

# Year 4 Science

# Sound

LO – I can set up simple fair tests.

[www.grammarsaurus.co.uk](http://www.grammarsaurus.co.uk)



**Grammarsaurus**

# Different Sounds...

Sounds can also be loud or quiet. We call this the **volume** or loudness of the sound.

Loudness is the amount of energy in the sound. The energy creates different sized vibrations. If you hit a drum hard, you give it lots of energy and the vibrations will be bigger than if it was hit gently. Bigger vibrations cause louder sounds.

Loudness is measured in **decibels** (dB).

**Can you think of an example of a loud sound and quiet sound?**

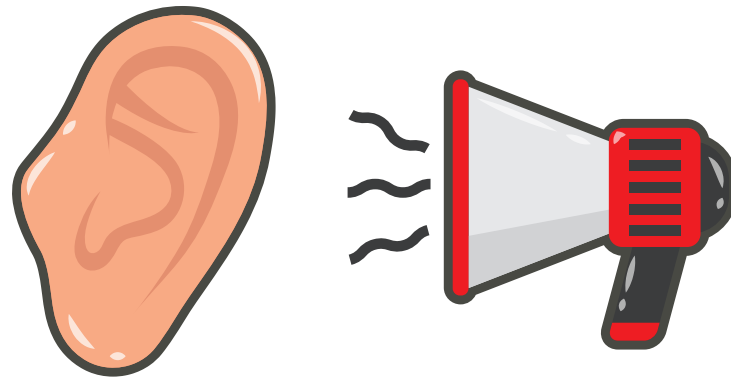


# Loudness of sounds

**Why do loud sounds appear quiet when you are further away?**

Sound loses energy as it travels away from its source, the amount of decibels produced depends on the vibrations produced by the sound source and how far away the listener is.

As the sound spreads out from the source in all directions, only a tiny part of the energy reaches the listener.



# Ear Protection

Some sounds are very loud and can damage our ears.

**What could we do to protect our ears?**

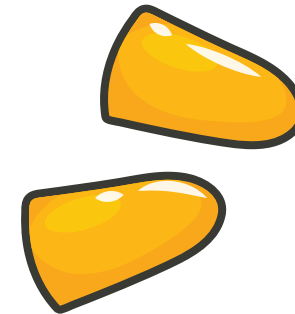
**What do people who work in loud environments do to protect their ears?**



# Ear Protection

Some of you may have heard of Ear Muffs. You might have some to keep your ears from getting cold in winter. Ear muffs were invented to help protect our ears from loud noises. They muffle the sounds so we hear them at a quieter volume.

Some people need to wear ear protection for work.

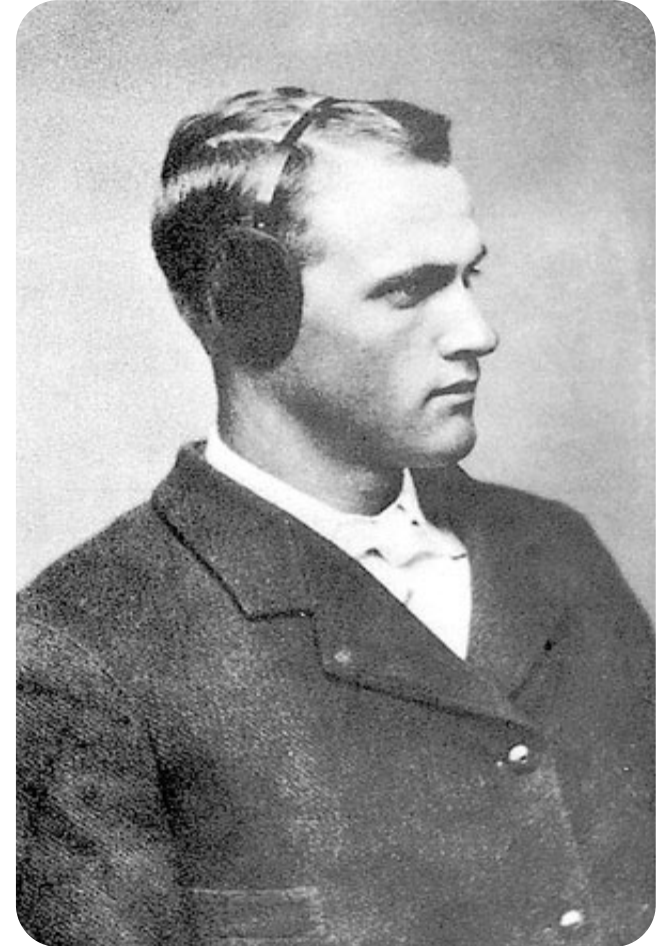


**What jobs do you think require ear protection?**

# Chester Greenwood

**Chester Greenwood** (December 4, 1858 – July 5, 1937), invented the earmuffs in 1873, at the age of 15. He reportedly came up with the idea while ice skating and he asked his grandmother to sew tufts of fur between loops of wire. He called them ear protectors and he manufactured them in his home town of Farmington, USA.

The people of Farmington still celebrate Chester's invention to this day. They celebrate 'Chester Greenwood Day' with a carnival on the first Saturday in December. Do you think everyone wears ear muffs to the carnival??



**I found this in a science magazine. Do you think we could help Jonny with his problem?**

Dear Science Agony Aunt,

I am trying to make some ear muffs for myself. You see, when I get home from school all I want to do is sit down with a glass of milk and a good comic. BUT my mum and dad and brother just talk to me all the time! I want to make ear muffs to block out as much sound as possible but I don't know which material to use. Can you help me?

I'm looking forward to your reply.

*Jonny, Yorkshire.*

# Fair Test

Today, we are going to investigate which material is the best at muffling sounds.

You will have a selection of materials and will have to plan a fair test to see which material is the best at muffling sounds.

## What is a fair test?



A fair test is a controlled investigation carried out to answer a scientific question. In a fair test two or more things are compared. We are going to compare **at least 3** different materials.

In order for a test to be fair we need to ensure only one thing is changed. This is called a **variable**. We are only going to change the surface. For it to be a fair test we need to make sure we use the same amount of material and that the sound is the same volume each time.



# Activity Part 1

Today, we are going to investigate which material is the best at muffling sounds.

These are the materials we could test;

**Netting, cotton, tin foil, toilet paper, denim,  
cotton wool, cardboard, paper, bubble wrap**


We need to test at least 3.

First, we need to plan our investigation. For it to be a fair test we need to make sure we use the same protractor and the same amount of force to push it.




# Activity Part 2

**Next, we need to plan and carry out our investigation.**



Complete the fair test planning sheet and then conduct your investigation.  
The investigation may need to be done on a different day so your teacher  
can gather all the resources you need.



**When we are carrying out our investigation, we need to  
record our results.**

# Thinking Time...

Now we have completed our investigation, have a think about some of these questions.

**What happened in our investigation?**

**Which was the best material to muffle sounds?**

**Why do you think this was the best material?**

**Which was the worst material to muffle sounds?**

**Why do you think this was the worst material?**

Discuss with your partner ready to feed back to the class.

# Activity Part 3

**Finally, we need to reply to Jonny to explain what we found out.**

Remember, this needs to be a short and precise reply.

## **Questions to think about;**

- What did you find out?
- Which was the best material?
- Why was it the best material?
- Which was the worst material?

# Assessment

Now that we have completed our sound topic, we are going to complete the assessment we did at the start of the topic again to see what we have learnt.

We will also compare our 2 assessments.

**Draw an annotated diagram to explain how we hear sounds, from the sound being made to us hearing it.**

**Draw it on your assessment sheet.**

