



# UNIT 4

## 单元流程说明

1. 本单元结合计算机辅助制造，围绕机电行业流程的第四个工作环节“机电产品生产”设计典型工作任务、工作场景；
2. **计算机辅助制造基础知识**：通过对计算机辅助制造（CAM）在生产过程中四个主要方面的应用：数字控制、工艺设计、机器人技术和工厂管理（Reading A）进行简单介绍，使学生对相关知识与表述有基本的了解；
3. **带领客户参观生产与技术讨论**：从实习生约见工程师开始，了解公司生产流程或请求帮助，到工作人员接待来访客户，客户参观公司生产线，最后共同讨论 CAM 技术（Listening & Speaking），以两条线构成完整的过程；
4. **塑料成型工艺**：介绍注塑成型、吹塑成型、压缩成型和滚塑成型这几种主要的塑料成型工艺（Reading B）；
5. **实习报告**：实习生通过在工厂的实习体验完成实习报告，介绍所了解的 CAM 技术，并填写产品生产报告书（Writing）。

## Warming-up

*Time:* 10 minutes

### Task 1

#### Key

Electrical bicycle, boiler, roller coaster, crane and revolving door are electromechanical products.

#### Note:

机电设备一般是指有电力控制的大型生产设备，例如：车床、铣床、空压机、包装机、凝冻机、煤矿上的钻煤平台、注塑机等。机电产品的种类多、范围广。在外经贸部机电产品进出口司编制的《机电产品进出口统计工作手册（一九九九年版）》中，列出了“机电产品的目录”，明确了机电产品的范围。

机电类设备：包括锅炉、压力容器（含气瓶）、压力管道、电梯、起重机、客运索道、大型游乐设施、场（厂）内机动车辆等八个种类。其中锅炉、压力容器（含气瓶）、压力管道为承压类特种设备；电梯、起重机械、客运索道、大型游乐设施、场（厂）内机动车辆为机电类特种设备。

### Task 2

#### Key

1. e      2. b      3. a      4. d      5. c



# Reading A

## Background Information

### 1. Computer-aided Manufacturing (CAM)

CAM is the use of computer-based software tools that assist engineers and machinists in manufacturing or prototyping product components. CAM makes it possible to manufacture physical models using CAD programs. CAM creates real life versions of components designed within a software package. CAM was first used in 1971 for car body design and tooling.

### 2. Numerical Control (NC)

NC refers to the automation of machine tools that are operated by abstractly programmed commands encoded on a storage medium, as opposed to manually controlled via hand wheels or levers, or mechanically automated via cams alone.

数控技术是指用数字、文字和符号组成的数字指令实现一台或多台机械设备动作控制的技术。它所控制的通常是位置、角度、速度等机械量和与机械能量流向有关的开关量。现在，数控技术也叫计算机数控技术，目前它是采用计算机实现数字程序控制的技术。

### 3. Group Technology (GT)

GT is a manufacturing philosophy in which the parts having similarities (Geometry, manufacturing process and/or function) are grouped together to achieve higher level of integration between the design and manufacturing functions of a firm. The aim is to reduce work-in-progress and improve delivery performance by reducing lead times.

成组技术是组织多品种、中小批量生产的一种科学方法。它将企业生产的各种品种、组成产品的各种部件、零件，按结构和工艺上相似性原则进行分类编组，并以“组”为对象组织技术工作和管理生产。它研究如何识别和发展生产活动中有关事务的相似性，对其进行充分利用。即把相似的问题归类成组，寻求解决这一组问题相对统一的最优方案，以取得所期望的经济效益。成组技术应用与机械加工方面，乃是将多种零件按其工艺的相似性分类成组以形成零件族，把同一零件族中零件分散的小生产量汇集成较大的成组生产量，从而使小批量生产获得接近于大批量生产的经济效果。

## Task 1

### Objectives:

- ▶ Ss know the expressions about CAM.
- ▶ Ss know about the application of robots in industrial automation.

**Time:** 10 minutes

### Steps:

- ▶ Ss work in pairs or small groups. Teacher circulates in the classroom to offer help if necessary. Write any useful vocabulary on the board.
- ▶ When Ss have finished discussing, get one or two groups to present what they've discussed.

### Suggested Answers

1. (Open)
2. Robots are widely used in a variety of industrial fields.

#### In construction

Construction robots aim to improve the efficiency of work at construction sites. With proper planning and development, robots are used in the applications like inner pipe crawling, excavation, load transport, mining and submersion, bricklaying, earth work, pavement work and many others. Generally, where there are dangerous conditions or accessibility and/or space limitations, robots will be used.

#### In the automobile industry

In the automobile industry, robotic arms are used in diverse manufacturing processes including assembly, spot welding, arc welding, machine tending, part transfer, laser processing, cutting, grinding, polishing, testing, painting and dispensing. Robots have proved to help automakers to be more agile, flexible and to reduce production lead times.

## Translation

### 计算机辅助制造

计算机辅助制造 (CAM) 可定义为通过直接或间接与厂家生产资源相连接的计算机系统来规划、管理和控制工厂的运作。

CAM 的功能主要集中在四个方面：数字控制、工艺设计、机器人技术和工厂管理。

**数字控制：**数控就是使用编码信息来控制加工机器的运动。在现代计算机数控系统中，运用 CAM 程序，连接组件设计被高度自动化。这些程序生成一个计算机文件，该文件是用来解释控制机器工作所需要的指令，并且载入 CNC 机器中进行生产。

**工艺设计：**工艺设计是指从开始到结束的详细生产步骤，它基本描述了各车间的生产运作状况。用计算机辅助工艺设计是较为先进的技术，它使所谓的成组技术获得了新的发展。成组技术的基础就是把所有类似的部分归类，使制造步骤标准化。

目前工艺设计系统还处于发展阶段，但它

可以在几乎无需人工参与的情况下从几何模具数据库中直接设计出工艺流程。在该系统中，工艺设计师可以通过交流来复核设计工程师的设计，然后把结果输入 CAM 系统，该系统将自动生成一整套工艺流程设计。

**机器人技术：**把机器人技术融入 CAM 技术正在取得不断的发展。美国空军集成计算机辅助制造项目就是其中之一，其目的就是在计算机自动化的环境下组织每个生产步骤。作为此项目的一部分，机器人被用来给飞机钣金部件钻孔。机器人钻出公差为 0.005 的一组钻孔，然后对 250 种部件中的任何一种的边缘进行加工处理，生产率比传统的人工操作提高了 4 倍。

**工厂管理：**该功能结合其他功能一起协调整个工厂的运作。该管理系统在很大程度上依赖于成组技术，计算机还执行各种管理任务，如库存控制和物资需求计划系统。

### Task 2

**Objective:** Ss understand the technical terms in the passage.

**Time:** 8 minutes

#### Steps:

- ▶ Ss work in pairs.
- ▶ Check the answers with the whole class by getting individual Ss to read their answers aloud.

#### Key

Chinese	English
计算机辅助制造	computer-aided manufacturing
计算机接口	computer interface
几何模型	geometric model
成组技术	group technology
金属薄片	sheet metal
生产率	production rate
数据库	database
人工生产	manual fabrication
存货管制（或盘仓）	inventory control

### Task 3

**Objective:** Ss can scan a passage to find supporting details for a point of information.

**Time:** 7 minutes

#### Steps:

- ▶ Ss do this exercise alone and then compare the answers with a partner.
- ▶ Check the answers with the whole class.

#### Key

1. Numerical control → f. use coded information to control machine tool movements
2. Process Planning → a. generate a complete set of process plans automatically  
→ d. organize all similar parts into families  
→ e. is involved with the detailed sequence of production steps from start to finish  
→ g. produce process plans directly
3. Robotics → b. integrate robotics into CAM
4. Factory Management → c. tie together the other areas to coordinate operations of an entire factory

### Task 4

**Objective:** Ss extend the topic on the basis of their understanding of the main functions of CAM.

**Time:** 10 minutes

#### Suggested Answers

##### Application:

CAM allows data from CAD software to be converted directly into a set of manufacturing instructions. CAM functions center around four main areas: numerical control, process planning, robotics, and factory management. CAM allows work instructions and procedures to be communicated directly to the manufacturing machines. A CAM system controls manufacturing operations performed by industrial tools. It moves the raw material to different machines within the system by allowing systematic completion of each step. Finished products can also be moved within the system to complete other manufacturing operations such as packaging, synthesizing and making final checks and changes.

##### Benefits:

Workers will become tired and make mistakes if they work long. The machines available to perform manufacturing functions do not get tired. Because of this, the likelihood of mistakes being made is greatly decreased.

In conjunction with CAD, CAM enables manufacturers to reduce the costs of producing goods by minimizing the involvement of human operators. By removing the need to translate CAD models into manufacturing instructions through paper drafts it enables manufactures to make quick alterations to the product design, feeding updated instructions to the machine tools and seeing instant results.

CAM removes the need for skilled and unskilled factory workers. All of these developments result in lower operational costs, lower end product prices and increased profits for manufacturers.



# Listening

**Task 1**

**Objective:** Ss can accurately match the people with the correct information.

**Time:** 5 minutes

**Script**

**Jessica:** Hello! This is Jessica, an intern. May I speak to Mr. Andrew Johnson, please?

**Andrew:** Yes, speaking.

**Jessica:** Well... Mr. Johnson, I have some questions about CAM system to consult you. Could we meet and have lunch together at the Atlas some time next week?

**Andrew:** That sounds nice. When exactly?

**Jessica:** Well, how about Tuesday?

**Andrew:** I'm afraid I can't make it. I've got to go to Head Office.

**Jessica:** Hmm... Then, is Thursday right for you?

**Andrew:** Yeah, that would be fine. What time?

**Jessica:** Shall we say 12:30?

**Andrew:** Good. 12:30, next Thursday, the Atlas. I'll look forward to it.

**Key**

Jessica → a student practicing in workshop  
 → has some questions about CAM system  
 → will have lunch at the Atlas

Andrew Johnson → can't keep appointment on Tuesday  
 → will go to Head Office  
 → will have lunch at the Atlas

**Task 2**

**Objective:** Ss can catch the main points in the phone conversation.

**Time:** 10 minutes

**Script**

**Jessica:** Hello, this is Jessica.

**Andrew:** Good morning! This is Andrew Johnson speaking. I'm calling about the appointment with you. Something's just come up. An American company wants to import some products from China. The representative will come to our company this Thursday.

**Jessica:** Well... when do you think it's convenient for us to meet?

**Andrew:** I'm fully occupied the whole week except Friday afternoon. Would that be too late?

**Jessica:** No, that'll be fine. When exactly?

**Andrew:** Well, I'll be free from 2:00. Is that convenient for you?

**Jessica:** Yes, quite all right. Can you confirm it now?

**Andrew:** All right. Two o'clock on Friday afternoon.

**Jessica:** I'm going to your office on time. Thank you very much. See you then.

**Andrew:** Bye, Jessica.

**Key**

- ( ) Ensuring the appointment time.
- (√) Changing the appointment time.
- (√) Reason of changing the time.
- ( ) Not available the whole week.
- (√) Free in Friday afternoon.
- (√) Another appointment time.
- (√) The appointment place.

**Task 3**

**Objective:** Ss can accurately write down the missing information.

**Time:** 10 minutes

**Script**

**Andrew:** Now this is the assembly line that produces the machine tools, Mr. Clive.

**Mr. Clive:** I've been very impressed by what I've seen. I know the factory is operating at full capacity.

**Andrew:** Yes, we've received plenty of orders, both for home needs and for export. As you know, we supply machine tools of all types and sizes.

**Mr. Clive:** Is any work done by subcontractors?

**Andrew:** No, we are fully self-sufficient. We have laboratories, quality control department and packing department all here.

**Mr. Clive:** Have you been producing this new model for a long time?

**Andrew:** Yes, we've introduced new technology and started a new model last year. Our designers always keep up with the development of technology.

**Mr. Clive:** Is the staff of engineers big?

**Andrew:** Totally we have about two hundred engineers.

**Mr. Clive:** How do you ensure quality control?

**Andrew:** Well, it's done by the Quality Control Department. Our quality control engineers ensure that all equipment manufactured is thoroughly inspected and meets in full the requirements of the orders technically.

**Mr. Clive:** Do you also check the packing?





**Andrew:** Yes, but we've recently started to use packing companies too. Well, is there anything else you'd like to see?

**Mr. Clive:** No, thanks.

**Andrew:** OK. Let's go to my office for a cup of tea.

**Key**

- |             |              |                |
|-------------|--------------|----------------|
| 1. assembly | 2. operating | 3. home        |
| 4. supply   | 5. packing   | 6. development |
| 7. staff    | 8. meets     | 9. check       |
| 10. tea     |              |                |

**Task 4**

**Objective:** Ss can catch the important information of a conversation.

**Time:** 10 minutes

**Script**

**Andrew:** Mr. Clive, what would you like, green tea or black tea?

**Mr. Clive:** Green tea, please.

**Andrew:** Here you are. According to our two-day schedule for you, we're going to watch the Peking Opera *Monkey King* tonight.

**Mr. Clive:** Great. My friend told me that Peking Opera is a must if you really want to know about China. It's quite different from Western operas. Also, I have learned *Monkey King* is one of the best-known Chinese novels.

**Andrew:** Oh, Mr. Clive, you really know much about Chinese culture.

**Mr. Clive:** Ha-ha, Chinese culture attracts people all over the world. But can we foreigners understand the opera?

**Andrew:** Don't worry. I will introduce the story to you before the show and explain it while we're watching.

**Mr. Clive:** Mr. Johnson, it's very kind of you. I feel more confident of your company and I think we will have a nice cooperation.

**Andrew:** We expect it.

**Keys**

1. T    2. F    3. F    4. T    5. T

**Task 5**

**Objective:** Ss can record the information completely.

**Time:** 15 minutes

**Script**

**Jessica:** Mr. Johnson, I learned that CAD and CAM are widely applied in mold design and mold making. Can you tell me something more about them?

**Andrew:** Sure. CAD is the use of computer technology

for the design of objects. And CAM is a system of using computer technology to assist the manufacturing process.

**Jessica:** Then how are these two systems related?

**Andrew:** CAM is commonly linked to CAD systems. The integrated CAD/CAM system takes the computer design and puts it directly into the manufacturing system; the design is then turned into many computer-controlled processes, such as drilling.

**Jessica:** CAM is one of the most dramatic changes in the manufacturing process since the Industrial Revolution, isn't it?

**Andrew:** Exactly.

**Jessica:** And I also knew there are four main areas of CAM. But I don't remember what they are exactly.

**Andrew:** You mean numerical control, process planning, robotics, and factory management?

**Jessica:** Yes, that's right! Could you please tell me more about them?

**Andrew:** Definitely! All these systems are concerned with a highly automated factory. Because each of the manufacturing processes in a CAM system is computer controlled, a high degree of precision can be achieved, which is impossible with manual manufacturing.

**Jessica:** So CAM can raise the production rates?

**Andrew:** Yes. It allows a company to get the best from workers by increasing their productivity. It also has many other advantages.

**Jessica:** For example?

**Andrew:** CAM allows the process planner to receive the impact from the design engineer via communication. It helps coordinate operations of an entire factory.

**Jessica:** That sounds great! Thank you so much, Mr. Johnson. I learned a lot today.

**Key**

1. CAD is the use of computer technology for the design of objects.
2. The integrated CAD/CAM system takes the computer design, and puts it directly into the manufacturing system; the design is then turned into many computer-controlled processes.
3. It highly automates a factory.
4. Computer.
5. CAM raises the production rates; allows a company to get the best from workers by increasing their productivity; makes the process planner receive the impact from the design engineer via communication; helps coordinate operations of an entire factory.



# Speaking

**Task 1****Objective:** Ss learn how to make an invitation.**Time:** 10 minutes**Steps:**

- ▶ Ss read the sample of Speaking Task 1.
- ▶ Ss choose the roles.
- ▶ Ss make up a short conversation.
- ▶ Ss role-play the short conversation.

**Sample 1****A:** Production Department.**B:** This is Mike. Could I speak to Mr. King?**A:** Oh, hello, Mike. Nice to hear you.**B:** I'm calling to invite you to join in our discussion about the production plan. Would you come?**A:** Sure.**B:** When are you coming then? Could you manage this afternoon?**A:** No problem. Where will we meet?**B:** In the meeting room. Is that OK?**A:** OK. See you then.**B:** Bye.**B:** I'm calling to invite you to have dinner with me. Would you come?**A:** Sure.**B:** Is 6:30 pm convenient for you?**A:** All right.**B:** I will pick you up at 6 pm.**A:** OK. Thank you. See you then.**B:** Bye.**Task 2****Objective:** Ss learn how to deal with friends' breaking an appointment.**Time:** 10 minutes**Steps:**

- ▶ Ss read the given useful expressions.
- ▶ Ss choose the roles.
- ▶ Ss make up a conversation.
- ▶ Ss role-play the conversation.

**Sample****Bob:** Mr. Brown, I have a hard time getting through to you. I rang you several times but there was no answer.**Mr. Brown:** Sorry, Bob, I was listening to the lecture in the 9th Meeting Room this morning. I left my cell phone in the office. What's up?**Bob:** You ask me? Did you forget our appointment?**Mr. Brown:** Appointment?**Bob:** Yes. You stood me up. Wouldn't you come to help me with the NC machine tool?**Mr. Brown:** Oh, my God! It was completely out of my mind. I saw the notice yesterday afternoon and attended the lecture this morning. Oh, Sorry...**Bob:** I was waiting for you from 8:00 to 12:00, but you didn't show up.**Mr. Brown:** I'm awfully sorry, Bob. I'm coming and I'll treat you to dinner. How about it?**Bob:** Really? I'd like Beijing Roast Duck.**Mr. Brown:** No problem.**Sample 2****A:** Marketing Department.**B:** This is Wang Ning. Could I speak to Mr. Black?**A:** Oh, hello, Wang Ning. Nice to hear you.**B:** I'm calling to invite you to join in our discussion about the marketing plan. Would you come?**A:** Sure.**B:** When are you coming then? Could you manage this afternoon?**A:** No problem. Where will we meet?**B:** In Mr. Black's office. Is that OK?**A:** OK. See you then.**B:** Bye.**Sample 3****A:** ABC Company.**B:** This is Jane. Could I speak to Mr. Jones?**A:** Oh, hello, Jane. Nice to hear you.



### Task 3

**Objective:** Ss learn how to discuss professional knowledge with others.

**Time:** 15 minutes

**Steps:**

- ▶ Ss read the given instructions.
- ▶ Ss choose the roles.
- ▶ Ss make up a conversation.
- ▶ Ss role-play the conversation.

#### Sample

**Bob:** Good afternoon, Mr. Brown.

**Mr. Brown:** Afternoon Bob. I heard you are having an on-the-job training program in the evening school. How is it going?

**Bob:** Quite well. I've learnt a lot there.

**Mr. Brown:** What have you learnt then?

**Bob:** We've discussed CAD and CAM these days. It's very practical, I think.

**Mr. Brown:** Can you tell me something more about them?

**Bob:** Sure. CAM is commonly linked to CAD systems. The integrated CAD/CAM system takes the computer design and puts it directly into the manufacturing system; the design is then turned into many computer-controlled processes.

**Mr. Brown:** Exactly. The two systems are closely related in manufacture.

**Bob:** Mr. Brown, could you tell me about the application of CAM in our company?

**Mr. Brown:** CAM here also functions in three main areas: numerical control, process planning, and factory management to automate our factory.

**Bob:** Have we enjoyed the advantages of CAM?

**Mr. Brown:** Definitely! With computer-controlled manufacturing processes, a high degree of precision can be achieved. Besides, productivity and efficiency has been greatly raised.

**Bob:** Sounds great! Thank you so much, Mr. Brown. I learned a lot from you today.

### Task 4

**Objective:** Ss understand the meanings of some production safety warning signals.

**Time:** 15 minutes

**Steps:**

- ▶ Ss first work in pairs, studying the signals and reading the statements.
- ▶ Do the match job.
- ▶ One student draws any of the signals on a piece of paper and tells his/her partner what it indicates.
- ▶ Check Ss' understanding by choosing one or two signals to ask them what they indicate.
- ▶ Ss explain the meanings.

#### Key

1. This symbol indicates that lethal accidents or serious injuries may occur if the operating and working instructions are not followed properly.
3. This symbol warns against dangerous voltage! Immediate death might be the consequence.
4. This symbol informs the user that the system or its components may be damaged if the working and operating instructions are not followed.
6. This symbol indicates prohibitive actions that must not be performed by the operator.
5. This symbol indicates compulsory actions that must be performed by the operator.
2. This symbol draws your attention to something particular.





## Reading B

### Background Information

#### Molding

Molding is the process of manufacturing by shaping pliable raw material using a rigid frame or model called a pattern.

A mold is a hollowed-out block that is filled with a liquid like plastic, glass, metal, or ceramic raw materials. The liquid hardens or sets inside the mold, adopting its shape.

Traditionally, molds have been expensive to manufacture. They were usually only used in mass production where thousands of parts were being produced. Molds are typically constructed from hardened steel, pre-hardened steel, aluminium, and/or beryllium-copper alloy. The choice of material to build a mold from is primarily one of economics. Steel molds generally cost more to construct, but their longer lifespan will offset the higher initial cost over a higher number of parts made before wearing out. Pre-hardened steel molds are less wear resistant and are used for lower volume requirements or larger components. These are by far the superior in terms of wear resistance and lifespan. Aluminium molds can cost substantially less, and when designed and machined with modern computerized equipment, can be economical for molding tens or even hundreds of thousands of parts. Beryllium-copper is used in areas of the molds which require fast heat removal or areas that see the most shear heat generated. The molds can be manufactured by either Computer Numerical Control machining or by using Electrical Discharge Machining processes.

#### Translation

### 塑料成型工艺

塑料可以模塑成各种形状，变硬定型后用作各种商业用途。塑料成型制品随处可见，如水杯、安全帽、塑料管、玩具、瓶子、箱子、各类配件、厨具等不胜枚举。你使用的键盘和鼠标也是由塑料成型工艺制成的，甚至你坐着的椅子的塑料部件也是这样制成的。

塑料成型工艺的基本原理是：把熔化的液态塑料注入一个已成形的模具里，如瓶子模具。待它冷却后再移走模具，这时塑料瓶就制成了。

如果你正准备从事塑料成型业务，那你首先得了解其有哪些不同的工艺。下列基本定义解释了塑料成型工艺的不同方法。

#### 1. 注塑成型

该方法是把熔化后的塑料注入一个模具型腔，一旦冷却就移走模具。这种塑料成型过程通常用于某个产品的大批量生产。注塑模机出现于 20 世纪 30 年代。这些设备可以用来大批量生产玩具、厨具、瓶盖和手机座等。

#### 2. 吹塑成型

该工艺和注塑成型类似，只是热熔塑料是从一个机桶被垂直挤出，形成管状胚料。模具随后闭合，迫使胚料与模具内壁完全贴合。待冷却后，就形成了一个中空部件。塑料瓶、塑料管和塑料容器都属于吹塑成型产品。

#### 3. 压缩成型

该工艺是把一块硬塑料放在两个加热过的模具中间进行挤压。压缩成型通常使用立式压力机，而不是注塑成型和吹塑成型所使用的卧式压力机。制成的部件最后由空气进行冷却。

#### 4. 滚塑成型（旋转模塑成型）

装有塑料粉末的中空模具固定在从主轴延伸出的许多管状轮辐上。主轴带动整个模具系统转至一个封闭的熔炉间，高温使模具内粉末熔化后附着在模具内壁。模具慢慢旋转至一个冷却室。在这里，喷射出的冷水使得模具内的塑料冷却硬化，从而形成一个中空部件。





### Task 1

**Objective:** Ss can scan the passage to find needed information to the questions.

**Time:** 15 minutes

**Steps:**

- ▶ Allow Ss enough time to read Reading B.
- ▶ Ss do this exercise alone and then compare the answers with a partner.
- ▶ Check the answers with the whole class.

**Key**

1. Pencil boxes, telephones, photo frames, garden pots, trash containers, cabinets, office trays and boxes, and traffic barriers, etc.
2. It made mass-production of a product possible.
3. In injection molding, melted plastic is forced into a mold cavity. In blow molding, hot liquid plastic pours out of a barrel vertically in a molten tube.
4. Both injection molding and blow molding use melted plastic, compression molding uses hard plastic and rotational molding uses powdered plastic.

### Task 2

**Objective:** Ss know some useful terms needed to understand the passage.

**Time:** 5 minutes

**Steps:**

- ▶ Ss work in pairs and read the two columns in Task 2.
- ▶ Allow Ss enough time to complete the task.
- ▶ Check the answers by asking several students to read their answers.

**Key**

- |                                  |                                 |
|----------------------------------|---------------------------------|
| 1. kitchen utensils → h. 厨具      | 2. injection molding → d. 注塑成型  |
| 3. mold cavity → f. 模具型腔         | 4. blow molding → a. 吹塑成型       |
| 5. compression molding → g. 压缩成型 | 6. horizontal press → c. 卧式压力机  |
| 7. vertical press → b. 立式压力机     | 8. rotational molding → e. 滚塑成型 |

### Task 3

**Objective:** Ss can correctly understand a paragraph and translate it into Chinese.

**Time:** 10 minutes

**Steps:**

- ▶ Ss read Task 3.
- ▶ If necessary, pre-explain the difficult words or phrases in the paragraph.
- ▶ Allow enough time for Ss to read the paragraph.
- ▶ Ss work individually or in pairs to complete the translating task.
- ▶ Offer help if necessary.
- ▶ Choose two Ss to present their work.
- ▶ Check the answers and make necessary comment on their work.

**Suggested Answers**

装有塑料粉末的中空模具固定在从主轴延伸出的许多管状轮辐上。主轴带动整个模具系统转至一个封闭的熔炉间，高温使模具内粉末熔化后附着在模具内壁。模具慢慢旋转至一个冷却室。在这里，喷射出的冷水使得模具内的塑料冷却硬化，从而形成一个中空部件。



# Writing

**Task 1****Objective:** Ss learn to write a notice.**Time:** 20 minutes**Steps:**

- ▶ Ss read the given information and the sample.
- ▶ Ss work on the task individually.
- ▶ Ss exchange the notice with a partner and check it.

**Note:****Useful expressions in writing a notice:**

1. A meeting on... is to be held...
2. Please be on time.
3. It is hereby announced that...
4. It is hereby proclaimed that...
5. All are welcome to be present...

**Sample****Notice**

A lecture, titled Digital Mold and Literate Activity, will be held in the 9th Meeting Room from 8 am to 11:00 am on Wednesday, April 14th. The lecture will be given by Professor Eric Jackson from California Institute of Technology. Professor Jackson is known for his unique probing of the many connections between literate activity and new technologies. He will present, in his humorous style, the relations he found between literate activity and digital mold which you surely will enjoy very much. Everyone is welcome to attend this lecture.

Publicity Department  
April 13th, 2009

**Task 2****Objective:** Ss learn to finish a production report.**Time:** 10 minutes**Steps:**

- ▶ Ss read the table and given information.
- ▶ Ss tell teachers the difficulties.
- ▶ Teachers explain and encourage students to look up the dictionary.
- ▶ Ss finish the task individually.
- ▶ Ss discuss their answers with partners.
- ▶ Present the answers and explain.

**Suggested Answers**

### A Daily Production Report in Die-casting Workshop

Date: 2009-6-4

Prepared by: Peter Stein

Unit production manager: Norman Brown

Examiner: Andrew Johnson

There are 640 361V auto carburetors and 640 FH-201 motorcycles radiators in the die-casting workshop on 6th April 2009. The standard time for each item is 45 seconds, and so is their actual time. The total turnout today is 1280, including two defective items. Jeff is in charge of carburetor's production, and Bob is in charge of the production of motorcycles radiators.



# Project

---

This project is an integrated task that requires Ss to work together and go through the procedures of production. Ss should first know how to purchase raw materials for the production. They also should understand CAM functions and know about CAM application in modern manufacturing industry. Finally, they should work out a production plan at the end of the discussion and make up a short play.

**Time:** Use 15 minutes or more to explain to Ss how to carry out the project. Ask them to complete the task after class. Then give them 20 minutes to make a presentation of their work in class.

**Steps:**

- ▶ **Grouping.** Ss form groups on their own or the teacher groups fast learners with slow learners.
- ▶ **Defining Project.** Go through the project with the class and clarify requirements. Remind Ss to review Reading A before start their work.
- ▶ **Timing.** Remind Ss that appropriate timing and job division are important at the beginning of their work. Make Ss fully aware that team work is the essential part of the practice.
- ▶ **Presentation.** Each group presents its production plans to the class. Ask other groups to make comments and give advice.
- ▶ **Acting.** Let each group to act the short play.

**Notes:**

- ▶ The project can be done after class.
- ▶ Each group gives an oral presentation and acts the short play in class. Teacher gives feedback on the work of Ss.



## Self-evaluation

**Objective:** Ss can evaluate their language skills in accordance with the *Unit Objectives*.

**Time:** 5 minutes

**Steps:**

- ▶ Go through the evaluation list with Ss.
- ▶ Ss tick the boxes on the list alone.
- ▶ Ss compare their work with others.
- ▶ Ask several Ss to report their self-evaluation results.
- ▶ Comment briefly.

(Continued from Page T-88)

### Reading B

#### Paragraph 2

1. **reveal:** v.

a. to allow something to be seen that, until then, had been hidden

e.g. A gap in the clouds revealed the Atlantic far below.

b. to make known or show something that is surprising or that was previously secret

e.g. He may be prosecuted for revealing secrets about the security agency.

#### Paragraph 4

2. **inject:** v.

a. to force (a liquid) into someone or something

e.g. The morphine took effect almost as soon as it was injected.

b. to provide more money, equipment, etc. for something

e.g. A large amount of money will have to be injected into the company if it is to survive.

#### Paragraph 5

3. **conform to/with something:** to obey a rule or reach the necessary stated standard, or to do things in a traditional way

e.g. Students can be expelled for refusing to conform to school rules.

e.g. All new buildings must conform with the regional development plan.

#### Paragraph 7

4. **rotate:** v. to (cause to) turn in a circle, especially around a fixed point

e.g. The satellite slowly rotates as it circles the earth.

**rotational:** a.

5. **swing:** v. to move easily and without interruption backwards and forwards or from one side to the other, especially from a fixed point

e.g. He walked briskly along the path swinging his rolled-up umbrella.

e.g. The door swung open.

6. **stick:** v. to cause something to become fixed as if with glue or another similar substance

e.g. Stir the sauce so that it doesn't stick to the pan.

**Useful expression:**

**stick to** 坚持, 信守, 粘住

e.g. Reporters should stick to investigating the facts.

e.g. It looks as if Nick will stick to his word this time.



# New Words and Expressions

## Language Points

### Reading A

#### Paragraph 1

1. **define:** *v. to describe the meaning of something, or to explain (something) more clearly so that it can be understood*

e.g. Your duties are clearly defined in the contract.

#### Useful expression:

be defined as 可定义为, 指的是

2. **interface:** *n. a connection between two pieces of electronic equipment, or between a person and a computer*

e.g. My computer has a network interface, which allows me to get to other computers.

#### Paragraph 2

3. **center around:** *If an activity or discussion centers around something, that is the main or most important part of it.*

e.g. Much of the discussion centered around the reduction of pollution.

4. **numerical:** *a. involving or expressed in numbers*

e.g. Keep your files in numerical order.

**CF: numerous:** *a. many*

e.g. She is the author of three books and numerous articles.

#### Paragraph 3

5. **interpret:** *v.*

*a. to explain the meaning of something*

e.g. Freud attempts to interpret the meaning of dreams.

*b. to translate spoken words from one language into another*

e.g. They speak good Spanish, and promise to interpret for me.

6. **extract:** *v. to carefully remove a substance from something which contains it, using a machine, chemical process, etc.*

e.g. Oils are extracted from the plants.

He extracted several passages from the speech.

7. **load:** *v.*

*a. to put a necessary part into something in order to make it work, for example, bullets into a gun or film into a camera*

e.g. Can you load the CD into the player, please?

*b. to put a program into a computer, or to be put into a computer*

e.g. To load the file, press the "return" key.

#### Paragraph 4

8. **sequence:** *n. a series of related things or events*  
e.g. The first chapter describes the strange sequence of events that led to his death.

9. **rebirth:** *n. a new period of growth of something or an increase in popularity of something that was popular in the past*

e.g. Spring is the season of rebirth.

#### Paragraph 5

10. **under development:** *in the process of development*

#### Similar patterns:

under construction 正在建设之中

under discussion 正在讨论中

under consideration 正在考虑中

under way 正在进行

under guard 受到保护

under attack 受到攻击

11. **review:** *v.*

*a. to consider (something) in order to make changes in it, study it, or give an opinion about it*

e.g. Officials have to review the text before it's made public.

*b. to examine and describe the most important parts of a series of events or period of time*

e.g. a journalist who will review the events of the past six months

12. **impact:** *n. the strong effect or influence that something has on a situation or person*

e.g. The environmental impact of this project will be enormous.

13. **via:** *prep. by way of, or by use of*

e.g. I sent the application papers via fax.

14. **generate:** *v. to cause something to exist; produce energy in a particular form*

e.g. The new development will generate 1,500 new jobs.

The wind farm may be able to generate enough electricity for 2,000 homes.

#### Paragraph 7

15. **coordinate:** *v. to make various different things work effectively as a whole*

e.g. We need someone to coordinate the whole campaign.

16. **rely on:** *to need something or someone in order to survive, be successful*

e.g. We'll rely on you to keep the conversation going.

(To be continued on Page T-87)



# Vocabulary and Structure

## Task 1

**Objective:** Ss know the spelling and meaning of the vocabulary from this unit.

**Time:** 5 minutes

**Steps:**

- ▶ Ss read Vocabulary and Structure Task 1.
- ▶ Allow 5 minutes for Ss to do the task.
- ▶ Ss work in pairs. One student reads the items randomly in the column on the right while the other writes down the corresponding words.
- ▶ Ss switch roles.
- ▶ Check the answers.

**Key**

- |                |              |              |               |
|----------------|--------------|--------------|---------------|
| 1. resistance  | 2. integrate | 3. symmetric | 4. assistance |
| 5. competitive | 6. numerical | 7. inject    | 8. rely       |

## Task 2

**Objective:** Ss enlarge the vocabulary by word transformation.

**Time:** 10 minutes

**Steps:**

- ▶ Ss read Vocabulary and Structure Task 2.
- ▶ Ss work individually.
- ▶ Ss give the correct answers based on their understanding of each sentence and the words given in brackets.
- ▶ Check the answers.

**Key**

- |               |                 |                |              |               |
|---------------|-----------------|----------------|--------------|---------------|
| 1. definite   | 2. manufacturer | 3. application | 4. injection | 5. resistance |
| 6. assistance | 7. vary         | 8. accurate    | 9. replaced  | 10. tolerable |

## Translation

1. 没有明确的理由可以解释她为何应该这么做。
2. 如果货品质量有问题，你应该向厂家投诉。
3. 运用你所学到的知识就可以帮你解决这些新问题。
4. 医生给我打了一针。
5. 健康的人比身体虚弱的人对疾病具有更强的抵抗力。
6. 他说他特别需要我的帮助。
7. 烹调时间根据烤箱会稍有不同。
8. 要获得确切的人口数据并非是件易事。
9. 他们用新设备取代了旧设备。
10. 如此无礼的举止是难以容忍的。



### Task 3

**Objective:** Ss can use the vocabulary from this unit in other contexts.

**Time:** 10 minutes

**Steps:**

- ▶ Ss read Vocabulary and Structure Task 3.
- ▶ Ss work individually.
- ▶ Ss give the correct answers based on their understanding of each sentence and the words given in the box.
- ▶ Check the answers.

**Key**

- |                 |                  |               |              |                   |
|-----------------|------------------|---------------|--------------|-------------------|
| 1. competition  | 2. linked to     | 3. conform to | 4. available | 5. In addition to |
| 6. coordination | 7. involved with | 8. reliable   | 9. secure    | 10. lead to       |

### Translation

1. 传统书商面临着来自于网络售书公司的激烈竞争。
2. 一个人的想法和感受主要和传统、习惯以及所接受的教育有关。
3. 彼得并不像一个大家通常所认为的警察那样。
4. 星期五的演出已经没有票了。
5. 除了这些课程之外，该系还开设数学和地理课。
6. 要打好球赛我们需要很好的手眼配合。
7. 多年来她一直从事动物权益方面的工作。
8. 她已证明在危急时刻她是可以信赖的。
9. 这门会关上，所以我们得把它固定在那根柱子上。
10. 工作太忙而休息太少通常会导致疾病。

### Task 4

**Objective:** Ss can express ideas in writing using the two models outlined for Task 4.

**Time:** 10 minutes

**Steps:**

- ▶ Read the models to Ss with an explanation if needed.
- ▶ Ss work in pairs.
- ▶ Check the answers.

**Key**

**Part I**

1. He wants to make sure when Tom will be here.
2. This depends on how hard you work.
3. Our success is totally dependent on whether she would give us some help.
4. She had to tell me what had happened to her by that day.
5. People have heard what the President has said; they are waiting to see what he will do.



## Part II

1. He must be ill, *otherwise* he is present.
2. The homework must be well done, *otherwise* our teacher will criticize us.
3. Take the opportunity, *otherwise* you will regret it.
4. Heat the water, *otherwise* it will freeze.
5. She was out, *otherwise* I should have seen her.

## Task 5

**Objective:** Ss can use the vocabulary from this unit for translation.

**Time:** 15 minutes

### Steps:

- ▶ Tell Ss that English and Chinese sentence structures are different.
- ▶ If necessary, re-build the first Chinese sentence in accordance with the English sentence structure as an example.
- ▶ Ss work individually or in pairs and translate the sentences with the words or phrases given in brackets.
- ▶ Check the answers and give necessary comment.

### Key

1. This technology is moving in the direction of wider application.
2. CAD/CAM will provide technological foundation for the future computer-integrated manufacturing plants.
3. In the 16th century, village life centered around religion.
4. The class varies from 15 to 18 in age.
5. This computer is not directly linked to manufacturing steps.



# Grammar

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## Task 1

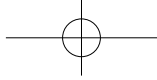
### Key

1.  4.  6.  8.  10.

## Task 2

### Key

- |            |            |             |            |             |
|------------|------------|-------------|------------|-------------|
| 1. Simple  | 2. Complex | 3. Compound | 4. Simple  | 5. Compound |
| 6. Complex | 7. Simple  | 8. Compound | 9. Complex | 10. Simple  |



### Task 3

#### Key

1. We will go out to dinner tonight and they will join us.
2. I would like to get this job done in a hurry, but I think it will take a long time.
3. We could have the meeting tomorrow, or we may postpone it until next Monday.
4. We didn't choose the first class seat, for we had to save money.
5. I can't study everything all at once, so I will study the most important concepts.
6. I don't enjoy the study of chemistry much, nor do I like the other natural sciences.
7. Lily was a successful career woman, yet her husband wanted her to be a housewife.
8. Be quick, or we'll be late for class.
9. Come a little earlier next time, or you'll miss the best part of the TV show.
10. The teacher told them to clean the lecture room, but he quickly walked away.

### Task 4

#### Key

You ask how I met my boyfriend. Well, it's quite a funny story. Do you remember I failed one of my final exams? That meant I had to spend part of the summer in college. And that meant I couldn't go on holiday with my family. The travel company refused to give us a refund because we cancelled too late. I was pretty angry about it. Then something nice happened. I think the travel agent felt sorry for me, because he had failed his final exam when he was a student. He agreed to transfer my booking to another tour which started later in the summer. I was really pleased. My father was too, as transferring the booking meant that his money wasn't being wasted. So, I went on this tour. And I met this young man. He was on his own too. He told me his girlfriend should have been with him, but they had a quarrel and she had refused to come. We were the only ones traveling alone, so we found ourselves going around the sights together. He hadn't read about the places we were visiting and I spent most of my time telling him about them. We found we'd fallen in love at the end of the tour.





## 英语中的句子

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### 教学思路（供参考）

总的原则：根据不同的分类方法，句子可以分为不同的种类。根据句子的结构，英语中的句子可分为简单句、并列句和复合句。识别与分析句子种类与结构是学生学习的难点之一，但必须成为学生熟练掌握的一门技能，这对于阅读和写作有着至关重要的作用。

- 重点训练：
1. 判断识别各种句子类型；
  2. 三种句子类型之间相互转换与合并；
  3. 分析篇章语境下复杂句子的结构。



## Comprehensive Exercises

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### Task 1

#### Key

1. My son Tim attends the local school. (SVO)
2. My wife and I went to his school yesterday. (SV)
3. We spoke to his teachers. (SV)
4. The teachers gave us Tim's school report. (SVOO)
5. Tim's report wasn't very good. (SVP)
6. His marks were low in every subject. (SVP)
7. Tim's report made him very anxious. (SVOC)
8. My wife and I told him to try harder. (SVOC)
9. Tim's friend Jimmy seems very clever. (SVP)
10. He got good marks in all subjects. (SVO)

### Task 2

#### Key

1. He told us that they didn't get the contract.
2. They are the new secretaries who work in our office.
3. She is the nurse that/whom I saw at the hospital.
4. They are the children whose football team won the match.
5. He had already opened the letter before he realized it wasn't addressed to him.
6. I will give the letter to him as soon as I see him.
7. I'll never forget the school where I started to learn to play the violin.
8. He didn't come to the meeting because he was injured in a car accident yesterday.
9. It was such a big box that nobody could move it.
10. We will go to the beach if the weather is fine.

### Task 3

#### Key

- |               |            |             |                    |          |
|---------------|------------|-------------|--------------------|----------|
| 1. that/which | 2. but/yet | 3. and      | 4. Although/Though | 5. and   |
| 6. but/yet    | 7. and     | 8. As/Since | 9. that/which      | 10. that |

### Task 4

#### Suggested Answers

I still remember the first day when I came to college. It was a sunny day and everything seemed fresh to me. I was very excited like other freshmen because my dream of becoming a college student had come true. This was really a turning point in my life. Looking at the modern classroom buildings and the large library, I felt proud of my college. I knew that going to college would be a good opportunity for me to obtain a great deal of knowledge useful for my future career, but studying at college was also a great challenge to me, for I had to learn how to overcome the difficulties in my study and life at college. Anyway, I was determined to study hard in order to live up to the expectations of my parents and my friends. I was sure that I would meet the challenge, make the best of the opportunity and prove myself a worthy college student.