Healthcare

NORWICH SCIENCE FESTIVAL @ School

Healthcare

Technology transforming Healthcare
The idea of using technology to help care for people isn't new, we've been doing it for a long time. From the invention of tools such as stethoscopes to assist with hearing your heart rate, thermometers that tell your temperature, or even the use of specialist machines that analyse your blood, technology plays a critical role in helping to look after you.

In recent years there have been some incredible technology firsts in healthcare. Robot-assisted surgery is a perfect example, where surgeons can improve the accuracy of the surgery they perform by using robotic arms to assist with the micro-movements. Also, the advancement of 3D printing technology has now made it possible to 3D print personalised prosthetics for amputees, specific tools required for surgery or even new heart valves.

Outside of the hospital environment, there are now a whole host of apps that can monitor anything and everything! It's not uncommon for athletes to use heart-rate monitors or GPS trackers to monitor their performance, AI cameras that can distinguish good technique from bad or digital coaching apps that teach you as you train.

You can buy all sorts of 'smart' devices for your home which monitor things from energy consumption right through to how many eggs you have left… There are even technology solutions which can help to monitor loved ones whilst nobody else is home.

The rise in popularity of video-conferencing tools like Zoom, Teams and Google Classroom have made it easier to see people remotely for remote working or learning, and you can also make voice calls over voice-assistants (Amazon Echo or Google Home), phones and tablets. Even just a few years ago, tech like this wasn't available to buy, but now it is being used daily to help look after our friends, family and loved ones in their homes.
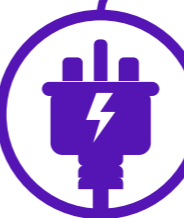
Ultimately, advances in healthcare technology make it easier and safer to monitor health conditions with greater accuracy. This allows medical professionals to treat health conditions more quickly and effectively to keep us all fit and strong.

With that in mind, today's activities focus on how to test and monitor your reflexes and gives you a chance to think about how technology might help you perform better in future.

Plugged-in activities
If you'd like to have a go at a plugged-in version of this activity, there's lots that you can try:
- On Your Marks…Get Set…Breathe – four experiments that explore lung function and how different activities affect your breathing - https://atadastral.co.uk/go/nsfhp1
- Low energy step counter – use a micro:bit to make your own DIY step counter - https://atadastral.co.uk/go/nsfhp2
- Exercise tracker - use App Inventor to make an app that tracks how much exercise you've done - https://atadastral.co.uk/go/nsfhp3
- Look after yourself - learn how to look after others and yourself with Scratch coding- https://atadastral.co.uk/go/nsfhp4

Find out more

- Getting active - https://atadastral.co.uk/go/nsfhf1
- Being active - https://atadastral.co.uk/go/nsfhf2
- Health tech - https://atadastral.co.uk/go/nsfhf3

Teacher Links
- Free HelloWorld magazine - Health and Well Being Issue 17 - https://atadastral.co.uk/go/nsfht1
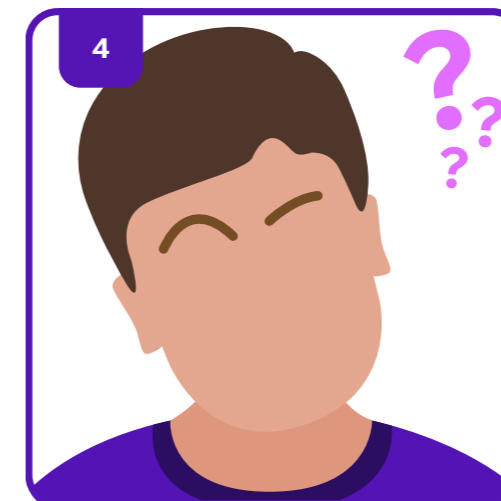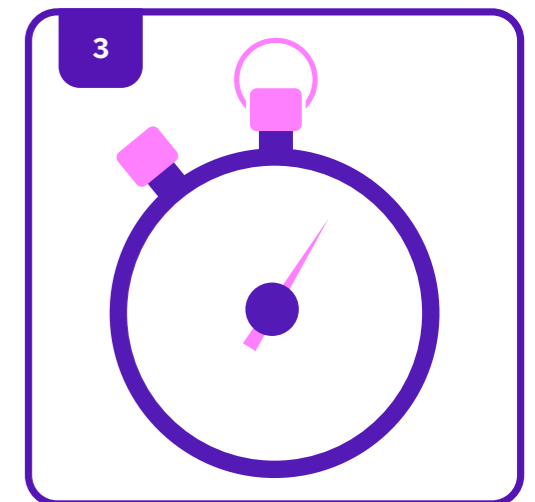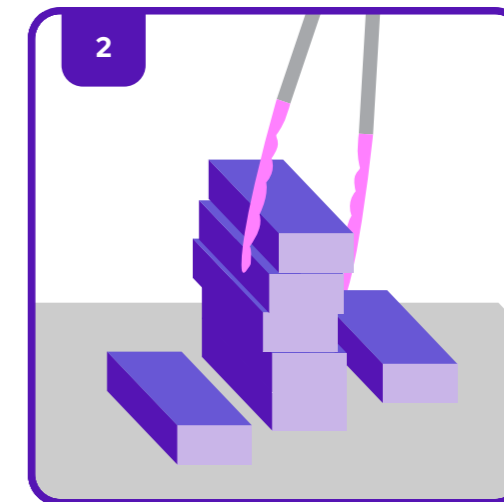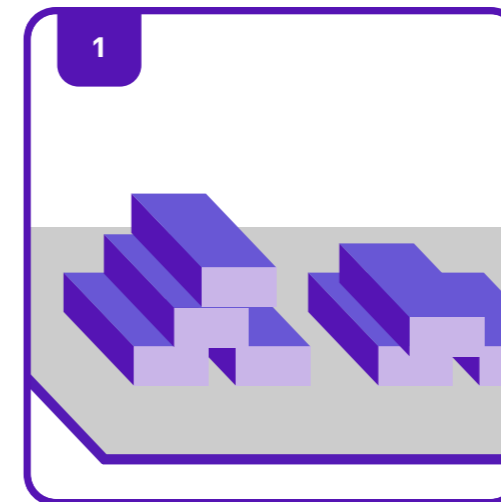
Activity One

Surgical skills

For this activity we're going to practise our surgical skills to help understand the reasons why a doctor or surgeon might want to use a robot to assist them with operations.

Using tongs and plastic bricks you will simulate the delicate movements a surgeon has to perform whilst carrying out operations. This will test your reflexes, skills and accuracy and you will then test yourself under more difficult conditions to see how you get on.

1. Place a pile of plastic bricks in front of you.

2. Pick up the tongs, set your timer to start and see how quickly you can stack them into a tower.

3. Make a note of how long it took you and have a think about how you could stack the bricks more quickly. Repeat step 2, but this time try and make the stack as neat as possible and compare how long it takes.

4. What was the difference between your first and second attempts? Were you faster or slower when stacking the bricks neatly? Think about what you can do to retain your accuracy but also maintain a good speed. Try to beat your fastest time or challenge someone else to see who can get the quickest time.

5. It's now time to test your skills by introducing an extra layer of difficulty. Put on your blindfold so that it covers your eyes and time yourself stacking the bricks again to see how well you do.

6. Did you do better or worse? The answer will almost certainly be worse! This time you're going to try and give accurate instructions to someone who is blindfolded to help them neatly stack a tower of bricks. This is more like a robot-assisted surgery where you are the doctor and person blindfolded is the remote robotic arm!
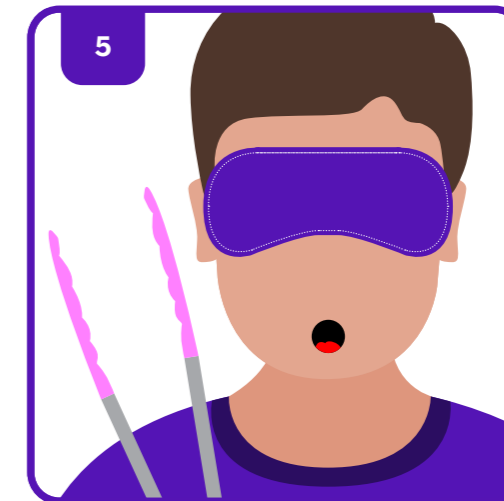
Activity Two

For our next activity, let's have a look at how we can measure lung capacity. Using a couple of balloons we're going to carry out an experiment to measure your lung capacity from a calm, relaxed position, and then see if this is affected after a burst of exercise.

This will give us the beginnings of an experiment that can be carried out over a longer period of time of your choosing – say a month or a few months.

1. This activity is best done in a large open space, outside if possible, and you'll be working in pairs.

2. Get one of your deflated balloons and take 5 big breaths into the balloon, one after the other.

3. Now clasp the end so the air can't escape.

4. With the help of your partner, take a piece of string and wrap it around the widest part of the balloons circumference.

5. Mark the string with a pen at the point where the string meets.

6. Take your piece of string and lay it on a flat surface. Use a ruler to measure the length of the string that wrapped around your balloon.

7. Now swap over so that you both have a go at blowing up a balloon.

8. Record your measurements on a piece of paper.

9. Decide what set of exercises you are going to do e.g. star jumps, running. It's up to you which exercise you want to do, but make sure you have a safe space to do them.

10. Now make sure you've got your second balloon and string ready.

11. Carry out your chosen exercise and as soon as you've finished, take 5 big breaths into the balloon. Measure it using a piece of string, mark the string and measure it against a ruler.

12. Make a note of the measurement and compare it to your first measurement – is it the same or similar?

13. Maybe you could create a graph to display your results and compare them with your friends. Can you work out the average for the class?

14. Have a think about what you could do to improve your lung capacity over time and design an experiment. It could involve physical exercise, breathing exercises or even singing! Maybe do some research before you make your plans.

15. Consider the length of time you would want to have your experiment run for – could you repeat it weekly, monthly or over a different period of time?

16. Don't forget to record your new results at the end of your experiment and compare the group average to the original findings.