

Year 7 Science: Home Learning Week 11

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

Take care & stay safe

Miss Johnston 😊

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
2	Biology a) Visit BBC Bitesize and read the information and complete the quiz on the differences between plant and animals cells: https://www.bbc.co.uk/bitesize/topics/znnycdm/articles/zmrtn8 b) What are the similarities and differences between animal and plant cells? c) Describe the function of each of the following cell parts: - i Cell membrane - ii Cell wall - iii Vacuole - iv Mitochondria
3	Chemistry a) Visit BBC Bitesize, read the information on the properties of metals (page 4): https://www.bbc.co.uk/bitesize/guides/z84wjxs/revision/4 b) Answer the following questions: i. List three properties of metals ii. List three properties of non-metals iii. Are all metals magnetic? c) Use the periodic table in the back of your planner to find the chemical symbols for the following metals: i. Tin ii. Iron iii. Copper iv. Aluminium v. Zinc vi. Gold vii. Silver viii. Lead ix. Mercury x. Sodium
4	Physics a) Visit BBC Bitesize, read the information and complete the quiz on food energy: https://www.bbc.co.uk/bitesize/topics/zf339j6/articles/zm8yb82 b) Answer the following questions: i. Which unit of measurement is used to measure energy? ii. Which three food groups do we get our energy from? iii. Which food group provides the most energy per gram? c) The NHS recommends that the recommended daily calorie intake for is 2500 for men and 2000 for women. 1 calorie = 4.2J. i. Calculate the recommended daily values in Joules. ii. Elite athletes need an intake of around 5000 calories per day. Calculate this value in Joules and, with what you've learned about food energy in mind, explain why this figure is much higher than for the average man or woman.

Practical details:

Boomerangs

Why do this?

A boomerang is best known for its ability to return to the thrower but there is some very interesting science behind its flight path. This activity allows you to quickly and easily make your own boomerang and then to have fun practicing throwing it. You might be more familiar with a v shaped boomerang but this one is easier to throw.

Safety

- Allow plenty of room for throwing your boomerang, outdoors is best.
- Never throw a boomerang at or to anyone.
- Don't be tempted to throw boomerangs made from heavier materials such as wood or metal, their flight is unpredictable and could cause injury.

Equipment & materials

- A large piece of thick, flat cardboard
- Boomerang template
- Scissors
- Sticky tape
- Blu-tack
- Coloured pens / pencils / paint

Method

1. Cut out the paper boomerang template and place onto the cardboard. Each arm of a boomerang is called a 'rang'.
2. Draw around the template taking care not to move it. This might be easier done in pairs with one person holding the template down while the other draws. Alternatively, *blu-tack* the three rangs of the boomerang template to the card to stop it moving.
3. Cut out the boomerang and decorate it if you want to.



To throw your boomerang:

- Place the boomerang flat on the palm of your hand. Then gently press on the middle so that the rangs lift a little, however be very gentle so you don't crease it.
- Release the rangs, these should now be slightly raised on one side of the boomerang.
- Hold out your hand with the palm facing the floor and thumb extended at right angle to the palm.
- Remain in this position and form a fist. The rang (with the raised side nearest your thumb) is placed between the thumb and first finger and the thumb is closed.
- Turn your hand clockwise 90° so that the rang is perpendicular to the floor.
- The throw of the rang is in the wrist, which moves like it is knocking on the door, releasing the rang while the wrist is flicking in a forward motion, almost like when you flick a towel at someone.



1. Try to observe the boomerang's flight for the first throws in order to understand how it spins rather than just focussing on catching it.
2. After several throws, try to catch it using both hands in a clapping motion



Expected observations and results

With practice and if thrown correctly, your boomerang should fly on a circular path and you might even be able to catch it. Boomerangs were used most famously by the Australian Aborigines for hunting but are also found in other ancient cultures, including Egypt. Even though they look simple, they use a complex combination of aerodynamics to perform their amazing returning flights.

There are several forces acting on a boomerang, these are:

- The force of gravity
- A force caused by the spinning motion of the wings through the air
- The force of your throw
- A force caused by the uneven speed of the wings
- The force of any wind in the area
- Air resistance

For a boomerang to travel in a circle and come back to its starting point, all of these forces have to combine in just the right way. To accomplish this, you need a well-designed boomerang and a correct throw.

When you throw a ball it travels in the direction that you first threw it in. As it travels, air resistance slows it down and gravity brings it down to ground.

So why is a boomerang different from a ball? A boomerang has wings that spin. The spinning wings add extra forces that hold it in the air longer and make it fly in a curve. If you throw it so that the spin is just right, it can curve all the way back to you.

Background notes

- This is a great way of recycling supermarket pizza trays
- Try not to crease the cardboard when cutting it out. This is particularly difficult with corrugated cardboard. If you do crease it, cut another one out and tape them together.
- When decorating your boomerang, use materials that don't add to its weight or change its balance. As the cardboard wings are light, they work best thrown indoors.

Questions and possible further investigations

- How does size affect the way your boomerangs fly?
- Try using different types of cardboard or glueing together several layers to see how this affects flight.
- Traditionally, boomerangs were beautifully decorated. Why not find out about aboriginal art here: <https://www.artfactory.com/aboriginal-art/aboriginal-art-lesson-boomerang-designs.html> , you could try out some traditional designs to decorate your boomerang.



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