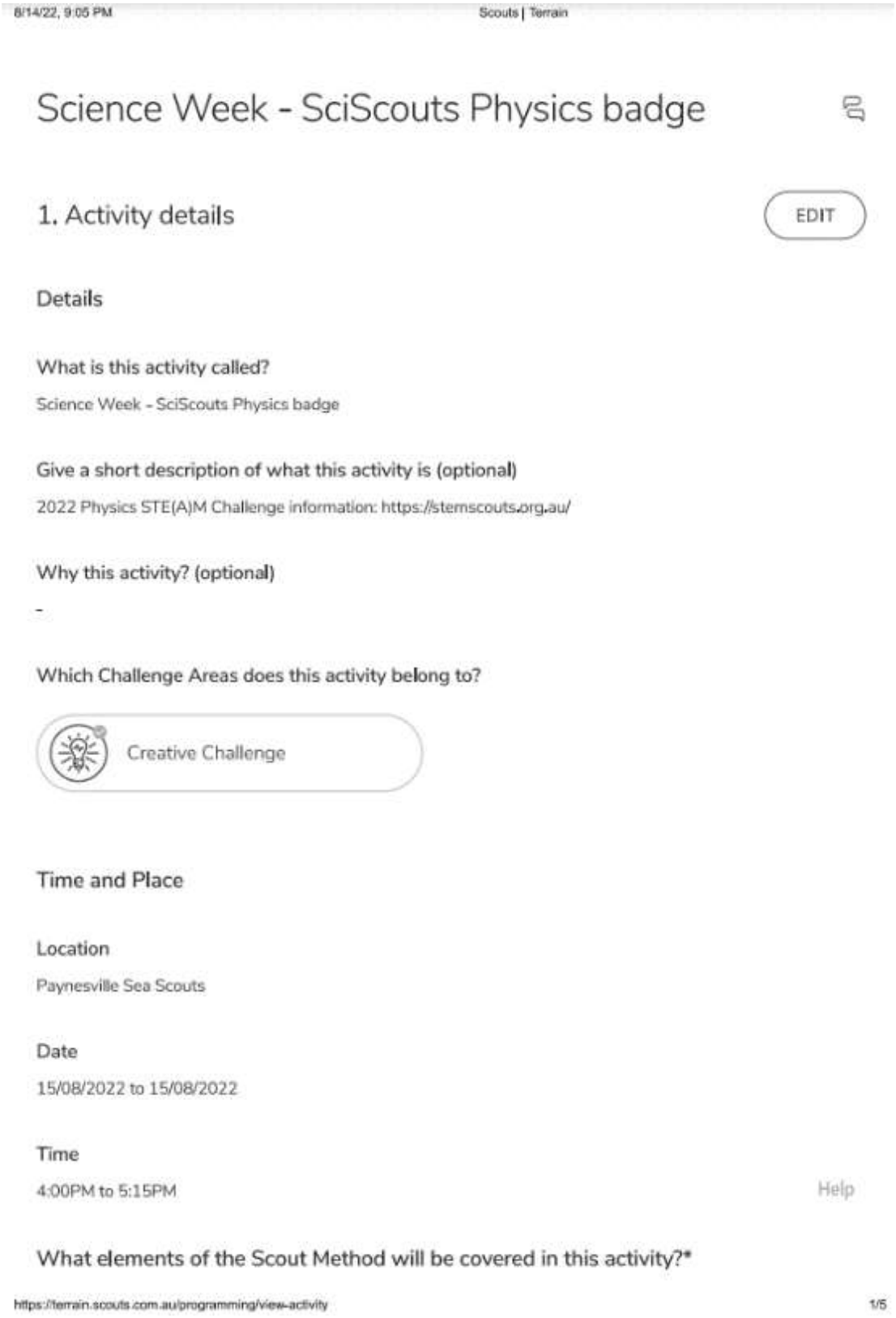
To view our Paynesville Joey video. Please go to: https://youtu.be/ot-1yNXH_8s

To see the procedure documents to complete the experiments yourself, please see below.



8/14/22, 9:05 PM Scouts | Terrain

Science Week - SciScouts Physics badge

1. Activity details

EDIT

Details

What is this activity called?

Science Week - SciScouts Physics badge

Give a short description of what this activity is (optional)

2022 Physics STE(A)M Challenge information: https://stemscouts.org.au/

Why this activity? (optional)

-

Which Challenge Areas does this activity belong to?

Creative Challenge

Time and Place

Location

Paynesville Sea Scouts

Date

15/08/2022 to 15/08/2022

Time

4:00PM to 5:15PM

Help

What elements of the Scout Method will be covered in this activity?*

https://terrain.scouts.com.au/programming/view-activity 1/5

Learning by Doing

Youth Leading, Adult Supporting

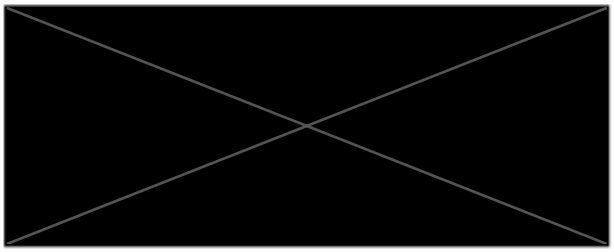
Personal Progression

2. Participants & Schedules

EDIT

Who is this activity for?

1ST PAYNESVILLE SEA SCOUTS



Who will assist with the activity?

-

Add schedules (optional)

15/08/2022
16:00 - 16:10

Opening parade and investiture

Amanda [redacted]

15/08/2022
16:10 - 16:15

Quick game - Musical statues / dance freeze

Ingrid [redacted]

Help

15/08/2022
16:15 - 17:05

Science experiments - sound waves Experiment 1 - String telephone: - See attached Scout Challenge Card Experiment 2 - Kazoo: - See Curious Pearl Science Girl book (attached photo) Experiment 3 - Singing jars: - See attached Scout Challenge Card Experiment 4 - Panpipes: - See: https://www.youtube.com/watch?v=BaymX3qJRbQ - Need someone to take photos and short videos throughout each experiment. - Need someone to get permissions for photos. - Need someone to record comments and feedback from scouts (e.g. "I loved..." or "I've learnt how to..." etc.)

Angelo [redacted]

15/08/2022
17:00 - 17:10

Chicken sounds in a cup - sound waves - See https://www.youtube.com/watch?v=B8T80Eur8DI&authuser=0

Amanda [redacted]

15/08/2022
17:10 - 17:15

Closing parade & review

Amanda [redacted]

Supporting materials

General equipment list (optional)

Flag; plank; rope; section flag; investiture process Scissors; sticky tape; straws; elastic bands; greaseproof paper; paper towel roles; 6 glass jars; water; paper cups / clean tin cans; string / wool Review ball

Additional notes (optional)

-

Additional files (optional)

Make Glass Bottles Sing.pdf

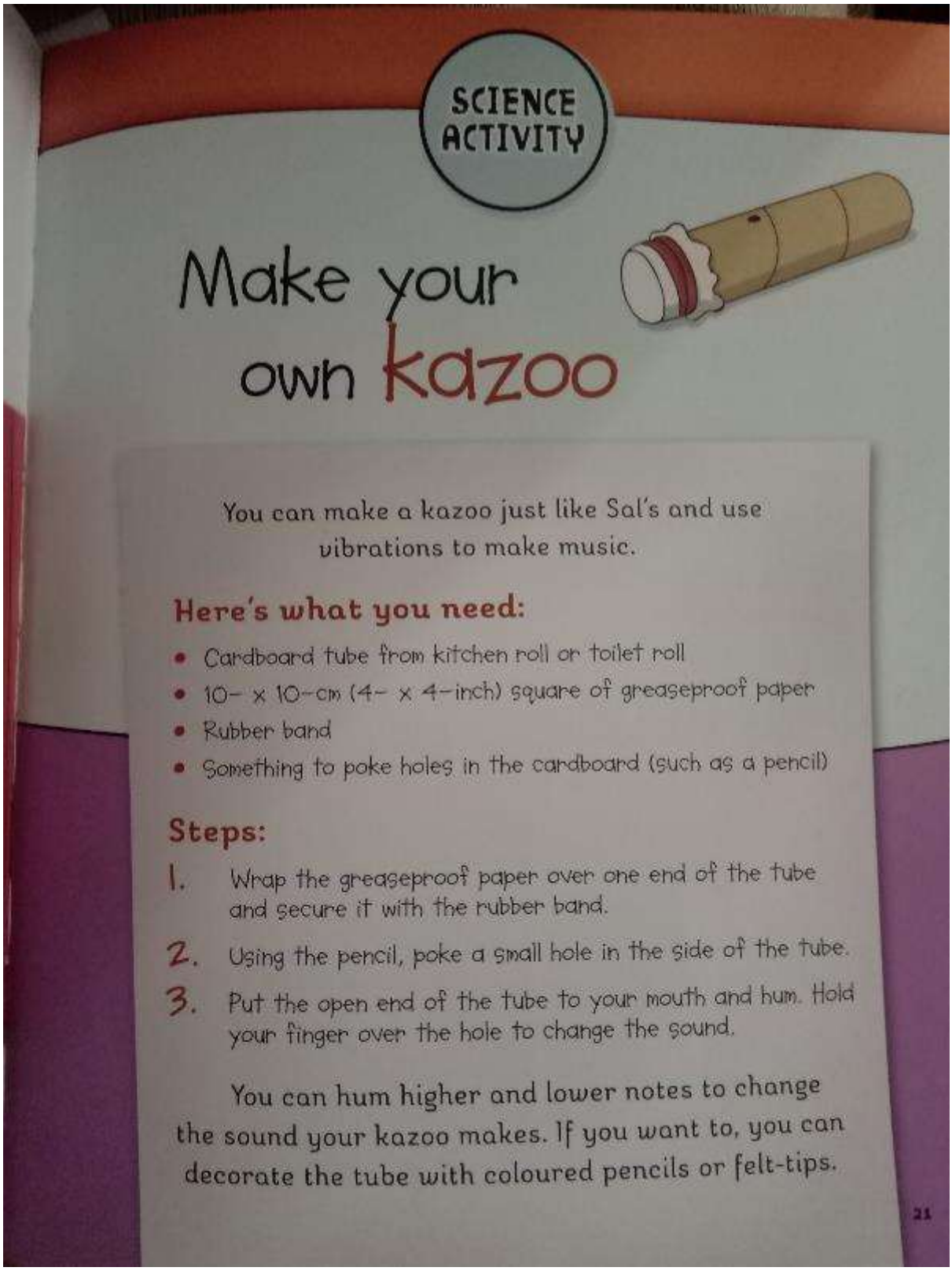
String Telephones.pdf

Help

IMG_20220814_202010.jpg

The URL for the listed websites in the program are:

- Sciscouts info: https://stemscouts.org.au/
- Chicken sounds in a cup: https://www.youtube.com/watch?v=B8T80Eur8DI&authuser=0



STEM Program

Scouts AUSTRALIA

Make Glass Bottles 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 glass bottles sing? This challenge card is similar to 'Make Glasses Sing' but is more appropriate for younger 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

STEM Program

Make Glass Bottles Sing

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 bottle on a flat surface and half fill with water.
2. With a metal spoon, gently tap the side of the bottle and observe what happens. What sound is made? Does the sound differ if you hit above or below the water line?
3. With your mouth at the same level as the top of the bottle, gently blow across the top of the bottle and observe what happens. Does it make the same or different sound than when you hit the bottle with a spoon?
4. Fill some more bottles of the same size with varying levels of water and line the bottles up from fullest to emptiest.
5. Starting at the fullest bottle, gently tap each bottle and compare the notes produced.
6. Tune your bottle xylophone to a scale (think 'do re mi fa sol la ti') by adding or removing water.
7. Try playing a song with your bottle xylophone. If you are working in a patrol, each patrol member could play one bottle. Some suggested songs are provided in the supplementary information.

Review

1. Did you manage to get your bottles 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 bottles 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 bottles?
4. Do you think the type of liquid in the glass might make a difference to the note produced?

STEM Program

Make Glass Bottles Sing

Variations

- Make your singing glasses colourful by adding some food colouring to each glass. This is especially effective if your glass bottles are clear.
- 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 challenge cards about sound waves. 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.
- Try making a xylophone using the same amount of water but different size bottles. Does this affect the sound?
- Try gently tapping the glass bottles with a different utensil or object. Does a knife or fork make a different sound to a pencil? Why might this be?

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, get an adult to safely clean the glass up.
- 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?

Tapping the glass bottle or blowing air across the top of the bottle creates vibrations, or sound waves, which travel differently through different substances, meaning that these sound waves will travel differently through the glass, water, and the air. As such, different water levels and different bottles create different vibrations and sound waves and therefore different sounds.

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.

national science week 2022

An Australian Government Initiative

Inspiring Australia

STEM Program

Scouts AUSTRALIA

String Telephones

Sound Waves - How Do We Hear?

Explore how sound waves travel by building a string telephone. Challenge your communication skills and test just how well you can communicate using your string telephone.

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

STEM Program

String Telephones

Plan

1. Investigate sound and how it travels. Try model sound waves using a slinky to visualize how sound travels from one space to another. Play some loud music and either place your hand on the speaker, or feel the floor or table around you, what do you notice? You can also try placing your hand on your throat and making a long 'ahh' sound, what do you feel?
2. Collect the materials required for the activity. Communicate with your patrol and leaders if you need to bring items from home.
3. Read the safety requirements and discuss with you leaders/adults supervisors what supervision and safety requirements might be needed.

Do

1. Punch small holes in the bottom of two paper cups. You may need to use scissors, a sharp pencil, or a nail.
2. Thread a piece of string through the hole and tie the end on the inside to a paperclip so it doesn't slip out of the cup. Cut your string, and do the same to the other end.
3. Test out your string phone and call a friend! Get in position so the string is tight. Speak into the cup while your friend on the other end holds the phone to their ear to listen. Try to have a conversation!
4. See how far you can make your string phones reach. Experiment with different lengths of string.
5. Experiment with your cup phones. What happens if the string is loose? What happens if you place your hand on the string while using the phone?
6. Test your string phones with some communication games. Try sending a secret message on the string phone through your whole unit, passing the message along to each other one at a time. Did the secret message make it through the whole unit?

Review

1. How does the string phone work? How did the sound travel along the string to your cup?
2. What have you learnt about sound during this activity?
3. Do real telephones work the same way? What is the same, what is different?
4. If you were to do this activity again, what would you do the same? What would you do differently? What did you enjoy most about this activity?

STEM Program

String Telephones

Variations

- Once you've mastered one-to-one communication, can you jump on a conference call? See if you can build a string phone line that allows more than 2 people to communicate together.
- What else can you use to build your string phone? Test different types of strings and cups. How do different materials affect the string phone?
- A larger program can be built using other 'How Do We Hear' or sound wave challenge cards.
- Explore telephones and how they work. Who invented the telephone? How have telephones changed over history? How do we use telephones today? Why is the telephone an important form of communication?

Safety Tips

- Sharps warning: You may need to use scissors or other sharp objects during this challenge card, posing a risk for cuts. Ensure younger sections are appropriately supervised.

Why Does This Happen?

For help understanding how your string phone works visit: https://www.scientificamerican.com/article/talk-through-a-string-telephone-bring-science-home/ Sounds travel as a wave, which we can't see, we can feel as vibrations. When you speak into your cup the sound waves make the cup, and string start to vibrate, or shake. The vibrations then made their way along the string to the other cup where the vibrations fill the cup and can be heard as sound. This is why the string has to be tight, if the string is too loose the vibrations can't travel as well and get lost. Think about jingling a loose rubber band compared to the twang when the rubber band is tight.

SciScouts Physics of Waves

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