

Music Advanced

Textbook

Music Advanced



Let's learn some more specifics about making music using the micro:bit.

Play a Specific Note

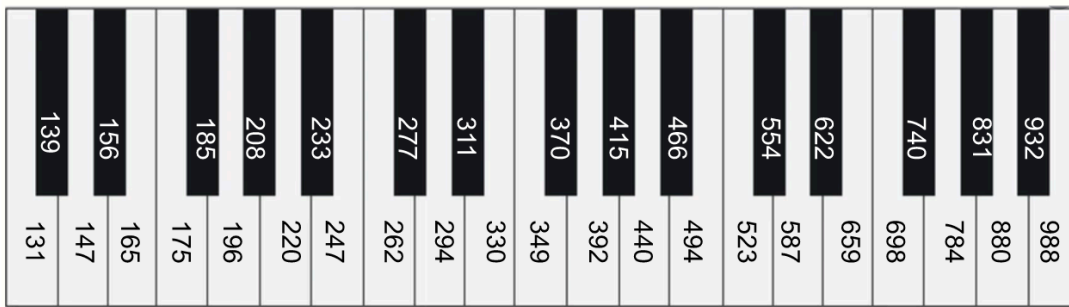
Tone is a musical sound. You can also play specific notes for a specific amount of time using the micro:bit.

Here is an example of Low C

```
1 music.play_tone(131, music.beat(BeatFraction.WHOLE))
```

To play different notes, replace the number 131 with specific values.

Here is a chart of each note and the number value that you would replace the number 131 with.



Here are the same values in chart form.

Note Name	Number Value	Note Name	Number Value	Note Name	Number Value
Low C	131	Middle C	262	High C	523
Low C#	139	Middle C#	277	High C#	554
Low D	147	Middle D	294	High D	587
Low D#	156	Middle D#	311	High D#	622
Low E	165	Middle E	330	High E	659
Low F	175	Middle F	349	High F	698
Low F#	185	Middle F#	370	High F#	740
Low G	196	Middle G	392	High G	784
Low G#	208	Middle G#	415	High G#	831
Low A	220	Middle A	440	High A	880
Low A#	233	Middle A#	466	High A#	932
Low B	247	Middle B	494	High B	988

932	988
831	880
740	784
	698
	659
622	587
554	523
466	494
415	440
	392
370	349
311	330
	294
277	262
233	247
	220
208	196
185	175
156	165
	147
139	131

Note Length

You can also change the length of the note to the following options by changing the word **WHOLE**.

```
1 music.play_tone(131, music.beat(BeatFraction.WHOLE))
2 music.play_tone(131, music.beat(BeatFraction.QUARTER))
```

Try it!

HALF - 2 beats

QUARTER - 1 beat

EIGHTH - ½ a beat

SIXTEENTH - ¼ a beat

DOUBLE - 8 beats

BREVE - 16 beats

Output Examples

When your music plays, you will hear the melody through one of the micro:bit's outputs. An output is a place where information is produced on a computer. For example, the speaker is an output on the micro:bit. A speaker produces the melodies you make! The LED light display is another example of an output we've been using. It shows the code you create using its lights.

Adopted from microbit.org platform

Critical Thinking Questions

- When playing a musical instrument, why is it important to control both the exact pitch (how high or low a note sounds) and the exact duration (how long a note lasts) to create a recognizable melody or express a specific feeling?
- Imagine you're trying to create a unique sound effect for a robot. How could combining very short notes with specific high or low pitches allow you to design a distinct sound that conveys a particular meaning, like an alert or a friendly greeting?
- Beyond just playing a song, how could a system that allows for precise control over individual tones and their lengths be used in a non-musical way, such as for communication (like Morse code) or to signal different types of data?

Questions (10)

1. A student wants to make a note play for the shortest possible time. Looking at the beat options, which one should they choose?

MULTIPLE CHOICE

Choose the correct answer:

- A. BeatFraction.WHOLE
- B. BeatFraction.DOUBLE
- C. BeatFraction.SIXTEENTH
- D. BeatFraction.BREVE

2. If you change only the first number in this code, what aspect of the sound will change?

MULTIPLE CHOICE

```
music.play_tone(131, music.beat(BeatFraction.WHOLE))
```

Choose the correct answer:

- A. How long the note plays
- B. How loud the note is
- C. Which note plays
- D. Where the sound comes from

3. A programmer wants to create a song with fast, quick notes. Which beat fraction would work best for this goal?

MULTIPLE CHOICE

Choose the correct answer:

- A. BeatFraction.BREVE
- B. BeatFraction.WHOLE
- C. BeatFraction.HALF
- D. BeatFraction.EIGHTH

4. What happens when you run these two lines of code one after the other?

```
music.play_tone(262, music.beat(BeatFraction.QUARTER)) music.play_tone(330, music.beat(BeatFraction.QUARTER))
```

Choose the correct answer:

- A. Both notes play at exactly the same time
- B. The first note plays, then the second note plays
- C. Only the louder note will be heard
- D. The notes will mix together into one new sound

5. If you want to make a note play twice as long, which change should you make to this code?

MULTIPLE CHOICE

```
music.play_tone(440, music.beat(BeatFraction.QUARTER))
```

Choose the correct answer:

- A. Change QUARTER to EIGHTH
- B. Change QUARTER to HALF
- C. Change the number 440 to 880
- D. Add the code twice

6. Looking at the note chart pattern, what can you conclude about the relationship between Low, Middle, and High versions of the same note?

MULTIPLE CHOICE

Choose the correct answer:

- A. They all use the same number value
- B. Higher versions always use smaller numbers
- C. Higher versions use larger number values
- D. The pattern changes for each different note

7. What is the main purpose of changing the second part of the `play_tone` code (the `music.beat` section)?

MULTIPLE CHOICE

Choose the correct answer:

- A. To change which note plays
- B. To control how long the note lasts
- C. To make the note louder or softer
- D. To choose between speaker or LED output

8. If a student wants to create a slow, long-lasting melody, which combination would work best?

MULTIPLE CHOICE

Choose the correct answer:

- A. Large note numbers with SIXTEENTH beats
- B. Small note numbers with WHOLE beats
- C. Any note numbers with HALF beats
- D. Sharp notes (#) with QUARTER beats

9. Debug the following code:

DEBUG CODE

Code to Debug:

```
1 music.play_tone(131, music.beat(BeatFraction.WHOLE))
```

10. Debug the following code:

DEBUG CODE

Code to Debug:

```
1 music.play_tone(831, music(BeatFraction.QUARTER))
```

Robotics Challenges (5)

1. Wizard Theme

Challenge

Textbook

Wizard Theme

Create a wizard theme song!

Create a melody that plays the following notes with the required duration.

Low B - WHOLE

Middle E - DOUBLE

Middle G - HALF

Middle F# - WHOLE

Middle E - DOUBLE

Middle B - WHOLE

Middle A - BREVE

Middle F# - DOUBLE

Use the chart to put in the proper values for the notes!

Play around with the note lengths to make it sound good!

Requirements

- Play a low B note for WHOLE

Step 1

Play the Low B note

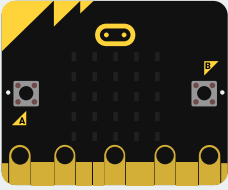
Wizard Theme Step 1 of 2

1 Next

Toolbox

Search

```
1 def on_forever():
2     pass
3     basic.forever(on_forever)
4
```



Download

...

2. Shark

Challenge

Textbook

Shark

Create a song that sounds like a shark approaching.

In your song include at least 3 for loops.

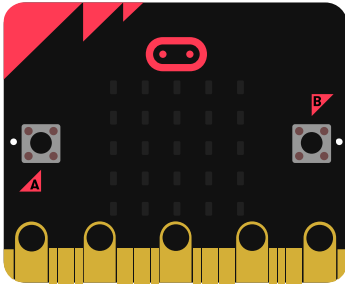
Each for loop should have at least 2 notes.

A suggested pairing of notes would be F and F#

Requirements

- In your song include at least 3 for loops. (remember to use index1, index2, and index3.)
- Each for loop should have at least 2 notes.

Answer Key



Search

Basic

start

forever

Download

...

3. Holiday Tune

Challenge

Textbook

Holiday Tune

Play the song Jingle Bells. Start on Middle E.

First, display a holiday image.

Then play the song.

Here are the notes you will use.

Repeat Twice with a for loop:

E - WHOLE

E - WHOLE

E - DOUBLE

Play Once:

E - WHOLE

G - WHOLE

C - DOUBLE

D - HALF

E - WHOLE

Requirements

First, display a holiday image.

Step 1

Add an image

Holiday Tune

Step 1 of 2

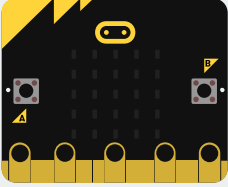
1

Next

Toolbox

Search

```
1 def on_forever():
2     pass
3     basic.forever(on_forever)
4
```



4. Create Your Own Tune!

Challenge

Textbook

Create Your Own Tune!

Create your own tune! Use at least 16 notes in your song.

Requirements

Include at least 16 notes.

Answer Key

Submit

Step 1

Add an image

Holiday Tune

Step 1 of 2

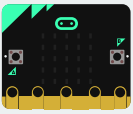
1

Next

Toolbox

Search

```
1 def on_forever():
2     pass
3     basic.forever(on_forever)
4
```



5. Alarm

Challenge

Textbook

Alarm

Create a program that triggers an alarm if the temperature is higher than 30. Important alarms need both a visual alert and a sound alert. Think of the people who have hearing or seeing impairments. Having both methods helps everyone know what's going on.

Create a forever function, because we want the alarm to trigger anytime.

If the temperature is higher than 30, play at least 3 notes and 2 icons.

Else, show the **HAPPY** icon.

Requirements

- Create the forever function
- Inside the forever function, create a variable named temp.
- Create an if statement to check if the temperature is higher than 30.

Step 1

Create the forever function.

Alarm Step 1 of 5



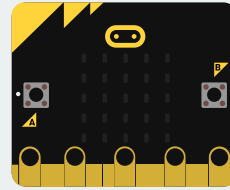
1

Next

Toolbox

Search

```
1 def on_forever():
2     pass
3     basic.forever(on_forever)
4
```



Download

Answer Keys & Solutions

Questions

1. A student wants to make a note play for the shortest possible time. Looking at the beat options, which one should they choose?

MULTIPLE CHOICE

Correct Answer:

- | | |
|---------------------------|-------------|
| A. BeatFraction.WHOLE | ✗ Incorrect |
| B. BeatFraction.DOUBLE | ✗ Incorrect |
| C. BeatFraction.SIXTEENTH | ✓ Correct |
| D. BeatFraction.BREVE | ✗ Incorrect |

Explanation:

Think about which fraction represents the smallest part.

2. If you change only the first number in this code, what aspect of the sound will change?

MULTIPLE CHOICE

Correct Answer:

- | | |
|-------------------------------|-------------|
| A. How long the note plays | ✗ Incorrect |
| B. How loud the note is | ✗ Incorrect |
| C. Which note plays | ✓ Correct |
| D. Where the sound comes from | ✗ Incorrect |

Explanation:

The first number controls the pitch of the sound.

3. A programmer wants to create a song with fast, quick notes. Which beat fraction would work best for this goal?

MULTIPLE CHOICE

Correct Answer:

- A. BeatFraction.BREVE ✗ Incorrect
- B. BeatFraction.WHOLE ✗ Incorrect
- C. BeatFraction.HALF ✗ Incorrect
- D. BeatFraction.EIGHTH ✓ Correct

Explanation:

Fast notes need short time lengths.

4. What happens when you run these two lines of code one after the other?

MULTIPLE CHOICE

Correct Answer:

- A. Both notes play at exactly the same time ✗ Incorrect
- B. The first note plays, then the second note plays ✓ Correct
- C. Only the louder note will be heard ✗ Incorrect
- D. The notes will mix together into one new sound ✗ Incorrect

Explanation:

Code runs from top to bottom, one line at a time.

5. If you want to make a note play twice as long, which change should you make to this code?

MULTIPLE CHOICE

Correct Answer:

- A. Change QUARTER to EIGHTH ✗ Incorrect
- B. Change QUARTER to HALF ✓ Correct
- C. Change the number 440 to 880 ✗ Incorrect

D. Add the code twice

✗ Incorrect

Explanation:

A half is twice as big as a quarter.

6. Looking at the note chart pattern, what can you conclude about the relationship between Low, Middle, and High versions of the same note?

MULTIPLE CHOICE

Correct Answer:

A. They all use the same number value

✗ Incorrect

B. Higher versions always use smaller numbers

✗ Incorrect

C. Higher versions use larger number values

✓ Correct

D. The pattern changes for each different note

✗ Incorrect

Explanation:

Compare any note across the Low, Middle, and High columns.

7. What is the main purpose of changing the second part of the play_tone code (the music.beat section)?

MULTIPLE CHOICE

Correct Answer:

A. To change which note plays

✗ Incorrect

B. To control how long the note lasts

✓ Correct

C. To make the note louder or softer

✗ Incorrect

D. To choose between speaker or LED output

✗ Incorrect

8. If a student wants to create a slow, long-lasting melody, which combination would work best?

MULTIPLE CHOICE

Correct Answer:

A. Large note numbers with SIXTEENTH beats

✗ Incorrect

B. Small note numbers with WHOLE beats

✓ Correct

C. Any note numbers with HALF beats

✗ Incorrect

D. Sharp notes (#) with QUARTER beats

✗ Incorrect

Explanation:

For slow melodies, focus on what makes notes last the longest time.

9. Debug the following code:

DEBUG CODE

Incorrect Code:

```
1 music.play_tone(131, music.beat(BeatFraction.WHOLE))
```

Correct Solution:

```
1 music.play_tone(131, music.beat(BeatFraction.WHOLE))
```

Explanation:

This code is missing a parenthesis

10. Debug the following code:

DEBUG CODE

Incorrect Code:

```
1 music.play_tone(831, music(BeatFraction.QUARTER))
```

Correct Solution:

```
1 music.play_tone(831, music.beat(BeatFraction.QUARTER))
```

Explanation:

This code is missing the .beat