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**Student Activity- What are the indications of a chemical change?**

In this laboratory you will observe and record a reaction between the element, sodium, and the compound, water. Additionally, you will observe the physical characteristics of the element, sodium, and see what changes occur as it reacts.

Observe what happens when sodium in placed in water that contains phenolphthalein indicator. Later you will prove that a chemical change has occurred. The following can indicate that a chemical change has taken place, although this evidence is not conclusive:

* change in color
* change in temperature or energy
* formation of a gas
* formation of a precipitate (a solid substance that falls out of a solution)

1. Write down at least four physical characteristics of sodium

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2. Write down at least four observations about what you saw in this demo.

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3. Describe three things that occurred that demonstrate a chemical change has occurred.

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4. One of the products of this demonstration was solid sodium hydroxide, a white soluble

powder. Why was it not seen? What happened to it?

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5. Phenolphthalein is an indicator that turns pink in the presence of a base. What can you

conclude about at least one of the products of this lab based on your observations?

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6. Write out the balanced chemical reaction that occurred as described by your teacher.

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7. What do you think happened to the water molecules when they reacted with the sodium?

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8. An endothermic reaction takes place when energy is absorbed from surroundings in the form

of heat, and exothermic is when energy is released from the system into the surroundings. Was the reaction you observed exothermic or endothermic? How do you know?

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9. A 2nd product that was formed from the reaction of the sodium and water was hydrogen gas.

Though hydrogen gas is invisible and odorless, what proof do we have that hydrogen gas

was formed? How do we know the gas produced wasn't something other than hydrogen?

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10. The law of conservation of mass states that for any system closed to all transfers of matter and energy, the mass of the system must remain constant over time. Therefore, matter cannot be created or destroyed, only rearranged. Given that this law is accurate, where did the hydrogen gas come from?

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