# Activity 19. Perfect Pitch (STEMworks)

1. **Learning outcome(s):** (list up to 3)
	* 1. Identify and test key variables.
		2. Maintain a fair test.
		3. Use investigation findings to develop a product (instrument).
2. **Relation of activity with the STEM, gender inclusiveness and Entrepreneurship:** (text, not bullets, explaining the relation of the activity to 3 above)

This activity requires teams to use skills central to entrepreneurship and STEM, including creativity, ingenuity, experimentation (fair testing), communication and data management. This activity offers participants the opportunity to work in a variety of ways that facilitates inclusiveness and necessarily requires good teamwork, communication and creativity.

1. **Indicate the area of focus:**

**☒ STEM**

**☐ Gender inclusiveness**

**☐ Entrepreneurship**

1. **Materials:** (including ppts, videos, hands-on material)
* Pipes of different materials (copper and plastic are most easily sourced), 3 different lengths (20 cm, 10 cm and 5 cm) and 3 different diameters (narrow, medium and wide). This results in 18 pipes when using two different materials.
* Straws, scissors, rulers, tape and any additional craft materials.
1. **Preparation:**Cut pipes to required length ensuring burr is removed.
2. **Duration:** 50-90 (minutes)
3. **Target group:** 11-13 (student age)

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1. **Description of the activity:**

Objective: Students are challenged to identify key variables that determine the pitch/frequency produced when a pipe is struck. Using this information students must then develop a musical instrument of their own design based around straws.

0-5 mins: Demonstrate how a note can be produced by tapping pipe into your hand. Inform students that they must identify which variables determine the frequency of the sound produced.

5-10 mins: allow experimentation to help students practise generating notes. Students may not distinguish between frequency and tone, the latter of which incorporates timbre, volume, duration and frequency.

10-15 mins: Ask students to identify variables and vote for which variable they consider will be most important and justify responses.

15-45 mins: students begin to test ideas and record data. Prepared tables may be given or students can be asked to develop their own recording strategy.

45-50 mins: discuss findings as a group - students should have found that length is the key variable. It is worth reflecting at this point on their role within the group. Were they leading, how did they assign tasks, what could they do better next time? This self and peer assessment may open up a discussion on gender divisions that is worth exploring during the reflection.

50-55 mins: ask teams to now apply their knowledge to design and make an instrument using straws and supplied craft materials. The teacher should demonstrate how blowing through a straw produces a sound of a particular frequency. It may be worth experimenting before the lesson if you want to generate a clear note, but generating a sound with a set frequency is quite straightforward.

55-80 mins: students make their instruments

80-90 mins: instrument demonstration

**9. Link to curriculum:** Science , sound, fair testing.