

Acoustics of Globe-News Center for the Performing Arts K-5

Objectives:

- Demonstrate that vibrations create sounds. (3-5)
- Recognize that sound must have a medium for transmission. (3-5)
- Identify that some media transmit sound better than others. (3-5)
- Describe how the ear works. (3-5)
- Demonstrate that sounds can be changed by (K-5)
 - Adding energy
 - Reflecting or
 - Absorbing the sound.
- Recognize that architects design buildings for specific uses. (K-5)
- List the 3 types of events that occur in the Globe-News Center for the Performing Arts. (K-5)
- Identify and describe how the building [Globe-News Center for the Performing Arts] can “transform” to give the best sound. (K-5)
- Identify and describe the unique acoustic characteristics of the Globe-News Center for the Performing Arts. (3-5)

Science TEKS addressed:

- **Kindergarten:** (7) The student knows that many types of change occur. The student is expected to:
 - (A) **observe, describe** and record **changes** in size, mass, color, position, quantity, time, temperature, **sound** and movement.
- **1st Grade:** (7) The student knows that many types of change occur. The student is expected to:
 - (A) **observe, describe** and record **changes** in size, mass, color, position, quantity, **sound** and movement.
- **2nd Grade:** (7) The student knows that many types of change occur. The student is expected to:
 - (A) **observe, describe**, record, **analyze, predict** and illustrate **changes** in size, mass, temperature, color, position, quantity, **sound** and movement.
- **3rd Grade:** (2) The student uses scientific inquiry methods during field and laboratory investigations. The student is expected to:

- (C) **analyze and interpret information to construct reasonable explanations from direct and indirect evidence**;
 - (D) **communicate valid conclusions**; and
 - (E) construct **simple graphs**, tables, maps, and charts to organize, examine and **evaluate information**.
- (7) The student knows that matter has **physical properties**. The student is expected to:
- (A) **gather information** including temperature, magnetism, hardness, and mass using appropriate tools **to identify physical properties of matter**; and
 - (B) **identify matter** as liquids, **solids and gases**.
- **4th Grade:** (2) The student uses scientific inquiry methods during field and laboratory investigations. The student is expected to:
 - (C) **analyze and interpret information to construct reasonable explanations from direct and indirect evidence**;
 - (D) **communicate valid conclusions**; and
 - (E) construct **simple graphs**, tables, maps, and charts to organize, examine and **evaluate information**.

(7) The student knows that matter has **physical properties**. The student is expected to:

 - (B) conduct tests, compare data, and **draw conclusions about physical properties of matter including states of matter, conduction, density**, and buoyancy.
 - **5th Grade:** (2) The student uses scientific inquiry methods during field and laboratory investigations. The student is expected to:
 - (C) **analyze and interpret information to construct reasonable explanations from direct and indirect evidence**;
 - (D) **communicate valid conclusions**; and
 - (E) construct **simple graphs**, tables, maps, and charts to organize, examine and **evaluate information**.

(7) The student knows that matter has physical properties. The student is expected to:

 - (A) **Classify matter based on its physical properties** including magnetism, **physical state**, and the **ability to conduct or insulate** heat, electricity, and **sound**;

(8) The student knows that **energy occurs in many forms**. The student is expected to:

 - (C) **demonstrate that electricity can flow in a circuit and can produce** heat, light, **sound** and magnetic effects; and
 - (D) **verify that vibrating an object can produce sound**.

K–2 Lesson Plan

The Acoustic Virtual Field Trip includes

- √ *Interaction between the host and the students,*
- √ *Student activities,*
- √ *Demonstrations,*
- √ *Applications of concepts to students' prior experiences,*
- √ *And many images of the exterior and interior of the Globe News Center for the Performing Arts.*

- **Introduction**

- **Objectives:**

- **Demonstrate how sounds start.**
- **Describe how to change sounds.**
- **Explain how the building changes the sounds.**
- **Tell what an architect does.**
- **Tell what an acoustician does.**

- **The Building**

- **Architects**
- **Exterior and Interior Design**
- **Types of Events at the Center**
 - **Theater**
 - **Amplified concerts**
 - **Symphonic concerts**
- **Transforming the building**

- **Acoustics & Acousticians**

- **Definitions**
- **Activities & Demonstration**
 - **Creating sounds**
 - **Modifying sounds**
 - **Predicting modifications of sounds**
 - **Reflecting sounds**
 - **Absorbing sounds**

- **Transforming**

- **Modifying for Different Events**
 - **Stage**
 - **Orchestra Pit**

- **Closure:**

- **Question and Answer:**
 - **Evaluate mastery of objectives listed in the introduction**
 - **Student Generated questions if time allows**

3-5 Lesson Plan

The Acoustic Virtual Field Trip includes

- √ *Interaction between the host and the students,*
- √ *Student activities,*
- √ *Demonstrations,*
- √ *Applications of concepts to students' prior experiences,*
- √ *And many images of the exterior and interior of the Globe News Center for the Performing Arts.*

- **Introduction**

- **Objectives:**

- **Demonstrate how sounds are generated and transmitted.**
 - **Describe how sounds can be modified.**
 - **Explain how the Center modifies the sounds.**
 - **Compare and contrast what architects and acousticians do.**
 - **Determine if Carol Emeny's vision for the Center was fulfilled.**

- **The Building**

- **Architects**
 - **The Vision for the Center**
 - **Exterior and Interior Design**
 - **Types of Events at the Center**
 - **Theater**
 - **Amplified concerts**
 - **Symphonic concerts**
 - **Transforming the building**

- **Acoustics & Acousticians**

- **Definitions**
 - **Activities & Demonstration**
 - **Creating sounds**
 - **Modifying sounds**
 - **Predicting modifications of sounds**
 - **Reflecting sounds**
 - **Absorbing sounds**

- **Transforming**

- **Modifying for Different Events**
 - **Stage**
 - **Orchestra Pit**

- **Closure:**

- **Question and Answer:**
 - **Evaluate mastery of objectives listed in the introduction**
 - **Student Generated questions if time allows**