PBIS PROJECT PLANNER*

*Modeled after and adapted from Vermont secondary PROJECT Science Partnership and Buck Institute for Education (www.bie.org/)

VISION:

To provide an opportunity to **connect** the study of sound to an **important issue** in **our community**, and to **integrate science** with **social justice**.

Teacher(s): University of Vermont Dept. of Ed Example

Project Title: How loud is too loud?

Grade Level(s): 9th-10th

Big Ideas/Enduring Understandings: What big ideas or real-world dilemma will drive this project?

- The FAA has launched a program to buy up houses in our neighborhood and relocate residents because of the level of "noise." So, *How Loud is Too Loud?*
- How is noise measured?
- What is "noise" and what is sound?
- Is sound everywhere?
- What makes loud loud?
- Are there other places facing this same dilemma?
- How does this relate to other "noisy" things we encounter in life?

- Sub Questions
- "They" are calling the neighborhoods "rundown"
- Who are "they?" What is the meaning of "rundown"?
- The airport needs room/space to expand, so are there other political issues going on here?
- Hidden agendas?
- There are multiple stakeholders—who are they? What do they have to say? Do they have voice?

Subject(s):

- How can you incorporate **interdisciplinary subjects** into this project design?

- Coordinate with **humanities** and **art** instructors to look at **social justice**, **history**, **art for social change**
- Work with **math** teachers to **graph** sound measurements
- Connect with **Biology** and **Anatomy** to study the human ear anatomy
- Connect with the **librarian** and **media specialist**

Timeframe: 1 month

Essential Questions: What essential questions will drive the project?

- Consider the themes that will focus the unit and ones that integrate social justice issues (preferably local ones/issues that are meaningful to student audience).
- This is a great activity to do with your students but it is usually helpful to already have some ideas in the hopper.

Ideas for the Hopper:

- **History**: What is the history of the neighborhood?
- What are the **social justice** issues that are connected with why airports end up where they end up (would this be happening if the mayor lived there?)
- What are the demographics of the neighborhood?
- What are the politics behind this move?
- Explore working with an **art** teacher to do some possible **art for social change project** connected to community and sound.
- What is a **real** project or something **authentic** that needs to be measured that will **inform our stakeholders**?

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KNOWLEDGE AND SKILLS: What key knowledge and skills will students acquire as a result of this unit?

Content & Concepts: What will Students **know** or **need to know**?	**Skills**: What **skills** will students **need** or **need to acquire**?	**Standards Addressed**
✧ **Sources of sound**: sound waves, the propagation of sound, and the mathematical calculations for sound ✧ **Doppler effect** ✧ **Acoustics** ✧ **Terminology** of sound (e.g. RMS, dB, Pa , etc.) ✧ **Vectors,** adding and subtracting noise levels ✧ Relationship between **sound** and **pressure** ✧ **Sonic boom** ✧ The **perception** of sound & **human ear** ✧ Etc.	✧ How to **think like a scientist** and engage in the **scientific process** including **hypothesizing, experimenting and design, analysis, presenting,** and, as Einstein said **take action** ✧ How to **measure**, **graph**, and **report** about sound levels—**collect** and **process data** ✧ How to **present** information to various stakeholders from officials to community members ✧ How to **determine** whether the **information** you find is **helpful** or **accurate**, and how will it help **inform** your essential question ✧ Effective ways to work with **groups**	**S:29** Students demonstrate their **understanding of sound energy.** **S:1** Students demonstrate their **understanding of scientific questioning.** **S:2** Students demonstrate their understanding of **predicting** and **hypothesizing**. **S:3** Students demonstrate their understanding of **experimental design**. **S:4** Students demonstrate their **ability to conduct experiments** **S:5** Students demonstrate their **ability to represent data.** **S:6** Students demonstrate their **ability to analyze data.** **S:7** Students demonstrate their **ability to explain data**. **S:8** Students demonstrate their **ability to apply results.**

Any **additional concepts** or **ideas** that may not be the focus but are worth being familiar with.

- ✧ Exploring the connection between **sound** and **voice**
  - ✧ **Physiologically,** how do we make sound?
  - ✧ How are our voices **heard**? What makes some voices more powerful than others? How does this relate to sound and volume—or does it?
- ✧ Exploring the concept of **privilege**
  - ✧ Who has it? What does it take to get it? What happens to people who do not have it?
  - ✧ How is education a form of privilege?
  - ✧ How does science fit into this equation?
  - ✧ What are our responsibilities as educated members of this community who have access to **knowledge** and **resources**?
- ✧ What are some techniques for **handling information**?
  - ✧ How to best stay organized
  - ✧ How to maintain confidentiality and grace around sensitive, politically charged issues
  - ✧ How to properly site sources
- ✧ What re some helpful techniques for **collaborating**?
  - ✧ With peers who may have different opinions, work ethics, ideas and approaches
  - ✧ With community members who have varying opinions, approaches, agendas, experiences, and are multigenerational

Source: Vermont Department of Education. Science Grade Expectations for Vermont's Framework of Standards (2004).

INQUIRY: What is the desired result and how will students know when they have reached it?
What is acceptable evidence?

ASSESSMENT/PERFORMANCE TASKS: What is relevant assessment that will be useful to the stakeholders/problem identified?	**Other Evidence** that can be Assessed
▪ What useful data, measurements, survey information, etc. might be helpful to the cause? ▪ How will you help students generate realistic, challenging, relevant final projects? ✧ At this point in the planning process, we would have to check in with the various stakeholders to find out what would be helpful at this juncture in the evolution of their community issue. We would want to find something that is of use to the people involved and also to the city that is in alignment with our educational goals. A good first step might involve students and teachers: ✧ **Interviewing** the various stakeholders ✧ hearing multiple points of view and synthesizing the **needs** on a **challenge board** to help facilitate a discussion and analysis process ✧ **Researching** other communities that have this or similar issues and finding out what sort of **action steps** they took to use as a **model** for the final project ✧ Consider what sorts of venues exist for **disseminating information** (e.g. community TV, radio, publications, letters to the editor, etc.) and design an authentic assessment tool around those outlets	Examples could include but are not limited to: challenge projects, problem solving tasks, lab design/write-ups, presentations/performances, cooperative group work, models, quizzes, tests, observations, dialogues, work samples/drafts, logs, data collected, self/peer assessments, interviews with experts, etc. ✧ Collect **quantitative** and **qualitative data** from the airport and other areas around the community, the school, the students (e.g. via our own headphones) ✧ Experiment with various types of **software programs, apps, and probes/tools** to help **collect** and **organize data** ✧ Conduct **interviews** ✧ Make **concept maps** of the various issues—**organize information** into various "bins" or categories ✧ Experiment with various software programs to help **organize data (e.g. mind-map software, PowerPoint, etc.)** ✧ Sound **station** lab and other sound-related labs ✧ Create a **working model of the ear** ✧ **Research** on sound-related concepts and **sound** related **dilemmas** in the larger world/community ✧ Mini-lecturettes ✧ Sound **equations** ✧ Create a kinesthetic representation of a **sound wave** (e.g. via a dance, an animation, a skit/performance, a play) ✧ Write **Reflections on speakers, interviews, fieldtrips** ✧ Write to a **scientist** who is working in the field of **sound science** ✧ Keep all work organized in a **portfolio**

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BUILD: How will the learning experiences be developed?

DESCRIBE THE PROJECT	CREATE BUY-IN
▪ What is the background and context of the project? ▪ What is the relevancy and importance of the project? ▪ What is the authentic challenge/problem being addressed? ▪ ✧ The FAA's house relocation program: students can look look into the history/background of this ✧ When did this program begin? ✧ Why did it start? ✧ Does it have bi-partisan support? ✧ What are their definitions, (e.g. of "loud") ✧ Why is it **relevant? Important? A challenge for our community?**	▪ How can you hook your students? ▪ What would create buy-in? ▪ Who might they get involved with that is an expert in this field? ✧ Start with a fieldtrip to the airport ✧ Set up interviews with the various stakeholders or have a panel discussion ✧ connect them with real people who are being negatively affected by the noise, the need to move, etc. especially if they themselves are young people ✧ Involve the media ✧ Listen to broadcasts and read lots and lots and lots articles with varied opinions ✧ Dissect articles—explore how this one made you feel versus the other and *why* that was so

Begin to design your project board: Outline specific tasks, milestones/timelines that students will complete early on, during, and at the end of the project. Who might they get involved with that is an expert in this field? Remember to emphasize problem posing, problem solving, and other meaningful tasks in the design.

BUILD, cont.

List preparations necessary to address needs for differentiated instruction: How this project meet everyone's needs? (Remember to consider any ELL students, special-needs students, students with diverse learning styles, students who many struggle with reading and need varied levels, students who need clear expectations and scaffolding, students who need constant challenge, etc.)

List preparations for multicultural, socially-conscious classroom: How will *all* voices and points of view be heard with this project? How will the classroom promote the values of democracy?

List reflection and evaluation techniques: How will you and your students reflect on and evaluate the project? (E.g. Class discussion, Fishbowl, Student-facilitated formal debrief, individual evaluations or rubric work, peer/group evaluations, etc.) Develop a project rubric (or several mini-rubrics) that assesses the learning intentions for this project.

CURRICULUM UNIT RESOURCES			
Student Literature	Classroom Materials	Web sites & Technology	Field Trips and Field Work

PLAN LEARNING OPPORTUNITIES AND SEQUENCE INSTRUCTION		
Think about the different lessons/activities that will be needed to demonstrate the key knowledge and skills for this project. How will students work autonomously and build on their learning to ensure continual improvement?		
Week 1 - Dates:	Week2 - Dates:	Week 3 - Dates:
Week 4 - Dates:	Week 5 - Dates:	Week 6 - Dates:

REFLECTION: Throughout and especially at the end of the project, consider what went well and what changes you would make for the next time.