

Section 3

Understanding Matter and Energy

EXPLORATION 2

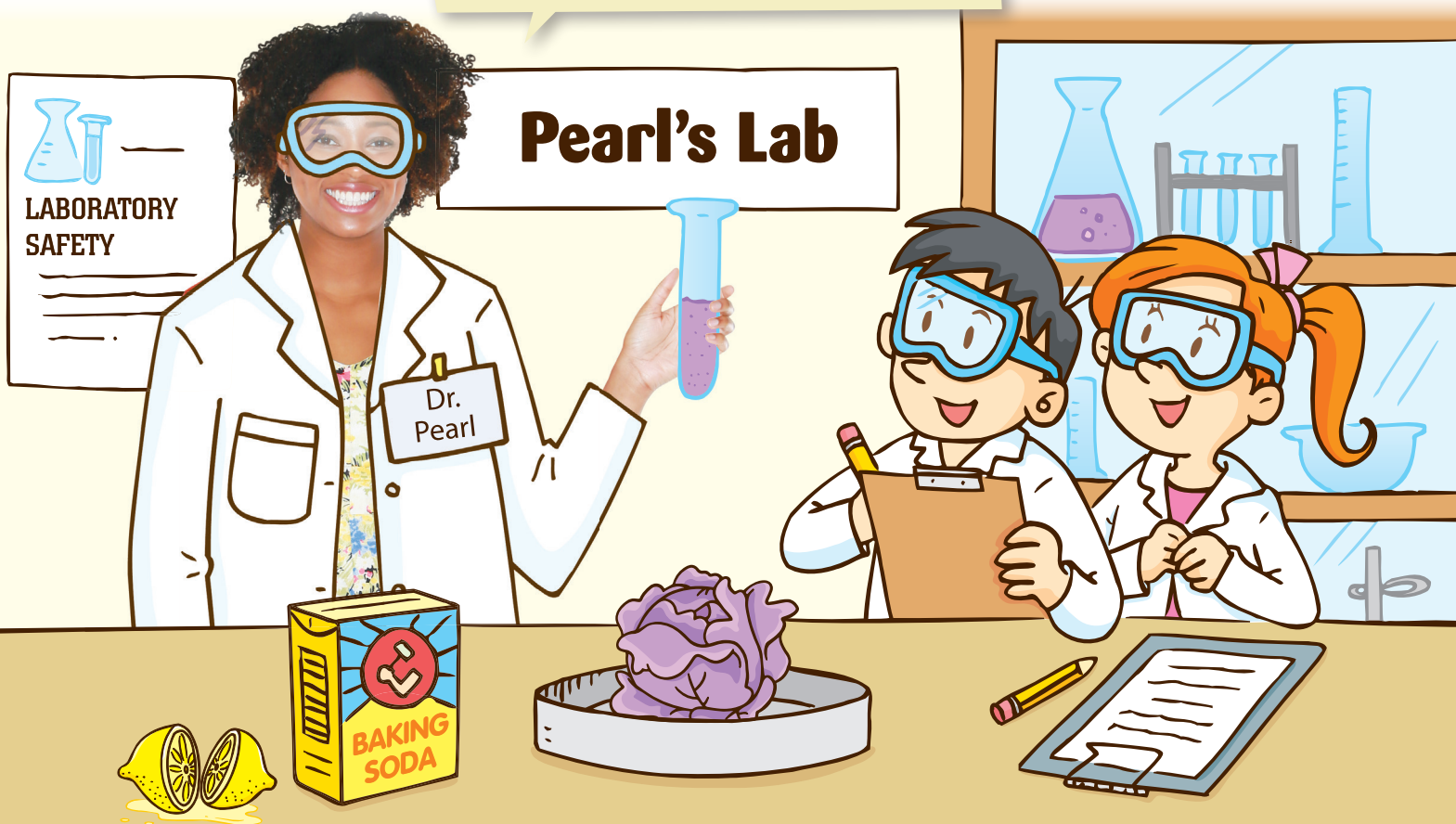
Create a chemical change!

See chemical change in action.

Mixing red and blue colours creates purple. Since no new substance is formed, the change of colour is a simple physical change. However, sometimes a change of colour can indicate a chemical change. For example, if you are given a cup of purple cabbage juice, you can make use of chemical reactions to get red or blue juice out of it. Let's explore how it works.

Let me show you how to turn the purple juice into red or blue juice.

Pearl's Lab



Section 3

Understanding Matter and Energy

EXPLORATION 2

Create a chemical change!

In this experiment, you will learn about one of the indicators of a chemical change.

Level of Difficulty:

easy

Time Needed:

2 hours

Hypothesis:

Circle the word to show your hypothesis.

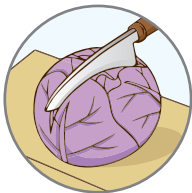
Chemical changes **can / cannot** result in colour changes.

Materials:

- a red cabbage
- a lemon
- baking soda
- 2 glasses
- a spoon
- a pot
- a strainer
- a jar

Steps:

1.



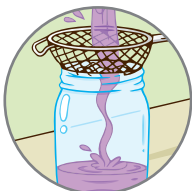
Chop half of the red cabbage into small pieces. Then cut the lemon in half.

2.



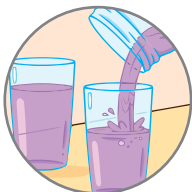
Put the cabbage pieces into a pot of water and submerge them. Bring the water to boil.

3.



Remove the pot from heat and let it cool. Once cooled, strain the cabbage juice into the jar.

4.



Pour equal amounts of juice into the two glasses.

Ask an adult for help with Steps 1 to 3.

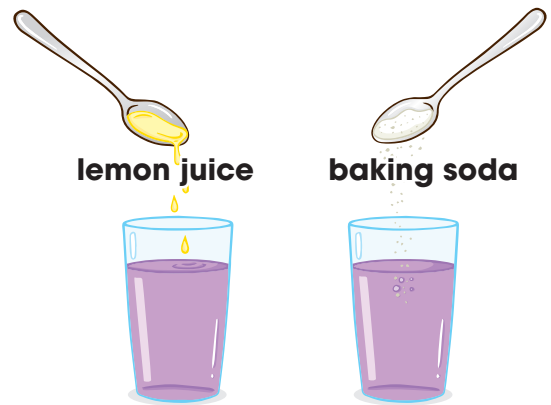
Section 3

Understanding Matter and Energy

EXPLORATION 2

Create a chemical change!

5. Squeeze out a spoonful of lemon juice and add it to one of the glasses. Observe.
6. Add a spoon of baking soda to the other glass. Observe.



Conclusion:

Fill in the blanks and circle the correct word after conducting the experiment.

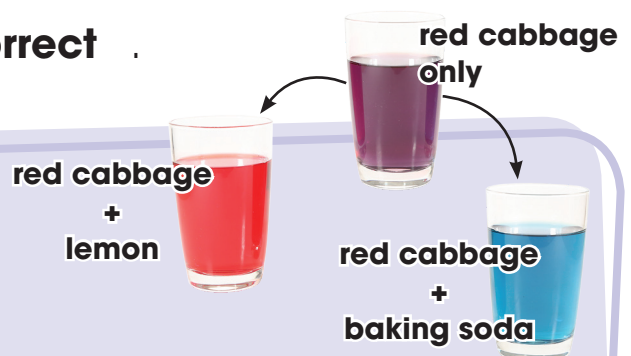
Adding lemon juice to cabbage juice changes its colour from purple to _____. Adding baking soda to cabbage juice changes its colour to _____.

My hypothesis was **correct / incorrect** .

Explanation:

The purple cabbage juice turned red when lemon juice was added and turned blue when baking soda was added. This happened because the cabbage juice underwent chemical changes.

The purple pigment in the red cabbage, called anthocyanin, changes from purple to red when it is mixed with something acidic, like lemon juice; it changes from purple to blue when mixed with something basic, like baking soda.



Section 3

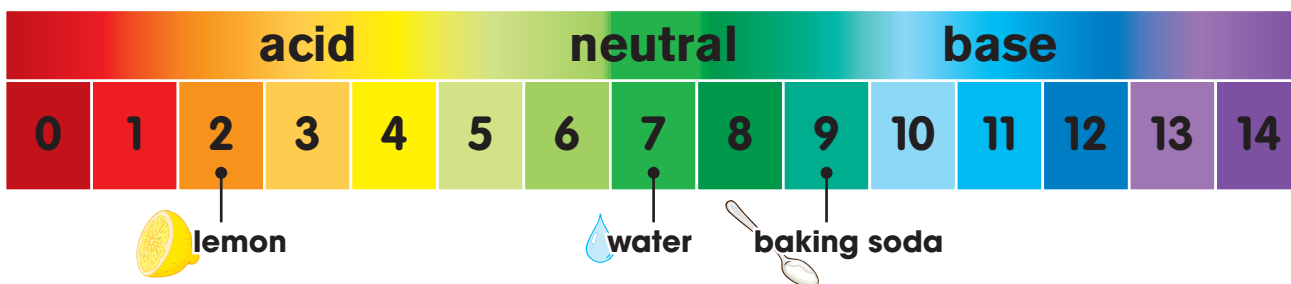
Understanding Matter and Energy

EXPLORATION 2

Create a chemical change!

Read about the pH scale. Then determine the pH value of each substance with the descriptions below.

We can use cabbage juice to determine whether substances are acidic or basic, but it cannot tell us the strength of the acid or base. To indicate the strength of an acid or a base, scientists invented a helpful scale to tell us how acidic or basic a substance is. It is called the pH scale and it ranges from 0 to 14 with colour codes. A pH less than 7 is acidic (0 being the most acidic) while a pH greater than 7 is basic (14 being the strongest base). A pH of 7 is neutral.



1. An egg is a stronger base than water but weaker than baking soda.

pH value: _____

2. Battery acid is the strongest acid.

pH value: _____

3. The acidity of stomach acid is between that of battery acid and lemon juice.

pH value: _____

4. Drain cleaner is the strongest base.

pH value: _____