

DURATION: 3 days

Project Description	Learning Targets
<p>In this project, students will demonstrate durations of light using musical instruments. The students will discover shadows through movement and sources of light to demonstrate that morning has short shadows, noon has longer shadows and night has shortest shadows. They will use their bodies, objects (balls, rulers, etc.) and rotate while observing where their shadows go. Students will create sounds using long, short, and medial lengths of sounds that demonstrate the time of day. Students will create sounds, long and short, that will demonstrate how shadows crescendo and decrescendo throughout the day.</p>	<p>“I Can...”</p> <ul style="list-style-type: none"> • Create sounds, long and short, that will demonstrate the durations of shadows throughout the day • Demonstrate how the movement of the light source changes the length of the shadows throughout the day

ESSENTIAL QUESTIONS

- How can we create sounds that will demonstrate the duration of shadows throughout the day?

STANDARDS

Curriculum Standards	Arts Standards
<p>S1P1 Students will investigate light and sounds. a. Recognize sources of light. b. Explain how shadows are made.</p>	<p>M1GM.4 Improvising melodies, variations, and accompaniments. b. Improvise soundscapes (e.g., weather, animals, and other sound effects).</p>

KEY VOCABULARY

Content Vocabulary
<ul style="list-style-type: none"> • Light • Shadows • Light Sources
Art Vocabulary
<ul style="list-style-type: none"> • Crescendo: gradual increase in volume, soft to loud • Decrescendo: gradual decrease in volume, loud to soft • Forte: loud • Piano: soft • Mezzo: medium soft (piano) or loud (forte) • Duration: how long or short a sound is produced • Dynamics: refers to loud and soft sounds; volume • Largo: long and connected sounds • Staccato: short and detached sounds

TECHNOLOGY INTEGRATION

- <https://www.youtube.com/watch?v=3B7KLstUZbI> (Time Lapse with shadows)
- <http://www.schooltube.com/video/96d3fe1ce9fdeec40269/Tree-Shadow-TimeLapse>
- <http://www.schooltube.com/video/8833edd200a8672040d8/Shadow%20Time%20Lapse>
- https://www.youtube.com/watch?v=99kHBXw0_UM (Mr. Greg's Dynamics)

ASSESSMENTS

Formative	Summative
<ul style="list-style-type: none"> • Students will be observed when given direct instructions to hear if they can make accurate sounds to create shadows that reflect morning, noon, and night. 	<ul style="list-style-type: none"> • Students will be able to create notations and perform their sounds of shadows that follow the progression of the day (Morning, Noon, and Night).

MATERIALS

- Slide whistles
- Recorders
- Drawings of the same picture with variations of shadow movement
- Triangle
- Tone bloc
- Gong
- If there are no instruments present at your school, you can substitute vocal sounds with body percussion or found sounds (anything one can find, ex: pencil tapping the desk).

Activating Strategy (5-10 min)

- Watch video of a tree's shadow (see technology for links)
- Listen to parts of **Dvorak's New World Symphony Movements 2, 3, & 4** (in the order of 3, 4, & 2) while looking at a picture of various shadows (see Downloads).
- Ask EQs and review "I Can Statements" to explain to students what this project in the unit is about.

Main Activity**PROCESS:**

Apply the idea of long and short sounds representing shadows through music.

PART 1

- Revisit science vocabulary and introduce music vocabulary.
- Students will create shadows through movement and sources of light to demonstrate that morning has longer shadows, noon has shorter shadows and night has shortest shadows.
- They will use their bodies, objects (balls, rulers, etc.) and rotate while observing where their shadows go.
- The musical element would include different instruments to represent both the time of day and length of shadow:
- Watch videos of shadow progressions and have students describe on chart paper or interactive science journal on the variations of the positions of the shadows based on the main object.
- Morning: Triangle: Represents the longer shadow produced in the morning with a prolonged, high pitched sound that is legato (long and connected). The timbre (sound of the instrument) of the triangle is representative of the bright light of the morning sun.
- Noon: Tone block: Creates short, staccato (short/detached) sound, which represents the length of the noon shadow.

- Evening: Gong or Metallophone (Orff instrument): Creates a warm, long, low (timbre) sound which represents the length of the evening shadow and the time of day.

PART 2

- Listen to **Dvorak's New World Symphony Movements** (see Downloads).
- Students will brainstorm on each movement as to which part of the day it might represent (morning, noon, or night) and where the shadow would be at that part of the day. Each movement will have elements of long, slow, fast, loud, and soft sounds. Just use the first few minutes of each movement.
- Students will look at a basic picture with variations of lights and shadows to discuss which movement would be more likely to go with the picture.
- Students will strike a gong to simulate morning shadow (long), triangle to simulate afternoon (short), and tone block to simulate evening/night (shortest).

Part 3

- Students will create sounds of shadows with the aid of slide whistles and recorders.
- Short blasts of the recorders will simulate short shadows and slide whistles will simulate long shadows.
- This should not be about the quality of the sound, but the durations of each of the sounds to simulate shadows.
- Students with the teacher will come up with notations that represent the time of shadows. (i.e. Long lines=Long shadows=Longer part of the day; Short lines or (any other geometric shape) will represent the shorter shadows and shorter part of the day.
- Students will then discuss what part of the day, morning, noon or night, where shadows are the shortest and longest.

Classroom Tips:

- *With modeling, students should be able to do this at their desk with writing musical notations and performing musical instruments.*

REFLECTION

Reflection Questions

- How does music help you understand how shadows change throughout the course of a day?
- Describe the relationship between the light source and the shadow at specific times throughout the day. In general, why did the shadow grow or shrink?

DIFFERENTIATION

Accelerated:

- Students will create and write individual short and long sounds approved notations on paper for others to follow.
- Advanced students could pretend to have a "pen pal" in different areas of the world (northern vs southern hemisphere or eastern vs western hemisphere, etc).
- They will be given different times of day (morning, when you go to school, lunch time, bed time), and will be asked to predict if they were to message their pen pal, how would the pen pal describe the amount of light at that time.
- Map of the earth and where sunlight is shining: <http://www.die.net/earth/>
- Additionally, students could research what time zone their "pen pal" was in, and what the time difference would be.

Remedial/EL Students:

- Teacher will model “I do, We do, You (Student) do” sounds of long and short shadow sounds.

ADDITIONAL RESOURCES**Websites:**

- <https://www.youtube.com/watch?v=3B7KLstUZbl> (Time Lapse with shadows)
- <http://www.schooltube.com/video/96d3fe1ce9fdeec40269/Tree-Shadow-TimeLapse>
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APPENDIX (See Downloads)

- **Sounds of Shadows Rubric**
- **Dvorak’s New World Symphony Movements Music Files**

CREDITS

U.S. Department of Education

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