Patterns: Ostinato & Mathematics

Learning Outcomes and specific purpose:
Adapted from the lesson plan ‘Ostinato’ contained in ‘Essential Arts Toolkit, 2nd Edition’

An Ostinato is a repeating pattern found in music. Patterns are also found and use in maths. Integrating repeating patterns in music and mathematics will benefit students with different learning styles and reduce fear and anxiety when learning maths. The AusVELS Mathematical content strand Numbers and Algebra (VCAA 2013c) main component relates to patterns and their identification.

Identifying patterns and the rule at a pre-algebraic stage may assist student’s functional thinking and ergo understanding of algebra in secondary school (Warren 2005, p105). Through music students can aurally and kinaesthetically become aware of patterns and begin to understand this abstract mathematically concept. At the same time, the student’s musical knowledge and skills can be constructed through learning about ostinato and its role in musical composition / aesthetics.

Students will
1. Be able to recognise a simple ostinato
2. Compose and perform a simple ostinato
3. Apply the concept of repeating patterns to maths, including generalising the rule for the pattern

Outcome | AusVELS Standard or Progression Point or learning Focus
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1 & 2 | **AusVELS The Arts: Learning Focus - Level 3 (VCCA 2013a):**
- They show evidence of arts knowledge when planning arts works for different purposes and audiences and identify techniques and features of other people’s works that inform their own arts making.

3 | **AusVELS Mathematics Level 3 (VCCA 2013c):**
- ACMNA060: Describe, continue, and create number patterns resulting from performing addition

Prerequisite knowledge and/or links to previous/future lessons:
## Prior knowledge:
- Understanding of note durations: quarter and eighth notes as well as quarter rests.
- Be able write and read music notation (conventional or other format).
- Understand and read measures.
- Use of percussion instruments

## Links:
- This lesson introduces simple ostinati in music and will form the base for exploring their creation and use in different styles of music.
- In maths, numbers and spatial patterns will be further explored

## Resources required
- IWB
- Ostinato music / patterns notation sheet
- Percussion instruments
- Music journals
- Pencils

## Songs / videos: examples of ostinato in different styles of music

- **Somebody I used to know** – Walk off the Earth: [http://www.youtube.com/watch?v=d9NF2edxy-M](http://www.youtube.com/watch?v=d9NF2edxy-M)
- **Canon in D** – Pachelbel: [http://www.youtube.com/watch?v=8Af372EQLck](http://www.youtube.com/watch?v=8Af372EQLck)
- **Call your Girlfriend** – Erato: [http://www.youtube.com/watch?v=fQoCEvVL57E](http://www.youtube.com/watch?v=fQoCEvVL57E)
- **Call your Girlfriend** - Lenon and Maisy: [http://www.youtube.com/watch?v=7_aJHJdCHAo](http://www.youtube.com/watch?v=7_aJHJdCHAo)

Teaching note: You may need to review video for suitability. Options are to play only the relevant portion or audio only
source: Mundesley Junior School e-learning (n.d)

**Equipment required:**
- IWB
- Computer
- Internet access

**Assessment**
- Formative assessment: monitor progress to inform guidance / teaching moments
- Summative: Assessment rubric
- Reflection: develop awareness of own understand and ability of the task (Churchill et al 2011, p402)

**Actual Lesson Plans**

**Lesson Introduction (whole class focus)**

Learning activities, key questions and teacher explanations: 15 – 20 minutes

**Introduction**

1. Elicit knowledge of patterns – description of repeating units found in maths and music. Introduce musical terminology: ostinato
2. Echo clapping: clap a short sequence and have the students echo the pattern. With each echo, repeat and extend the pattern 2- 3 times.
   Questions: What did you notice about our clapping?
3. Show clips / audio of ostinato in different styles of music (examples
in resources section, choose suitable ones for the class). Try to listen for the ostinato, (focus the students’ attention on any visual cues as well). What do you think of the ostinato in the different styles of music? Are there any difference or similarities? Why do you think that? Did you find it easier to find the ostinato when you were looking at the video or when you were just listening for it?

4. Show the class the ostinato patterns / music notation sheet. Clap one of the patterns and ask the students to identify the one you are playing. Now have everyone clap that pattern. Repeat with all patterns. Perhaps have the students include other body percussion.

5. Split class into groups and have them compose their own 8-beat ostinato (with 4 beats per measure), ensuring that it is written down (large sheets of paper or in a journal).

6. Have each group perform their ostinato, repeated 3 times. This could be done for the whole class or just the teacher.

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**Main Component of Lesson**

**Learning activities, key questions and teacher explanations:**

**Introducing maths: 15-20 minutes**

1. Clap / play the ostinato (perhaps use a student’s composition), but play the second measure twice. Repeat and play the second measure three times – extending the pattern (addition of a unit / measure).

   Guiding Questions: who can describe what you are hearing? What do you think is happening to the ostinato? Have students discuss and demonstrate to show understanding.

2. Give the students time to do this extending with their own composition (play through ostinato 3 times extending with either 1st or 2nd measure). Have the students write down what they are playing.

**Session 2: Making geometric pattern from the ostinatos**

1. First model the process. For each measure in the extended ostinato assign a different geometric shape to the corresponding measures (i.e. square / circle, square/ circle/ circle, square/ circle/ circle/circle). Play the pattern while you say / chant the shape pattern.

2. Now have the students draw geometric shapes to represent what they have been playing. Have the students play their pattern again looking at both the original ostinato and the geometric shapes.
Questions: Look at the shapes, how would describe what is happening to the pattern? Try to focus the children’s use of description into more maths language i.e. growth of pattern was by addition of a particular shape.

3. Have students create different patterns with their ostinato and apply the geometric shapes again: what is happening to the patterns?

4. Reverse the process, write the geometric shape pattern and apply ostinato pattern.

Lesson Conclusion

Learning activities, key questions and teacher explanations: 20 minutes

1. Using the geometric patterns have the students write the maths rule i.e. the circles are increasing by one each time. Have students continue the geometric shape pattern.

2. Have students write different geometric shape patterns and swap for others to identify the pattern and the rule.

3. Reflection: what did you learn about patterns in music and maths? Which ostinato did you like? Why did / didn’t you like it? Did music help you to identify the patterns in maths?

Extension / Adaption:

1. Instead of instruments or body percussion have the students create an ostinato with them chanting singing words related to a theme ie: different plants or animals or books (example Potter Puppets Ostinato)

2. Extend the difficulty of the pattern by adding a third or fourth measure

3. Use plastic geometric shapes to create the pattern with the ostinato (one colour or multi-coloured depending on need)

4. Use cups to create the ostinato (e.g. Erato – Call Your Girlfriend) and perform to a known song.

5. Record (video or audio only) the ostinatos and keep as part of a music portfolio

Assessment of students’ learning:

Student Reflections
Complete sheet

Teacher Assessment Rubric
Complete
**Student Reflection**

**Ostinato and Mathematical patterns**

1. What did you like doing the most in this session and why?

2. Do you think music helped you identify the patterns and their rule?

**Teacher’s Assessment Rubric**

Name:

Music: Patterns: Ostinato and Mathematics

<table>
<thead>
<tr>
<th>The Arts: Music: Creating and Making</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
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</thead>
<tbody>
<tr>
<td>Creates an ostinato of 8 beats (2 measures of 4 beats)</td>
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<td>Able to describe the change in the pattern of the ostinato</td>
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<td>Able to perform ostinato using a variety of body percussion or instruments accurately</td>
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<tr>
<th>The Arts: Music: Exploring and Responding</th>
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<td>Able to identify and describe the use of ostinato in musical compositions</td>
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<tr>
<th>Mathematics: Exploring and responding</th>
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<tr>
<td>Able to describe a geometric pattern and identify the rule</td>
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<td>Able to continue the pattern</td>
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Elizabeth Kennedy
211253811
ECP711
1 Experiencing difficulties; 2. Developing; 3. Satisfactory; 4. Very good; 5. Excellent

Comments: