SOUND SYMMETRY FOR KS1!

Get reflective on all things symmetrical and develop learning in both maths and music!
A KS1 Music and Maths Activity Plan with curriculum links by **Jennie Henley** and **Caroline Hilton**

What you'll need

Song Bank songs:
- *Dr Knickerbocker, ek, dho, teen!*
- *1, 121*
- *Twinkle, twinkle, little star*

Resources:
- Mirrors
- Two-dimensional shapes
- Three-dimensional objects

This scheme of work enables children to explore symmetry through music and mathematical enquiry, with opportunities for work in PE, Dance and Art. Children are encouraged to develop their understanding of the ways that symmetry exists in songs in relation to pitch, rhythm and structure, and apply this to their own improvisations and compositions. Through exploring symmetries in sound, children also develop the understanding that there are many different symmetries that can have a variety of representations. They use mathematical enquiry to investigate different types of symmetry, and explore both musical and non-musical patterns.

LEARNING OUTCOMES

MUSIC
- To warm up the voice healthily and invent a healthy warm-up
- To analyse the pitch and melody of a song and understand that these can be symmetrical
- To listen to different songs and identify how the song has been developed using symmetry
- To consider how symmetry is used to structure a song or piece of music
- To improvise simple melodies and rhythms using the voice
- To compose a simple song using symmetry to develop a melody, structure and rhythmic accompaniment

MATHS
- To explore symmetry in two- and three-dimensional shapes
- To understand that there are different symmetries
- To identify and describe line symmetry and plane symmetry
- To investigate symmetry in natural and man-made environments
- To recognise and name common shapes, including 2-D shapes, eg. rectangles (including squares), circles and triangles and 3-D shapes, eg. cuboids (including cubes), pyramids and spheres
- To recognise and create repeating patterns with objects and with shapes

ACTIVITIES

1. Finding symmetry in *Dr Knickerbocker*

Introduce *Dr Knickerbocker, ek, dho, teen!* Warm up the body with some stretches and shaking of the arms and legs before moving on to a siren activity for a vocal warm-up: siren down first, and then back up. Play *Dr Knickerbocker* to the children. Explain that you are going to learn the melody first and ask the children to discuss what they notice about it. After some discussion tell them that you noticed that part of the melody is *symmetrical*. Ask children if they know what that might mean. Teach the melody and see if pupils can spot when the melody is symmetrical and when it is not symmetrical. Can they represent the melody with physical actions to help them see and feel the shape?

2. Symmetrical or not?

Use the same body and voice warm-ups as before, but this time ask children if they can invent a physical warm-up that makes the body symmetrical and/or a vocal warm-up using symmetry in pitch (it might help to work in pairs or groups). They can then lead the

CURRICULUM LINKS

History

Many coats of arms include symmetry, pattern and repetition. See how many heraldic designs children can find that include these features and then create your own unique coats of arms with at least two examples of symmetry.

MFL

Look at flags from around the world – can children spot which ones have repeated patterns and/or lines of symmetry? Explore the lines of symmetry using mirrors. What would happen if you cut up the flags and re-arranged them?

others in their warm-up – can they identify and describe the symmetries in each other's creations?

Remind children of the melody for *Dr Knickerbocker* and then teach the lyrics. Ask the children if the lyrics are symmetrical in any way. What would make them symmetrical – how do we know if something is symmetrical or not? Then move on to explore 2-D shapes. You might use paper shapes and fold them in half, or you could use mirrors. When they have explored the shapes, discuss what makes something symmetrical.

3. Different kinds of symmetry

Invite some pupils to lead the others in the warm-up they invented last time. Introduce a new one: *1, 121*. You may like to start with going up to three only and gradually building on this, depending on the ability of the group. Discuss whether the warm-up is symmetrical and why (remind the children of their explorations of 2-D shapes to help). The warm-up is symmetrical in both the pitch and the pattern of the numbers.

See if the children can find any other **reflections** (symmetry) in a song. Give examples of songs with a symmetrical (ABA) structure, such as *Twinkle, twinkle, little star.* Now explore 3-D objects: how do we know if an object is symmetrical? Provide some everyday items like cereal boxes or plastic cups and ask the group to find the **planes** of symmetry. You could investigate other types of reflection and devise symmetrical dances in pairs or experiment with symmetrical and non-symmetrical movements.

4. Pattern quest

Start with the children's own warm-ups, then sing three notes and ask the group to sing the reflection. Invite pupils to work in pairs, taking it in turns to improvise a short melody and sing the reflection. Then try singing *Dr Knickerbocker*, this time clapping the rhythm while you sing. Next, play the backing track and ask children to use their thinking voices to sing the song while they clap the rhythm. Consider together whether the rhythm is symmetrical – if not, why not?

Use this as a starting point to explore symmetry in rhythm. Clap a short, simple rhythm and ask children if they can clap the reflection (you may wish to model this first by asking a child to clap a simple rhythm with you clapping the reflection). When children are comfortable with this, ask them to work in pairs to create symmetrical rhythms with one child improvising a rhythm and the other clapping the reflection.

Explain that the group is going to go on a 'pattern quest'! They have explored lots of different symmetrical shapes, objects and sounds and their task now is to explore the classroom/school/playground and find symmetrical patterns. Children could take photos of the patterns for display and/or to stimulate art work.

5. Sound symmetry in action

Together recount all the different ways you have explored symmetry. You can assess the children's understanding by playing a game of 'symmetrical or not symmetrical', asking children to identify whether different shapes, objects and sounds are symmetrical.

Explain that they are going to compose a short, simple song using symmetry (either in groups, pairs or as a whole class). Children could write lyrics in ABA form – maybe a song to explain symmetry! Then they might use pitch symmetry to compose a melody for the lyrics – they could start with Dr Knickerbocker's melody, adapt part of a different song (eg. the first three notes of *Three blind mice*) or use *1, 121* as a guide. They could even compose a rhythmic pattern for percussion instruments as an accompaniment. Make audio recordings to save your special symmetrical songs! Celebrate your learning journey by performing *Dr Knickerbocker* and the children's compositions in assembly.

Words by Jennie Henley and Caroline Hilton

RE

Religious symbols are full of symmetry! Hold a class competition, working in pairs, to find as many lines of symmetry as possible in these emblems: Christian cross, Jewish Star of David, Taoist Taijitu, Islamic star-and-crescent, Buddhist Wheel of Dharma, Shinto torii, Sikh Khanda and Bahá'í star.

PE

Using coats of arms, flags and religious symbols as stimuli, create movement sequences that include symmetry. Extend the activity by adding in repetition and structural reflections as well as variations in height and speed.

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Song Bank

See if children can spot the symmetry in these Song Bank songs!

- ***Water!* – symmetrical structure (ABABABA)**
- ***Boom chicka boom* – rhythmic symmetry**
- ***Jamawaile* – pitch symmetry (this song also demonstrates how a symmetrical melody can be layered and accompanied with a rhythm to produce a song!)**