- **Music Interfaces I**
    - 75 min
    - 20-30 Students
    - High school students

- **Summary of activity**
    - Students get into groups and discover a unique interface. They then report their findings and demonstrate them to the class

- **Pre-requisite knowledge requirements**
    - Math
    - Science
    - Music
    - Other

- **Dependencies on other SMT activities**
    - None but having taken waves & sound is a plus.

- **Learning objectives**
    - After taking this less, students should understand that anything can be implemented as a musical interface. New unique interfaces can lead to a new and rather unique kind of music and performance.
    - Science/Engineering: Discovering unknown items in a structured manner and conveying findings to others. How is design related to practicality. Learn of different interfacing control methods such as buttons (discrete control) vs sliders (continuous control).

- **Relevant educational standards** (download Mathematics PDF and Science and Technology PDF from here)
    - Math
    - Science

- **List of materials**
    - Each student (or group) needs
        - notebook/pen
        - interface (specifics below)
        - macbook(s)

- **Detailed description of the activity**
    - Intro: Music is increasingly played, manipulated, and created on computers. This activity will explore interesting ways to manipulate and create music though experimentation and discovery.
    - Background: Many different interfaces have been used in the past to interact with music. They range from the basic 12 tone piano layout or a layout of guitar stings. More recently, work is being done to create interfaces that are more intuitive to the user, and do not need professional instruction to make music. A new interface can

be almost anything, as long as it has a way of allowing the human to interact with music. This can range from an X/Y track pad to even a Wiimote video game controller. Aspects of an interface:
- boundary between user and output
- Give data
- intuitive
- analog or digital
- New Vocabulary / Definitions:
  - Interface- an intuitive tool for human and device interaction
  - Amplitude- (as directly related to sound) - volume of signal
  - Frequency-(as directly related to sound) - speed and pitch
  - Degrees of Freedom- the number of independent ways of interaction
- Procedure
  - Before the activity: The stations must be set up and tested.
  - With the students: Students split into groups of 4 and explore their interfaces. There is a helper at each station to talk the group through snags(20 -25 mins). At the end the students will then present their findings to the class and demonstrate their interfaces. Describe degrees of freedom, ease of use and other applications.
    - Interface Specifics
      - Kaoss Pad 3: 2 usable knobs, 2-D touchpad
      - NANOKONTROL 2: knobs, sliders, and buttons
      - iPad / Touch OSC: accelerometer, slider, xy-plane
      - Wii in PureData. Amplitude/Frequency
      - STC1000: 2-D pressure sensitive touchpad
- Safety Issues? None
- Troubleshooting tips
  - Everything will be run through beforehand.
  - Each group helper will become familiar with their part, so they are able to fix problems.

- **Investigating question**
  - Name an interface you found interesting, and how its degrees of free correspond to it's function

- **Assessments**
  - Pre-activity assessment? Converse with class and see what interfaces they can come up with.
  - Assessment embedded within the activity? They are presented with a unknown object and must discover and document what it does.
  - Post-activity assessment? How well did the communicate their findings to the class?