

WaterViz Investigation 3 Facilitator Guide

1. Analyzing Data Presented as Music: In this investigation **data from the same rain event** was used to create instrumental music videos. Think about the trends you observed for each water cycle component. How would those trends sound if presented with music?

Water Cycle Component	Observed Trends
Temperature	Went up during the day and down at night; daily cycle
Precipitation	None for the first 4 days, then lots of rain on days 5-10, then rain slowed and stopped
Streamflow	Low, increased when raining, gradually went back down
Evaporation/Transpiration	Up and down on a daily cycle; lower during rain storms
Soil Water	Dry, increased when it rained, started drying out when rain stopped

2. Sonification is the use of non-speech audio to convey information. In the music videos, each water cycle component is represented using 1 or more musical instruments.
 - a. You may hear an instrument start and stop or play continuously.
 - b. The speed of the music may change.
 - c. You may hear the pitch change.
 - d. *Fun Science Demos* has a nice video explaining sound waves and pitch: https://www.youtube.com/watch?v=yMLTF_0PAQw
3. Play the Cymbals video. **Be sure to indicate when you have started the video. (If you don't hear anything, maybe this instrument does not play continuously.)

4. Discussion Questions:

- a. What changes did you hear in the music?
Cymbals start and stop; no change in pitch is heard; cymbals crash when precipitation is shown in the animated art.
- b. Thinking back on your Gallery Walk notes, can you infer which water cycle component was represented by the cymbals?
Precipitation
- c. Do you think cymbals are a good choice for representing precipitation? Why or why not?
Loud and get your attention; easy to hear when start/stop

5. Play the Bass Guitar + French Horn video.

6. Discussion Questions:

- a. Could you hear the music continuously or did it start and stop? Did the pitch change? What other changes did you hear?
Music played continuously; pitch started out low and the speed of the notes was slow; pitch went up and speed increased a little during smaller rainfall; pitch went up and speed increased a lot during periods of higher rainfall.
- b. Thinking back on your Gallery Walk notes, can you infer which water cycle component was represented by the cymbals?
Streamflow
- c. Do you think bass guitar + French horn are a good choice for representing streamflow? Why or why not?
Plays continuously and easy to adjust pitch and speed in response to changes in how fast the stream is flowing.

7. Repeat steps 5 & 6 for the remaining instrument videos.

Note: Hearing changes in the music may be more difficult for some instruments than for others. Listen to/watch the videos as many times as needed. Scientists may be able to use clues from the animated art and their Gallery Walk Notes may be helpful.

- Do changes in the red streamflow (cfs) number seem to match changes in the music?
- Do musical changes seem to follow a pattern that matches changes in the time of day?

- Do some animations appear, disappear, or get more or less noticeable along with changes in the music?

WaterViz Music	Water Cycle Component
Instrument used to represent water cycle data	
Cymbals	Precipitation
Bass Guitar and French Horn	Streamflow
Marimba	Evaporation/Transpiration
Guitar	Soil Water
Flute	Temperature

Note: A detailed teacher guide, with tips for analyzing the musical data is available on the WaterViz website/Teaching Tools/WaterViz Curriculum/Lesson 3/Teacher Guide: [WaterViz Lesson 3 - Google Drive](#)