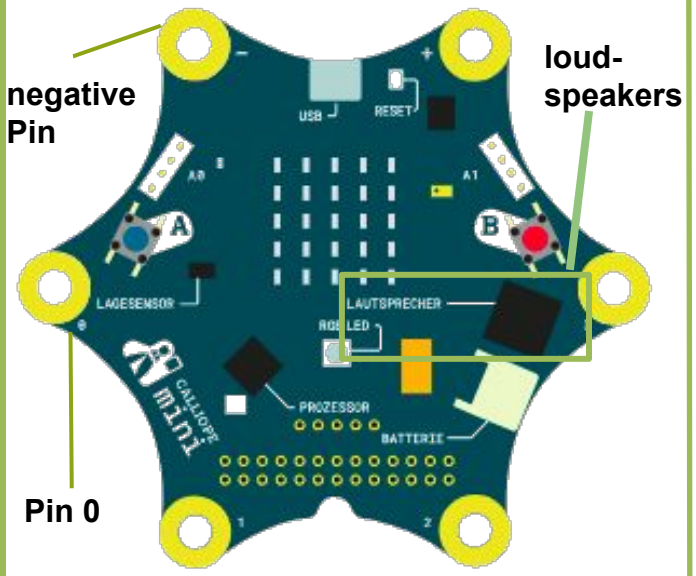
1.1 Nature: Playing a sound



Info

To press or activate the pins, you must always activate the minus pin at the same time.

Tip

Test your program first in the simulator and then on your Calliope mini device.

Note

You need the **Repeat indefinitely** block to play the sound more than once.

Task

We play a sound over the Calliope's loudspeaker.

- First enter lab.open-roberta.org into your browser and then select Calliope (2017) as your system. → There you can program.

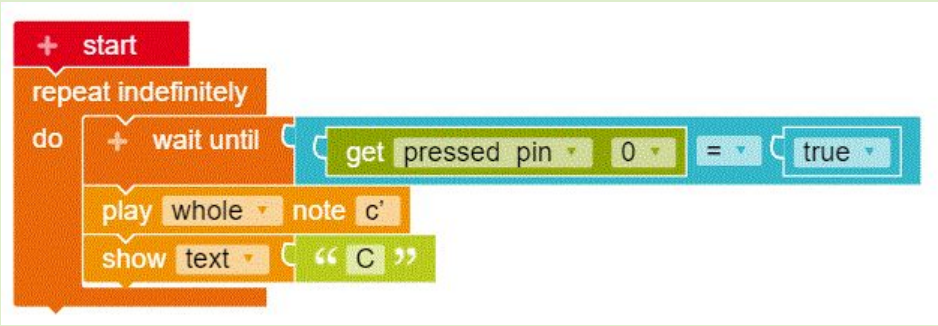
Step one:

- Add the **Repeat indefinitely** block to your program.
- Play a **whole note in C**.
- **Show text "C"** on the LED matrix of the Calliope to display which note is being played.

Step two:

- The sound should only be played when pin 0 is pressed. Use a **Wait until** block and adjust it accordingly.

If you've done everything right, your result should look like this:

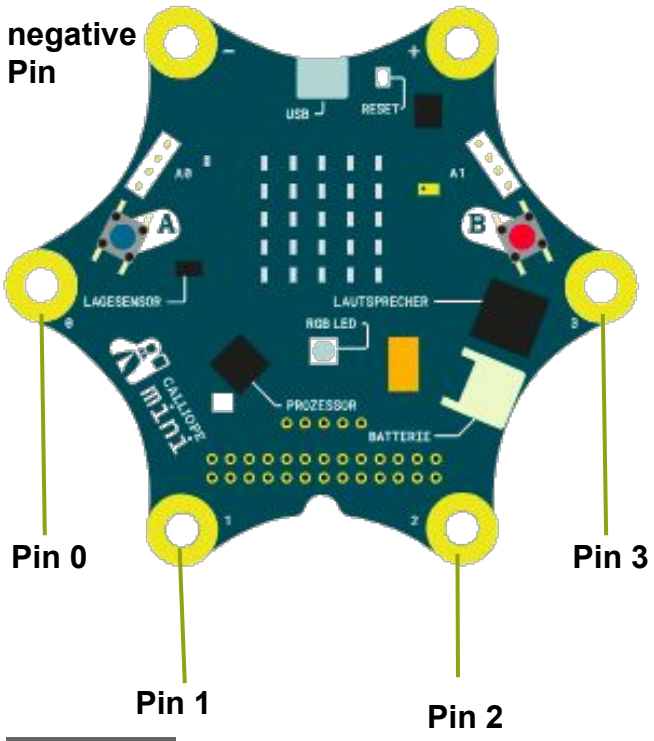


Next task

Expand your program so you can play multiple notes. At least three more notes. Change both the note itself and the length of the note (whole, half, quarter...).

Try it yourself before you get your next flash card.

1.2 Nature: Play multiple tones



Note

Use the Calliope with battery to move freely.

Tip

If you want to play more than four tones, you can use other Calliope sensors as triggers or combine pins with the and-block (from the Logic section). For example, if pin 0 and pin 1 (simultaneously!) are pressed, play note H.

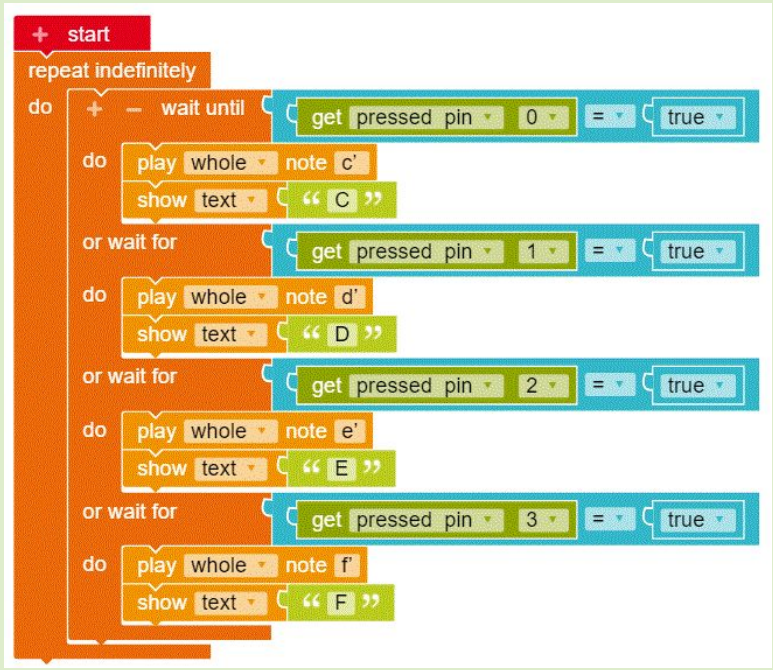
Task

Now different notes and note lengths come into play.

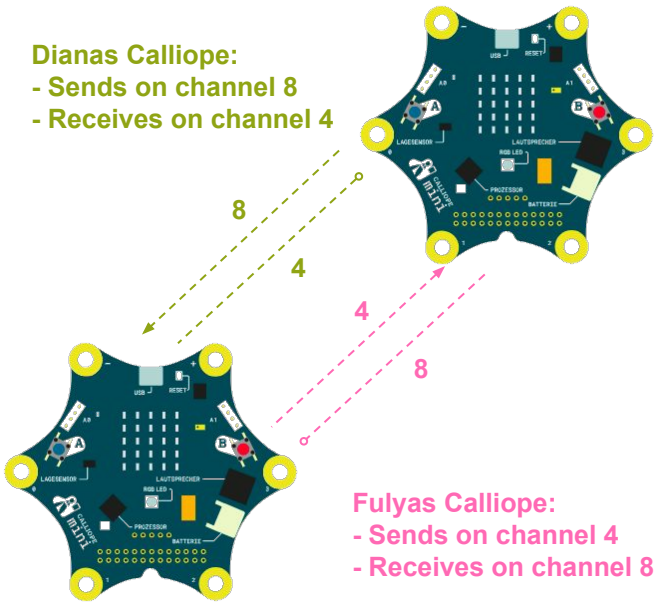
Expand your code: Pins 0, 1, 2 and 3 should play different notes.

- Add more blocks to the **Wait until** block with the **+**.
- Add the note you want to play to the respective "do" part. Also display this note as text.
- Optional: Change the note length. You can change the note length by clicking on the small arrow.

Hier siehst du eine mögliche Lösung.

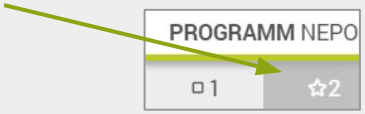


1.3 Nature: send tones



Note

The area with the functions can be found in the extended editor (top left).



Tips

1. Write on the front of the board which channel you have to send.
2. Write down the notes on a separate piece of paper and play them on your mini piano. You may need to adjust your piano program slightly.
3. Make sure that one Calliope sends and the other Calliope receives at the same time.

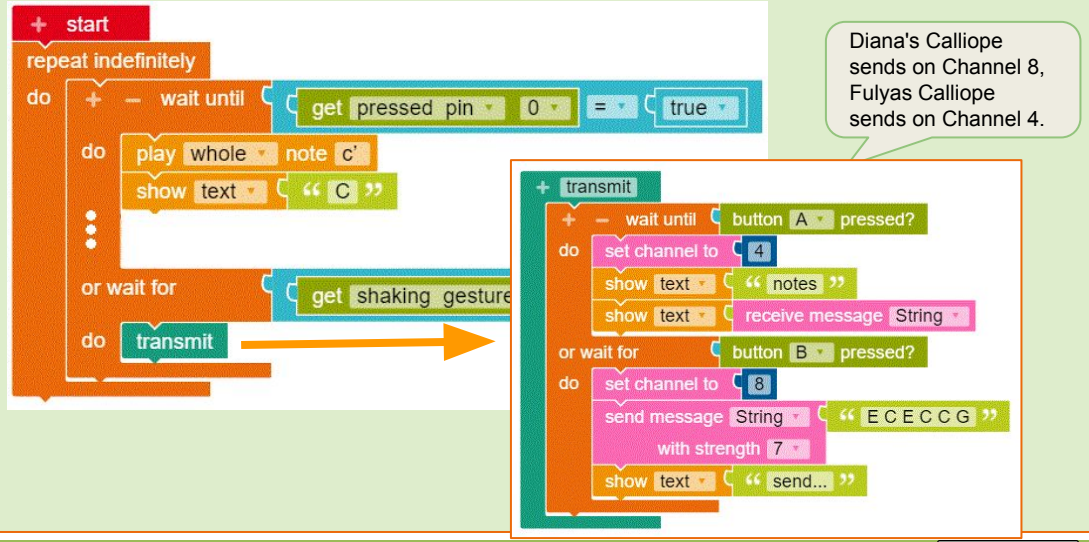
Aufgabe

Expand your code: Send the notes for a song to your friends.
Step 1: Agree in the class who has which channel (1 to 30) to send.
Step 2:

- Create a **function** (advanced editor) and call it "transmit".
- To receive a message press key A, to send a message press key B.
  - Add a **Wait until** block for key A and **set the channel** to your friend's channel. Also add a second **Show Text** block with the **Received Message** block from the **Radio** section. Change the type of message from number to string.
  - Add a **or wait for** block for key B and **set the channel** to your frequency. Add the **send Message** block (also as string) and in a **Text** block add the notes you want to send, e.g. **"E C E C C G"**. Add a **show text** block with the text "**send**...".

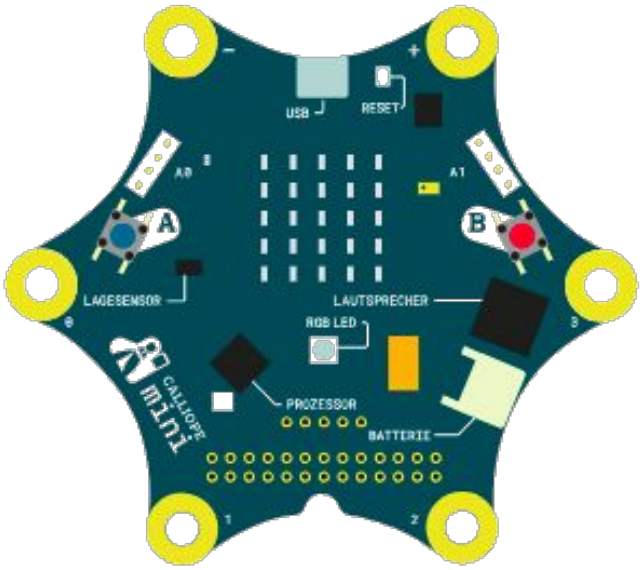
Step 3:

- - Add another **or wait until** block to your previous **Wait until** block. If your Calliope is shaken, then the function "transmit" is to be called.



CC BY NC SA

1.4 Nature: conductive objects

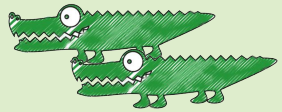


Info

If an object is conductive, this means that it can "transmit" current. This is of particular importance nowadays, as each of us needs electricity in our everyday lives.
Current flows from A to B. For example, your body conducts electricity. That's why you could activate the keys of your mini piano by touching the minus pin with one hand and the pins 0,1,2 or 3 with your other hand. With your body you have conducted the current and thus closed the circuit or activated the pins.

Task

We use conductive objects as keys for our mini piano.



- Check which objects are conductive.

Step 1:

- Connect one clip connector each to the pins Pin 2 and Pin 3 (In German these are called crocodile clips because they look like the mouth of a crocodile)
  - negative Pin, Pin 0, Pin 1, Pin 2 und Pin 3

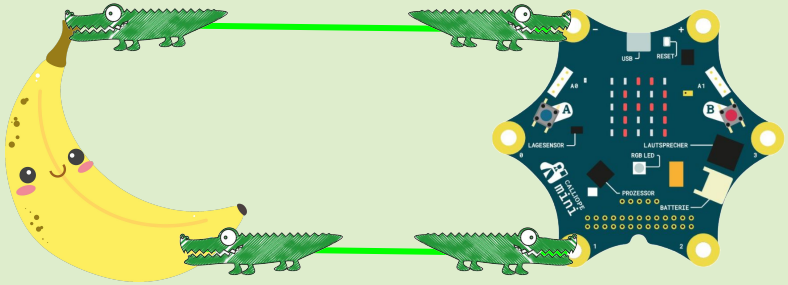
Step 2:

- Find various items you want to test for conductivity.
  - e.g. a banana, chalk, a pencil, a human chain, ...

Step 3:

- Create a table and enter which items conduct and which do not. Find at least four objects that are conductive.

Possible experimental setup:



Outlook

On the next flashcards you will find a picture of the entire experimental setup.

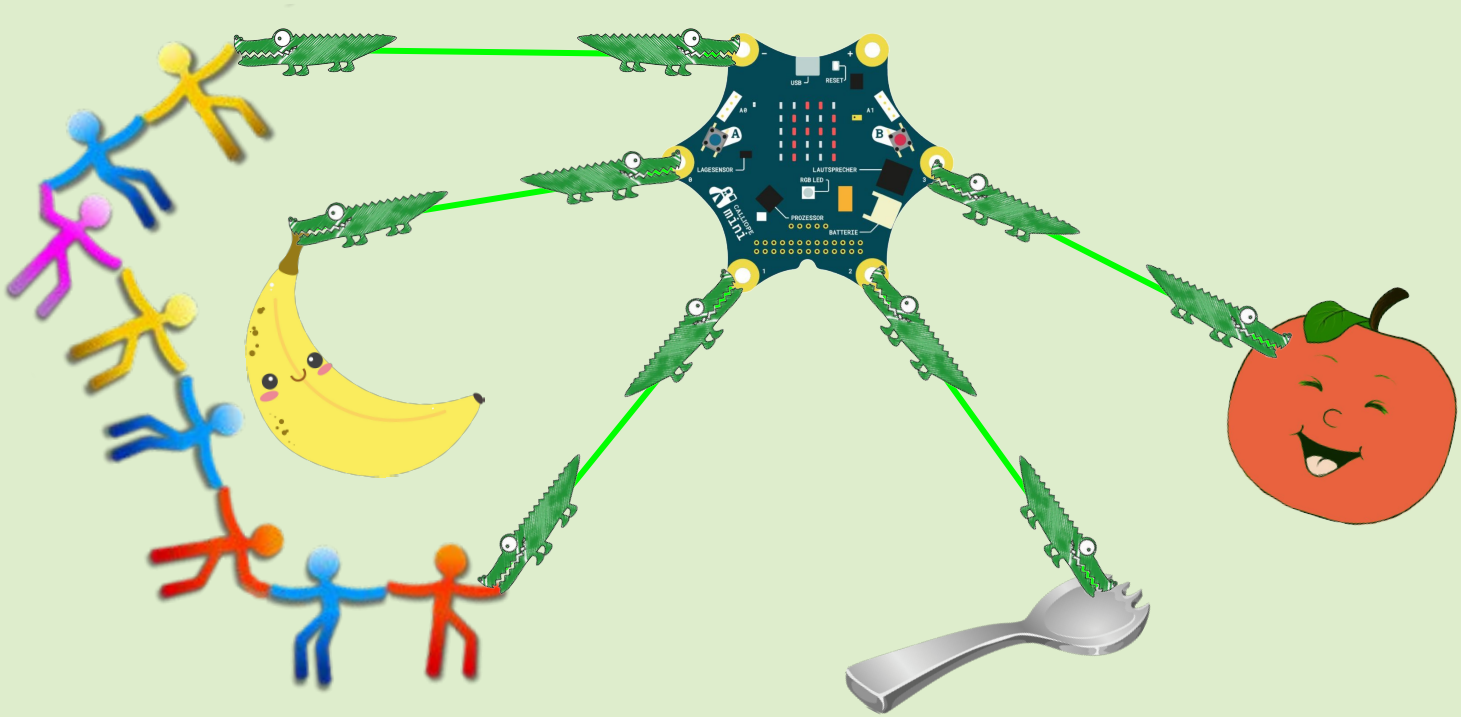
You'll also get suggestions on how you can expand your mini piano.

Think for yourself before you get the next flashcard.

CC BY NC SA

Experimented enough already?

Possible experimental setup:



Of course, that's just an example. Your own mini piano, with conductive objects as keys, can look very different. :)

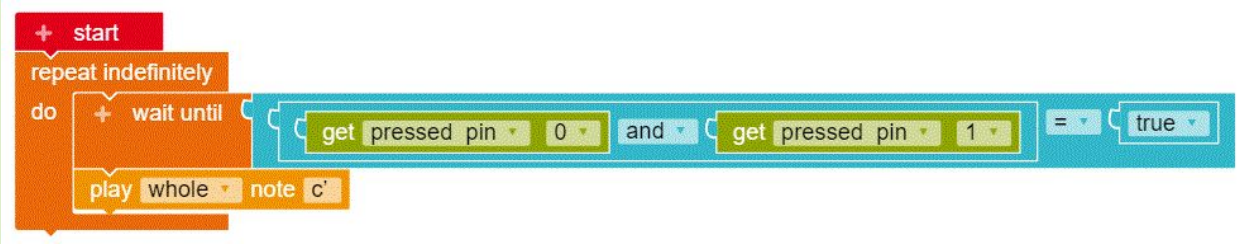
Note that every time you want to play a sound, you must also activate the minus pin to close the circuit!

Everything done yet?

You built your own little miniature piano today with the Calliope. You learned how to send notes to your friends and how to use conductive objects as keys.

Now expand your mini piano and test, if not already done, one last thing for conductivity. At the end of the lesson you can then show what you have done to the others in your class.

- You could, for example:
  - Compose your own song.
  - Play the note at the same time and display it on the LED matrix. (Tips: 1st "Show character" block (arrow at "show text" block); 2nd swap the "Play note" and "Show character" blocks)
  - Depending on which note is played, let the colored LED shine in different colors.
  - Play even more sounds by activating two pins simultaneously or using other Calliope sensors (e.g. the position sensor or buttons A and B). A small example of this....



- Test together how long your human chain can be.
  - Take each other by the hand. One person touches the minus pin with his free hand, the other person touches one of the other pins (0,1,2 or 3) with his free hand.
  - Step by step take another person between you and hold your hands.
  - Optional: We are curious! Tell us how long your human chain was. Ask your teacher who will do this together with you.