THE ROYAL SOCIETY

Making medicines

Mah Hussain-Gambles
Technical Project Manager

Mah has worked in the pharmaceutical sector and successfully developed her own company producing a range of Halal cosmetics. She has researched how medical trials may be influenced by the ethnicity of participants.

Medicines are made in a variety of formulations, for example tablets, syrups, injections and ointments. Each form is developed to make the medicine effective and usable. For example, tablets are good ways of delivering medicines such as antibiotics which are absorbed into the blood and spread throughout the body. Creams are good ways of delivering medicines that affect the skin.

Medicines are closely controlled and have to undergo a series of tests before they can be used by the public. The development and testing of a new medicine includes the following stages:

Discovery – chemicals are selected for potential medicinal use.

Pre-clinical – potential medicines are tested in the laboratory to see if they act as expected and to assess the safety of the product before being trialled on people.

Clinical trials – possible medicines are first tested on healthy volunteers to prove their safety in humans, then undergo large scale investigations to test effectiveness.

Licencing – manufacturers apply to the regulators for a licence to sell the medicine for use in defined clinical conditions.

Monitoring – when in use, the medicine continues to be monitored for signs of unexpected side effects.

In the UK, the Medicines and Healthcare products Regulatory Agency (MHRA) are responsible for the licensing of medicines.

Introduction to Inspiring Scientists

Inspiring Scientists is a series of resources to help develop your students' understanding and awareness of science and the diversity of scientists. This resource forms part of a collection of ten ethnic minority scientists in the UK who are leaders in their field of scientific research. The resources for each scientist are divided into three academic levels: primary, secondary and post-16.

Each resource is accompanied by an activity worksheet, scientist's timeline and a video profile.

Learning outcomes

- Understand the importance of the safe use of medicine and the problems associated with the misuse of drugs.
- Design a medicine box combining science, art and design.
- Gain familiarity with key medicine product terminology.
- Perform a 'business pitch' to the class to explain their medicine box design.

Making medicines

Challenge students to consider the requirements of medicine packaging. This could be in the format of class or group discussions. It can form the basis of the production of a detailed design brief if required. To give students some guidance, they can look at a range of empty over-the-counter medication packets.

Some of the points that students may consider are shown below. It is unlikely that they will suggest all of them.

- Protecting the medicine inside.
- Product name.
- Attractive to consumer.
- Active ingredient and dose.
- Use by date.
- Batch number (to allow for tracking and recalls).
- Manufacturer details.
- Safe dosage.

Once the design brief has been understood, students can make their own packaging, using thin card and glue. If required a blank template could be photocopied onto thin card and used as a basis for the students' designs.

Students should also consider points such as the instructions on how to take the medicine safely. This could be in the form of an information sheet for the medicine and lead into further work on the safe use of medicines and the harmful effects of some drugs.

Once complete, groups can present their design to the rest of the class, including their rationale, and then the whole class can vote for their favourite.

Activity toolbox

To complete this activity you will need:

- Activity Sheet;
- Template;
- Empty medicine boxes as examples;
- Colouring pens;
- Glue; and
- Scissors.

Suggested sequence of events

Timing: 45/60 minutes

- Lead a class discussion to recall prior learning of the topic.
- Play the video profile and encourage students to record their own notes (running time approximately 7 minutes).
- Lead a class discussion on the importance of medicine safety and show the class example of medicine packaging.
- Brief class on the activity.
- Activity.
- Class presentations.

Homework ideas

Medicine mission
What medicines do you have at home? Ask a parent/guardian to make a list of the different common medicines they have at home. Make a table to say what each is and what it is for. Do all the medicines look the same?

Extra reading?
Look out for primary science or fiction books on this subject to use during class time. Why not try *Project Body* by John Farndon shortlisted for the Royal Society Young People's Book Prize?

ACTIVITY

Making medicines

A company called Marvellous Medicines have developed a new type of medicine to treat chesty coughs.

Before the medicine can be sold in shops, the medicine needs a new box to help people know about what's inside and what it does.

Task

Working in pairs, design a new box for the Marvellous Medicines' chesty cough medicine. At the end, you will present your design to the rest of the class to decide on the winning design.

Think about:

- What the medicine is used to treat.
- What information needs to go on the outside of the box?
- How can you make the box clear and eye-catching?
- How can you make sure the medicine is used safely?

Use the template to make a sample box.