**Alloy Advantage Summary Assessment Answer Key**

**Part A:** On the lines below, define *alloy* in your own words.

Answers may vary. *Example answer*: An alloy is a mixture of a metal with other substances.\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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**Part B:** Review the table below. Answer the questions that follow.

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|  | **Description** | **Properties** | **Uses** |
| **Iron (Fe)** | * Element (pure substance) * Atomic number 26 * Fourth most abundant element of Earth’s crust | * Density: 7.8 g/cm3 * Melting point: 1538 oC * Very reactive * Rapidly corrodes * Hard * Brittle | * Make alloys * Vital to plant and animal life; carries oxygen |
| **A709 Steel** | * Alloy (mixture) * Composed of mostly iron, magnesium, silicon and carbon | * Density: 7.9 g/cm3 * Melting point: 1510 oC * Non-corrosive in most environments * High strength * Non-brittle | * Bridges * Buildings (skyscrapers) |

1. How do the properties of iron change once an alloy is created?

Answers may vary. *Example answer*: When iron is mixed with other substances, like magnesium, silicon and carbon, it becomes less brittle and non-corrosive.

1. Why might a materials engineer recommend the use of steel over pure iron in the design of bridges?

Answers may vary. *Example answer*: A materials engineer may recommend the use of steel over pure iron in the design of bridges because steel has high-strength and is non-brittle. Steel bridges may not collapse like pure iron bridges would.