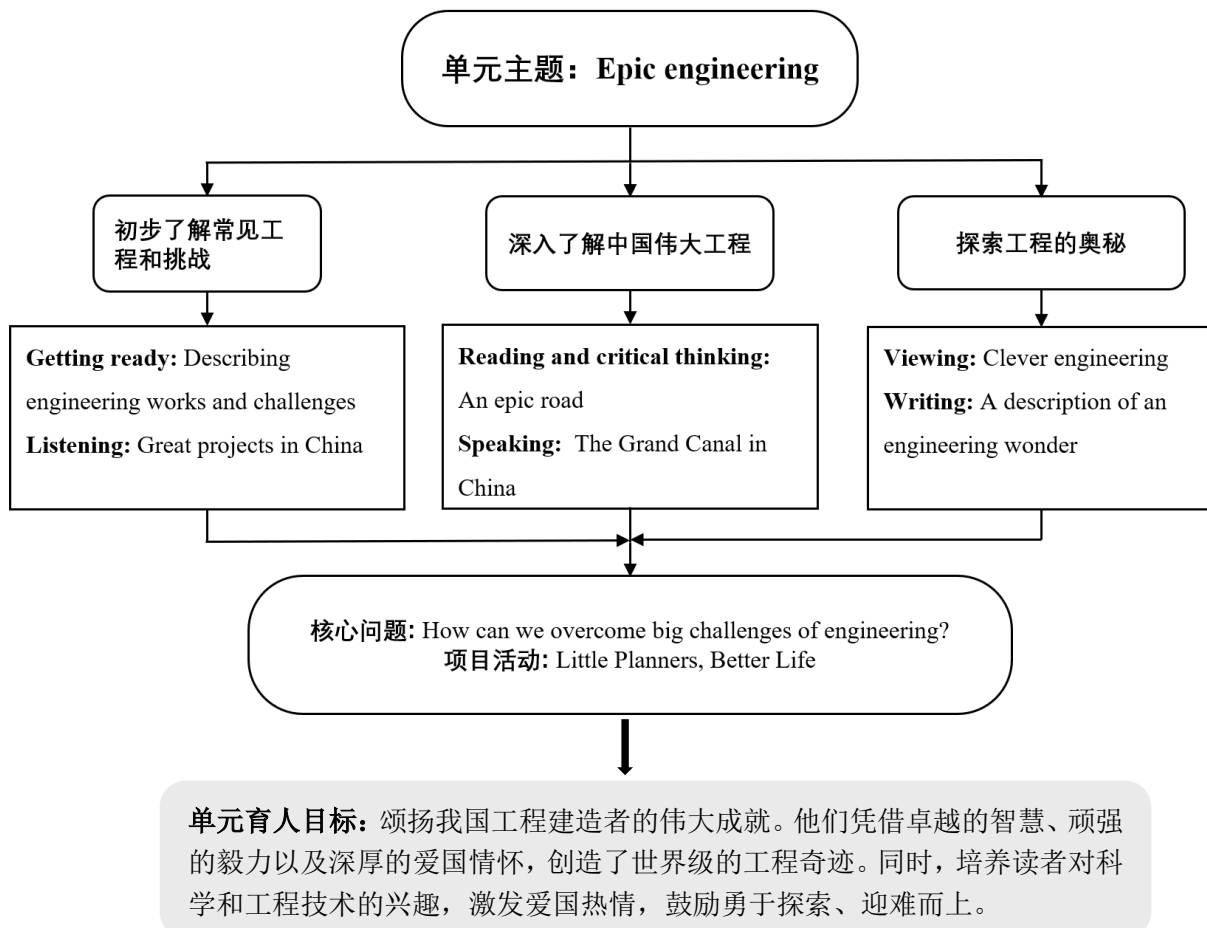


Unit 4 Epic engineering

教材：《义务教育教科书 英语（沪外教版）》七年级下册

授课学校/老师：上海市格致初级中学 毛彬彬

一、 单元内容结构图



二、 单元目标

通过教学帮助学生达成以下目标：

语音	能准确朗读句子，并在语法层面注意重音的使用
词汇	能在语境中正确使用工程话题相关的词汇
语法	能在语境中正确使用 though, although, even though 引导的状语从句
看	能提取细节信息，并进行合理推测
听	能辨析音频的文体，并进行合理推测
说	能口头介绍中国大运河工程
读	能读懂介绍青藏铁路的文章，并运用寻找定义法理解文中的生词
写	能书面介绍都江堰工程，并写出恰当的主题句和支持句，形成提纲
文化	能理解铁路发展史的英文简介
跨学科	能运用科学与工程知识，合理选址常见工程，分析挑战并提出解决方案

三、 单元内容概览


主题	Epic engineering 该主题属于“人与社会”范畴，涉及科学技术与工程，涵盖了“常见的工程与挑战”“中国伟大工程”和“工程的奥秘”等内容。本单元涵盖五个语篇，包括一篇应用文和四篇说明文。各语篇聚焦工程及其建造过程中面临的挑战与解决方案，展现了建造者的智慧与成就。		
语篇	阅读	说明文	探讨建造过山车、水坝、铁路和桥梁的挑战及建造者的智慧应对，激发读者对工程的兴趣和对建造者的敬佩之情。
		说明文	介绍青藏铁路的基本信息及其重要意义，详述建造面临的冻土、生态保护、缺氧三大挑战及应对方案，赞扬建造者的智慧、奋斗精神与爱国情怀。
	听说	广播稿	介绍中国大运河的基本信息及其重要意义，展现古代劳动人民的智慧与合作精神，激发读者的民族自豪感。
		说明文	解释船闸调整水位差实现船舶通航的工作原理。
	写作	说明文	写作范文介绍青藏铁路在建造过程中面临的挑战及解决方案。
语言知识	语音	语法重音	
	词汇	工程话题相关的词汇	
	语法	though, although, even though 引导的状语从句	
文化知识	颂扬我国工程建造者的伟大成就，激发爱国热情与文化自信。		
语言技能与学习策略	阅读	任务：阅读介绍青藏铁路建设工程的说明文 技能与策略：寻找定义法	
	看	任务：观看讲解船闸工作原理的视频 技能与策略：提取细节信息	
	听	任务：听关于中国大运河的广播 技能与策略：辨析文本类型	
	说	任务：口头介绍中国大运河工程 技能与策略：通过提问确认理解准确	
	写作	任务：书面介绍都江堰工程 技能与策略：使用提纲	

四、 单元文化分析

活动维度	活动设计
比较与判断	<p>1. 工程对比分析 (Engineering Comparison)</p> <ul style="list-style-type: none"> 选择一项中国工程（如青藏铁路、大运河、都江堰）与一项外国工程进行对比。重点分析技术难点、解决方案及社会影响等方面的异同。 例如，将青藏铁路与秘鲁安第斯铁路（平均海拔 4,000 米以上）进行对比，突出青藏铁路在生态保护和科技创新（如冻土技术）方面的突破。 又如，将青藏铁路与澳大利亚甘号铁路进行对比，它们同样穿越极端气候带。甘号铁路早期主要服务于畜牧业运输，推动当地畜牧经济发展，而青藏铁路不仅促进区域经济，还承载着促进民族团结的重要使命，推动西藏现代化进程与多民族交流。 以小组为单位制作对比表格或 PPT，进行展示。
调试与沟通	<p>2. 工程师访谈角色扮演 (Engineer Interview Role-play)</p> <ul style="list-style-type: none"> 学生分组，一部分扮演中国工程师，另一部分扮演外国记者。 在角色扮演活动中，鼓励学生用 3 到 5 个句子编写对话。例如，以青藏铁路建设者克服冻土问题的故事为背景，结合课本生词表中的词汇进行交流。活动中，记者用英语提问：What were the main challenges in building the Qinghai-Xizang Railway? 工程师用英语回答，讲述中国工程的创新突破，增强学生对国家科技自主的认同感。 课后反思：如何清晰地表达中国工程领域的卓越成就，彰显民族精神。 <p>3. 文化宣传短片制作 (Culture Promotion Video)</p> <ul style="list-style-type: none"> 以小组为单位，选择大运河、青藏铁路或都江堰等工程，制作 2-3 分钟短片。 介绍工程背景、建设难点及其社会影响，表达对中国工程的自豪感。 视频配英文解说，并在班级或校园活动中展播。
感悟与内化	<p>4. 创意工程设计 (Little Planners, Better Life)</p> <ul style="list-style-type: none"> 选择一个日常生活中的建筑项目（如城市公园、生态园、智能社区）。 结合所学，思考如何解决建设难题，提出可行方案。 讨论如何以实际行动助力国家基础建设。 <p>5. 文化体验日 (Cultural Experience Day)</p> <ul style="list-style-type: none"> 组织“中国工程展览”，通过青藏铁路、大运河、都江堰的模型、海报、VR 体验等形式，让学生直观感受中国工程的辉煌成就。 现场设立“外国游客问答站”，学生用英语向“外国友人”（由教师或同学扮演）介绍古代和现代中国工程。 思考中外工程如何让生活更美好，设计问卷调查“Which project best protects nature?”，通过集体投票激发社会责任意识，体现人类命运共同体理念，并呼应教育部关于培养学生全球领导力的号召。 课后反思：如何更好地向世界讲述中国工程故事？

教学设计

课程基本信息		
课题	Unit 4 Epic engineering Period 1 Reading and critical thinking	
教科书	书 名：义务教育教科书 英语 出版社：上海外语教育出版社	
语篇研读		
<p>本文的语篇类型为介绍类说明文。</p> <p>What: 围绕青藏铁路的建造和面临的挑战展开。详细介绍了建造过程中面临的三大挑战——冻土、动植物保护和缺氧，以及相应的解决方案。尽管面临巨大的挑战，中国建造者凭借智慧和毅力成功建造了这条铁路。青藏铁路沿途风景奇美，被誉为史诗般的天路。</p> <p>Why: 旨在颂扬我国建造者的伟大成就。他们凭借卓越的智慧、顽强的毅力以及深厚的爱国情怀，创造了世界级的工程奇迹。同时，培养读者对科学和工程技术的兴趣，激发爱国热情。</p> <p>How: 采用总—分—总结构。引言概述青藏铁路建设的重要性，引出主题。主体部分由三段组成，首句为中心句，概述面临的挑战，再介绍具体解决方案。结尾总结全文并点题。文章结构紧凑，运用下定义、列数字等说明方法。配图与主题契合，直观展现青藏铁路的特点。</p>		
教学目标		
<p>By the end of the lesson, students are expected to:</p> <ol style="list-style-type: none"> 1. understand key engineering-related vocabulary, such as “railway” and “epic”, and learn the new term “permafrost” by finding its definition. 2. comprehend a passage about the Qinghai–Xizang Railway by scanning for key information, and provide practical travel tips. 3. appreciate the wisdom and hard work of engineers, and cultivate a sense of national pride. 		
<p>Teaching focus:</p> <ol style="list-style-type: none"> 1. Understanding key engineering-related vocabulary such as “railway” and “epic”, and finding the definition of the new term “permafrost” while reading. 2. Scanning for the challenges and solutions in building the Qinghai–Xizang Railway. <p>Learning difficulties:</p> <ol style="list-style-type: none"> 1. Some students may find it difficult to understand why the Qinghai–Xizang Railway is called an “epic road”. 		
教学过程		
Stages	Learning activities	Evaluation
Lead-in	Get to know the structure of the unit, today’s topic, and learn some interesting facts about railways by reading <i>Culture Link</i> .	The teacher observes to check if students have learned some facts about railways.
	Intention: To lead in the topic, spark students’ interest, and prepare them for learning	
Pre-reading	Look at the picture in the passage and predict the main idea of the passage.	The teacher listens and checks if students make reasonable predictions.
	Intention: To guide students to observe the picture carefully and predict the main idea based on it	

While-reading	1. Read the introduction to the passage, check the predictions and answer the questions.	The teacher listens and observes to check if students understand the importance of building the Qinghai–Xizang Railway.											
	Intention: To help students grasp basic information and identify the main idea												
	2. Read the passage, scan for challenges and solutions, and complete the table.	The teacher observes and checks if students can find the key information accurately.											
	Intention: To guide students to understand the passage by scanning for key information.												
	3. Find the definition of “permafrost” and learn the new word “passage”, and share the opinions on building the railway.	The teacher checks if students understand the new words by finding its definition or analyzing the context.											
	Intention: To guide students to understand the new term “permafrost” by finding its definition and appreciate the wisdom and hard work of the engineers												
Post-reading	4. Read the passage and share the understanding of the title.	The teacher and peers offer timely feedback.											
	Intention: To guide students to understand the word “epic” in context and cultivate a sense of national pride												
	Give the teacher tips for a trip on the Qinghai–Xizang Railway based on the text.	The teacher and peers offer timely feedback.											
Summary	Intention: To encourage students to think critically and apply their learning by providing practical travel tips for real-life situations												
	Summarize what is learnt today and conduct a self-assessment using the checklist.	Students conduct a self-assessment and share their reflections in class.											
Assignments	Intention: To encourage students to reflect and prepare for the next lesson												
	<p>Must do: Read the passage again and finish Exercises B3 to B5 on pages 61 to 62.</p> <p>Choose to do: Write at least two more possible challenges and solutions for building a railway station at Site 2.</p> <table border="1" style="width: 100%;"> <thead> <tr> <th colspan="2">Building a railway station at Site 2</th> </tr> <tr> <th>Possible challenges</th> <th>Possible solutions</th> </tr> </thead> <tbody> <tr> <td>To deal with the problem of noise pollution,</td> <td>we can build walls to block the sound.</td> </tr> <tr> <td>To _____,</td> <td>_____.</td> </tr> <tr> <td>To _____,</td> <td>_____.</td> </tr> <tr> <td> </td> <td> </td> </tr> </tbody> </table> 		Building a railway station at Site 2		Possible challenges	Possible solutions	To deal with the problem of noise pollution,	we can build walls to block the sound.	To _____,	_____.	To _____,	_____.	
Building a railway station at Site 2													
Possible challenges	Possible solutions												
To deal with the problem of noise pollution,	we can build walls to block the sound.												
To _____,	_____.												
To _____,	_____.												

学习任务单

课前学习任务

1. Find the engineering works around us.
2. Preview the new words in Getting Ready.

课上学习任务

【学习任务一】

Read the passage, find out the challenges and solutions, and complete the table.

Challenges	Solutions
To solve the problem of permafrost,	1 _____ 2 _____
To 3 _____,	engineers built 25 special passages, like bridges, just for animals.
To solve the problem of 4 _____, _____	5 _____

【学习任务二】

Read the passage and find the definition of “permafrost”.

The biggest challenge was permafrost—a type of frozen ground that remains at or below 0°C for at least two years. Most of the railway is built on it. The ground can break easily if it gets too warm. Though the engineers were not familiar with this problem, they invented ways to solve it. They built walls to block the sun. This could keep the ground colder and stronger. In some places, the railway is built above ground, like long bridges.

【学习任务三】

Read the passage and answer the question.

Why is the Qinghai–Xizang Railway called an “epic road”?

【学习任务四】

Give tips for a trip on the Qinghai–Xizang Railway.

Tips	Reasons
	Low O ₂ levels can make some passengers feel sick.

【学习任务五】

Conduct a self-assessment.

How well I can do these	
A. identify the text type, the topic, challenges and solutions in different texts	😊 😐 😞
B. communicate on engineering works by using words about overcoming challenges and <i>although</i> or <i>though</i>	😊 😐 😞
C. describe an engineering wonder by using an outline with effective topic sentences and supporting details	😊 😐 😞

D. understand the history of railways	😊 😐 😞
E. create tips for a trip on the Qinghai–Xizang Railway by analysing the challenges and possible solutions	😊 😐 😞
F. organise information in the form of tables or mind maps	😊 😐 😞
G. appreciate the wisdom and hard work of engineers, and cultivate a sense of national pride.	😊 😐 😞

推荐的学习资源

1. 《修建青藏铁路（2020）》：五集纪录片，真实记录青藏铁路建设的艰难历程与伟大成就，适合初中生了解历史与工程奇迹。

B Reading and critical thinking

The Qinghai–Xizang Railway connects Xining and Lhasa, the capital cities of Qinghai and Xizang. It ended Xizang’s no-railway history and set a new record for the world’s highest railway. How did engineers deal with the challenges? Let’s find out.



An epic road

The railway itself is a world wonder. Work began in 1958, and it took over 50 years to complete. Although it was a difficult task, Chinese engineers and workers did their best to overcome the challenges.

The biggest challenge was permafrost—a type of frozen ground that remains at or below 0°C for at least two years. Most of the railway is built on it. The ground can break easily if it gets too warm. Though the engineers were not familiar with this problem, they invented ways to solve it. They built walls to block the sun. This could keep the ground colder and stronger. In some places, the railway is built above ground, like long bridges.

Another challenge was to protect

the plants, rivers and animals along the line. The Qinghai–Xizang Railway passes through Kekexili and Qiangtang, places with many wild animals. The engineers built 25 special passages just for animals. Now the animals can cross the railway without danger.

Also, the air in the high mountains is thin, and the oxygen (O₂) level is low. Passengers may feel sick. Engineers designed trains that can give passengers more oxygen.

Although there were epic challenges, Chinese engineers made history. Today, the Qinghai–Xizang Railway travels for 1,956 km across green rivers, along snowy mountains, by blue lakes, and through amazing deserts. It is an epic road.

Comprehension

B1 Tick where you can read the text.

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
magazines	novels	cartoons	dictionaries

B2 Read and find out the challenges and solutions.



Challenges	Solutions
To solve the problem of permafrost,	1 _____ 2 _____
To 3 _____,	engineers built 25 special passages, like bridges, just for animals.
To solve the problem of 4 _____,	5 _____

B3 Answer the questions. Underline the key words in the text that support your answers.

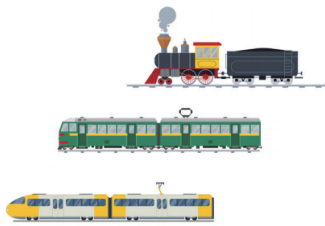
- 1 What is permafrost and why is it a challenge for building railways?
- 2 What can we see when we take the Qinghai–Xizang Railway?
- 3 Why is the Qinghai–Xizang Railway called an “epic road”?



Subskill Finding definitions

Sometimes writers use words that readers may not be familiar with. They will then give definitions or explanations of the new words. The definitions may be shown by quotation marks “ ”, parentheses (), or a dash —. When we find a new word, we should read carefully to see if the writer has explained its meaning.

B Reading and critical thinking



Culture link

The history of railways dates back to the early 19th century. The first public railway, the Stockton and Darlington Railway, opened in England in 1825. This marked the beginning of the railway age. China's first railway was built in 1876, and now China has the largest high-speed rail network in the world. Railways connect cities and even countries. They have greatly developed trade and tourism.

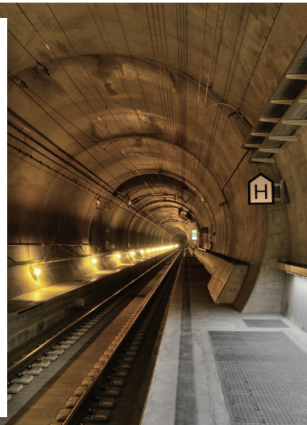
Word work

B4 Choose the correct answers.

- If you *connect* two things, you _____.
a join them together b cut them into pieces
- Engineers* can _____.
a build bridges b write stories
- Building a bridge _____ the wide river is a *challenge* for the engineers.
a over b along
- The hall is full of people. But there is another *passage* to _____.
a go through b read on
- Protect* your eyes from the sun. _____ your sunglasses.
a Put on b Take off

B5 Complete the passage about the Gotthard Base Tunnel with the correct forms of the words from B4.

Do you know what a tunnel is? It is an underground 1 _____ that goes through a hill or under a river. The Gotthard Base Tunnel is the world's longest and deepest tunnel. It 2 _____ Switzerland and Italy. It was a big 3 _____ because it goes through the Alps. The 4 _____ had to find out how to dig through the hard rock safely and 5 _____ the environment. Now the tunnel helps to reduce traffic and keep the mountains beautiful.



Critical thinking

- 1. Recall.** What are some of the challenges that the engineers had to overcome in building the Qinghai–Xizang Railway?
- 2. Evaluate.** Think carefully about the challenges travellers may face when taking the Qinghai–Xizang Railway, such as low O₂ levels, bad weather, and long journey. Find out reasons and possible solutions.

EXAMPLE

Challenge: *Low O₂ levels can make some passengers feel sick.*

Reasons: *The Qinghai–Xizang Railway holds the record for being the highest railway in the world. It goes very high up in the mountains. The air there is thin and the O₂ level is low.*

Possible solutions: *Drink lots of water. Don't jump or run. Take medicine.*

- 3. Create.** Imagine your friend is planning a trip on the Qinghai–Xizang Railway. Write at least three tips for a great trip and explain why each tip is important.



Tips	Reasons
Take some medicine.	Low O ₂ levels can make some passengers feel sick.
Take a camera.	The view is beautiful. The Qinghai–Xizang Railway travels across green rivers, along snowy mountains, by blue lakes, and through amazing deserts.
...	...