Year 7 Science: Home Learning Week 4

Hello Year 7, more from the BBC Bitesize lessons this week and an optional practical to make your own pH indicator. Remember to follow the instructions carefully, get permission from an adult before doing anything and clean up after yourself when you're finished!

Stay at home & stay safe

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Task	Description
1	Watch the BBC Bitesize lessons on Tuesday (biology), Wednesday (chemistry) and Thursday (physics). Here's a link to the daily lessons page: https://www.bbc.co.uk/bitesize/tags/zf9yy9q/year-7-lessons/1 If you have trouble watching online, you can access the Bitesize lessons via the red button on your TV remote. Just switch the TV to BBC1, press the red button and the Bitesize options should come up… It can take a minute or two to load so be patient!
2 a	**Biology** a) Visit BBC Bitesize, revise your knowledge and complete the quizzes on diet and food groups: https://www.bbc.co.uk/bitesize/guides/zyjx6sg/revision/2 b) What are the main food groups and why do our bodies need them? c) Could you explain what "balanced diet" means to someone in year 6? Have a go! Design a poster or make a leaflet. You need to include information about what the food groups are used for, why we need a balanced diet and what can happen if we become deficient in a certain nutrient. Remember to explain clearly and use explain what any technical words mean.
3	**Chemistry** a) Visit BBC Bitesize, revise your knowledge and complete the quizzes on solubility: https://www.bbc.co.uk/bitesize/guides/zy8739q/revision/2 Next, watch this video clip: https://www.bbc.co.uk/teach/class-clips-video/chemistry-ks3-gcse-solubility-solutes-solvents-and-solutions/zdwt382 b) What do the following terms mean: i. Solute ii. Solvent iii. Solution c) A 330ml can of cola contains 33g of sugar (approximately 7 teaspons!!!). i. How much sugar is there in 100ml of cola? ii. How much sugar is there in 2L of cola?
4	**Physics** a) Visit BBC Bitesize, revise your knowledge and complete the quizzes on energy stores and transfer: https://www.bbc.co.uk/bitesize/guides/z99jq6f/revision/1 b) How do materials that are conductors transfer energy? c) Make a list of energy types and try to think of examples of each that you could observe at home. For example: a tin of baked beans on the edge of a shelf in my cupboard has gravitational potential energy.
5	**OPTIONAL PRACTICAL ACTIVITY: Make your own pH indicator – details on the next page.**

Practical details

Make Your Own pH Indicator

Why do this?

Some chemical substances can tell you if a solution has acidic, neutral or alkaline properties by displaying colour changes. This practical is a simple, safe method to observe how everyday indicators behave.

Safety

- You must wash your hands with soap and water after the activity
- As with all science activities, **do not** eat any of the substances that you are using, even if they are foods!
- Take extreme care when using knives to cut up materials – adult supervision is strongly recommended. The process can be made safer by using a blender or food processor to chop up the indicator materials.
- Use only the recommended substances for tests – **do not** test cleaning products or bleach. These are very strong alkalis and can be very dangerous.

Equipment & materials

- Chopping board
- Vegetable knife or food processor / blender
- Seive
- Yoghurt pots, medicine cups or other similar sized containers
- Hot water (from the hot tap in your kitchen)
- Plates / saucers (preferably white)
- Pipettes or teaspoons
- Marker pen
- Paper towels or kitchen roll
- Lemon juice
- Bicarbonate of soda solution - 1/2 tsp powder mixed with 4 tbsp (50ml) water

Suggested indicator materials:

- Raw red cabbage
- Red rose / geranium / tulip petals
- Beetroot – raw or cooked, but not pickled
- Blackberries – fresh or frozen

Method

To make the indicators:

1. Chop your indicator material and put it into a beaker/cup/yoghurt pot. You will need to fill it to about ¾ full.
2. Add hand-hot water (about 1tbsp) to the fruit, vegetable or petals.
3. Mash and squash each indicator with a spoon and leave to soak for approximately 10 minutes.
4. Pour the mixture through the sieve and collect the indicator liquid in a new container (yoghurt pot).
5. Write the name of the indicator on each container.

To test the indicator:

Indicators turn red in the presence of an acid and blue in the presence of an alkali. Green usually indicates a neutral solution in lab indicators, but natural indicators turn purple if a solution is neutral.

1. On a clean saucer, drip 4 drops of lemon juice, using a pipette or teaspoon. Add 2–3 drops of indicator. Watch for a few minutes and describe any observations. Is lemon juice an acid or an alkali?
2. Repeat the process with the bicarbonate of soda solution. Is bicarbonate of soda an acid or an alkali?
3. If you made indicators from more than one substance, test the lemon juice and bicarbonate solution with each of your indicators – do they all cause the same colour change? Which indicator gave the best or strongest results?

Expected observations and results

A good indicator gives a clear distinct colour change in different conditions. If the object of the investigation is to find the best indicator to distinguish between acids and alkalis, then the children should look for the indicator that gives the most distinct colour change between the acidic and alkaline liquids. For example, red cabbage turns deep pink in the lemon juice or vinegar and distinctly blue in the bicarbonate of soda.

Not all the samples will turn equally blue or pink because some liquids are more acidic/alkaline than others (the deeper the colour the stronger the acid/alkali).

Possible further investigations

You could use your left over indicator to find out:

- Is toothpaste an acid or an alkali?
- Which soap is the most acidic and which is the most alkali?
- Which soft drink is the most acidic and which is the most alkali?
- Which drinks might you avoid if you had an acid stomach?
- Which fruits are acidic?

Background notes

You will cross-contaminate the sample if you use the same pipette or spoon for more than one liquid.

Indicators are best made and used on the same day or kept refrigerated and used the following day.

Some reactions do not happen for several minutes. It is worth waiting, leaving and returning to any of the samples to see if any further changes have occurred.