ANSWERS: Classifying reactions as either endothermic or exothermic.

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|  | **Reactions** | **Endo- or**  **Exothermic reaction** |
| 2022 | Solid lithium bromide, LiBr(*s*), readily dissolves in water, as shown in the equation. LiBr(*s*) → Li+(*aq*) + Br–(*aq*) Δr*H* = –48.8 kJ mol–1 | **EXOthermic** |
| 2020 | Octane, C8H18(), is used as a fuel.  The equation for the complete combustion of octane is shown below.  2C8H18*(l)* + 25 O2(*g*) → 16CO2(*g)* + 18H2O(*g*) Δr*H* = –11 018 kJ mol–1 | **EXOthermic** |
| 2019 | C(*s*) + O2(*g*) → CO2(*g*) Δr*H* = –394 kJ mol–1 | **EXOthermic** |
| 2018 | The equation for the dissolving of ammonium chloride, NH4Cl, in water is shown below. | **ENDOthermic** |
| 2017 | When solid calcium chloride, CaCl2(*s*), reacts with water, the temperature increases. | **EXOthermic** |
| 2017 | When a person sweats, water is lost from the body by evaporation. This evaporation speeds up when a person exercises. | **ENDOthermic** |
| 2017 | Draw a labelled enthalpy diagram for the evaporation of water, H2O(*ℓ*).  H2O(*ℓ* ) → H2O(*g*) Δr*H*° = 40.7 kJ mol–1 | **ENDOthermic** |
| 2016 | Instant cold packs are useful for treating sports injuries on the field. They contain salts such as ammonium nitrate, NH4NO3. When the packs are activated, the salt dissolves in water, causing the temperature to decrease. | **ENDOthermic** |
| 2016 | The equation for hydrating anhydrous copper sulfate is as follows:  CuSO4(*s*) + 5H2O(l) → CuSO4.5H2O(*s*) Δr*H* º = −78.2 kJ mol–1 | **EXOthermic** |
| 2016 | Pentane, C5H12, is a liquid at room temperature. It evaporates at 36.1°C | **ENDOthermic** |
| 2016 | *ass91164q1b2_2* | **EXOthermic** |
| 2015 | Hand warmers contain a supersaturated solution of sodium ethanoate which, when activated, crystallises and releases heat. | **EXOthermic** |
| 2015 | Glucose is made in plants during photosynthesis when carbon dioxide gas, CO2(*g*), and water, H2O(l), react together \* in the presence of light to  produce glucose, C6H12O6(*aq*), and oxygen gas, O2(*g*). \* *edited* | **ENDOthermic** |
| 2014 | When solid sodium hydroxide is added to water, the temperature increases. | **EXOthermic** |
| 2014 | The freezing of water to form ice can be represented by the following equation. H2O(l) → H2O(*s*) | **EXOthermic** |
| 2013 | Dissolving ammonium nitrate in a beaker containing water can be represented by the following equation:  NH4NO3(*s*) → NH4+(*aq*) + NO3–(*aq*) Δr*H*° = 25.1 kJ mol–1 | **ENDOthermic** |
| 2015  2013 | Glucose is an important source of energy in our diet. The equation below shows the combustion of glucose to form carbon dioxide and water.  C6H12O6(*s*) + 6O2(*g*) → 6CO2(*g*) + 6H2O(*ℓ*) Δr*H°* = *–*2820 kJ mol–1 | **EXOthermic** |
| 2013 | Many portable BBQ and camping gas canisters contain butane, C4H10. Butane is a gas at room temperature, and has a boiling point of – 0.5°C. The gas canisters contain both gas and liquid butane. As the gaseous butane is used, some of the liquid evaporates. | **ENDOthermic** |
| 2018  2017  2012 | Water formed in the respiration reaction evaporates.  When a person sweats, water is lost from the body by evaporation. This evaporation speeds up when a person exercises.  H2O (*ℓ*) → H2O (*g*) Δr*H* = 40.7 kJ mol–1 | **ENDOthermic** |

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