

# Music

Age-group: 6-9 years old

Number of hours: 5 hours

Short description of activity: (max. 4 sentences)

Children explore the rhythm and melody in a piece of music and create their own piece of music by programming rhythm and melody (e.g. in scratch)

CT-competences:

- Data collection/analysis/representation
- Algorithms & procedures
- Decomposition of a problem
- Debugging
- Automation
- Pattern recognition

## Goals

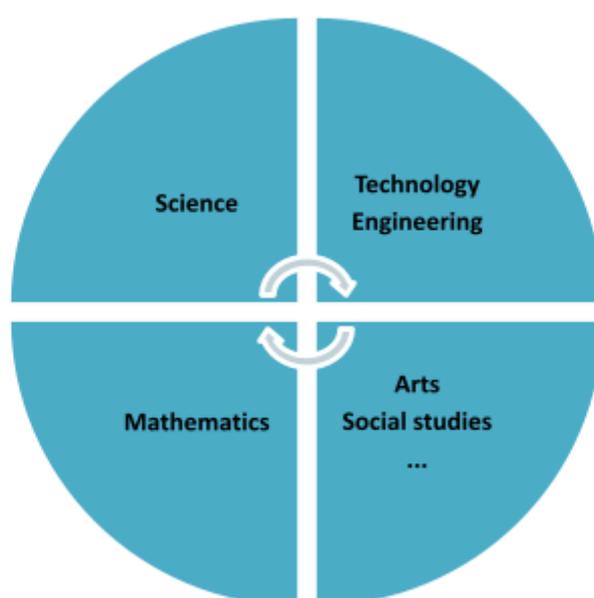
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- Listen and distinguish sounds with different tempo and rhythm.
- Defining tempo as a unit that indicates at which speed a composition needs to be played.
- Distinguish and apply musical codes to define the rhythm of a piece of music.
- Distinguish and apply musical notes to define the melody of a piece of music.
- Set up, apply, check and adjust a simple algorithm to solve a specific task or achieve a goal such as programming a piece of music.
- Applying fractions while analysing the rhythm patterns of songs.

## Realistic STEAM-context

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(short description including problem(s) to be tackled)



(short justification of STEAM-integration)

<b>Science</b>	<b>Technology - Engineering</b>
pitch (low/high) - frequency length, capacity, volume of objects affecting the pitch Vibration (sound is a vibration) Timbre (different materials)	building your own music instrument based upon criteria different materials
<b>Mathematics</b>	<b>Arts - Social studies</b>
rhythm (codes to define rhythm) measuring time (in seconds) logical thinking programming your own piece of music applying fractions	listening to music (considering) creating music notes - beats - tempo

## Methodology

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Based on learning by doing (with different levels: from imitation to creation)

Part	Description	Timing
1	<p><b>Introduction</b></p> <p>The students listen to different pieces of music, each with a different rhythm. The teacher encourages the students to move on the music, move and follow the rhythm with their body and clap to the rhythm. For example:</p> <ul style="list-style-type: none"> <li>- Queen: we will rock you</li> <li>- Beegees: stayin' alive</li> <li>- TiËsto: The business</li> </ul> <p>Discussion about the pieces of music:</p> <ul style="list-style-type: none"> <li>- Did the students like the music? Why? What exactly did they like? (melody, rhythm, ...)</li> <li>- How did they feel about the music?</li> <li>- What makes you move to the music?</li> </ul> <p>Besides the tempo, rhythm, there are also melodies in the pieces of music. Melodies can be sung, or played by instruments. The combination of <i>tempo</i>, <i>rhythm</i> and <i>melody</i> can become something really powerful.</p> <p>In this activity we are going to create our own piece of music with a certain tempo, rhythm and a melody.</p>	15'
2	<p><b>Tempo, tempo ...</b></p> <p>The <u>tempo</u> determines how fast a piece of music is played. This is often indicated with a number. This can be, for example 120 bpm (beats per minute). Musicians use a metronome to stick to the tempo. You can</p>	10'

	<p>download a metronome app on smartphone), and set it for example on a tempo of 60 bpm (60 beats/minute, or 1 beat/second). Actually 'bpm' is a unit that indicates at which speed a composition needs to be played (tempo).</p> <ul style="list-style-type: none"> <li>- Queen: we will rock you (81 bpm)</li> <li>- Beegees: stayin' alive (103 bpm)</li> <li>- TiËsto: The business (120 bpm)</li> </ul> <p>Listen to your heart, and try to count how many beats per minute. It's different for all of us. (= how to introduce 'beats per minute': bpm)</p>	
3	<p><b>Rhythm is a dancer!</b></p> <p>Let's now focus on the rhythm! Rhythm is also in all of us... Try to move AND clap on this song:</p>  <p><a href="https://www.youtube.com/watch?v=WA4iX5D9Z64&amp;t=2s">https://www.youtube.com/watch?v=WA4iX5D9Z64&amp;t=2s</a></p> <p>If you find yourself tapping or nodding your head along with music, it's probably the beat you are following and you are synchronized with. As you <u>clap</u> along in time with the music, you're keeping track of the tempo. It's instinctive: a skill we generally develop naturally in early childhood as we start listening to music, and dancing, clapping or singing along with it.</p> <p>So Rhythm is not the same as tempo... But of course both terms are linked with each other. For example musicians can play a song at a different tempo, but the rhythm of the song will stay the same. <u>Actually you can think of it as a kind of beat that supports the song.</u></p> <p>So in music the 'beats' are important, they define the rhythm of the piece of music. This rhythm needs to be steady in a piece of music!</p> <p>In a piece of music, the beats are arranged in 'bars'. E.g. 1 bar contains 4 beats. The bars are separated from each other by 'barlines'.</p> <p><i>E.g. A popular song is built around 8 bars and each bar contains 4 beats. In a choreography the movements are built around these bars. E.g. a song with 8 bars = 8 different movements.</i></p>	45'

Children can build their own choreography on a song. A lot of inspiration can be found on Tiktok... You can also make a choreography with the pencils from the children's pencil case. In fact, the movements can be analysed 'mathematically'.

First you can do an exercise together with the children on a simple song such as Father John.

① ②

1 2 3 4

Are you sleep - ing? Are you sleep - ing? Bro - ther John Bro - ther John  
Frè - re Jac - ques, Frè - re Jac - ques, Dor - mez vous? Dor - mez vous?

5 6 7 8

Mor - ning bells are ring - ing, can you hear them ring - ing? Ding, dong, ding, ding, dong, ding.  
Son - nez le ma - ti - nes, son - nez le ma - ti - nes, Din, din, don, din, din, don.

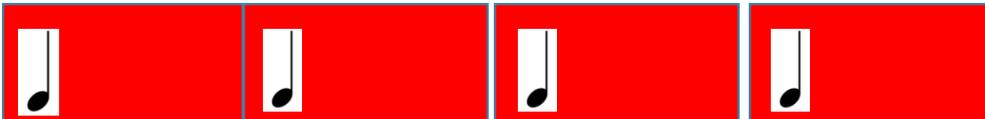
We can visualize each bar as follows and 'clap' hands:



Play 1 'clap' per 4 beats = TU (= full note = 1)



Play 1 'clap' per 2 beats = TO (= half note = 1/2)



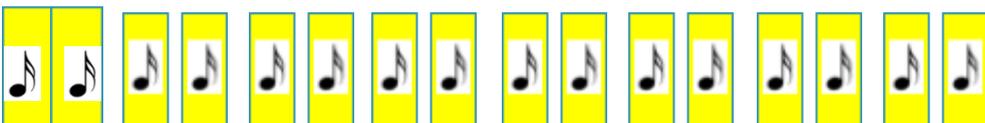
Play 1 'clap' per beat = TA (= quater note = 1/4)



Or



Play 2 'claps' per beat = TITI (= eighth note = 1/8)



Or



Play 4 'claps' per beat = TIRITIRI (= sixteenth note = 1/16)

RED: 1 clap of hands per beat = TA

GREEN: 2 claps of hand per beat = TITI

GREY: 1 clap of hands per 2 beats = TO

YELLOW: 4 clap of hands per beat = TIRITIRI

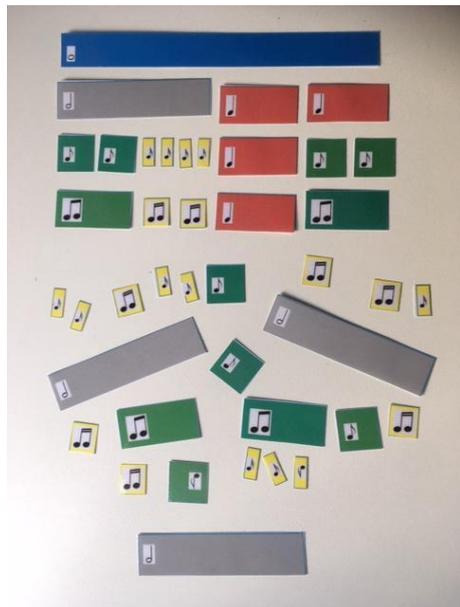
BLUE: 1 clap of hand per 4 seconds = TU

*you can make these 'blocks' yourself out of carbon. The template (which is added here) contains all the different rhythm codes (colored blocks). You can cut them out, so that they can be used to visualize the rhythm patterns.*

RED: We count 1-2-3-4, and we clap hands on each number = One clap per beat, 4 claps in 4 seconds, with one 'clap' on each beat. Here, one beat lasts one second, but of course you can speed up the rhythm which makes it more challenging to follow the rhythm.

You can also combine different rhythms such as the examples on the picture.

This can make it really challenging and you need some exercise to succeed!



E.g. The teacher plays some short and repeated rhythms: e.g.

GREY-RED-RED = TO-TA-TA or RED-GREEN-GREEN-GREY = TA-TITI-TITI-TO,  
a really challenging one:

GREEN-GREEN-YELLOW-YELLOW-YELLOW-YELLOW-RED-GREEN-GREEN =  
TITI-TITI-TIRITIRI-TIRITIRI-TIRITIRI-TIRITIRI-TA-TITI-TITI.

The group in turns repeat the same rhythm by clapping and/or singing.  
It's helpful to keep using the metronome.

*CT: Data analysis, Data representation, Pattern recognition*

**TASK (in small groups)**

Now the children can make their own patterns by using the colored blocks. They can work in small groups for this task. Once the groups are ready, the other groups have to 'clap' or 'sing' the patterns.

You can also show a rhythm pattern to the children (such as the example on the picture) and they have to find out a choreography on it themselves.

*CT: Algorithms & procedures, Pattern recognition*

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**Codes in music**

30'

Show the children now a score with a music composition, and analyze it:

E.g.

① ②

1 2 3 4

Are you sleep - ing? Are you sleep - ing? Bro - ther John Bro - ther John  
Frè - re Jac - ques, Frè - re Jac - ques, Dor - mez vous? Dor - mez vous?

5 6 7 8

Mor - ning bells are ring - ing, can you hear them ring - ing? Ding, dong, ding, ding, dong, ding.  
Son - nez le ma - ti - nes, son - nez le ma - ti - nes Din, din, don, din, din, don.

There are some symbols on this score. Discuss them with the children, what do they mean?

You can see the 'bars': How many bars? 8 bars

They probably also recognize the symbols of the notes. These were also on the blocks (see above).

So the way the notes are written also gives information about how long the note will sound, so they also give information about the rhythm.

 = this note will last for one beat

1 2 3 4

 = this note will last for half a beat, because you play 2 of these notes on one beat.

In music they don't write , but they combine it to 



 = this note will last for 2 beats



*CT: Data analysis,*

**TASK:** (in small groups)

Try to decode the composition and try to visualize with the rhythm blocks.

With the blocks of 'rhythm is a dancer', children now have to visualize the 'rhythm pattern' of the song "Brother John". Also here they can work in small groups.

Bars 1 & 2:



Bars 3 & 4, 7 & 8:



Bars 5 & 6:



Can children recognize the rhythms in the song?

Let's then try to sing the song with 'TA' - 'TO' - 'TI', while clapping hands

*CT: Data analysis, pattern recognition, data representation*

Discuss the pattern with the children:

How many notes in each bar?

Bar 1&2: 4 notes

Bar 3&4: 3 notes

Bar 5&6: 6 notes

Bar 7&8: 3 notes

There is a challenge in bar 5 and 6: There are 6 notes in a bar of 4 beats. How can that be? There are 2 times, 2 notes in 1 beat (see picture above).

Here you can link this to fractions in Math, because each bar can be written as a fraction, e.g.  $4/4 = 1$ . Or as in Bar 5&6:  $\frac{1}{8} + \frac{1}{8} + \frac{1}{8} + \frac{1}{8} + \frac{1}{4} + \frac{1}{4} = 1$ .

So this means:

Bar 1&2:  $\frac{1}{4} + \frac{1}{4} + \frac{1}{4} + \frac{1}{4} = 1$

Bar 3&4:  $\frac{1}{4} + \frac{1}{4} + \frac{1}{2} = 1$

Bar 5&6:  $\frac{1}{8} + \frac{1}{8} + \frac{1}{8} + \frac{1}{8} + \frac{1}{4} + \frac{1}{4} = 1$

Bar 7&8:  $\frac{1}{4} + \frac{1}{4} + \frac{1}{2} = 1$

This explains why there are quarter notes, eighth notes, sixteenth notes, halve and full notes.



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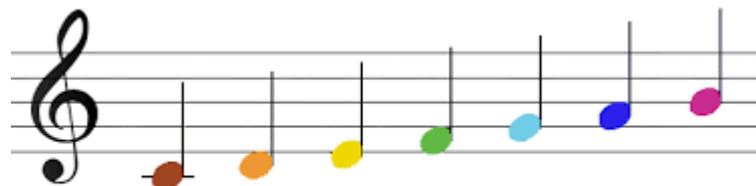
### Melody maker

30'

A song isn't a song without a melody.

A melody consists of different notes and the combination of the notes makes the melody.

Which notes do we know?



**Do Re Mi Fa Sol La Si**

(see template) - in some countries, they also use :  
A(la)-B(si)-C(do)-D(re)-E(mi)-F(fa)-G(sol)

**TASK: (in small groups)**

Can the children recognize the notes in the song “Brother John” by comparing?

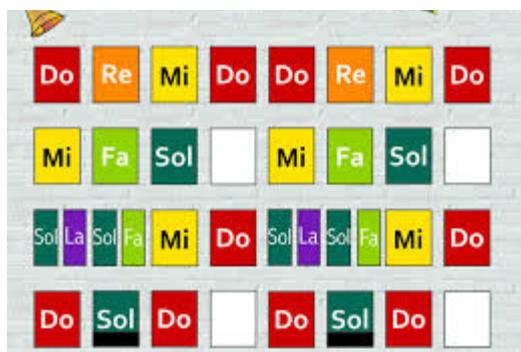
There is one problem... the “dong”... The note is lower than all the rest. (= lower octave).

(you can also solve this by using a ‘sol’ from the regular scale, within the same octave: it also sounds good)

They can then put the right notes on the blocks of the pattern they have made in the former exercise (by using sticky notes/dots)

*CT: data analysis, data representation, algorithms & procedures*

So here they combine rhythm and notes and sing the song with the notes!



*CT: Data analysis, pattern recognition, data representation*

6

**Music Composer!**

**TASK (in small groups)**

Let’s compose/program our own song!

The song needs to last for 8 ‘bars’. Each bar takes 4 beats.

You can use all the notes do-re-mi-fa-sol-la-si.

Try to search for a catchy melody by using the notes and the rhythms we have learned!

*CT: Problem decomposition, debugging, algorithms & procedures, automation, simulation*

In order to help you compose the song, you can use scratch!

<http://scratch.mit.edu>

60’

Before starting to compose in scratch, use the rhythm blocks to compose the rhythm of your song!

Some things you have to know about scratch...

**1. Concerning the rhythm: In scratch you need to use the proportion in relation to the measure (4/4)**

So if a quarter note ( $\frac{1}{4}$  note) = 1 (beat), then the values for half a note ( $\frac{1}{2}$  note) = 2 and for an eighth note ( $\frac{1}{8}$ ) = 0,5

This can be confusing for children. In order to make it clear you can do the exercise with the blocks again:



So 1 beat means  $\frac{1}{4}$  note (red).

How many eighth notes fit in a  $\frac{1}{4}$  note, so in one beat

$$\frac{1}{8} + \frac{1}{8} = \frac{1}{4} \text{ or } 0,5 + 0,5 = 1$$

**2. Concerning the notes: In scratch the notes have a number:**

E.g. notes in one octave:

do = 60

re = 62

mi = 64

fa = 65

sol = 67

la = 69

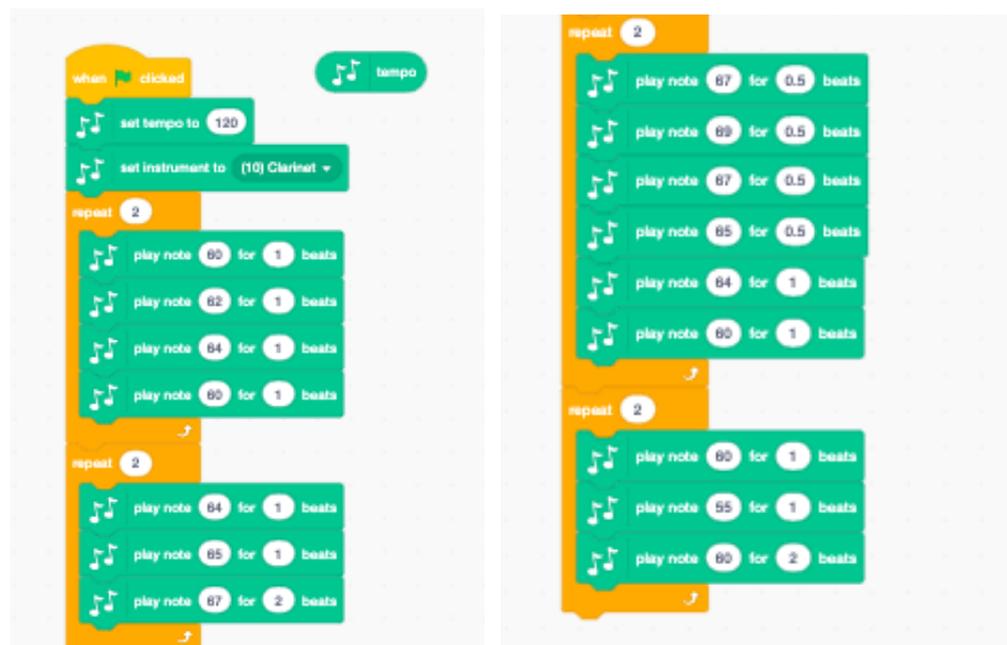
si = 71

Octave	Note Numbers											
	C	C#	D	D#	E	F	F#	G	G#	A	A#	B
-2	0	1	2	3	4	5	6	7	8	9	10	11
-1	12	13	14	15	16	17	18	19	20	21	22	23
0	24	25	26	27	28	29	30	31	32	33	34	35
1	36	37	38	39	40	41	42	43	44	45	46	47
2	48	49	50	51	52	53	54	55	56	57	58	59
3	60	61	62	63	64	65	66	67	68	69	70	71
4	72	73	74	75	76	77	78	79	80	81	82	83
5	84	85	86	87	88	89	90	91	92	93	94	95
6	96	97	98	99	100	101	102	103	104	105	106	107
7	108	109	110	111	112	113	114	115	116	117	118	119
8	120	121	122	123	124	125	126	127				

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Example of Brother John in Scratch (with tempo 120 bpm).

If the children are not familiar with scratch, you can use this example to explain the program and how it is used in order to compose and play songs.



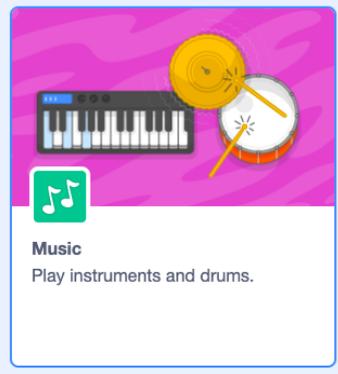
So in order to ‘program’ a song in scratch some commands are important and need to be learnt.

First of all, you need to activate the “music extension” in scratch in order to program ‘music’.

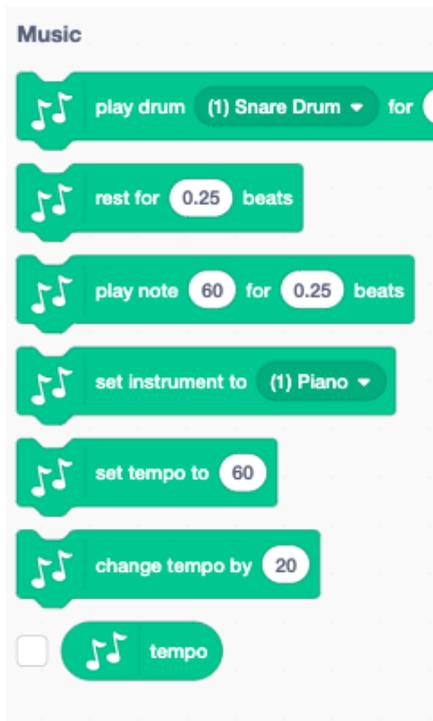


You can do this by pressing this button in the left corner at the bottom of the Scratch program.

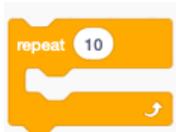
Then you choose the music extension:



The commands which are important in this extension can be found here:



And maybe some basic controls like the “repeat” command.



You can use this if 2 bars contain the same rhythm and notes, like in the song ‘brother John’.

7	<p><b>Let’s play it!</b></p> <p>Play the song in scratch! The other groups listen to the song and in group we can discuss and analyze the different songs. <i>CT: Simulation, pattern recognition, data representation</i></p>	15’
8	<p><b>A Challenge: Make your own instrument!</b></p>	45’

If we want to create music, we need instruments that make a sound. We need to introduce the concept of sound here as a vibration.

*Put a piece of paper in front of a speaker. You can attach it in front of the speaker with adhesive tape. Put on a piece of music with a strong beat.. The piece of paper starts to vibrate..*

Children work in pairs to find different objects in the classroom and make more than one sound with them. They should find out how to make different pitches (low/high) with the same object. What makes the difference?  
(Foresee some materials such as bottles of different shapes, cups, containers, rubber bands, empty box of matches, water)

eg.

- length (long/short): does it affect the pitch? (e.g. length of a rope or rubber band)
- capacity (empty/full): does it affect the pitch? (containers filled with water)
- volume (big/small): does it affect the pitch? (large, small containers)

Children compare different timbres, depending on the materials and we explore some real instruments, like drums, guitar, flute, ... and try to explain how the instruments create their specific sound.

In the discussion it is also important to be clear about the difference between timbre and pitch.

Some instruments are typical for creating the rhythm, others for creating a melody.

*CT: data collection/analysis/representation*

**In 'making your own instrument' there are 2 options:**

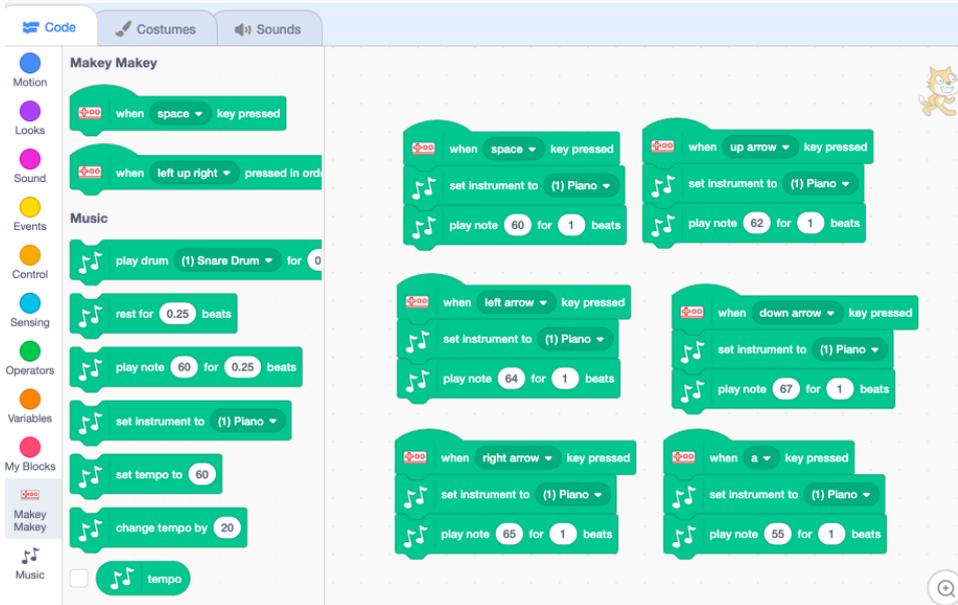
***Option 1:***

Make an instrument on which you can play all the rhythms at a strong volume, and on which you can create at least 2 different pitches (a two-pitched instrument).

Children can make a sketch on how their instrument should look like. With younger children, the teacher can provide materials and let them experiment with them.

***Option 2:***

Use Makey Makey and scratch to create your own music instrument.

	 <p><i>CT: Problem decomposition, Algorithms &amp; procedures</i></p>	
9	<p><b>Let's play some music on your instrument!</b>  Can you play the song you have composed on your instrument?</p> <p>The group in turns repeat the same rhythm by singing and also by using their self made instrument.  It's helpful to keep using the metronome.</p>	15'
		... hours

## Organization

### Materials:

- template with rhythm codes
- Music installation (in order to play a song)
- Computers - scratch
- Makey MAkey (optional)
- Objects that can make sounds
- In order to construct their own music instrument, the children prepare a list of materials they need to make the instruments and use for example trash materials

Use of ICT: (only mention when relevant)

Children will have to use scratch in order to program their own piece of music.

Opening of classroom: (only mention when relevant)

# Coaching

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Useful questions:

- **Introduction**
  - Did you liked the music? Why? What exactly did you like? (melody, rhythm, ...)
  - How did you feel about the music?
  - What makes you move to the music?
- **Tempo, tempo**
  - How would we call a unit that indicates the speed of a composition? (tempo).
  - How was the tempo in the different pieces? fast/slow
  - How can tempo of a song make you move in a different way? Faster/slower
- **Rhythm is a dancer!**
  - How can the rhythm make you move in a different way?
  - Given a certain rhythm pattern (with the rhythm blocks in carbon): Can you clap the rhythm pattern? Can you sing the rhythm pattern? (Ta, To, Tu, TiTi, TiRi). Can you make your own choreography based upon a certain rhythm pattern?
  - Can you make your own rhythm pattern by using the colored blocks? E.g. for two bars... and make a choreography.
- **Codes in music**
  - When showing the score of a piece of music (Brother John). There are some symbols on this score. What do they mean?
  - How many bars do you see in the song 'Brother John'? 8 bars
  - Which information do the notes give you? *Mostly children will answer the melody (do, re, mi, fa, sol)*... They also contain other information: take a close look at the notes on the colored rhythm blocks and compare... So which information?... So these notes also give information about how long the note will sound, so they also give information about the rhythm.
  - Can you visualize the 'rhythm pattern' of the song "Brother John" with the colored carbon blocks?
  - Can you clap/sing the 'rhythm pattern' of the song "Brother John"?
  - How many notes does each bar have in the song "Brother John"?
  - There is a challenge in bar 5 and 6: There are 6 notes in a bar of 4 beats. How can that be? ( make a link with 'fractions' in Math)
- **Melody maker**
  - Can the children recognize the notes in the song "Brother John" by comparing with the notes on the template?
  - Can you put the right notes on the colored blocks of the rhythm pattern you made in the former exercise (by using sticky notes/dots)?
- **Music Composer**
  - Can you compose/program your own song by using Scratch?  
The song needs to last for 8 'bars'. Each bar takes 4 beats.  
You can use all the notes do-re-mi-fa-sol-la-si.  
Try to search for a catchy melody by using the notes and the rhythms we have learned!
- **Let's play it!**
  - Do you like the song composed by your classmates? Give a reason.
- **Make your own music instrument.**

- length (long/short): does it affect the pitch? (e.g. length of a rope)
- capacity (empty/full): does it affect the pitch? (containers filled with water)
- volume (big/small): does it affect the pitch? (large, small containers)
- Can you make an instrument on which you can play all the rhythms at a strong volume, and on which you can create at least 2 different pitches?
- **Let's play some music on your instrument!**
  - Can you play the song you have composed on your instrument?

Stimulation of self-management: (concrete opportunities/remarks adapted to the project)

Stimulation of cooperation: (concrete opportunities/remarks adapted to the project)

□ Teamwork:

- Groups consist of 2-3 students.
- Competences needed in a group:
  - ...
  - ...
  - ...

Formative assessment: (concrete description/summary adapted to the project)

Computational thinking skills:

- Data collection/analysis/representation
  - e.g.
    - finding out how to make different pitches, low/high, with the same object.
    - finding out how rhythm of a song works, and how to represent by using the colored rhythm blocks.
    - analyzing symbols (= notes) on a score
    - with the blocks of 'rhythm is a dancer', children have to visualize the 'rhythm pattern' of the song "Brother John"
- Pattern recognition
  - e.g.
    - Can children recognize the rhythms in the song "Brother John"?
    - Can the children recognize the notes in the song "Brother John" by comparing with the template?
    - Can children put the right notes on the blocks of the rhythm pattern of Brother John' (by using sticky notes/dots)
- Algorithms & procedures
  - e.g.
    - The children make their own rhythm patterns by using colored blocks, for 2 bars of 4 beats.
    - The children compose in Scratch their own song using rhythm patterns and notes they have learnt.
- Decomposition of a problem
  - While programming in Scratch, they will encounter problems. E.g. something doesn't sound right.. They will have to find out how to fix this by isolating the problem and then find the error (= Debugging)
- Automation
  - Composing music in a form that a computing system can perform

## Other skills:

- Cooperate and add value to group work
- Schedule tasks, time and resources
- Individual contribution to the work
- Reflect on process and results of the different stages of this activity
- Analysing and Interpreting data in order to optimise
- Making and using material

## Adaptations

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- General ideas:
- Ideas with younger/older children: (3-6 <-> 6-9 / 9-12 <-> 12-15)

## Tips & tricks

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It is important to use different colors in the rhythmic patterns and notes of the scale. Use the template.

BEWARE of the differences in the organisation of rhythmic patterns. While the division of the rhythmic figures (especially if you work in English: whole note, half note, quarter note) gives the unit to the round (the fraction  $1/2$  to the half note,  $1/4$  quarter note...), in the programming with Scratch the proportion is being used in relation to the measure ( $4/4$ ), so that the values are half note =2, quarter note =1 and eighth note =0.5. This can be confusing.

Some suggestions after testing by pilot teachers:

### 2. Tempo, tempo

Explain the use of a metronome to illustrate different tempos in 'bpm'.

### 3. Rhythm is a dancer.

The use of sounds TA, TITI, ... in combination with the clapping can be too difficult for the children (and also the teacher). You can choose to not use the sounds and only focus on the clapping. We suggest to do a lot of different clapping exercises with the rhythm bars to understand them fully.

### 4. Codes in music.

It is not necessary to focus too much on the notation of the notes with the younger children. The most important here is to do the exercise to decode the composition and try immediately to visualize with the rhythm blocks.

### 6. Music composer.

To introduce Scratch with the music extension you can choose to do the 'Brother John' song together step-by-step. After this exercise the children can experiment a little bit with Scratch, before composing their song of 8 'bars' with 4 beats each. Before composing in Scratch, they first use the rhythm blocks to compose their song.