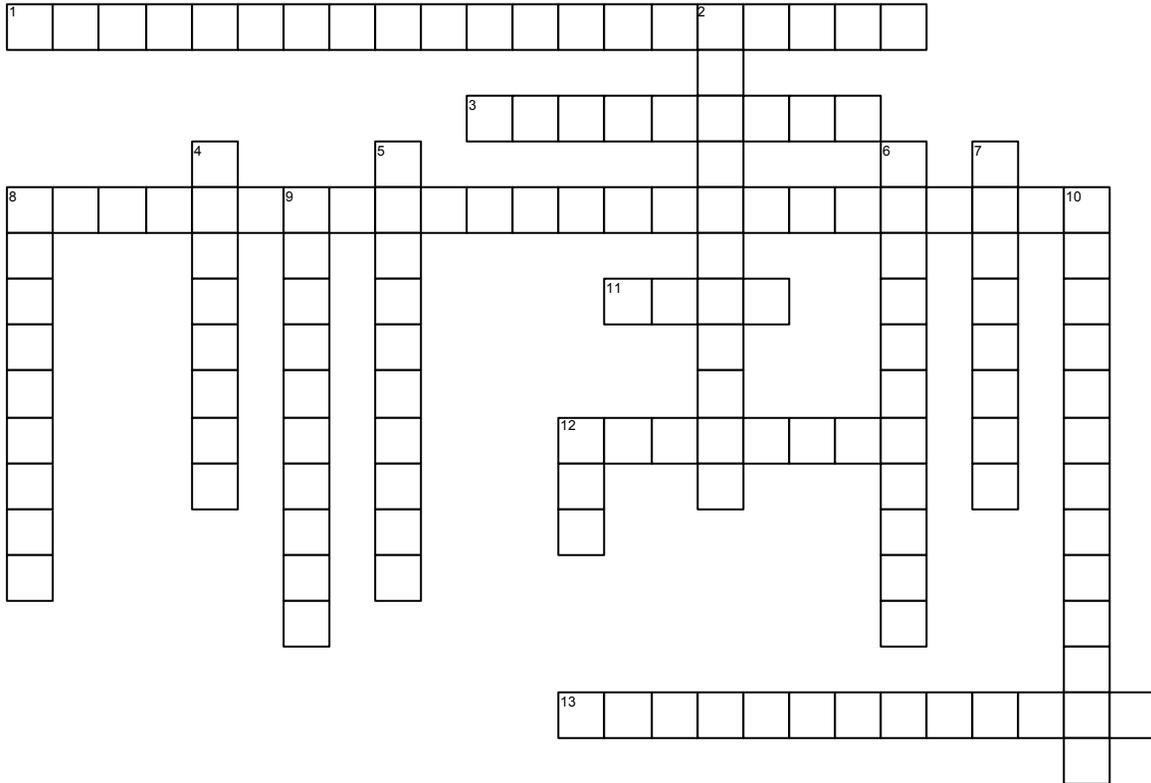


# Hybrid Vehicle Heating and Air Conditioning

## Chapter 12



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### ACROSS

- 1 The fan can be turned on and off through the use of a \_\_\_\_\_ mounted on the radiator tank, or by electronic means using the PCM.
- 3 Some vehicles use a \_\_\_\_\_ instead of a coolant recovery reservoir.
- 8 Problems led engineers to include a \_\_\_\_\_ in cooling system designs.
- 11 Much research was conducted to find an alternative to IAT, and this led to the development of OAT and \_\_\_\_\_ coolants.
- 12 The ICE water pump is a non-positive displacement design, meaning that the \_\_\_\_\_ can turn without any coolant being pumped if a blockage exists in the system.
- 13 A liquid-to-air \_\_\_\_\_ is utilized that dissipates the heat from the coolant to the air passing through it.

### DOWN

- 2 All automotive ICEs are liquid-cooled, meaning that the cooling systems are sealed and liquid coolant is circulated through the \_\_\_\_\_ by a water pump to absorb excess heat.
- 4 The heated coolant is sent through a \_\_\_\_\_ to dissipate the heat and lower its temperature.
- 5 Many hybrid electric vehicles utilize an electrically-driven \_\_\_\_\_ that continues to circulate coolant when the ICE enters idle stop.
- 6 The purpose of the \_\_\_\_\_ is to maintain pressure in the cooling system in order to maximize cooling efficiency.
- 7 \_\_\_\_\_ radiators have vertical tubes with tanks at the top and bottom of the core.
- 8 \_\_\_\_\_ radiators are made to be installed in vehicles with lower hood lines and have horizontal tubes with tanks attached to each end.
- 9 A \_\_\_\_\_ is used to confine coolant flow to the ICE water jacket and heater core until the coolant reaches approximately 195°F (91°C).
- 10 \_\_\_\_\_ have an inner lining made from synthetic rubber.
- 12 The green antifreeze that was used for decades across vehicle lines was based on \_\_\_\_\_, which often used silicates as its primary corrosion inhibitor.