Name: _____ Date: _____

Why a Wet Finger Makes a Glass Sing

Circle group

Run a wet finger slowly around the rim of a thin glass. The glass may begin to hum with a clear, ringing note. The sound seems to come from nowhere, because your finger makes no noise. It shows two ideas from physics. One is friction that grabs and lets go. The other is the natural shaking of objects.

A finger on a rim does not glide smoothly. It sticks to the glass for a moment. It drags the rim a tiny bit sideways. Then it slips free. As soon as it slips, it sticks again. This happens hundreds of times each second. Each stick and slip gives the glass a small push.

Every object has certain rates at which it shakes most easily. These are its natural frequencies. A glass is shaped like a bell. When it is pushed at just the right rhythm, it shakes more and more strongly. This is called resonance. The sticking and slipping of the finger settles into that rhythm. So the glass rings at one steady pitch.

The pitch depends on the glass. A smaller, thinner or stiffer glass rings higher. A larger glass rings lower. Water in the glass makes the pitch lower, because the water adds weight that the shaking must move. The water on your finger matters too. A clean, wet finger grips and slips in just the right way. A dry or oily finger does not work well.

Questions

1. What does the wet finger do as it moves around the rim?

_____

_____

2. How often does the stick and slip happen?

_____

_____

3. What is resonance?

_____

_____

4. Why does the glass ring at one steady pitch?

_____

_____

5. Why does water in the glass make the pitch lower?

_____

_____

6. Why might a dry finger fail to make the glass sing?

_____

_____

Words to know

friction: the rubbing force between two surfaces that touch
rim: the top edge of a cup or glass
frequencies: the number of times something vibrates each second
resonance: strong vibration caused by pushes at just the right rhythm

Talk together (every group has these)

1. Find one fact that every group read. How did your sheet say it?
2. What did your sheet tell you that you think another group's did not? Ask them.
3. What is one question about this topic that none of the sheets answered?

Name: _____ Date: _____

Why a Wet Finger Makes a Glass Sing

Triangle group

Run a wet fingertip slowly around the rim of a thin glass, and the glass may begin to hum with a clear, ringing note. The sound seems to appear from nowhere, because your finger is making no noise at all. It is a small demonstration of two ideas from physics: friction that grabs and lets go, and the natural vibration of objects.

A finger moving across a rim does not glide smoothly. Instead, it sticks to the glass for an instant, drags the rim a tiny distance sideways, and then slips free. As soon as it slips, it sticks again, and the pattern repeats hundreds of times each second. Every stick and slip gives the glass a small push.

Every object has certain rates at which it vibrates most easily, and these are called its natural frequencies. A glass is shaped something like a bell, and when it is pushed at just the right rhythm, it vibrates more and more strongly, an effect known as resonance. The sticking and slipping of the finger settles into that rhythm, so the glass rings at one steady pitch.

The pitch depends on the glass itself. A smaller, thinner or stiffer glass rings higher, while a larger one rings lower. Pouring water into the glass lowers the pitch, because the water adds weight that the vibration must move. The water on your finger matters as well, since a clean, wet fingertip grips and slips in just the right way. A dry or oily finger does not work nearly as well.

Questions

1. What does the wet fingertip do as it moves around the rim?

_____

_____

2. How often does the stick and slip pattern repeat?

_____

_____

3. What is resonance?

_____

_____

4. Why does the glass ring at one steady pitch?

_____

_____

5. Why does pouring water into the glass lower the pitch?

_____

_____

6. Why might a dry finger fail to make the glass sing?

_____

_____

Words to know

friction: the rubbing force between two surfaces that touch
rim: the top edge of a cup or glass
frequencies: the number of times something vibrates each second
resonance: strong vibration caused by pushes at just the right rhythm
demonstration: a way of showing how something works

Talk together (every group has these)

1. Find one fact that every group read. How did your sheet say it?
2. What did your sheet tell you that you think another group's did not? Ask them.
3. What is one question about this topic that none of the sheets answered?

Name: _____ Date: _____

Why a Wet Finger Makes a Glass Sing

Square group

Draw a wet fingertip slowly around the rim of a thin glass, and the glass may begin to hum with a clear, ringing note. The sound appears to emerge from nowhere, because your finger produces no noise whatsoever. This small demonstration illustrates two ideas from physics: friction that alternately grabs and releases, and the natural vibration of objects.

A finger traveling across a rim does not glide smoothly. Instead, it clings to the glass for an instant, drags the rim a tiny distance sideways, and then slips free, and as soon as it slips, it clings again, so that the pattern repeats hundreds of times every second. Each cycle of sticking and slipping delivers a small push to the glass.

Every object has particular rates at which it vibrates most readily, and these are called its natural frequencies. A glass is shaped somewhat like a bell, and when it is pushed at precisely the right rhythm, it vibrates more and more strongly, an effect known as resonance. The finger's sticking and slipping gradually settles into that rhythm, so the glass rings at one steady pitch.

The pitch depends on the glass itself, since a smaller, thinner or stiffer glass rings higher, while a larger one rings lower. Pouring water into the glass lowers the pitch, because the water adds weight that the vibration must move. The water on your finger matters as well, because a clean, wet fingertip grips and slips in exactly the right manner, whereas a dry or oily finger does not perform nearly as well.

Questions

1. What does the wet fingertip do as it travels around the rim?

_____

_____

2. How often does the pattern of sticking and slipping repeat?

_____

_____

3. What is resonance?

_____

_____

4. Why does the glass ring at one steady pitch?

_____

_____

5. Why does pouring water into the glass lower the pitch?

_____

_____

6. Why might a dry finger fail to make the glass sing?

_____

_____

Words to know

friction: the rubbing force between two surfaces that touch
rim: the top edge of a cup or glass
frequencies: the number of times something vibrates each second
resonance: strong vibration caused by pushes at just the right rhythm
demonstration: a way of showing how something works

Talk together (every group has these)

1. Find one fact that every group read. How did your sheet say it?
2. What did your sheet tell you that you think another group's did not? Ask them.
3. What is one question about this topic that none of the sheets answered?

For the teacher: Why a Wet Finger Makes a Glass Sing

Each student sheet carries a shape, not a level. The same topic and facts, written three ways.

Circle: Why a Wet Finger Makes a Glass Sing

Easier · 238 words · Flesch-Kincaid grade 2.8

1. It sticks, drags the rim a bit, and then slips free, again and again.
2. Hundreds of times each second.
3. When an object pushed at the right rhythm shakes more and more strongly.
4. The finger's sticking and slipping settles into the glass's natural rhythm.
5. The water adds weight that the shaking must move.
6. It would not grip and slip in the right way, as a clean, wet finger does.

Triangle: Why a Wet Finger Makes a Glass Sing

This passage · 256 words · Flesch-Kincaid grade 6.9

1. It sticks, drags the rim a tiny distance, and then slips free, again and again.
2. Hundreds of times each second.
3. The effect in which an object pushed at the right rhythm vibrates more and more strongly.
4. The finger's sticking and slipping settles into the glass's natural rhythm.
5. The water adds weight that the vibration must move.
6. It would not grip and slip in the right way, which a clean, wet fingertip does.

Square: Why a Wet Finger Makes a Glass Sing

Harder · 258 words · Flesch-Kincaid grade 10.1

1. It clings, drags the rim a tiny distance, and then slips free, over and over.
2. Hundreds of times every second.
3. The effect in which an object pushed at precisely the right rhythm vibrates more and more strongly.
4. The finger's sticking and slipping gradually settles into the glass's natural rhythm.
5. The water adds weight that the vibration must move.
6. It would not grip and slip in the right manner, which a clean, wet fingertip does.