**作业：**

1）注意红色生词，记住读音及意义，明天考单词。

2）注意加粗，为主要信息，可以参考进行笔记练习。

3）提交：1）重听记一遍笔记，按照段落分层，三个要素影响回声。

2）模拟朗读整篇听力，先听原文，再朗读，确保imitate the original tone and intonation, pay special attention to the pauses and emphasis.

NARRATOR:Listen to part of a lecture in an architecture class.  
  
MALE PROFESSOR: Today I'd like to talk a bit about the relationship between the built world and sound- uh, the design of buildings like concert halls or theaters. So **what's the most important aspect** in the design of such a building?  
  
MALE STUDENT: Acoustics【注意发音，跟读】?  
  
MALE PROFESSOR:Yes. Now people have been concerned about how sound carries【传播】 in auditoriums and theaters for at least 2,000 years, but it was not until the beginning of the twentieth century that architectural acoustics **became a scientific field**. That was when the physicist **Wallace Sabine** started to **do extensive studies**【研究，不是学习，注意一下】 on reverberation. 【Q2】  
  
Sabine wanted to find out why the audience **could not understand** speakers at a lecture hall in Boston. He designed a series of studies on reverberation to figure it out【想出原因，弄明白】.So what is reverberation? It's the **persistence of sound** in a room after the source has stopped making sound. You see, sound made in a room **reflects** off the walls, floor, and ceiling- that's the reverberant sound. **The time** it takes for the reverberant sound to **die down【逐渐消逝】** is important for **the acoustic quality** of a room. Sabine recognized this, and he came up with【想出】 an equation to measure a room's reverberation time. **So, what happens if the reverberation time is very long?**  
FEMALE STUDENT: Wouldn't it be **difficult to hear new sounds** if you can still hear the old sounds? **[Q3]**  
  
MALE PROFESSOR: Exactly. A long reverberation time may cause musical notes【音符，注意notes这里是音符，不是笔记】 to drown one another out. On the other hand, if the reverberation time is very **short**, meaning【伴随状语】 the reverberations are **absorbed very quickly**, the room is called **"dead."** Performers would feel they have to struggle to fill the room with sound. We don't want that. In a concert hall or theater, we prefer a **"live"** room, where the sound **has fullness**. So we need to **control the reverberation time**. After all, we don't want the listeners or the performers to have to struggle, right? **So what are some important considerations** when we design a theater or concert hall? **[Q1]**  
  
MALE STUDENT: The **size** of the place?  
  
MALE PROFESSOR: Absolutely. The **larger** the room, the **longer** the reverberation time. So we'll have to take into account【考虑，把…纳入考虑范围】 what the room will be mainly **used for** since **music** requires **more** reverberation **than speech.** A room intended for music needs to be designed differently from a room intended for drama. For **music** we need a very **large** room, a **concert** hall- actually, I-I should say for **full orchestras**-because for **a single instrument**, say,【口语，举例，打个比方，要注意记笔记，通常例子会出题】 something like a **piano recital**【独奏会】【Q4】, a room with a **short reverberation time** is better. So, for a **solo piano**, a **smaller** room works well. Yes?  
  
MALE STUDENT:I read that concert halls designed for **symphony orchestras【交响乐团】** have too much echo for jazz music【爵士乐】.  
  
MALE PROFESSOR: That doesn't surprise me- **most small jazz groups** would need rooms with a **shorter** reverberation time.

But, besides the size of the room, another 【注意分段了，新的观点被引出，another】variable【n.变量； adj 多变的，此处是n，注意】 affecting reverberation is the **shape** of the room. **Let's say【又是举例】** you designed a **rectangular, box-like space** with bare【裸露的，无装饰的】 walls and ceiling. This would allow the sound to act like a ball in a racquetball【racketball，注意发音，没听明白也无所谓，知道是个球类就行】 court, you know bouncing around and hitting some parts of the walls and ceiling but missing many others. If that happens in a concert hall, audience members may hear some sounds but not others. So what can be done to distribute the sound【第三个点要出来了】 evenly in every direction? The answer is: avoid straight, parallel walls. Karen?  
  
FEMALE STUDENT: But I think I've seen photos of rectangular concert halls....  
  
MALE PROFESSOR: Right... Older concert halls from the **1800s are generally rectangular**, but they all have a lot of **decorations** on the walls inside, lots of ornamental plasterwork【灰泥】 like statues【statue status stature 比较这三个词的意义及发音】, which **distribute** sound very efficiently, reflecting it in all different directions.**[Q5]**  
And that **brings me to another variable** we need to consider- the acoustic characteristics of the building materials as well as the wall and floor coverings. In fact, most objects you see in a concert hall or theater serve double duty【服务双重职责】. **The plush【长毛绒】 chairs absorb sound** **and soften** reverberation. And the beautiful crystal chandeliers【水晶吊灯】? They are very good at **diffusing sound**. You see, everything must be planned down to the last detail in order to predict the acoustic performance of a room. That being said...【注意口语里常用，用来表示转折：话虽这么说，话是这么说，但…】【Q6】 there's something that can't be controlled by the architect. **The audience** has an effect on acoustics too- **the heads of people** are good diffusers of sound- and architects try to account for【考虑到】 this effect in their design, but they can't guarantee a full auditorium【观众席】!