STEM Program

Make Glasses Sing

Sound Waves – Magic of Music

Music can be found all around us if you know where to look. Did you know that you can make glasses sing? This challenge card is similar to 'Make Glass Bottles Sing' but is more appropriate for older sections.

Suited to Section

Joey Scouts
Cub Scouts
Scouts
Venturer Scouts
Rover Scouts

Challenge Area

COMMUNITY
PERSONAL GROWTH
OUTDOORS
CREATIVE

Key SPICES Growth

SOCIAL
PHYSICAL
INTELLECTUAL
CHARACTER
EMOTIONAL
SPIRITUAL

Likely Scout Method Elements

COMMUNITY INVOLVEMENT
LEARNING BY DOING
NATURE AND THE OUTDOORS
PATROL SYSTEM
PERSONAL PROGRESSION
PROMISE AND LAW
SYMBOLIC FRAMEWORK
YOUTH LEADING, ADULTS SUPPORTING

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Plan

1. Investigate friction and vibrations and how sound waves interact with different materials such as air and water. You might also want to investigate how moisture affects friction.
2. Investigate the concept of resonance and hypothesise why this might be important in music. You may also like to look at how an opera singer can break a glass with just their voice!
3. Examine how sound waves are measured and at what frequencies humans can hear. You might also want to look at factors that affect the frequencies that we can hear and why, and what frequencies different animals can hear.
4. Read the safety section of this challenge card and make sure that everyone is aware of the safety risks and requirements.
5. Collect all the necessary materials for your experiment.

Do

1. Place an empty glass cup on a flat surface and half fill with water.
2. Gently run your dry finger around the rim of the glass while pressing down and observe how it feels. Does your finger run smoothly over the rim? Does it make any sound?
3. Wet your finger and now run your finger around the rim of the glass again. Does it feel different to the dry finger? Does it make any sound?
4. Experiment with different pressures and speeds until you can make the glass sing.
5. Once the glass is singing, take your finger away from the glass. What happens? Does the glass keep singing?
6. Make the glass sing again and this time stop moving your finger but keep it on the glass. What happens now?
7. Using a metal spoon, gently tap the side of the glass above water level. Does this make the same or a different noise to running your finger over the rim? What happens if you tap the spoon below water level?
8. Remove about half of the water from the glass so that it is now only a quarter full.
9. Make the glass sing again. Does it make a different noise?
10. Experiment with different volumes of water or sizes of cups to see what notes you can make.
11. Set up multiple glasses in your patrol to create a scale (think ‘do re mi fa sol la ti’) and see what you can play.

Review

1. Did you manage to get your glass to sing? If you didn’t, what do you think you could change to make it sing? If you did, did you find it challenging? Did it get easier with practice?
2. What did you enjoy the most from making glasses sing? What did you learn?
3. If you were to do this activity again, what would you do the same? What would you do differently? How could you improve your singing glasses? Do you think you could tune your glasses? If so, how?
4. Do you think the type of liquid in the glass might make a difference to the note produced?

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Variations

- Make your singing glasses colourful by adding some food colouring to each glass.
- Try making xylophones with different numbers of notes.
- This challenge card pairs nicely with other challenge cards from the Magic of Music such as 'Make a Guitar' and 'Make an Idiophone', or other sound wave related challenge cards. In your patrol, you could make a range of instruments and play them together. Think about what other instruments that you may be able to make. To add an extra sciencey challenge to your glass xylophone, try playing the periodic table song (https://www.youtube.com/watch?v=rz4Dd1l_fX0) or another science-based song.

Safety Tips

- Sharps/glass warning: This challenge card uses glass and therefore there is the risk of breakage and cuts. Supervise younger sections around glass and if glass is broken make sure it is cleaned up immediately. Shoes should be worn while doing this challenge card and in any area where there has been broken glass.
- Slips and Spills: This challenge card uses water. As such, it should be performed in an area that can tolerate spills, but care should be taken if spills occur so that slipping does not occur.

Why Does This Happen?

When rubbed along the rim of the glass, your finger encounters resistances or friction from the glass. However, by wetting your finger, you reduce the friction, allowing your finger to run more smoothly. When the combination of factors such as pressure, moisture, and speed are just right, vibrations are created in the side of the glass which will then be transmitted into the air as soundwaves. As vibrations travel differently through different substances, the amount of water in the glass will affect the sound produced.

SciScouts Physics of Waves

The SciScouts Physics of Waves is a National Science Week project, undertaken in collaboration with Fizzics Education. These instructions were prepared by Scouts for Scouts. This National Science Week project is supported by the Australian Government.

Scouting has always been strong on STEM skills. Maths to calculate catering quantities and navigate, the science of water purification, the physics of abseiling, and the engineering of pioneering structures – they all have their place. In the current program for our youth members, STEM and Innovation forms one of six Special Interest Areas that enable Scouts to set goals and pursue their own ideas.