = 477)
- Weight – gross weight of vehicle in pounds (Min = 2035, Max = 6133)
- Wheel Base – distance from front to rear axle in inches (Min = 89, Max = 130)
- Length – overall length of the vehicle (Min = 144, Max = 219)
- Width – overall width of the vehicle (Min = 65, Max = 80)

Consider the automatic selection procedures in JMP with Prob to Enter set at 0.05 and Prob to Leave set at 0.05.

**Forward:**

$$\text{Predicted Highway MPG} = 33.025 - 0.025756 * \text{Horsepower} - 0.0062597 * \text{Weight} + 0.20569 * \text{WheelBase}$$

**Backward:**

$$\text{Predicted Highway MPG} = 43.550 - 4.9351 * \text{SUV} - 4.2563 * \text{Minivan} - 2.6744 * \text{AllWheel} - 1.3934 * \text{Cylinders} - 0.029779 * \text{Horsepower}$$

**Mixed:**

$$\text{Predicted Highway MPG} = 33.025 - 0.025756 * \text{Horsepower} - 0.0062597 * \text{Weight} + 0.20569 * \text{WheelBase}$$

**All Possible Models:**

There are 8191 possible models.