Year 5 & 6 Science: Home Learning Week 9

Hello Year 5 & 6, this week our focus is on reversible and irreversible changes. You should try to complete tasks 1, 2 & 3 if you can, the rest, including the practical activity, are optional. I've included instructions to make a solar oven so that you can try out some tasty reversible changes of your own by melting chocolate and marshmallows. As always, remember to get permission from an adult before doing any practical activities and clean up after yourself when you're finished!

Take care & stay safe

Miss Johnston ☺

<table>
<tr><th>Task</th><th>Description</th></tr>
<tr><td>1</td><td>Watch the BBC Bitesize lesson on Wednesday. Here's a link to the daily lessons page: https://www.bbc.co.uk/bitesize/tags/zncsscw/year-6-lessons/1<br><br>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!</td></tr>
<tr><td>2</td><td>Visit BBC Bitesize, read the information and complete the activities on reversible and irreversible changes: https://bbc.in/3eL7bXJ</td></tr>
<tr><td>3</td><td>Answer the following questions:<br><br>a) What does reversible mean? Can you give an example?<br><br>b) What does irreversible mean? Can you give an example?</td></tr>
<tr><td>4</td><td>Jane mixed different materials together and wrote this about her investigation:<br><br>I put some sand into a beaker of water and stirred it. The mixture went a yellowy-brown colour. After a little while I could see all the sand on the bottom of the beaker. My teacher said that I could get the sand back if I filtered the mixture.<br><br>I did the same thing again, but this time I used salt instead of sand. I couldn't see the salt, because it dissolved. Then I mixed some baking powder with some vinegar. The mixture went all frothy. My teacher said that the bubbles were made by a gas called carbon dioxide.<br><br>a) Name all of the materials that Jane used in her investigation<br>b) Which change was reversible? How do you know?<br>c) Which change was irreversible? What did Jane observe (see) that tells you this?</td></tr>
<tr><td>5</td><td>OPTIONAL PRACTICAL ACTIVITY: Solar Oven<br><br>The ultimate junk modelling challenge – can you turn a cardboard box into an oven to make s'mores?</td></tr>
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**Practical Details**

## Make a Solar Oven

**Why do this?**

There are lots of great reasons to learn how to make a solar oven! Maybe you're going camping. Maybe you're interested in learning about different ways to concentrate the sun's energy. Maybe you're interested in methods of cooking that don't add greenhouse gasses to the atmosphere. Maybe you're just hungry! In any case, as long as you're patient and willing to move your oven where the sun is, you'll be rewarded with a tasty snack.

Several scientific phenomena are involved in making your oven work. **Heat** is the form of energy (sometimes called **thermal** energy) that is transferred by a difference in temperature. You want to transfer the sun's heat to your solar over. **Reflection** is the throwing back of light, heat or sound by a body or surface, like a mirror. The shiny foil you'll use in your oven will reflect the sun's light and heat inside your oven. During **absorbtion**, energy is taken into a material rather than reflected. You will line the inside of your oven with black paper so it can absorb the light and heat being reflected into it. Another energy process you should be familiar with for this project is **convection**, which is the transfer of heat by the movement of a gas or liquid. You'll use plastic wrap to make your oven airtight so the air warmed by the sun doesn't leave your oven through convection. One final energy term important to this project is **insulation**. Insulating materials prevent heat leaving your oven through **radiation**. That's why you are going to line the inside of your oven with a cheap and effective insulator—newspaper!

**Safety**

- Take care when using scissors – adult supervision is required.
- DO NOT attempt to use your oven to cook meat or anything with raw egg in – it will not get hot enough to cook them properly.

**Equipment & materials**

- Cardboard takeaway pizza box, shoe box or large cereal box
- Pencil
- Ruler
- Scissors
- Aluminium foil
- Clear sticky tape
- Black card or paper
- Cling film
- Newspaper
- Oven gloves
- Oven proof dish or pie plate
- Cooking ingredients for s'mores: digestive biscuits, chocolate & marshmallows
- Optional: an oven thermometer to check the temperature inside your solar oven

**Method**

1. Clean any stray bits of cheese, sauce or crumbs out of your box.
2. Using the ruler and pencil, draw a square 2cm in from the edges of the top of the box.
3. Use the scissors to cut out three of the four sides of the square.
4. Make a crease along the uncut side of the square to create a flap that stands up.
5. Cut a piece of aluminium foil large enough to cover the inner side of the cardboard flap.
6. Wrap the foil tightly, and secure with tape.
7. Line the bottom of the pizza box with black card or paper.
8. Cut two pieces of cling film that are the same size as the top of the pizza box.
9. Roll up some newspaper pages into tubes to stuff into the sides of the box. Make sure you are still able to close the lid if you are using a pizza box.
10. Now it is time to cook something! The best time to use your oven is between 11 AM and 2 PM. Make sure to set the food on a dish so you don't mess up the interior of your oven.
11. Make your s'mores - Place one or two marshmallows on top of a digestive biscuit. Put two to three squares of chocolate on top of the marshmallow. Place them in the dish, inside your oven.
12. Use tape to secure the cling film to the inside edges of the square window you cut into the box. You are creating an airtight window.
13. Wait until the chocolate and marshallow have melted, open your oven by removing the cling film.
14. Top your s'more with a second digestive biscuit.

This example, from NASA, shows how to make the oven using a cereal box: https://climatekids.nasa.gov/smores/

**Expected observations and results**

On a warm sunny day, in a sheltered spot, your oven could reach around 100°C. You will notice that food takes longer to cook in a solar oven than a regular one, why is that?

Let's recap: You covered the flap with foil so that the foil would reflect sunlight into the oven. The black paper on the bottom of your oven absorbed the sun's energy (white paper would have reflected a lot of that energy). You made your oven airtight so that the warm air inside your oven would not leave the box via convection. You put the newspaper inside your oven to insulate it and prevent heat loss through radiation. It is best to use your oven between 11 AM - 2 PM because that is when the sun's rays are strongest. If you are making s'mores, it is good idea to have the chocolate on top because its dark colour will absorb heat better than the lighter biscuits. Food takes longer to cook in a solar oven because solar ovens don't get as hot as conventional ovens.

**Questions and possible further investigations**

- What purpose does the black paper serve? Would white paper work as well? Why or why not?
- Why do you want to make your oven airtight?
- What purpose does the newspaper serve?
- Try making melting cheese onto tortilla chips to make nachos or as a topping for baked potatoes – your oven won't get ot enough to cook your potatoes though!
- Find out how solar ovens are being distributed in areas where there is little fuel but lots of sun here: https://climatekids.nasa.gov/smores/