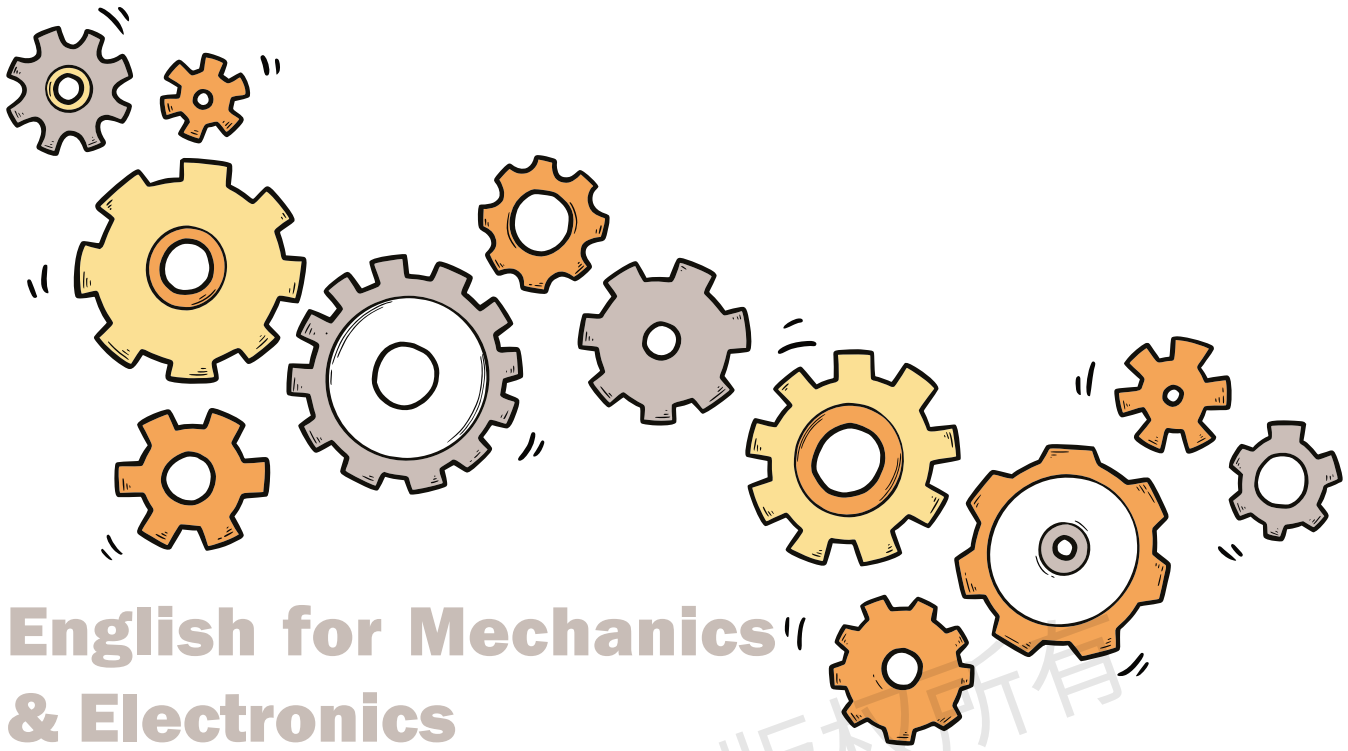

English for Mechanics & Electronics

机电英语

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内 容 简 介

本书涵盖机械制图、机械加工、电气元件、电气设备和机电一体化等内容，由浅入深地将机电技术与英语学习有机结合，系统深入地讲解专业知识，为学生进入机电行业工作奠定基础。

本书具有通用性、职业性、实用性和创新性等特点，内容涉及机械、电工、电子、电气等多个领域的专业基础知识。本书选取的素材与生产实际紧密结合，内容浅显易懂，符合学生认知规律。本书引入机电行业新技术、新应用等相关内容，结合机电类职业岗位需求、技能竞赛和英语学业水平考试要求设计教学内容，并融入思政元素，启智有道，润心无声。

本书可作为职业院校机电类专业的教材，也可供对机电英语感兴趣的读者阅读。

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PREFACE 前 言

随着全球机电行业的迅猛发展，国际间的交流与合作日益频繁，对具备机电行业专业知识且能熟练运用英语进行沟通的复合型人才的需求激增。在职业教育领域，机电类专业学生面临着新的挑战与机遇，需要掌握一定的专业英语知识，以适应未来职场的国际化需求。

一、编写思路

本书立足于机电行业的发展现状，针对职业院校学生的知识结构和学习需求，参考国内职业院校选用的机电英语教材进行编写。本书选取了机电类专业的五大主题，由浅入深地介绍了机械制图的基础规范、机械加工的实践技能、电气元件的功能识读、电气设备的操作维护、机电一体化技术的前沿应用，把机电技术和英语学习有机地结合起来，进行系统且深入的讲解，为学生进入机电行业工作打好基础。

二、编写特色

1. 通用性。本书用英语介绍了机电行业中的专业基础知识，涉及面广，适合机电类专业的职业院校学生使用。

2. 职业性。本书职业特色鲜明，各章紧密结合机电类职业岗位需求设计教学内容，为学生今后的职业生涯奠定坚实的基础。

3. 实用性。本书选取的素材均与机电行业的生产实际紧密结合，如机械制图的基础规范、电气设备的操作步骤、机械加工的基本流程等实用性较强的内容。考虑到机电类专业学生的英语基础，在内容设计上力求浅显易懂、循序渐进，充分激发学生的

学习积极性。每章包括学习目标、热身环节、听力、对话、阅读、写作和实践等模块，全面提升学生的英语听、说、读、写等能力，以及对机电行业专业知识的掌握程度。本书还配有音频、参考答案等资源，可以通过扫描书中的二维码，以及登录华信教育资源网查看和下载。

4. 创新性。本书积极引入机电行业的新技术、新应用，确保内容的时效性与前瞻性。秉持“岗课赛证”融通的先进理念，紧密结合机电类技能竞赛与英语学业水平考试的要求设计教学内容，以赛促学、以证督学，引导学生能够用英语展示机电类技能比赛的操作流程，确保学生所学知识和技能与职场要求对接。同时融入思政元素，提升学生的工匠意识。

三、教学安排

本书聚焦机电行业专业知识，涵盖机械制图、机械加工、电气元件、电气设备和机电一体化等内容，参考总学时为 36 ~ 50 学时，教师可根据实际教学情况灵活安排教学时间。

本书由上海海事大学附属职业技术学校陈力静担任主编，英语正高级讲师、全国模范教师、上海市先进工作者、上海市教书育人楷模谢永业担任主审，上海海事大学附属职业技术学校刘敏、张妍、樊碧雪担任副主编，上海海事大学附属职业技术学校陶莉华、周亮、陆晨晖、蔡震阳参与编写。

由于编者水平有限，书中难免存在不足和疏漏之处，恳请广大读者批评指正。

编　者

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Chapter 1

Mechanical Drawing

Learning Objectives

Upon completion of the chapter, learners should be able to:

- Recognize the terms related to basic solids, machine parts and drawings.
- Elicit the information about views.
- Talk about drawing by hand and computer-aided drawing.
- Describe the differences between detail drawings and assembly drawings.

1 Warming-up

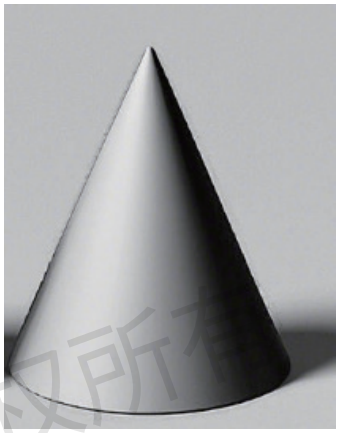
1.1 Look and say

1.2 Look and match

A. torus B. cone C. cube D. cylinder E. prism F. sphere

1. _____

2. _____



3. _____

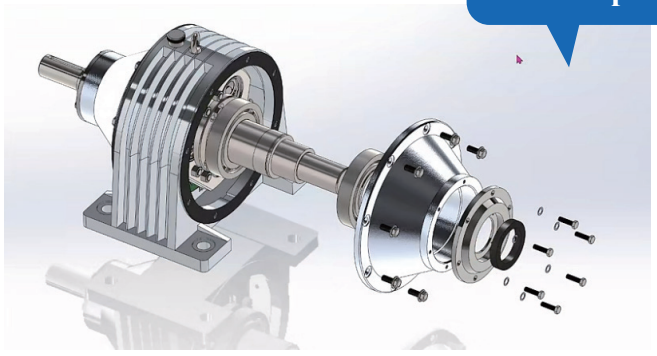
4. _____

5. _____

6. _____

1.3 Observe and say

What basic solids can you find from the picture?



1.4 Analyze and say

screws gears bearings springs nuts

What basic solids can you find from the following machine parts?

Words & Expressions

torus /'tɔːrəs/ *n.* 圆环面；环形圆纹曲面；花托；隆凸

gear /gɪə(r)/ *n.* 齿轮；装置，工具；传动装置；排挡；*v.* 使变速；使调挡；使适合；使准备好

bearing /'beərɪŋ/ *n.* 轴承；关系；方位；举止

spring /sprɪŋ/ *n.* 春天；弹簧；泉水；活力；*v.* 使跳起；使爆炸；突然提出；使弹开；跳跃；涌出

nut /nʌt/ *n.* 坚果；螺母；螺帽；着迷的人，爱好者

basic /'beɪsɪk/ *adj.* 基本的；基础的；*n.* 基础；要素

solid /'sɒlɪd/ *adj.* 固体的；实心的；结实的；可靠的；*n.* 固体；立体图形

parts /pɑːts/ *n.*（part 的复数）部分；零件；角色；部位；*v.*（part 的第三人称单数）分开；使分开；将…… 分成部分；给（头发）分缝

2 Listening

2.1 Listen and choose

(1) Which of the following views shows the object from above? (　　)

A. Front view.　　B. Top view.

C. Side view.　　D. Rear view.

(2) In mechanical drawing, the six projective views are essential for _____. (　　)

A. artistic creation　　B. accurate design and manufacturing

C. simple decoration　　D. random representation

2.2 Listen and decide (T for true or F for false)

(1) The main projective views in mechanical drawing include top view, front view and side view only. (　　)

(2) The front view mainly shows the length and width of the object. (　　)

(3) The bottom view is exactly the same as the top view. (　　)

(4) The side view includes the left side view and the right side view. (　　)

(5) These six projective views are very important in mechanical engineering. (　　)

2.3 Listen and fill

A: Do you know about the six (1)_____ in mechanical drawing?

B: Yeah, the top view, (2)_____, and side view are the main ones. The top view shows the object from above.

A: Right. The front view gives a clear picture of the front face. And the side view helps with understanding the lateral dimensions.

B: Then there is the (3)_____, which is the opposite of the top view.

A: True. And the rear view, which is like the backside of the object.

B: And the left or right (4)_____ depending on what's needed for a more comprehensive understanding.

A: These six projective views together provide a (5)_____ representation of the mechanical part.

B: Exactly, they are essential for accurate design and manufacturing in mechanical engineering.

3 Speaking

3.1 Read aloud in pairs

Drawing by Hand

A: Do you often draw by hand in mechanical drawing?

B: Yeah, sometimes. I find it quite enjoyable.

A: What do you like most about it?

B: I like the freedom to sketch and make changes easily as I go.

A: True. But isn't it harder to be super accurate compared to using software?

B: Well, it takes more practice.

A: Indeed. What is the first step when you start a hand-drawn mechanical drawing?

B: I usually start with a rough outline of the shape.

A: Oh, right. And then what?

B: Then I add in the details and dimensions bit by bit.

A: Do you use any special pencils or tools?

B: Just a regular mechanical pencil and a ruler mostly.

A: That is simple yet effective. Manual drawing in mechanical drawing has its own unique appeal.

B: Definitely. Manual drawing still matters a lot to a draftsperson.

3.2 Read aloud again and underline sentences talking about the advantages and steps of drawing by hand

Drawing by Hand

A: Do you often draw by hand in mechanical drawing?

B: Yeah, sometimes. I find it quite enjoyable.

A: What do you like most about it?

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A: True. But isn't it harder to be super accurate compared to using software?

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A: Do you use any special pencils or tools?

B: Just a regular mechanical pencil and a ruler mostly.

A: That is simple yet effective. Manual drawing in mechanical drawing has its own unique appeal.

B: Definitely. Manual drawing still matters a lot to a draftsperson.

3.3 Read the following material and try to make a conversation to talk about the advantages and steps of computer-aided drawing

Computer-aided Drawing (CAD)

A: Have you used CAD for mechanical drawing?

B: Yes, I have. It is extremely useful.

A: What do you like about it?

B: It's so precise and efficient. You can make changes easily.

A: True. And it can create really complex designs.

B: Right. Plus, it's great for sharing files with others.

A: Do you think it's better than manual drawing?

B: Well, it depends. CAD is great for accuracy, but manual drawing has its charm.

A: Yeah, I agree. What's your favorite feature of CAD?

B: The ability to rotate and view the design from different angles.

A: That's really helpful. It makes it easier to understand the design.

A: Do you think CAD will replace manual drawing completely?

B: No way. Manual drawing is still important for quick sketches and ideas.

A: Agreed. They both have their place in mechanical drawing.

B: Definitely. Each one has its own advantages.

Words & Expressions

view /vjuː/ *n.* 观点；视野；风景；看法；*v.* 看待；查看；观看

bottom /'bɑːtəm/ *n.* 底部；末端；臀部；*adj.* 底部的；*v.* 到达底部；建立基础

rear /rɪr/ *n.* 后面；后方部队；屁股；*adj.* 后方的；后面的；*v.* 饲养；养育；举起；树立

projection /prə'dʒekʃn/ *n.* 投影；投射；预测；凸出物

projective /prə'dʒektɪv/ *adj.* 投影的；投射的

object /'ɑːbdʒekt/（作名词）/ əb'dʒekt/（作动词） *n.* 物体；目标；对象；宾语；*v.* 反对；提出……作为反对的理由

mechanical /mɪ'kænɪkl/ *adj.* 机械的；力学的；呆板的；无意识的；手工操作的

artistic /ɑːr'tɪstɪk/ *adj.* 艺术的；有美感的；风雅的；艺术家的

accurate /'ækjərət/ *adj.* 精确的，准确的；正确无误的

manufacturing /ˌmænju'fæktʃərɪŋ/ *n.* 制造业；*adj.* 制造的；制造业的

representation /ˌreprɪzen'teɪʃn/ *n.* 代表；表现；表示法；陈述

lateral /'lætərəl/ *adj.* 侧面的；横向的；旁系的；*n.* 侧部；支线

dimension /dɪ'menʃn/ *n.* 方面；尺寸；次元；容积；*v.* 标尺寸；定规格；在……上标尺寸

comprehensive /ˌkɑːmprɪ'hensɪv/ *adj.* 综合的；广泛的；有理解力的；*n.* 综合学校；专业综合测验

sketch /sketʃ/ *n.* 素描；草图；梗概；*v.* 画素描或速写；草拟；概述

software /'sɔːftwer/ *n.* 软件

appeal /ə'piːl/ *n.* 呼吁；恳求；上诉；吸引力；*v.* 呼吁；恳求；上诉；有吸引力

draftsperson /'dræftspɜːrsn/ *n.* 绘图员；制图员

efficient /ɪ'fɪʃnt/ *adj.* 有效率的；有能力的；生效的

complex /'kɑːmpleks/（作名词和部分形容词）/kəm'pleks/（作形容词，表复杂）*adj.* 复杂的；合成的；*n.* 复合体；综合设施；情结

file /faɪl/ *n.* 文件；档案；文件夹；锉刀；*v.* 提出；把……归档；用锉刀锉；列队行进

charm /tʃɑːrm/ *n.* 魅力；吸引力；魔力；*v.* 使陶醉；吸引

angle /'æŋgl/ *n.* 角度；角；观点；*v.* 斜移；使带角度；钓鱼；谋取

rotate /'roʊteɪt/ *v.* 旋转；使旋转；轮流；循环

replace /rɪ'pleɪs/ *v.* 取代；代替；替换；把……放回原处

4 Reading

Detail Drawings and Assembly Drawings

Detail drawings and assembly drawings are essential components in the field of engineering and manufacturing.

Detail drawings provide in-depth and precise information about a single part or component. They show all the necessary dimensions, tolerances, surface finishes, and other specific details. These drawings act as a comprehensive guide for machinists, fabricators, and other workers involved in the manufacturing process. For example, in the production of mechanical gear, the detail drawing would specify the exact diameter, tooth profile, and shaft size.

Assembly drawings, on the other hand, focus on how distinct parts come together to form a complete assembly or product. They show the relative positions, orientations, and connections between various components. Assembly drawings often include exploded views, which provide a clear visual of how each part fits into the whole. In the case of an automobile

engine, the assembly drawing would show how the pistons, cylinders, crankshaft, and other components are assembled to work in harmony.

Both detail drawings and assembly drawings are integral to the successful design, production, and maintenance of mechanical and engineering products. They communicate the necessary information to different teams involved in the project.

4.1 Read and choose

(1) What do detail drawings provide information about? ( )

A. A complete assembly. B. A single part or component.

C. Different teams in a project. D. Exploded views.

(2) What do assembly drawings often include? ( )

A. Specific details of a single part.

B. Exploded views.

C. Only dimensions of components.

D. Information only for machinists.

(3) Who will refer to detail drawings in their work? ( )

A. Designers only.

B. Managers.

C. Machinists, fabricators, and other manufacturing workers.

D. Salespeople.

4.2 Read and decide (T for true or F for false)

(1) Detail drawings and assembly drawings are important in engineering and manufacturing. ( )

(2) Detail drawings only show the dimensions of a part. ( )

(3) Assembly drawings focus on a single part. ( )

(4) Exploded views are only found in detail drawings. ( )

(5) Both detail drawings and assembly drawings communicate information to different teams. ( )

4.3 Read and complete

Compare and contrast the information provided in detail drawings and assembly drawings in terms of their focus and the audience they serve.

Detail drawings focus on a (1)_____ part, providing in-depth information such as dimensions, tolerances, and surface finishes. They are mainly used by (2) _____ directly involved in manufacturing individual components. Assembly drawings, however, focus on how (3) _____ parts come together to form a complete product. They show the (4) _____ positions, orientations, and connections, and often include (5) _____ views. They are more useful for assemblers, engineers overseeing the overall product assembly, and maintenance teams. The former is part-specific, while the latter is about the whole product's assembly.

Words & Expressions

assembly /ə'sembli/ *n.* 装配；集会；集合；议会

component /kəm'poʊnənt/ *n.* 组成部分；成分；组件；*adj.* 组成的；构成的

tolerance /'tɑːlərəns/ *n.* 公差；宽容；容忍；忍耐

finish /'fɪnɪʃ/ *v.* 完成；结束；磨光；*n.* 结尾；结束；饰面

machinist /mə'ʃiːnɪst/ *n.* 机械师；机工；机械安装修理工

fabricator /'fæbrɪkeɪtər/ *n.* 制造者；加工厂；造假者

diameter /daɪ'æmɪtər/ *n.* 直径

tooth profile /tuːθ 'proʊfaɪl/ *n.* 齿形；齿廓

shaft /ʃæft/ *n.* 轴；杆；柄；矛

orientation /ˌɔːriən'teɪʃn/ *n.* 方向；定向；定位；适应

exploded /ɪk'sploʊdɪd/ *adj.* 爆炸了的；分解的

automobile /'ɔːtəməbiːl/ *n.* 汽车

engine /'endʒɪn/ *n.* 发动机；引擎；机车；火车头

piston /'pɪstən/ *n.* 活塞

crankshaft /'kræŋkʃæft/ *n.* 曲轴；机轴

integral /'ɪntɪgrəl/ *adj.* 不可或缺的；重要的；整体的；*n.* 积分；完整

communicate /kə'mjuːnɪkeɪt/ *v.* 交流；沟通；传达；传染

5 Writing

5.1 Read and write

(1) A three-dimensional geometric shape with six square faces.（一种有六个正方形面的三维几何形状）_____

(2) A solid geometric figure that is shaped like a ball.（一种形状像球的立体几何图形）_____

(3) A mechanical part often used with bolts to fasten things together.（一种常与螺栓一起用于将东西固定在一起的机械零件）_____

(4) A type of prism where the bases are circular.（一种底面是圆形的棱柱）_____

(5) A geometric shape that has a circular base and a pointed top.（一种有圆形底面和尖顶的几何形状）_____

(6) A mechanical component that is often used to transmit motion or power between rotating shafts.（一种常用于在旋转轴之间传递运动或动力的机械部件）_____

(7) A three-dimensional shape that looks like a donut（甜甜圈）.（一种类似甜甜圈的三维形状）_____

(8) A mechanical part that provides support and reduces friction in a rotating system.（一种在旋转系统中提供支撑并减少摩擦的机械部件）_____

(9) A coiled mechanical device that can store and release energy.（一种能储存和释放能量的螺旋状机械装置）_____

(10) A small, threaded metal object used to join things together.（一种用于将东西连接在一起的小型带螺纹的金属物体）_____

(11) A type of geometric solid with flat faces and straight edges.（一种具有平面和直边的几何立体类型）_____

(12) A mechanical part that is often circular and rotates around an axis.（一种通常是圆形并绕轴旋转的机械部件）_____

5.2 Read and fill

Part A: Basic Vocabulary (基础词汇)

(1) The front view of an object is also known as the _____ view.

(2) The view that shows the object from above is called the _____ view.

(3) When we look at the object from the left side, we get the _____ view.

(4) The view seen from the right side of the object is the _____ view.

(5) Looking at the object from underneath gives us the _____ view.

(6) The view that shows the back of the object is the _____ view.

Part B: Describing Views (描述视图)

(1) In the top view, we can see the layout of the object's _____ (top /bottom) surface.

(2) The left view helps us understand the object's _____ (left /right) side profile.

(3) When looking at the right view, we focus on the object's _____ (left /right) side details.

(4) The bottom view reveals the shape and details of the object's _____ (top / bottom) part.

(5) The rear view provides information about the object's _____ (front/back) side that is not visible from other views.

5.3 Read and complete

There are two more options.

computer-aided drawing; draw up; assembly drawing; principal views; consist of; drawing by hand; views, sections and cuts; detail drawing; basic solid; stand for

In mechanical design, the process of creating technical drawings is of immense importance. Technical drawings usually (1)_____ different elements to accurately represent an object or a mechanical part. For example, an (2)_____ is a type of drawing that shows how different parts are put together. It often contains multiple (3)_____ such as front view, top view, and side view, which are also known as (4)_____.

When we talk about the detailed representation of a specific part, we use a (5)_____. This kind of drawing provides in-depth information about the part's shape, size, and other details. And for creating these drawings, sometimes we rely on advanced software like (6)_____ (CAD for short), which helps designers to create and modify drawings more efficiently.

Before finalizing a drawing, designers may need to (7)_____ a draft first. They consider numerous factors and make adjustments according to the actual requirements. During this process, they need to show different forms of the object, including (8)_____, to present a comprehensive understanding of the object's structure.

Words & Expressions

geometric /ˌdʒiːəˈmetrɪk/ *adj.* 几何的；几何学的

motion /ˈmoʊʃn/ *n.* 运动；移动；动作；提议；*v.* 示意；打手势

friction /ˈfrɪkʃn/ *n.* 摩擦；摩擦力；不和；争执

underneath /ˌʌndərˈniːθ/ prep. 在……下面；adv. 在下面；在底下；*n.* 下部；底部

layout /ˈleɪaʊt/ *n.* 布局；布置；设计；安排；版面编排

focus on /ˈfoʊkəs ɑːn/ 关注；聚焦于

section /ˈsekʃn/ *n.* 部分；部门；章节；截面；*v.* 把……切成片；把……分成部分

cut /kʌt/ *v.* 切；割；砍；削减；*n.* 伤口；切口；削减

element /ˈelɪmənt/ *n.* 要素；基本部分；元素；成分

multiple /ˈmʌltɪpl/ *adj.* 数量多的；多种多样的；*n.* 倍数

modify /ˈmɑːdɪfaɪ/ *v.* 修改；更改；修饰；调整

finalize /ˈfaɪnəlaɪz/ *v.* 敲定；最终确定

present /ˈpreznt/（作名词、形容词）/prɪˈzent/（作动词）*adj.* 现存的；当前的；出席的；*n.* 礼物；现在；*v.* 呈现；赠送；提出；展示

draft /dræft/ *n.* 草稿；草案；草图；*v.* 起草；草拟；选派

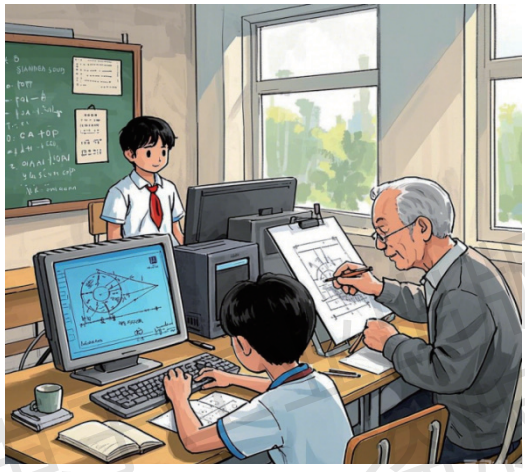
numerous /ˈnuːmərəs/ *adj.* 众多的；许多的

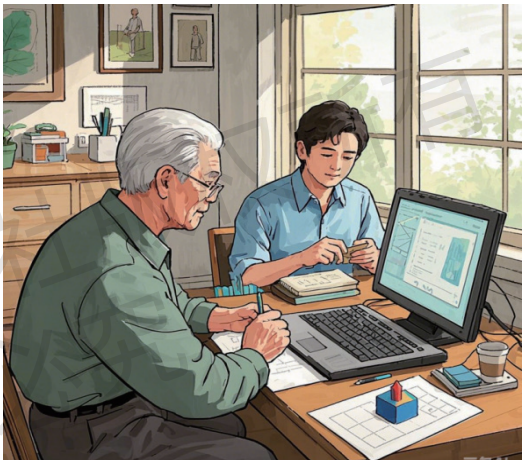
structure /ˈstrʌktʃər/ *n.* 结构；构造；建筑物；*v.* 构造；组织；安排

6 Practice

Talk about the following scenarios in several sentences by using the sentence patterns given.

情景描述：中学时，我在学校学习机械制图。有时，我会与老师共绘一张图，老师选择手工绘图，而我尝试计算机辅助绘图。多年后，我也成为了一名机械绘图师，经常和退休的老师共同探讨手工绘图和计算机辅助绘图的优缺点，以及我们的心得体会。





You may use:

- CAD is great for ...
- I find it ...
- One of my favorite features of ... is ...
- Drawing by hand is still important for ...
- Each one has its own advantages.

You may also use in your personal touch:

- Practice makes perfect.
- The more ..., the ...
- It usually takes ... hours/days to ... a drawing.
- ...need to focus on ...
- It's also important for ... to be careful/persistent.