

Apps to the rescue



Part 2: Develop

Educator notes



Learning objectives

- Understand how smart technology can help solve design opportunities in healthcare
- Practise using technology to develop improved design through the design process of research, analysis and develop



Curriculum links

- Science
 - Analysis and evaluation
- Computing
 - Undertake creative projects that involve selecting, using, and combining multiple applications, preferably across a range of devices, to achieve challenging goals, including collecting and analysing data and meeting the needs of known users
- Design and technology
 - Exploring, identifying and understanding user needs
 - Identify and solve their own design problems and understand how to reformulate problems given to them
 - Develop specifications to inform the design of innovative, functional, appealing product that respond to needs in a variety of situations

This module follows on from **Apps to the rescue – part one**. The activities within it assume that students have already completed those activities and are familiar with sensors in smartphones and the concept of smart healthcare.



Resources required

- Designing a SMART inhaler student sheet
- Apps to the rescue part 2 presentation slides
- Completed Hidden sensors student sheets from Apps to the rescue – part one



Equipment needed

- Drawing equipment, (pencils, eraser, rule, ellipse templates, circle template)
- Rendering equipment (colouring pencils, marker pens, fine liners, pastel crayons)



Time needed: 40 minutes

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Slide 1 and 2

Introduction

- Make sure students have their **Hidden sensors student sheet** from **Apps to the rescue – part 1**
- Remind students that this lesson follows on from the activities they've done around mobile phone sensors and introducing smart health
- Move to **Slide 2** and recap the different types of sensors with the class, reminding them of all the different ways smartphones can record things we do



Slide 3

Introducing asthma

- Introduce the class to asthma using **Slide 7** and the quick facts below
- Note that students might have already completed the **Dust and breathing module** in Science, or simply be familiar with asthma and some of these facts:
 - Asthma is a condition that causes breathing difficulties
 - Tubes carrying air to the lungs becomes inflamed and narrow, causing thicker mucus to be produced
 - Risk factors include smoking, allergies, pollution and cold weather
 - Symptoms including coughing, wheezing, shortness of breath and difficulty breathing, chest pain
- Over 5.4 million people in the UK suffer from asthma
- 300 million have asthma globally set to rise to 400 million by 2025
- Around half of people with asthma do not take their medication as prescribed
- As many as two-thirds of people do not attend their asthma review
- Potentially life-threatening asthma attacks happens every 10 seconds in the UK
- £108m is spent every year in the UK on GP consultations for asthma

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Slide 4

What's next for asthma inhalers?

- Ask your students how much they know about asthma inhalers and use **Slide 10** to give a quick overview of how asthma inhalers work, particularly if your students aren't very familiar with asthma already
- Highlight to students that the technology of asthma inhalers dates back to 1778. However, despite years of development leading to a range of available treatments, asthma remains a serious illness, as well as a socioeconomic burden due to unscheduled visits to hospital
- Explain that poor adherence and inadequate inhaler technique are contributing factors to a lack of asthma management and control amongst patients



Slide 5-8

Smart inhaler (develop)



Activity 3

Smart inhaler (develop)

30 mins

- Get the class into small groups or pairs and hand out the **Designing a SMART inhaler student sheet** and explain that they will now work on the final element of the design process; developing an adaptation
- Using **Slide 5**, share the design brief for a smart asthma inhaler with the students, explaining that their design needs to:
 - Appeal to teenagers in the design
 - Keep track of the user's health
 - Address some of the issues faced by users of current inhalers which will be explored on **Slide 6**
 - Track and predict environments the user may visit during the day or night
 - Treat asthma symptoms
- Moving on to **Slide 6**, ask groups to pick an issue associated with asthma treatment from the slide and complete the 'Design opportunity' section within the student sheet
- Remind them to think about the research, analysis, develop process; what information do they have, what can it predict and what can be developed that will lead to adaptation
- Students should develop a series of initial ideas which focus on a device and app that will tackle their chosen design brief
- Ask students to annotate all sketches with details such as:
 - Materials
 - How it works
 - Size or shape
 - What mobile phone sensors will their design use (they can use their **Hidden sensor student sheet** to help think about which sensors might be useful)
- After approximately ten minutes, instruct students to choose one of their initial concept ideas and develop a final design – remind them that sketches and annotations are a must
- Bring up **Slide 7** and encourage students to consider the prompts on the screen while they refine their idea

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Slide 5-8

Smart inhaler (develop) Continued...

- If your students aren't already aware, introduce the idea of a unique selling point (USP) as something that differentiates one product from all others, therefore making it a necessary and worthwhile innovation or service
- Products and businesses often talk about their USP; what do they have that's unique. This is crucial as it's what makes you stand out
- Circulate between groups and make sure they specify what the unique selling point (USP) of their design is, along with detail about the smart features, using the space on the student sheet
- Move to **Slide 8** to show an example of asthma inhaler development and explain to students that a new smart inhaler has recently been developed to address the design opportunity of handling errors, which were known to be negatively impacting drug delivery
- The new device is much easier to use, according to patient feedback, and is also 'smart' in that it shows how many doses are remaining on a screen, a feature lacking from most commonly available inhalers



Discussion

- Pose these questions to the class:
 - Did anyone address handling errors? Discuss their innovation
 - Did anyone introduce a dose counter? Discuss their innovation
- Wrap up by recapping that technology, like the sensors within our smartphones, are enabling a new wave of 'smart health'; devices use our own behaviour to better treat medical conditions
- Remind students that good design will follow the research, analysis, develop process; doing these steps in order is key to ensuring your design fits the purpose



Extension/homework

- Students could spend more time on their designs, including working on them digitally if technology allows
- Groups could prepare a presentation to share their ideas back to the wider class, detailing their design process and what the USP and smart features of their inhaler are
- They could present back to a panel of their peers, Dragons' Den-style, to make it feel like a real business pitch

Try next: The **Inclusive design module** introduces the seven principles of inclusive design. After completing that module your students could return to the **Designing a smart inhaler activity** and reflect whether they've designed their inhaler in an inclusive way.