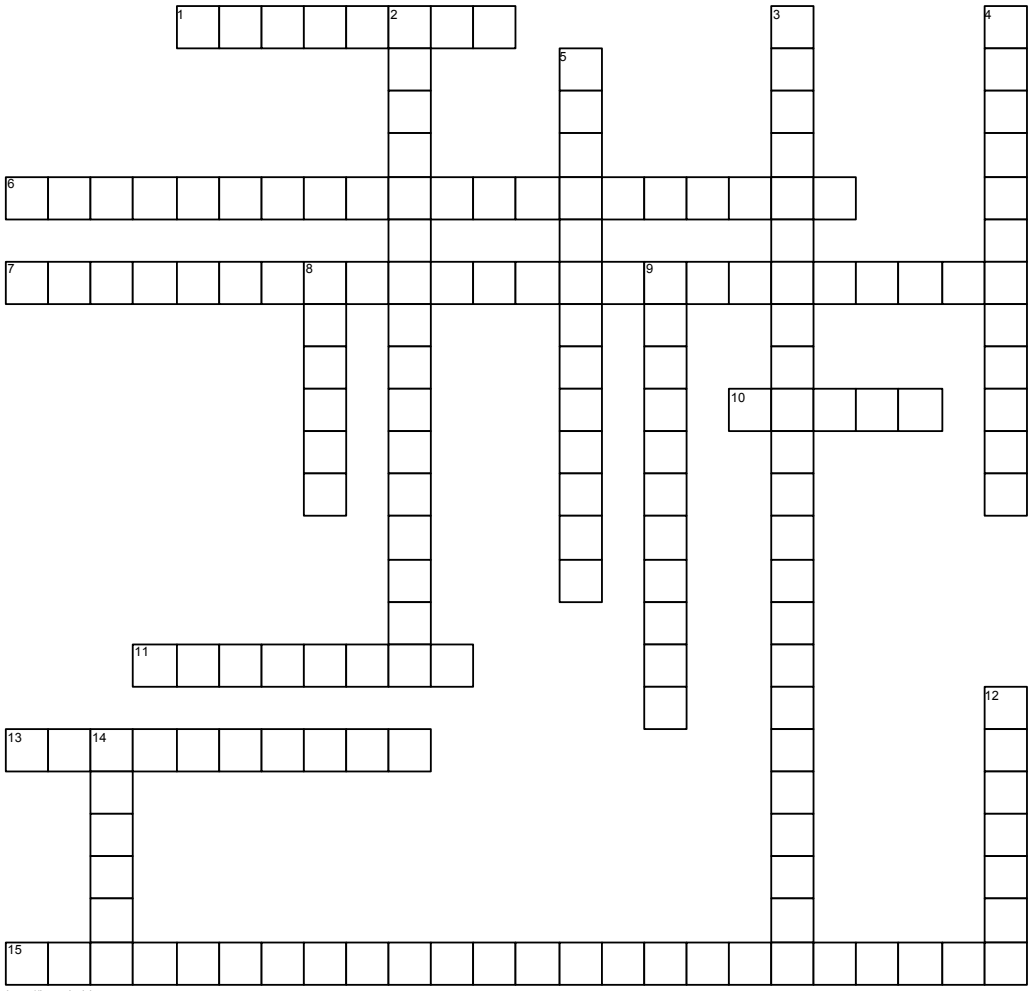
# Computers and Sensors

Chapter 29



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**ACROSS**

**1** An _____ is an electrical or mechanical output device that converts electrical energy into a mechanical action.
**6** The _____ ___ _____ sensor is used to measure the temperature of the air entering the engine.
**7** The PCM uses an _____ _____ _____ sensor for engine temperature information.
**10** Receives voltage signals from sensors.
**11** _____ oxygen sensors are constructed using a reference chamber that allows the sensor to detect air-fuel ratios as rich as 12:1 and as lean as 23:1.
**13** Performs mathematical calculations
**15** The _____ _____ _____ sensor detects engine load by using a signal from a sensor that measures the vacuum in the intake manifold.

**DOWN**

**2** The _____ _____ sensor measures the throttle opening and is used by the computer for engine control and the shift points of the automatic transmission/transaxle.
**3** The onboard automotive computer has many names but _____ _____ _____ is the SAE standardized name.
**4** The _____ _____ sensor measures the vehicle speed using a sensor located at the output of the transmission/transaxle or by monitoring sensors at the wheels.
**5** The TP sensor consists of a _____, a type of variable resistor that has three wires.
**8** Controls an output device by either turning it on or off usually by providing a ground.
**9** A ____ _____ sensor measures the mass of the air flowing through the sensor and entering the engine.
**12** Includes short-term and long-term memory.
**14** _____ sensors can have 1, 2, 3, or 4 wires.