

APP
AF1, AF2

PoS
2.1c, 2.3a,
3.1b

Framework
1.11b, 1.1.1c,
1.1.2a, 4.2

Resources

Worksheet 30.1 or 30.2

Equipment:

access to computer and internet

images of bottles and jars with tops and lids

Websites you may find useful:

Bottle and can opener product 1

Bottle and can opener product 2

A range of bottle and jar openers 'Inclusive design'

Nursing in practice Magazine

Materials for producing displays and, for the higher levels, materials to produce models

Information displays about levers and friction

Possible internet revision site:

Levers revision

Task overview

Pupils consider the problem of making opening bottle caps and jar lids easier. They then use their thoughts to design a new device to help clients in a nursing home open bottles and jars. They prepare a poster presentation and card model to show to Dragon's Den panel (or the nursing home).

Key concepts

forces, friction, levers

Outcomes

Poster (and optional talk).

Alternative outcomes: Model, video.

Timing

1 or 2 lessons and 1 long homework

Levels 3–5

Pupils use Worksheet 30.1 *Bottle opener 1* to plan their research into the sizes and features of bottle tops and jar lids. They then use this information and the instructions on the worksheet to help them design a bottle top and jar lid opener for a care home.

Pupils present their ideas using a poster containing a labelled sketch of the design idea. The labelled sketch should be annotated so that it is clear how the lid or top is gripped and why the device is helpful in opening bottles or jars for people who have reduced strength in their fingers, hands and arms.

Pupils could present their posters as part of an oral presentation where they explain these points. Alternatively, they could make a promotional video for their openers, or, if there is an opportunity to do a link-up with the technology department pupils, may be able to design their bottle openers.

Pupils will be aided by access to the Level Descriptions Sheet. Assessment by you, or by pupils themselves, can be done by using Level ladder 30.1.

Levels 5–8

As above but pupils use Worksheet 30.2 *Bottle opener 2*. Assess using Level ladder 30.2.

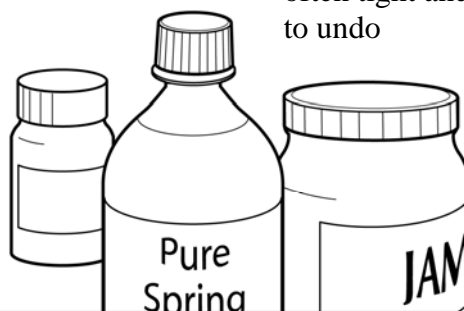
In addition, pupils will be expected to annotate their design sketches with much more detailed descriptions. They will also need to research more widely and produce an introduction that describes the product in context using examples of other devices or developments and describing the conflicting needs and costs that arise from new treatments and provision for older people.

Describe ways of communicating developing issues in the field of care for older people, this should be illustrated at the higher levels by reference to professional magazines or groups and how these are used to inform professional carers of new ideas and developments.

Having to depend on other people can be frustrating and losing the ability to do simple things for yourself can make you feel sad and depressed. This is why good nursing homes encourage the people staying there to look after themselves as much as they can.

As people get older they often find that their hands and fingers get weaker. Some older people have problems opening jars and bottles.

Lids and tops are often tight and hard to undo



Caring for Older People Today
The magazine for health care professionals working with older people

This week's feature issue:
New products for the care home and how this helps keep your clients independent!

Also in this issue

Equipment

You may need:

paper, pens, pencil, pencil crayons, access to the internet.

What you need to do

You are going to design a device to help people open bottles and jars. It can be hand held, wall mounted or stand on a work surface.

You will be asked to present the design to other pupils in the class as though they were staff at a nursing home.

You will need to explain how it works: how the lid or top is gripped and how the force needed to open the bottle or jar is made much smaller so that older people with weaker fingers and hands can use it.

You will need to produce a promotional poster display to help present the design. The poster should include good quality images as well as short descriptions of important parts of the design.

Key features:

- should make bottle and jar opening easy
- the bottle or jar must not fall to the floor when the top comes off
- the nursing home has said that the device should have no electrical parts.

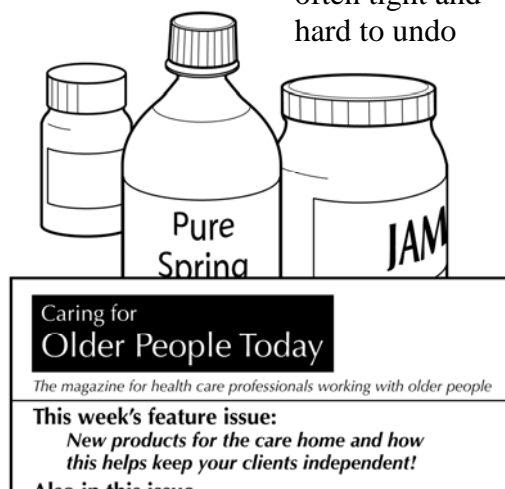
You may find these words helpful

force, friction, lever

Having to depend on other people can be frustrating and losing your independence can make you feel sad and depressed. This is why good nursing homes encourage the people staying there to look after themselves as much as they can.

As people get older they often find that their hands and fingers get weaker. Some older people have problems opening jars and bottles.

Lids and tops are often tight and hard to undo



Equipment

You may need:

paper, pens, pencil, pencil crayons, scissors, cardboard, glue stick, tape, paper fasteners and any other materials needed to make models.

What you need to do

Design a device to help people open bottles and jars. It can be hand held, wall mounted or stand on a work surface.

You will be asked to present the design to other pupils in the class as though you are presenting to the team on the *Dragon's Den* TV programme.

You will need to explain how the opener works, how the lid or top is gripped and how the force needed to open the bottle or jar is made much smaller so that older people with weaker fingers and hands can use it.

You will have to put your design into context and so you will have to describe how other scientific developments have made it easier for elderly people, whose muscles have become weak, to live independently.

Your presentation should include a detailed poster of the design that includes carefully worded labels and descriptions of the design.

Presentation tips:

- a sketch or image that is 3-dimensional with labels and explanations is more impressive than a 2-dimensional drawing
- to make your presentation more impressive still, you could produce either a 2D or 3D model to show how the product works.

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DRAFT

You can assess yourself on two strands: AF1, AF2.

	AF1 Thinking scientifically	AF2 Understanding the applications and implications of science
3	<p><i>To reach this level I could have:</i></p> <p>a described a difference between friction and another force.</p> <p>b shown that levers can help older people when opening bottles and jars.</p> <p>c made a simple lever to explain how levers work.</p> <p>d described another everyday example of levers being used to make things easier.</p> <p style="text-align: right;"><input type="checkbox"/></p>	<p><i>To reach this level I could have:</i></p> <p>a said how new designs for bottle openers can help elderly people.</p> <p>b shown where a lever is being used in my bottle opener design.</p> <p>c said how levers can help older people.</p> <p style="text-align: right;"><input type="checkbox"/></p>

	AF1 Thinking scientifically	AF2 Understanding the applications and implications of science
4	<p><i>To reach this level I could have:</i></p> <p>a described how friction always acts in the opposite direction to movement and that increasing friction can help to open jars.</p> <p>b described how a lever can magnify a force using an everyday example as a model.</p> <p>c shown how evidence I have collected or seen in the past shows that rough surfaces produce more friction because they slow things down more.</p> <p style="text-align: right;"><input type="checkbox"/></p>	<p><i>To reach this level I could have:</i></p> <p>a described an advantage of using my design as well as any drawbacks.</p> <p>b said the way that my design uses friction.</p> <p>c described other ways in which healthcare professionals use levers or friction in their jobs, e.g. using rough cloths for cleaning, hoists to make lifting elderly people easier.</p> <p style="text-align: right;"><input type="checkbox"/></p>

	AF1 Thinking scientifically	AF2 Understanding the applications and implications of science
5	<p><i>To reach this level I could have:</i></p> <p>a said how the moment of a force depends on force and distance from the pivot.</p> <p>b explained how friction depends on the roughness of a surface using a model to help me describe how this works</p> <p>c explained that the choice of design to open a bottle or jar depends on many factors and there is unlikely to be one opener that will suit everyone.</p> <p>d described how I used scientific ideas and my imagination to produce a design.</p> <p style="text-align: right;"><input type="checkbox"/></p>	<p><i>To reach this level I could have:</i></p> <p>a described how elderly people might welcome a bottle opener to stay independent but their carers and relatives might worry about them hurting themselves by trying to open bottles.</p> <p>b described how my design can help older people stay independent and how this helps them and staff.</p> <p>c described the conflict between helping older people to do things for themselves and doing things for them to make their life easier and how a bottle opener may be seen by some to help and by others as an extra problem for an elderly person.</p> <p>d described how moments are used in my design.</p> <p style="text-align: right;"><input type="checkbox"/></p>

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	AF1 Thinking scientifically	AF2 Understanding the applications and implications of science
6	<p><i>To reach this level I could have:</i></p> <p>a used moments and an example calculation to explain how a lever can increase a force.</p> <p>b explained the advantages and drawbacks of my design.</p> <p>c described how the design works using friction and moments.</p> <p>d described how recent scientific or technological developments have led to improvements in products designed to help the elderly remain independent, e.g. battery technology that extends range and speed in motorised wheelchairs.</p> <p style="text-align: right;"><input type="checkbox"/></p>	<p><i>To reach this level I could have:</i></p> <p>a described how the use of this product can improve the quality of life for individuals with different needs.</p> <p>b explained that new technologies have improved the quality of life for older people but the increased costs need to be met by the rest of society.</p> <p>c explained how the development of new technologies and treatments for the elderly has led to new challenges.</p> <p>d described why that professionals who care for older people need to have some understanding of scientific ideas to do their job well.</p> <p style="text-align: right;"><input type="checkbox"/></p>

	AF1 Thinking scientifically	AF2 Understanding the applications and implications of science
7	<p><i>To reach this level I could have:</i></p> <p>a described how the features of the design work together, to reduce the force needed to open a bottle or jar.</p> <p>b decided what the key aspects of the design needed to be before starting.</p> <p>c explained how different pieces of evidence are used to support theories (you may not have covered this).</p> <p>d described how new ideas about the care of older people are discussed, for example through professional groups and magazines.</p> <p style="text-align: right;"><input type="checkbox"/></p>	<p><i>To reach this level I could have:</i></p> <p>a explained how having to design the bottle opener for a nursing home influenced the design of your product.</p> <p>b described how the development of treatments has increased the quality of life for many people and so increased the expectations that we all have for care of the elderly in this country.</p> <p>c suggested some reasons for installing your bottle opener, e.g. helping elderly people to stay independent, and some reasons against, e.g. causing frustration to elderly people who can't use it.</p> <p>d described how I have used some methods of idea generation to improve my range of design ideas considered.</p> <p style="text-align: right;"><input type="checkbox"/></p>

	AF1 Thinking scientifically	AF2 Understanding the applications and implications of science
8	<p><i>To reach this level I could have:</i></p> <p>a explained clearly the advantages of the materials used and how these materials are integrated with the design.</p> <p>b used a series of questions to check that the design meets the needs of the user.</p> <p>c explained the changes I have made to my design as the product has been developed, or explained the changes made to another product designed to help elderly people live independently.</p> <p style="text-align: right;"><input type="checkbox"/></p>	<p><i>To reach this level I could have:</i></p> <p>a described how recent changes in the way that the elderly are cared for has opened up new markets for products that increase their independence.</p> <p>b described how new scientific developments have increased life expectancy and so changed the age profile of the country and the good and bad effects of this change.</p> <p>c described some of the new challenges that an ageing population has brought about.</p> <p>d expressed a personal view on the benefits and problems caused by the development of improved medicines and technologies.</p> <p style="text-align: right;"><input type="checkbox"/></p>