STRATEGIC PARTNERSHIP
AGENTS OF CHANGE IN EDUCATION

STEAM Recipe

Theme	**Functions and frequencies**
Target Age Group	15-17 years
Duration of Activity	1 lesson (40 – 50 minutes)
Resources/Materials Needed (exact details required)	• Maths class • 1 computer for the teacher • GeoGebra www.geogebra.org
STEAM Components	Math: functions Art: music Science: physics

WHY	**Goals/Objectives/Targets/Aims**	• They learn to work with functions. • They learn about the frequencies of music through visual aid. • They learn to listen to the different frequencies.
HOW	**Method/Activities (i.e step by step instructions for teacher)**	The students have already learned about functions. Step 1: The students listen to a song (for example Twinkle Twinkle little star). Step 2: Divide the students in 3 groups. Every group gets a part (2 lines each) of the song. Step 3: Give the students the notes of the song and the paper with the frequencies (see attachment). Step 4: The student have to draw the functions. Step 5: The students put the functions in GeoGebra (software) or the teacher could have prepared the song/functions.
DID IT WORK	**Reflection/Evaluation (where applicable)**	They talk about the relationship between music notes and functions. They can talk about the height and width of the frequencies.

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Attachments:

C4 C4 G4 G4 A4 A4 G4 F4 F4 E4 E4 D4 D4 C4	Group 1
G4 G4 F4 F4 E4 E4 D4 G4 G4 F4 F4 E4 E4 D4	Group 2
C4 C4 G4 G4 A4 A4 G4 F4 F4 E4 E4 D4 D4 C4	Group 3

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MIDI number	Note name	Keyboard	Frequency Hz	Period ms
21	A0		27.500	36.36
22			29.135	34.32
23	B0		30.868	32.40
24	C1		32.703	30.58
25			34.648	28.86
26	D1		36.708	27.24
27			38.891	25.71
28	E1		41.203	24.27
29	F1		43.654	22.91
30			46.249	21.62
31	G1		48.999	20.41
32			51.913	19.26
33	A1		55.000	18.18
34			58.270	17.16
35	B1		61.735	16.20
36	C2		65.406	15.29
37			69.296	14.29
38	D2		73.416	13.62
39			77.782	12.86
40	E2		82.407	12.13
41	F2		87.307	11.45
42			92.499	10.81
43	G2		97.999	10.20
44			103.83	9.631
45	A2		110.00	9.091
46			116.54	8.581
47	B2		123.47	8.099
48	C3		130.81	7.645
49			138.59	7.216
50	D3		146.83	6.811
51			155.56	6.428
52	E3		164.81	6.068
53	F3		174.61	5.727
54			185.00	5.405
55	G3		196.00	5.102
56			207.65	4.816
57	A3		220.00	4.545
58			233.08	4.290
59	B3		246.94	4.050
60	**C4**		**261.63**	**3.822**
61			277.18	3.608
62	D4		293.67	3.405
63			311.13	3.214
64	E4		329.63	3.034
65	F4		349.23	2.863
66			369.99	2.703
67	G4		392.00	2.551
68			415.30	2.408
69	**A4**		**440.00**	**2.273**
70			466.16	2.145
71	B4		493.88	2.025
72	C5		523.25	1.910
73			554.37	1.804
74	D5		587.33	1.703
75			622.25	1.607
76	E5		659.26	1.517
77	F5		698.46	1.432
78			739.99	1.351
79	G5		783.99	1.276
80			830.61	1.204
81	A5		880.00	1.136
82			932.33	1.073
83	B5		987.77	1.012
84	C6		1046.5	0.9556
85			1108.7	0.9020
86	D6		1174.7	0.8513
87			1244.5	0.8034
88	E6		1318.5	0.7584
89	F6		1396.9	0.7159
90			1480.0	0.6757
91	G6		1568.0	0.6378
92			1661.2	0.6020
93	A6		1760.0	0.5682
94			1864.7	0.5363
95	B6		1975.5	0.5062
96	C7		2093.0	0.4778
97			2217.5	0.4510
98	D7		2349.3	0.4257
99			2489.0	0.4018
100	E7		2637.0	0.3792
101	F7		2793.0	0.3580
102			2960.0	0.3378
103	G7		3136.0	0.3189
104			3322.4	0.3010
105	A7		3520.0	0.2841
106			3729.3	0.2681
107	B7		3951.1	0.2531
108	C8		4186.0	0.2389

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