

**Student Discussion Worksheet**

**Directions:** Think about a room or space that was designed to have specific sound requirements, like a concert hall, library or restaurant. Imagine you are tasked with designing a room with specific sound requirements. Use the prompts below to define your room's function, create and sketch a design based on your room's sound requirements, present your design to a partner and make any revisions based on your partner's feedback.

**Define the room**

Answer the following questions to define the room that you will design.

1. What will your room be used for?
  
  
  
  
  
  
  
  
  
  
2. What are the sound requirements of the room based on its function? (For example, do you want the room to increase or decrease the sound levels of voices? Of ambient noise? Do you want the sound to be uniform throughout the whole room or different in different places? Is the room a performance or social space?)
  
  
  
  
  
  
  
  
  
  
3. How many people will occupy the room?
  
  
  
  
  
  
  
  
  
  
4. What general size and shape do you want the room to be?

**Apply your background knowledge**

Think about a room in your school or elsewhere that is similar to the room you want to design. Using the prompts below, describe the characteristics of the room.

1. What is the general size and shape of the room? How high is the ceiling? How might the size and shape impact the acoustics? Would sound be different in different areas of the room?

2. What types of materials are typically found on the surfaces in the room? Are sound waves being absorbed or reflected by these materials? How do the materials affect the sound level in the room?

3. Is there generally furniture or other functional decorations in the room? If so, what are they made of and where are they located? How do these items affect the sound level in the area where they are located? What about in other areas?

4. How many people are generally occupying the room? Does the room's occupancy impact the room's acoustics? If so, how?

### **Design a solution**

Using the sound properties of different types of rooms and keeping in mind the functional goal of your room, draw a rough sketch of your room. Make sure your diagram indicates general shape, scaled size and is labeled with structures, materials and/or furnishings that will influence the sound. Answer the following questions about your room and be prepared to discuss your room design with a classmate.

1. What is the size and shape of your room? Are there areas of the room where sound levels will differ greatly from others? Why or why not?

2. Why are you including certain materials in certain places? How do the materials you're using impact the sound waves in the room?

3. Is there furniture in the room? If so, where is it located and what is it made of?

4. Are there people in the room? If so, where will they be? How will their location and proximity to one another impact the sound that they hear?

### **Gather feedback and refine**

Discuss your design with a classmate and get his or her feedback before answering the following questions.

1. How well does your design meet the sound requirements of your room? Be sure to think about the shape and scale of the room, as well as the materials you used.
2. Did your discussion with your classmate help you realize something new about your design? If so, how would you modify your design based on your discussion.

### **Testing**

Consider how you might test your design by answering the following questions.

1. What questions would you want to test about your design?
2. What data would you want to collect to test those questions?
3. How might building and testing a prototype be helpful?
4. How important do you think sound requirements should be to how architects and interior designers do their work? Explain.