

STUDENT WORKSHEET	NAME	FORM	DATE

What is Antibiotic Resistance?

Introduction

The use of antibiotics to fight bacterial infections has been one of the major medical advances of the 20th Century. However, the development of antibiotic resistance soon followed this success and is an ever increasing problem.

Watch the TED-Ed talk at: <http://ed.ted.com/lessons/how-antibiotics-become-resistant-over-time-kevin-wu>

Answer the questions below.



Questions

- Your body is made up of many cells. How many cells are bacteria made up from?
.....
- How many more bacterial cells do you have inside you than human cells?
.....
- How do antibiotics kill/neutralise bacteria?
.....
.....
- What key word means 'a change to the DNA'?
.....
- Why has antibiotic resistance developed quickly in hospitals?
.....
.....

Method

1. Using the 10cm³ measuring cylinder, put 5cm³ of limewater into each test tube and place in a test tube rack.
2. Using the 50cm³ measuring cylinder add 20cm³ of grape juice into each boiling tube and place in the boiling tube rack.
3. Label each boiling tube A to C. Then add 5cm³ of activated yeast to each tube. To test tube A add 1 spatula of citric acid and to test tube C add 1 spatula of baking powder.
4. Measure and record the pH of the liquid in each boiling tube.
5. Put the bung onto the boiling tubes and make sure that the delivery tube end is going into the limewater. Ensure that the boiling tubes are in the warm water bath.
6. Record how long it takes for the limewater to turn cloudy.

Questions

1. What is the independent variable in this experiment?

2. What is the dependent variable in this experiment?

3. What are the control variables in this experiment?

4. What microbe are we using in this experiment?

5. What do you predict will happen in this experiment?

6. Are your results reliable? **Yes / No / Don't know**
(delete as appropriate).

Explain your answer.

Results

Tube	pH	Time (minutes)
A		
B		
C		

Conclusion

Fill in the missing words:

Yeast is a fungus which is a type of It can be used to find out the effect of on the growth of microbes in chilled drinks.

Yeast grew best in pH values closest to pH 7.

Grape juice is quite acidic with a pH value of By adding citric acid, the taste is not changed and the pH is reducing the growth of microbes and increasing the shelf life. When baking powder is added the pH is

The baking powder will react with some of the natural acids in the grape juice and will affect the and appearance of the product.

TEACHERS NOTES

What is Antibiotic Resistance?

Teaching ideas

TED – Ed talks are a really useful resource in lessons, there are some longer programmes that could be watched on this topic such as:

<https://www.youtube.com/watch?v=ikZQP45Zbw> - Rise of the Superbug - Antibiotic-Resistant Bacteria: Dr. Karl Klose at TEDxSanAntonio

Extension

For this age group they will only have a qualitative knowledge of the steps involved in natural selection.

Answers

1. one cell
2. around 10 times
3. interrupt cell wall/protein synthesis
4. mutation
5. there is extensive usage of antibiotics