Antibiotic Awareness and Colour Change

Curriculum Links (KS2):

Science: Animals, including humans (upper KS2 only); Working scientifically

English: Reading and Comprehension

PSHE: Core Theme 1 - Health and wellbeing; Core Theme 3 - Living in the wider world

Learning Objectives for KS2:

All students will:

- understand that most common infections get better on their own through time, bed rest, liquid intake and healthy living.
- understand that if antibiotics are taken, it is important to finish the course.

Most students will:

- understand that antibiotics treat bacterial infections only.

Risk Assessment:

In the event of an outbreak of infection you may need to modify this activity to ensure social distancing or other criteria according to your school's policy. Please email the e-Bug team at e-Bug@phe.gov.uk if you wish to discuss ideas or modifications to this activity that are needed to follow guidelines in your setting.

This activity is suitable for school (KS2) and community groups and can be found in the Home Science section of the student website.

It involves an experiment involving changes in pH levels and colour change to explain the action of antibiotics affecting bacterial infections only, and having no effect on viral infections.

Advance preparation:

For this experiment, you will need to make some indicator – this is a substance that will change to a different colour, depending on whether an acid or an alkali has been added to it.

To make the indicator you will need:

- Red Cabbage
- A knife and chopping board
- Boiling water
- A colander or straining sieve
- 2 glass containers (a measuring jug works well)

Method:

- Chop the cabbage up into small pieces with the knife and chopping board, until you have enough chopped cabbage to fill 2 cups.
- Put the chopped cabbage into the glass container or measuring jug.
- Pour a cup of boiling water over the cabbage and leave the mixture for about 10 minutes.
- Pour the mixture through the colander into a glass container to get rid of the cabbage bits. The cooled purple solution will be your indicator.

Now you have your indicator, you can 'treat' some infections using an experiment.

Before you begin you will need:

- 2 small glasses
- 2 teaspoons
- Your indicator (purple cabbage water)

- White vinegar
- Lemon juice
- Baking soda
- Notepad
- Colouring pencils

Use the following steps as a guide to implement this activity:

Part 1

- Put some water to fill 2 small glasses until they are about 1/3 full. The glasses of water represent patients' bodies. Vinegar will represent the antibiotics. If the colour changes it means the antibiotics are working and the patient is getting better.
- Put in half a teaspoon of baking soda into one of the glasses. The baking soda represents the harmful bacteria entering the body and giving the body an infection.
- Add a tablespoon of indicator to the glass. Use your notepad and colouring pencils to note down the colour of the solution. Add a half teaspoon of vinegar (antibiotics) to the glass and see what happens to the solution – does it change colour? Draw a picture to demonstrate.
- Keep on adding half teaspoons of antibiotics, counting the dose as you increase up to 5 teaspoons.

Does the colour change and does the patient get better?

Do you think antibiotics treat bacterial infections?

Part 2

- Put in 2 teaspoons of lemon juice into the other glass. The lemon juice represents the harmful viruses entering the body and causing an infection.
- Add a tablespoon of indicator to the glass. Use your notepad and colouring pencils to note down the colour of the solution.
- Add a half teaspoon of vinegar (antibiotics) to the glass and see what happens to the solution – does it change colour? Draw a picture to demonstrate.
- Keep on adding half teaspoons of antibiotics (vinegar), counting the dose as you increase to 5 teaspoons.

Does the colour change and does the patient get better?

Do you think antibiotics treat viral infections?

From your results, can you answer the initial question: "Do antibiotics work on bacterial infections, viral infections, or both?"

Use the explanation below to explain the experiment results:

Antibiotics work to treat bacterial infections but do not work to treat viral infections. We demonstrated this in the experiment using changes in pH level. Cabbage contains chemicals that change colour when they are in solutions with different pH levels. This allows us to use the cabbage water as an indicator. The baking soda and water solution was alkaline, so as we added antibiotics (acid) the colour changed and the patient got better. The lemon juice and water solution was acidic so as we added antibiotics (acid) the colour did not change and the patient did not get better.

Colour Explanation:

Purple - This is a healthy person- free from infection

Blue - This person has a bacterial infection

Pink - This person has a viral infection

Click here to access the resources for this activity for schools and community groups

Method

1. Ask an adult to **chop** the cabbage up into small pieces with the **knife** and chopping board, until you have enough chopped **cabbage** to fill 2 cups.

2. Put the chopped cabbage into the glass **measuring** jug

3. Ask an adult to **pour** a cup of boiling water over the cabbage and leave the **mixture** for about 10 minutes.

4. Ask an adult to **pour** the mixture through the **colander** into a glass container to get rid of the **cabbage** bits.

5. The cooled purple solution will be your **indicator.**

Now you have your indicator, you can 'treat' some infections using an experiment!