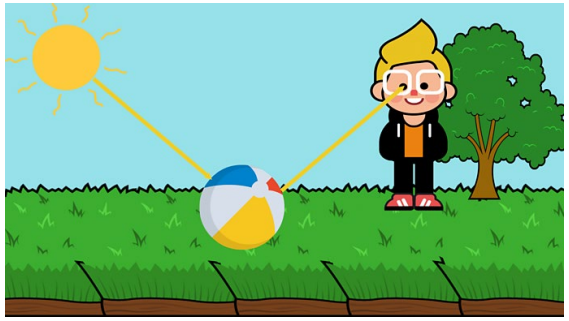
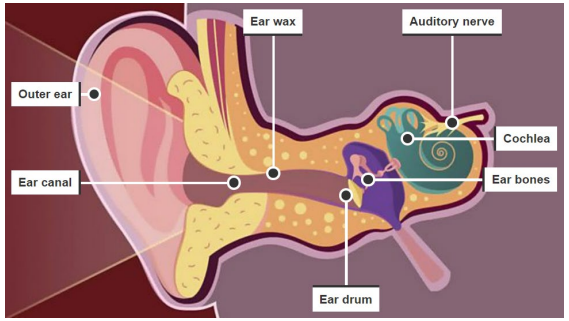
Curriculum Map

Topic		Other curriculum links
Let's Get Physical		How Do We Get There? London's Burning Bright Sparks I Bright Sparks II Feel the Force I Feel the Force II
Sustainability	Importance of using sustainable or recycled materials within product development	
Diversity and difference	PSHE unit: **Celebrating differences**	
Creativity	KS2 Christmas Carol Service (choir, fife performance, readings, tableaux); West of England Music & Arts hub performance; Christmas art projects; theatre company	

Topic Overview:



Children will learn that light and sound are waves and about how we see and hear. They will learn the difference between sources of light and reflections, experiment with how light travels in straight lines, and understand why shadows are formed. They will learn that sound is a vibration and that pitch and volume can be changed.



NC Statements:

Science

3.16 Recognise that they need light in order to see things and that dark is the absence of light
3.17 Notice that light is reflected from surfaces
3.18 Light travels faster than anything in the universe and it always travels in straight lines
3.19 Recognise that light from the sun can be dangerous and that there are ways to protect their eyes
3.20 Find patterns in the way that the size of shadows change

4.16 Identify how sounds are made, associating some of them with something vibrating
4.17 Recognise that vibrations from sounds travel through a medium to the ear
4.18 Find patterns between the pitch of a sound and features of the object that produced it
4.19 Find patterns between the volume of a sound and the strength of the vibrations that produced it
4.20 Recognise that sounds get fainter as the distance from the sound source increases

6.15 Recognise that light appears to travel in straight lines
6.16 Use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye
6.17 Explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes

People:

Heinrich Hertz (1857-94)
The unit of frequency used for all kinds of waves and vibrations is named after him. One Hertz is equal to one vibration per second.

Places:

n/a

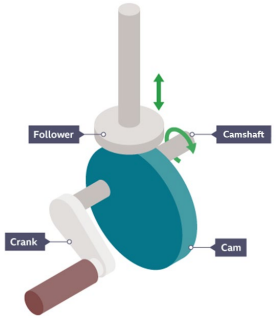
Events:

n/a

Vocabulary:

Science
light
wave
source
reflection
Sun, moon
opaque
translucent
transparent
shadow
absence
eye
retina
optic nerve
brain
sound
vibration
solid, liquid, gas
ear canal
ear drum
ear wax
cochlea
auditory nerve
pitch
volume
high
low

DT
cam
snail cam
off-centre cam
peg cam
pear-shaped
guide
lever
follower
slider
spacer
axle
shaft
crank
handle
housing
framework
motion
movement
rotation
rotary
oscillating
reciprocating
input
process
output

Children will also learn about cam-based mechanisms, including different types of movement that can be created using cams, before designing and making their own high-quality cam-based product.  	DT Select from and use a wider range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing], accurately Select from and use a wider range of materials and components, including construction materials, textiles and ingredients, according to their functional properties and aesthetic qualities Understand and use mechanical systems in their products [for example, gears, pulleys, cams, levers and linkages]			

Key Questions	Curriculum Knowledge
What is light and why do we need it? **(3.18, 6.15, 3.16, 3.19)**	- Know that light travels faster than anything in the universe. - Know that light travels in a straight line. - Know that, because of this, one can only see around corners by reflecting light (e.g. with mirrors). - Know that we need light to see. - Know that light can come from many different sources, such as the Sun, stars, torches, lamps and candles. - Know that some animals are sources of light, such as fireflies and glow worms. - Know that some sources of light are so powerful that they can damage our eyes if we directly look at them (e.g. the sun).
How is light reflected? **(3.17)**	- Know that light is a wave. - Know that most objects reflect at least a bit of light, but that smooth, shiny surfaces (e.g. mirrors) reflect lots, whilst dull, dark surfaces absorb it. - Know that when light travels towards a reflective surface, it bounces back off of it. - Know that when light is reflected, it changes direction.
How are shadows formed? **(3.20, 6.18)**	- Know that whilst transparent materials conduct light fully and translucent ones conduct light partially, opaque materials block light completely. - Know that when light is blocked, a shadow is formed. - Know that a shadow will take the shape of the thing blocking it. - Know that a shadow will appear 'attached' to the thing making it. - Know that bigger things create bigger shadows because they block more light. - Know that things closer to the light source create bigger shadows because, similarly, more light is blocked.
How does light enable us to see things? **(6.16, 6.17)**	- Know that when light hits a thing, it is reflected by that thing and travels in straight lines to our eyes. - Know that our eyes take in some of this light, an image forms on the retina and this image is sent to the brain via the optic nerve, enabling us to see. - Know that anything that creates light is a light source (e.g. bulb, electronic screen, the sun, fire). - Know that objects which reflect light are not light sources (e.g. a mirror, glass, the moon). - Know that the more reflective a thing is, the 'shinier' it will appear.
How are sounds made? **(4.16)**	- Know that sounds are made when objects vibrate. - Know that sound vibrations can be demonstrated using a rubber band around a box or a tuning fork in water. - Know that the vibration makes the air around the object vibrate, creating a sound wave. - Know that sound waves can travel through solids (e.g. metal, stone, wood), liquids (e.g. water) and gases (e.g. air).
How do we hear? **(4.17)**	- Know that sound waves enter the ear, allowing us to hear vibrations. - Know that the outer ear is specially shaped for detecting vibrations. - Know that sound waves travel down the ear canal where they cause the ear drum to vibrate, which sends a message to the brain.
Why do pitch and volume change? **(4.18, 4,19, 4.20)**	- Know that a sound's pitch is how high or low it is: a high sound has a high pitch; a low sound has a low pitch. - Know that a tight drum skin gives a higher-pitched sound than a loose drum skin. - Know that a full glass bottle gives a higher-pitched sound than an empty glass bottle. - Know that a sound's volume is how loud or quiet it is: a loud sound has a loud volume; a quiet sound has a quiet volume. - Know that hitting an object hard will make a stronger vibration and, therefore, a louder sound. - Know that hitting an object gently will make a weaker vibration and therefore a quieter sound. - Know that a sound will grow fainter the further away it is.

What is a CAM and how can one be used to make a moving product?	- Know that a cam is a mechanism that changes one type of movement into another. - Know that a cam can be an off-centre wheel or a specially-shaped wheel such as a pear or snail shape. - Know that the movement a cam creates can be a rotary movement (one that goes round), an oscillating movement (one that moves to and fro around a pivot point, as in a lever) or a reciprocating motion (one that moves backwards and forwards in a straight line, as in a slider). - Know that a follower is a device which follows the movement of the cam. - Know that cam mechanisms can be used to produce a variety of products such as toys or moving displays.