

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.

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

	Description	Properties	Uses
Iron (Fe)	<ul style="list-style-type: none"> ● Element (pure substance) ● Atomic number 26 ● Fourth most abundant element of Earth’s crust 	<ul style="list-style-type: none"> ● Density: 7.8 g/cm³ ● Melting point: 1538 °C ● Very reactive ● Rapidly corrodes ● Hard ● Brittle 	<ul style="list-style-type: none"> ● Make alloys ● Vital to plant and animal life; carries oxygen
A709 Steel	<ul style="list-style-type: none"> ● Alloy (mixture) ● Composed of mostly iron, magnesium, silicon and carbon 	<ul style="list-style-type: none"> ● Density: 7.9 g/cm³ ● Melting point: 1510 °C ● Non-corrosive in most environments ● High strength ● Non-brittle 	<ul style="list-style-type: none"> ● 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.

2. 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.