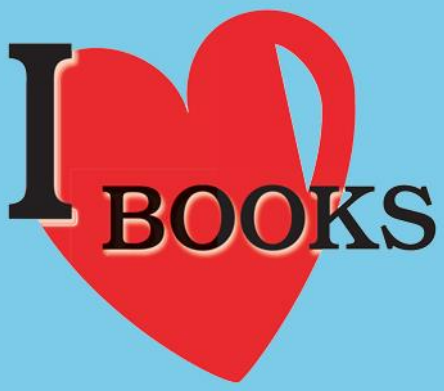

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100 Science Experiments

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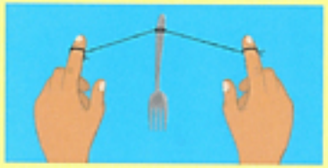
Sound vibrations

This is what sound vibrations look like on a computer screen.

All sounds are made by vibrations in the air. The vibrations reach your ear and make your eardrum vibrate. This is what makes you able to hear sounds. You can find out more by experimenting with vibrations on these two pages.

Chiming fork



1. Cut a piece of thread as long as your arm. Tie the middle to the end of a fork. Wind the ends around your fingers.

2. First swing the fork so that it knocks gently against the edge of a table. You will hear a dull clink.

3. Now touch your index fingers to the flaps just in front of your ear holes and let the fork hang down.

4. Swing the fork so that it knocks gently against the table again. What do you hear this time?

Don't tie the thread too tightly around your fingers; it could restrict your blood supply.

What's going on?

When the fork hits the table, it vibrates. This makes the air around it vibrate and you hear a dull clink. But it makes the thread vibrate too.

When you put your fingers near your ears, you bring the thread closer to the sound sensors in your ears. You can hear the vibrations much more clearly. They now make a clear chiming sound in your ear.

For links to a website where you can make a super sound cone, go to **www.usborne-quicklinks.com**

Measure the volume

1. Stretch a piece of plastic food wrap as tightly as you can across the top of a large bowl.

2. Screw up a few tiny pieces of tissue paper. Spread them over the plastic wrap. Put the bowl next to a speaker.

3. Switch on the stereo and play some music. Start with the volume low and gradually turn it up.

4. The tissue paper will start to move. Play different styles of music. What level of volume makes the paper move?

What's going on?

The sound from the speakers makes the air vibrate. These vibrations get stronger as the music gets louder. Eventually they are strong enough to make the food wrap vibrate, so that the scraps of tissue paper move around.

Different styles of music have different speeds of vibration. Some will make the food wrap vibrate at lower volumes than others.

Quacking duck vibrations

1. Make a hole in the bottom of a plastic cup using a drawing pin. Push a pencil into the hole to widen it.

2. Cut a piece of string as long as your arm. Then make a couple of knots in one end.

3. Thread the string through the hole, so that the knots rest on the outside of the bottom of the cup, like this.

4. Wet a paper towel. Hold the cup in one hand and drag the wet towel down the string with the other. What happens?

What's going on?

As you drag the wet paper towel along the string, it makes the string vibrate. The vibrating string makes the cup vibrate too, which makes the sound louder. The vibrations are uneven, so they make an unmusical sound rather like a quacking duck.

Down to Earth

How high can you jump? How long can you stay in the air? No matter how hard you try, a force from the Earth called gravity will always pull you down. Try these experiments to find out more about how gravity and balance works.

Balancing acrobats

1. Roll modelling clay between your palms to make a smooth ball. Cut it in half with a knife to make a base.

2. To make an acrobat, get a piece of plain card the size of a postcard and draw a banana shape with a head.

3. Then draw outstretched arms and another small banana shape for a leg. Add hands, feet and a face.

4. Draw a square tab under the foot. Then cut around the outside of the acrobat, including the tab.

5. Make a slit in the top of the base with a knife, then slot the tab into it. Now try to push your acrobat over.

What's going on?

When you try to push over the acrobat, he pops back up. This is because the round base weighs more than the body. This uneven spread of weight affects how gravity pulls on the acrobat. The heavier the lower part of something is, the more easily it can stay upright.

Balancing butterfly

1. Fold a piece of paper in half. Draw half a butterfly on it and cut it out. Unfold it. It will be symmetrical.

2. Draw round the butterfly on some card and cut it out. Glue or tape two coins on the tips of the wings, like this.

3. Now stick a pencil in some modelling clay. Try balancing the butterfly on the pencil. Where does it balance?

What's going on?

The point where the butterfly balances is called its pivot point. If you change the weight on one side, or move the coins, the butterfly will balance at a different point. For the butterfly to balance, the weight of the coins multiplied by their distance from the pivot point must be the same on both sides.

For a link to a website where you can feel the pull of gravity when you try to land a spacecraft, go to **www.usborne-quicklinks.com**