Title: Dash Mr Music

Year level band: Years 1-2

Description: How can we play and create music? Can robots play music? Use the Xylophone accessory and watch Dash play favourite childhood songs.

In this lesson, students will learn basic music vocabulary, such as note, composer, and rhythm. Using the Xylo App, students will write measures of a song to be played using Dash's Xylophone attachment. Xylo introduces children to programming through music and play. Start off by composing a musical phrase. Then students create their own songs or translate from sheet music. Finally, students will select dance moves for Dash to perform while playing a song.

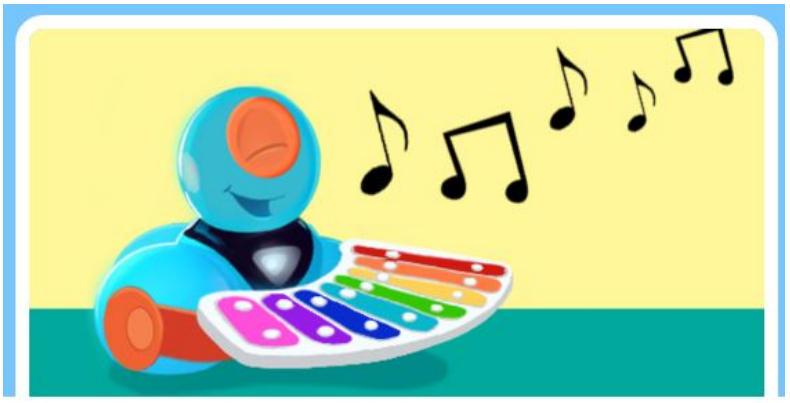
Resources:

- Dash Robot
- Xylophone attachment
- One iPad or tablet per group with the MakeWonder Xylo App Downloaded
- Handout - Xylophone Setup for Dash
- Tutorial for teachers https://www.youtube.com/watch?v=3LWQ5wPrXv0

Online Resources:

- Video about Xylophones: https://www.youtube.com/watch?v=TRW2SkgljRw
- Happy birthday sheet music https://s3-us-west-2.amazonaws.com/freesheetmusic/happy-birthday-alphanotes.pdf
- Erie canal sheet music **(Extension)** https://s3-us-west-2.amazonaws.com/freesheetmusic/erie-canal-alphanotes.pdf

Prior Student Learning: Students will have already been introduced to the Dash Robot and have had an opportunity to play. They will have had some experience exploring the drag and drop features of the Blockly app and these concepts can be transferred to the Xylo App.

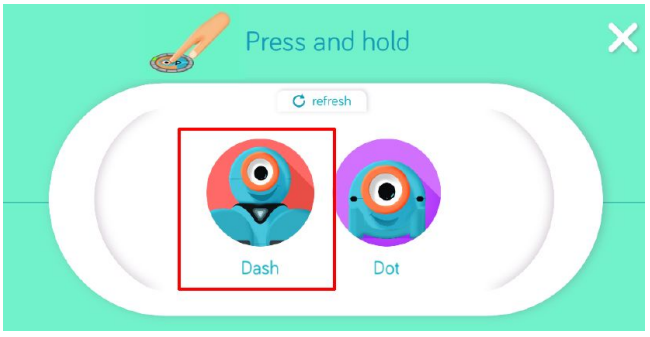


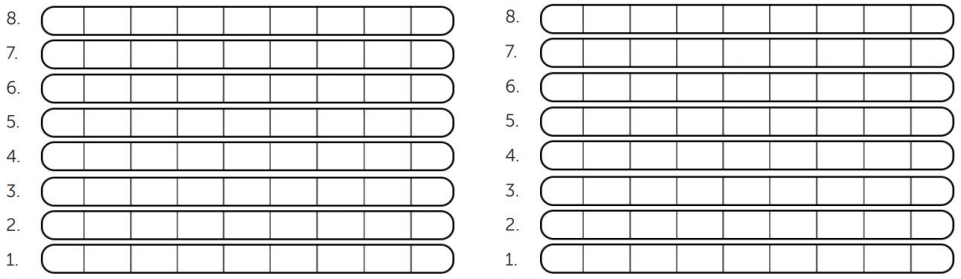
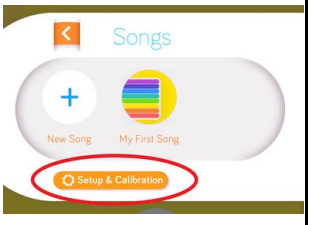
Australian Curriculum alignment summary

Digital Technologies: Students design solutions to simple problems using a sequence of steps and decisions. By the end of Year 2 students will have had opportunities to create a range of digital solutions through guided play and integrated learning, such as using robotics.

Music: Students learning Music listen, perform and compose. They learn about the elements including pitch, rhythm, dynamics and expression. They also respond as audience members enjoying, reflecting and analysing musical works. By the end of Year 2 students improvise, arrange, compose and perform music.

Year	Content Descriptions
F-2	**Digital Technologies:** Follow, describe and represent a sequence of steps and decisions (algorithms) needed to solve simple problems (ACTDIP004) **Music:** Create compositions and perform music to communicate ideas to an audience (ACAMUM082)

Element	Summary of tasks
Learning hook	Ask students how many have played a musical instrument? What are instruments? Have you ever seen a Xylophone? Let's learn a little more about Xylophones. Play a video such as this one: https://www.youtube.com/watch?v=TRW2SkgljRw Write vocabulary words on the board and go through the definitions. Modify the definitions to fit the level of understanding of students.these include: note, beat, bar, measure, high, low, pitch, sound, rhythm, compose, key, sound.(Appendix 1) Can robots play music? Can you create music? Can we combine this to make a robot play music you have created? Watch this then: https://www.youtube.com/watch?v=WrrMneHsc6Y The teacher demonstrates how to connect the Dash Robot to the iPad. 

Achievement Standards	**Digital Technologies (F-2):** Students design solutions to simple problems using a sequence of steps and decisions. **Music (F-2):** By the end of Year 2, students communicate about the music they listen to, make and perform and where and why people make music. Students improvise, compose, arrange and perform music.
Learning Map (Sequence)	• learn basic music vocabulary. • create music using the *Xylo* app and Dash's **Xylophone** attachment. • experiment with high and low sounds • copy familiar music notes into the Xylo app • practice **sequencing** by rearranging measures of music. • practice creating **loops** by repeating measures of music. • showcase compositions
Learning input	The aim is to control a robot to play music and create music through improvising, arranging, and composing. The teacher facilitates a discussion about xylophones and plays this video for students: https://screencast-o-matic.com/watch/conh2Begh5 The teacher explains how to connect a xylophone to the Dash robot and play music. Hand out a worksheet for students to colour from top to bottom, to match the xylophone in the *Xylo* app: red, orange, yellow, green, teal, blue, purple and violet. (Appendix 1 & 2) 
Learning construction	**Activity One: Play a Song Dash** Did you know Dash can play music? He uses a Xylophone, which is a rhythm instrument. Students form small groups of 3-4 with one Dash robot. 1. Pass out the handout – Xylophone Setup for Dash. 2. Help students add the Xylophone to Dash and then calibrate it, following the directions in the handout. 3. Open the Xylo app on a tablet. 4. Click the menu button (3 lines). 5. Make sure you calibrate the Xylophone and Dash robot 

6. Click the NEW SONG icon. Then choose one from the range of songs:
    a. Twinkle Twinkle Little Star
    b. Mary Had a Little Lamb
    c. Row Your Boat
    d. Frere Jacques
    e. London Bridge
    f. This Old Man
    g. Old McDonald
    h. Three Blind Mice
    i. Jingle Bells

7. After the song is loaded, press the Play button to download the song to Dash and watch him play.
8. Explain that each small box represents one measure, and each circle represents one note to play. Dash plays one note at a time. A white bar moves over the notes to show which one Dash is playing. To stop Dash at any point, just tap somewhere in the background. To start playing again, press the Play button, or tap on one of the measures. Notice the colors of the bars on the screen match the colors on the Xylophone. So if a note is on the Red, Dash will strike the red key, if it is on the Blue, Dash strikes the blue key.
9. Show students how they can modify the song by adding more notes or moving notes in a measure and allow them to experiment as time allows.

Activity Two: High Notes and Low Notes

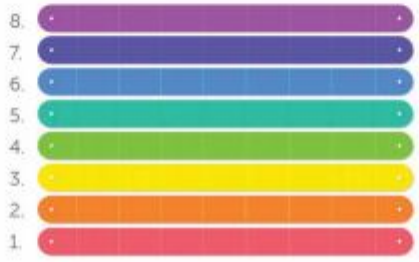
Dash can play both high and low notes on the Xylophone. We are going to identify which color bars play higher notes and which play lower notes.

We are going to add notes to the measure. As Dash plays the notes, listen closely to which pitch is higher and which is lower."

- Add notes to the red (lowest) bar and light purple (highest) bar on the screen by tapping on the thin, white, vertical lines.
- Play the measure on Dash's Xylophone.
- Ask which bar played a higher note, Bar #1 or Bar #8?
- Give out the High/Low worksheet (see below)
- Have students add two notes at a time to a measure.
    - Have students listen to which note is higher and which is lower.
    - Have students color the boxes under "Higher Note" and "Lower Note" on their worksheet the colors that match the bars.
- Have students repeat this process four times, until all of the boxes on their worksheet have been colored in. (Appendix 3)

Name:_____

	Higher Note ↑	Lower Note ↓
1.		
2.		
3.		
4.		



Activity Three: **Create Happy Birthday New Song**

1. Download some sheet music: for example, the Happy Birthday song: https://s3-us-west-2.amazonaws.com/freesheetmusic/happy-birthday-alpha notes.pdf
2. Open the Xylophone App and Choose New Song, then Empty Song.
3. Change the song name to Happy Birthday____ (put student name in the blank)
4. Help students translate the sheet music notes into notes for the Xylophone. Add colors to the sheet music notes. (We suggest to put the lowest note on the bottom bar and work up from there with each note.)
5. Students then put the notes onto the measures. When they tap the colored bar, a note is added. When they tap the note again it is removed. Use spacing to modify the note values. For example, quarter notes are closer together and half notes are further apart. Work on one measure at a time.
6. Press the Play button to see Dash play the song.
7. Continue working on the song until it plays well.

	Activity Four: Compose own Songs "What is a composer?" We are going to be composers. We are going to use what we learned about high and low notes to write our own songs. 1. Open the Xylo App and Choose New Song, then Empty Song. 2. Change the name of the song to Composer ____(put student name in the blank) 3. Which bar plays a lower pitch, Bar #1 or Bar #8? Continue in this matter, comparing two bars at a time and having students say which they think will play a lower or higher pitch. 4. Now it's your turn to write your own songs using both higher and lower notes. 5. Students put the notes onto the measures. When they tap the colored bar, a note is added. When they tap the note again it is removed. Use spacing to modify the note values. For example, quarter notes are closer together and half notes are further apart. Work on one measure at a time. 6. Press the Play button to see Dash play the song. Play for each measure, and then modify one measure at a time until it sounds right. 7. Continue working on the song until it plays well. 8. Students could record their songs on a worksheet with measures.  **Extension:** 1. Have students work together to write four measures of music. 2. Have students tap on the oval below each measure and choose a movement for Dash. 3. As students play their songs, encourage them to dance along with Dash. 4. Try Erie Canal sheet music (see online resources page 1)
Learning demo	Have students share their music with the class Students can dance with the class, dancing along with Dash. Prompt students to sing a low note and a high note.

Learning reflection	After each group plays their piece, ask them questions: ● What is your favourite measure in your song? Why? ● Would you change anything about your song? ● What was the greatest challenge in composing your own music? Ask groups to provide feedback on each other's songs. (Sample response: "The rhythm in the second measure of your song is really interesting.") Dash in action. **Dash the Robot's Valentine's Day Song & Dance** https://www.youtube.com/watch?v=ef9-SjP0lAo&feature=youtu.be 

Assessment:

Formative Assessment:

- Take photos/video of the students' as they perform their compositions.
- Collect algorithm designs that depict their musical solutions. (worksheets)

I Can	choose a pre-record song in the Xylo app	
I Can	copy the notes of a song into the app	
I Can	use a mix of high and low notes	
I Can	create my own song	
I Can	make Dash move whilst playing a song	

	Quantity of knowledge			Quality of understanding	
Criteria	**Pre-structural**	**Uni-structural**	**Multi-structural**	**Relational**	**Extended abstract**
Students design solutions to simple problems using a sequence of steps and decisions. (* students design their algorithm using the templates provided by the teacher. i.e. The algorithm is a sequence of notes that form their song).	Unable to design a musical solution for Dash to play.	Can design (with assistance) a sequence of notes that makes a musical solution for Dash to play.	Can independently design a piece of music using a sequence of high and low notes for Dash to play. With support can identify and solve mistakes in their algorithm. Can explain some parts of their algorithm design with teacher prompts.	Can present a design, using a sequence of steps and decisions, that represents their song they have created for Dash to play. Can explain and justify their algorithm design.	Can present a design, using a sequence of steps and decisions, that represents their song they have created for Dash to play. Can explain and justify when and where they use decisions and how they can extend their algorithm.
Students improvise, compose, arrange and perform music.	Unable to play pre-recorded music on the App.	Can play pre-recorded music with assistance.	Can play pre-recorded music on their own without assistance, with some errors.	Can successfully use a combination of pre-recorded songs as a basis for composing their own new song successfully.	Can successfully compose new songs for Dash, that are distinctly different to one another in sound (high and low notes, melody).
Students communicate about the music they listen to, make and perform and where and why people make music.	Cannot communicate about the music they hear Dash play.	Can communicate with assistance about the music they hear Dash play.	Can independently communicate about the music they create for Dash to play	Can communicate about the music they have made on their own.	Can communicate about the music they have made on their own and explain the motivation and reasoning behind their music in detail.

CSER Professional Learning:

This lesson plan corresponds to professional learning in the following CSER Digital Technologies MOOCs:

F-6 Digital Technologies: Foundations

- Unit 7: Algorithms and Programming
- Unit 8: Visual Programming

F-6 Digital Technologies: Extended

- Unit 2: Algorithms & Programming

See: http://csermoocs.adelaide.edu.au/moocs

Further Resources:

Lesson adapted from Make Wonder website:

https://education.makewonder.com/curriculum/

and

Exploring Robotics with Dash and Dot

http://www.ed4tech.com/courses/Dash-Dot/lessons/dash-can-play-the-xylephone%20v2.htm

More ideas in the Dash and dot Magazines of 2015

https://www.makewonder.com/magazine/

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Appendix 1 Vocabulary

Note	Beat
Measure	Rhythm
Low	High
Pitch	Bar
Compose	Sound

Red	Orange
Yellow	Green
Teal	Blue
Purple	Violet

Appendix 2 - Xylo worksheet

Name:_____

8.
7.
6.
5.
4.
3.
2.
1.

8.
7.
6.
5.
4.
3.
2.
1.

Appendix 3 - High Low Note worksheet

Name:_____

	Higher Note ↑	Lower Note ↓
1.		
2.		
3.		
4.