

Lesson 13: Exploring Membranes

(associated with EiE® Lesson 4, Part 2)

Lesson Topic: Students will present results from a test of their model membrane, then design an improved model membrane based on their findings.

DESIRED RESULTS (教学目标)

Academic Content Objectives: Students can...

Chinese Language Arts

- Adhere to grade-level appropriate speaking conventions
- Listen to student presentations, looking for specific criteria
- Write a sentence in past tense about why student groups chose to use certain materials in their design

Science and Engineering

- Test and report results of a model membrane design test
- Evaluate a model membrane design using established criteria
- Implement steps of the engineering design process to improve results of a model membrane (re-ask, re-imagine, re-plan, and re-create)
- Draw and label an engineering plan

Math

- Use tools to measure how much water has passed through a model membrane
- Use decimals or fractions and measuring units to report water volume
- Identify that *cup* and *milliliter* are different measuring units of liquid volume

Learning Strategies: Students can...

- Work cooperatively with each other
- Use background knowledge
- Make predictions
- Evaluate the effectiveness of methods
- Plan and organize
- Take notes

Chinese Language Objectives: Students can...***Functions and Forms*****Content-obligatory (CO)**

- State quantities of materials using numbers and appropriate classifiers
- State exact amount of liquids using fractions/decimals with units of measurement
- Describe attributes of something/someone using the existential verb 有 with a modifying noun phrase
- Ask and answer questions using question words
- Report on things, actions, or events in past time using action verbs with 了 (temporal marker) and dependent time phrase
- Recount events in simple past time using action verbs with 了 (temporal marker) and dependent time phrase/clause in complex sentence
- Give emphasis to the specific direct object by using 把 or 让/使 construction and placing the direct object before the verb
- Support ideas/opinions using compound sentences with adverb 因此
- Give reasons for actions/choices/preferences using preposition 为了
- Construct characters to form words and phrases adhering to character structure rules and stroke order guidelines
- Use a developing understanding of basic units of word formation in Chinese to infer and construct meaning with written text
- Order a series of events using sequencing adverbs
- Describe attributes of persons/places/things using modifying phrases
- Make comparison between two things using A + 比 (comparison marker) + B +(更) + adjective structure
- Suggest an alternative idea using serial verb construction with pivotal noun phrase
- Predict cause-effect relationship using hypothetical conditional sentences with 如果 /要是....., (那么)..... and the adjectival verb 可能

Content-compatible (CC)

- Ask for clarification about feedback/advice/idea
- Express a personal opinion
- Express agreement/disagreement
- Report events in past time using adverbs of time
- Give a command using serial verb construction
- Negotiate turn-taking
- Negotiate to reach consensus
- Request feedback
- Make a request using different degrees of politeness

Vocabulary

	了解 Recognize	识记 Produce
Content-obligatory		<p>Engineering Design Process 工程设计步骤 Engineering Design Process, 提问 ask, 思考 imagine, 设计 plan, 制作 create, 改进 improve, 步骤 step, 设计 to design, 模型 to model/modeling, 工程师 engineer, 实验 experiment, 科学家 scientist, 薄膜 membrane, 去解决实际问题 to solve real-world problems, 试一试新的想法 to try out new ideas, 运用想象力 to use imagination</p> <p>Measurement Words 液体量杯 measuring cup, 半个 one half, 四分之一 one fourth/quarter, 分数 fraction, 小数 decimal, 测量 to measure, 成功 success, 杯 cup, 毫升 milliliter, 体积 volume</p> <p>Materials-Related 容器 container, 盖子 lid, 铝箔纸 aluminum foil, 有一个孔的铝箔纸 aluminum foil with one hole, 有两个孔的铝箔纸 aluminum foil with two holes, 咖啡过滤纸 coffee filter, 纱布 cheesecloth, 毡布 felt, 海绵 sponge, 尼龙纱窗布 nylon screen, 材料 materials, 闪亮 shiny, 平滑 smooth, 厚 thick, 薄的 thin, 白色的/米色的 white/beige, 纸做的 made of paper, 有洞/有孔 has holes, 没有洞/没有孔 does not have holes, 有用/管用 works well, 没有用/不管用 does not work well, 组合 combination</p> <p>Action Words 改进 to improve, 记录 to record, 观察 to observe</p>

	了解 Recognize	识记 Produce
Content-compatible	<p>Assessment Words 测试 assessment, 反馈 feedback, 反馈圈 feedback loop, 综合的 integrated, 表现 performance, 理解的 interpretive, 表达的 presentational, 交流的 interpersonal, 同学评估 peer evaluation, 自我评估 self-assessment, 评分表 rubric, “准确地汇报” “accurately report”, “清楚地演示” “clearly present”, “正确地使用” “correctly use”, “连动词结构” “serial verb construction”, “修饰语” “modifying phrases”, 量词 classifiers, 复合句 compound sentence, 比较级 comparative expression, 视觉接触 eye contact, 评估 to evaluate, 标准 criterion, 质量 quality, 数量 quantity</p> <p>Instructional Activities 全班 whole class, 小组 small group</p>	<p>Adjectives 厚 thick, 薄 thin, 孔 small hole, 大小适中 right-sized, 适合 suitable, 管用/不管用 useful/not useful</p> <p>Action Words 折 to bend, 剪 to cut, 穿(洞/孔) to pierce holes, 分层 to layer, 把它摺起来 to fold something, 滴 to drip, 负责 to be responsible for, 测试 to test, 描述 to describe, 演示 to present, 计划 to plan, 改变 to change, 比 to compare, 代替 to replace, 收集 to collect, 控制 to control</p> <p>Adverbs/Adverb Phrases 慢 slow, 中 medium, 快 fast, 全部 all, 部分 some, 没有 none, 太多 too much, 太少 too little, 正好 just right/exact amount, 最多 at most, 更 even more, 约 approximately</p> <p>Job Cards/Roles 中文督察员 Chinese Champion, 材料管理员 Magnificent Materials Manager, 记录员 Remarkable Recorder, 工作管理员 Terrific Taskmaster, 演示质检员 Polished Presenter</p>

Note: In the **Language-Function-Form-Vocabulary Connection** section you will find additional vocabulary that is directly supportive of the various language functions. The particular words and phrases you choose to target will depend on your students' proficiency levels. Because of this, we have not included all vocabulary here. At the end of this lesson, you will find a table that provides more detailed information about the lesson vocabulary identified above.

PREPARATION (教学准备)**Materials Needed for Instruction**

Note: Also see the list of materials needed on p.107 of the EiE® binder.

- *Engineering is Elementary*® (EiE®) binder, Lesson 4, Part 2
- Interactive whiteboard pages for Lessons 13: MMIC 13-IWB
- Laminated “job” cards for each group
- Handouts:
 - a. MMIC 13-1 (EiE® {4-8}), one per group
 - b. MMIC 13-2 (EiE® {4-10}), one per group
 - c. MMIC 13-3: *Group Feedback Form*, one per group
 - d. MMIC 13-4: *Numbers, Classifiers and Volume*, four per person
 - e. MMIC 13-5: *Self-Assessment of Group Work*, one per person
- Completed MMIC 11-3, *Testing Model Membrane Materials* (EiE® {4-8}), one per student
- MMIC 13-6/IPA 1-1: *Presentational (Oral) Scoring Rubric*
- A video camera for filming student presentations
- A digital camera for taking a photo of each group’s initial design
- Students’ science journals

Note: Students should use the same testing container as they used in Lesson 12. They should also reuse many of the materials from Lesson 12.

Classroom Management Tip: Instead of giving one bin to each group, use three plastic bins at the front or back of class and have the groups bring their models there.

LEARNING ACTIVITIES (教学活动)**Preview Phase—“Intro” Activities**

Students will review how much water needed to drip through their model membranes in the past 24 hours. They will evaluate their model membranes and measure how much water actually passed through. As a group, they will then present their model membrane design to the class, telling the class what materials they used and whether or not their design was successful.

Attention: As students are presenting time-dependent test results, they must be able to complete all “Intro” activities within the same day.

Time: Learning Activity 1—45 minutes

Learning Activity 2—90 minutes divided into two 45-minute periods. Period I is the introduction to the activity; period II is the implementation of the presentation.

Learning Activity 1

1. Display page 1 of MMIC 13-IWB and model language needed for learning activity 1 by reporting on teacher’s model membrane design. During this modeling, elicit as much language as possible from students to jointly construct responses to the following three questions:

Chinese	English
昨天，老师用了哪些材料来做他/她的薄膜模型？	What materials did the teacher use for the model membrane yesterday?
昨天，老师向薄膜模型里倒了多少水？ 答案：1/2 杯或者 118.3 毫升。	How much water did the teacher pour into the model membrane yesterday? Answer: 1/2 cup or 118.3 ml.
从昨天开始应该有多少水通过老师的薄膜模型？ 答案：一些，但是不超过 1/4 杯或者 59.1 毫升。	How much water needs to have dripped through the model membrane since yesterday? Answer: Some, but no more than 1/4 cup or 59.1 ml.

2. Guide students through the “Think-Pair-Share” activity (Lyman, 1981) using the following questions displayed on page 2 of the interactive whiteboard, one at a time:

Chinese	English
昨天，你们组用了哪些材料来做你们的薄膜模型？	What materials did your group use for the model membrane yesterday?
昨天，你们组向薄膜模型里倒了多少水？	How much water did your group pour into

答案：1/2 杯或者 118.3 毫升。	the model membrane yesterday? Answer: 1/2 cup or 118.3 ml.
从昨天开始应该有多少水通过你们的薄膜模型? 答案：一些，但是不超过 1/4 杯或者 59.1 毫升。	How much water needs to have dripped through the model membrane since yesterday? Answer: Some, but no more than 1/4 cup or 59.1 ml.

- Discuss answers with the whole class using a picture of a measuring cup on the interactive whiteboard to illustrate the two volume measurements.
- Put students into their working groups, same as yesterday.
- Distribute job cards for each group:

Chinese Champion (中文督察员)

Remarkable Recorder (记录员)

Magnificent Materials Manager (材料管理员)

Terrific Taskmaster (工作管理员)

- Ask the 材料管理员 **Magnificent Materials Manager** to pick up their groups' model membranes from the plastic bins.
- Pass out MMIC 13-1 (EiE® {4-8}), one copy per group.
- Allow time for students to review and discuss the handout. The 工作管理员 **Terrific Taskmaster** should prepare to state his/her understanding of the task.
- Invite one (or more) 工作管理员 **Terrific Taskmaster(s)** to stand and state their understanding of the task to the entire class.
- Ask students (in groups) to evaluate their first model membrane and complete MMIC 13-1 (EiE® {4-8}).
- Remind students to do their jobs according to their job card description.

Classroom Management Tip: Circulate through the classroom while students measure the volume of water in the cup. Make sure that they are doing it accurately. There should be at least some water in the container, up to a maximum of ¼ cup or 59.1 ml in order to be considered successful.

Note: It is highly possible that only one group (if any) in each class will have a successful model the first time around. If groups are successful on the first try, they can design another model that will let smaller or larger amount of water through in a 24-hour period. Alternatively, successful students could try to calculate rate of flow—how much water drips in a 10-minute period, for example. Successful students could also repeat with the same design, to test and see if it works consistently.

Language Function-Form-Vocabulary Connections (Activity 1)		
CO LP 13.1.1	State quantities of materials using numbers and appropriate classifiers	
For example: 一张铝箔纸 (a piece of aluminum foil) 五张咖啡过滤纸 (five coffee filters) 三块纱布 (three pieces of cheesecloth) 两块海绵 (two sponges)		
Approaching	Attaining	Expanding
个 (gè) people and general object 家 (jiā) families and business establishments 件 (jiàn) clothing 棵 (kē) plants 只 (zhī) insects and animals 支 (zhī) rod-shaped objects, e.g., pencil, Chinese paint brush 把 (bǎ) small objects and objects with a handle, e.g., scissors, chair 本 (běn) journals, books and files	张 (zhāng) thin and flat objects, e.g., aluminum foil, coffee filter 块 (kuài) pieces of small things, e.g., felt, sponge 位 (wèi) persons of status, e.g., professor, engineer 碗 (wǎn) things that come in bowls mostly, e.g., noodles, rice, water 场 (chǎng) events and happenings such as episode, e.g., soccer game	滴 (dī) a drop/a drip used for liquid items 对 (duì) couple/pair: modifies anything that comes in pairs 架 (jià) planes and large vehicles and a few smaller electric objects such as radios
Form Focus: Number + Classifier + Object (noun)		
Classifiers are used when counting objects (nouns). Almost all nouns have a corresponding classifier. When learning a noun it is always good to learn its classifier.		
Noticing and awareness spotlight		
1. The difference between 二 and 两		
二	两	
1) Counting: e.g., 一、二、三..... 2) Used in ordinal numbers: e.g., 第一 (first)、第二 (second)、第三 (third) 3) As last part of any higher number that ends in two: e.g., 十二 (12)、八十二 (82)	Used whenever a classifier is used to indicate “two of something”, see: Subj. + Verb + 两 + Classifier + Noun	

2. The difference between 只 and 支	
只 (zhī)	支 (zhī)
只 is used for insects and animals.	支 is used for rod-shaped objects.
These two classifiers are homophones. They have the same pronunciation but different uses and meanings.	

CO LP 13.1.2	State exact amount of liquids using fractions/decimals with units of measurement
For example: 二分之一杯 (a half of a cup) 四分之三杯 (three quarters of a cup) 118.34 毫升 (118.34 milliliters)	
Focus on form: Fractions/decimals	
Fractions begin with the denominator, followed by 分之 (parts of), and the numerator, e.g., # (denominator) + 分之 + # (numerator). When reporting decimals, the whole number before the period is expressed as a multi-digit number (e.g., 118.34; before the decimal point, 118 reads as 一百一十八 [one hundred and eighteen]), while the decimal is expressed as single digits (e.g., .34 reads as 点三四 [dot, three, four]).	
Noticing and awareness spotlight	
1. Units of measurement	
Units of measurement can function as nouns or classifiers. When units of measurement are nouns, no classifier is used. For example: Unit of measurement as noun: 118.34 毫升 (118.34 milliliters), 11.5 杯 (11.5 cups) Unit of measurement as classifier: 150 毫升水 (150 milliliters of water), 一杯水 (a cup of water) Other such units of measurement are 盎司 (ounce), 英尺 (foot), 英里 (mile), 磅 (pound), etc.	
2. 杯 (cup)	
杯 (cup) as physical object: use the classifier “个” (e.g., 一个杯子 [one cup]) 杯 (cup) as unit of measurement: do not use classifier (e.g., 11.5 杯 [11.5 cups]) 杯 (cup) as classifier: used as a classifier (e.g., 一杯水 [a cup of water])	

CO LP 13.1.3	Describe attributes of something/someone using the existential verb 有 with a modifying noun phrase		
Approaching	Attaining	Expanding	
水太多/太少/正好。 There is too much/too little/just right water. 我们有太多/太少/足够的水。 We have too much/too little/just right water.	(在)杯子里有太多/太少/足够/118.34 毫升的水。 There is too much/too little/just right/118.34 milliliters of water in the cup.	有太多/太少/足够/118.34 毫升的水通过了薄膜模型。 There is too much/too little/just right/118.34 milliliters of water that passed through the model membrane.	
Subj. (noun) + [be verb is omitted] + adverb 太多/太少/正好 too much/too little/just right	Locative phrase + existential verb (有) + modifying noun phrase (adj. + 的 + noun)	Existential verb (有) + modifying noun phrase (adj. + 的 + noun) + Verb phrase	
Focus on form			
1. Locative phrase + existential verb (有) + modifying noun phrase			
The locative phrase, identifying the place where something exists, begins the sentence. The locative phrase is followed by the existential verb (有 [have]) and a modifying noun phrase.			
2. Modifying noun phrase [adj. + 的] + Head noun			
Modifying phrases can be attributive adjectives followed by the particle 的, e.g., 光亮的 (shiny), 太少的 (too little). Modifying phrases are placed in front of the head noun they describe (e.g., 足够的水 just enough water).			
Noticing and awareness spotlight: Character formation			
好 is made up of two semantic radicals, one for woman and the other for child. Invite students to brainstorm other words that use these same radicals.			

CO LP 13.1.4	Ask and answer questions using question words		
Approaching	Attaining	Expanding	
For example: 吗? Use of ma 是不是.....? Is or is not?	谁.....? (Who) 什么.....? (What) 哪里.....? (Where) 什么时候.....? (When) 怎么.....? (How) 为什么.....? (Why)	几/多少? (How many) 哪(些).....? (Which)	

Form focus: Placement of question words
<p>Most question words in English occur at the beginning of a sentence. However, question words in Chinese occur in a variety of positions. Generally, question words appear in the same position as the grammatical function they serve in the sentence.</p> <p>For example: 谁参加足球比赛? (Who is going to play the soccer game? ["Who" occurs in subject position]) 你看见几个足球运动员? (How many soccer players did you see? ["How many" is in the # position of the noun phrase # + classifier + noun])</p>
Noticing and awareness spotlight: Use of 吗? 吧? 呢?
<p>A few particles are commonly used at the end of questions.</p> <p>吧? is used to invite agreement. 呢? is a tag question meaning ", and you?" 吗? is a question particle that is used when one expects a "yes" or "no" response.</p>

CO LP 13.1.5	Report on things, actions, or events in past time using action verbs with 了 (temporal marker) and dependent time phrase		
Approaching	Attaining	Expanding	
<p>我们用两张咖啡过滤纸和一块毡布。</p> <p>We use two coffee filters and one piece of felt.</p>	<p>在我们的薄膜模型的设计中，我们用了一块海绵、三张咖啡过滤纸，和一块毡布。</p> <p>We used a sponge, three coffee filters, and one piece of felt in our model membrane design.</p>	<p>昨天，我们用了两张咖啡过滤纸和一块毡布。</p> <p>We used two coffee filters and one piece of felt yesterday.</p>	
No temporal marker, no adverb of time	Temporal marker 了 used	Temporal marker 了 and adverb of time used	
Form focus: action verb + 了 (temporal marker) + adverb of time			
Past time can be communicated using “了”, adverbs of time or both.			
Noticing and awareness spotlight: Position of temporal marker “了”			
The temporal marker “了” is positioned either immediately after the main verb or at the end of the sentence/clause.			

CO LP 13.1.6	Recount events in simple past time using action verbs with 了 (temporal marker) and dependent time phrase/clause in complex sentence	
For example:		
Approaching	Attaining	Expanding
<p>我们发现了.....不管用。</p> <p>We found ... did not work well.</p>	<p>当我们测试尼龙纱窗布的时候，我们看见了水穿过得很快。</p> <p>When we tested the nylon screen, we saw that water passed through it quickly.</p>	<p>经过测试有一个孔的铝箔纸后，我/我们发现了水流得很快。</p> <p>After testing the aluminum foil with one hole, I/we found that it made the water flow slowly.</p>
<p>我们学到了葡萄干吸收水。</p> <p>We learned that a raisin absorbs water.</p>	<p>在葡萄干的实验中，我们学到了薄膜可以让水通过。</p> <p>In the raisin experiment, we learned that a membrane can let water pass through.</p>	<p>在葡萄干的实验中，我们学到了薄膜可以让水通过，也可以阻挡沙。</p> <p>In the raisin experiment, we learned that a membrane can let some things pass through and block other things.</p>
Simple past time using action verb with temporal marker 了	Use of dependent time phrase in complex sentence and temporal marker 了	Use of dependent time clause in complex sentence and temporal marker 了
Form focus		
1. Use of 了 as temporal marker		
Simple past time can be communicated using 了 (temporal marker), e.g., action verb + 了 (temporal marker). The temporal marker “了” is positioned either immediately after the main verb or at the end of the sentence/clause.		
2. Use of dependent time phrase/clause in complex sentence		
<p>Mandarin uses adverbs of time and adverb of time phrases to connect two clauses and form one complex sentence.</p> <p>The first clause may consist of</p> <ul style="list-style-type: none"> • An adverb of time placed at the end of the first clause [noun + adverb of time 的时候], e.g., 足球比赛的时候, (While at the soccer game, ...) • or an adverb of time phrase that is separated into two parts [当 (part 1) + simple SVO sentence + 的时候 (part 2)], e.g., 当我们测试尼龙纱窗布的时候, (When we tested the nylon screen,...). <p>For example,</p> <p>Noun/simple SVO sentence + adverb of time phrase 以后.....后 (after), + main clause.</p> <p>Noun/simple SVO sentence + adverb of time 以前 (before), + main clause.</p> <p>Noun/simple SVO sentence + adverb of time phrase 当.....的时候 (when/while at), + main clause.</p>		


Noticing and awareness spotlight	
1. Use of temporal marker “了” with “verb + verb complement” structure	
When a two-character “verb + verb complement” structure is used, the temporal marker “了” must be placed after the verb complement.	
For example, [我] 看到了。(I saw.)	
However, if the verb complement consists of two characters instead of just one, then “了” can be placed either after the one-character first main verb or after the two-character verb complement.	
For example, 他走了出来。(He walked out of there.) 他走出来了。(He walked out of there.)	
2. Use of particles 的、地、得	
的 (de) is used when an adjective and/or a pronoun modifies a noun. The form is: Adj./pron. + 的 + Noun, for example, 炎热的夏天 (sweltering summer), 我们的薄膜模型 (our model membrane design)	
地 (de) is used when an adverb modifies a verb. The form is: Adv. + 地 + Verb (unlike in English!), for example, 高兴地欢呼 (cheer happily)	
得 (de), as a potential complement, is used as a complement to further describe a main verb/adjective. It is placed after the verb/adjective it describes. The form is: Verb/adjective + 得 + degree complement	
The degree complement can be made up of an adverb or a noun phrase.	
For example, 我跑得快。(I ran fast.) (得 + adverb as degree complement) 薄膜有一些小得眼睛都看不见的孔。(Membranes have holes that are too small to see.) (得 + noun phrase as degree complement)	



CO LP 13.1.7	Give emphasis to the specific direct object by using 把 or 让/使 construction and placing the direct object before the verb		
Approaching	Attaining	Expanding	
我的薄膜模型阻挡有害的东西在外面。	我的薄膜模型（不）让水通过。	我的薄膜模型（不）让水慢慢地通过。	
My model membrane blocks/stops harmful things outside.	My model membrane should (not) let water pass through.	My model membrane should (not) let water pass through slowly.	

Subj. + Verb + Object + Complement (adv.) .	Subj. + 让/使-construction [让/使 + direct object + verb], such as, ...	Subj. + 让/使-construction [让/使 + direct object + verb], such as, ...
Form focus: Use of 让/使-construction		
Similar to “把-sentence,” the “让/使-construction” allows one to place the direct object in front of the main verb, which is not typical word order in Chinese. This draws more attention to what is happening to the object itself.		

CO LP 13.1.8	Construct characters to form words and phrases adhering to character structure rules and stroke order guidelines	
For example: Left-right: 叫、场 Top-bottom: 吉、只 Left, middle, right: 树、谁 Top, middle, bottom: 复、常 One-part, totally enclosed: 国、回 Partially enclosed: 用, 原		
Approaching	Attaining	Expanding
One- and two-part characters One-part character 我、生 One-part, totally enclosed 国、回 Two-part characters Left-right: 叫、场 Top-bottom: 吉、只	Three-part characters Left, middle, right: 树、谁 Top, middle, bottom: 复、常 Left, top-right, bottom-right: 锋、纷 Top-left, bottom-left, right: 部、剂、劲 Left-top, right-top, bottom: 然、赞 Top, left-bottom, right-top: 死、前	Four + part characters Left-top, right-top, left-bottom, right bottom: 能、舒 Left, top-right, middle-right, bottom-right: 慢、镜 Left, middle, top-right, bottom-right: 游 Left, middle-top, middle-bottom, right: 湖
Form focus: Formation of Chinese characters		
1. Character structure rules		
Chinese characters are called “square” characters because no matter how simple or complex, each character fits inside a square. Characters can usually be divided into different parts. These parts form character structures. There are four main structures: one-part structure, two-part structure, three-part structure, and four-part structure. These structures can be further divided into sub-parts.		

For example,

Two-part structures:  (top/bottom),  (left/right)

Three-part structures:  (left, top-right, bottom-right),  (top-left, bottom-left, right), etc.

2. Stroke order guidelines

General rules for writing Chinese characters are:

1. Horizontal first, then vertical.
2. Top first, then bottom.
3. Left first, then right.
4. Left-slanted first, then right-slanted.
5. Outside first, then inside.
6. Center first, then both sides.
7. With “closed” characters, enter character first, then close it up.

CO LP 13.1.9	Use a developing understanding of basic units of word formation in Chinese to infer and construct meaning with written text
Form focus: radical → character → compound/word	
1. radical	
<p>A radical is the smallest meaningful orthographic unit in compound characters, for example, 虫 (insect) is used in the character 蛙 (frog). 虫 (insect) can also be a stand-alone character. There are three types of radicals: semantic (give information about character meaning) [手 (hand)], phonetic (give information about character pronunciation) [分 (fen) in the compound 纷 (one after another)], and perceptual (do not give information about character meaning or pronunciation, instead function as visual fillers) [此 (this, these in classical Chinese), however, in the compound 嘴 (mouth) the radical 此 functions as a perceptual radical providing information about neither meaning nor pronunciation].</p>	
2. character	
<p>A Chinese character is a meaningful orthographic unit that is always pronounced as one syllable. Chinese characters have evolved as a writing system over millennia and have developed in various ways. Some characters are pictographs that were originally drawings of concrete objects, for example, 雨 (rain), the four dots depicting the rain coming down from the sky; others are better described as ideographs because they were created as graphic representations of more abstract ideas such as the notion of “above”, 上, the stroke above the horizontal line indicating the idea of “above” or “up.” Another way to create characters was to combine two or more pictographs or ideographs to portray a new meaning, for example, 休 (to rest), a</p>	

combination of the pictographs for person, 人, and a person leaning against a tree, 木. These types of characters are referred to as **ideogrammatic characters**.

Over 90% of Chinese characters were created as **phono-semantic compound characters** and are made up of a combination of semantic and phonetic radicals. For example, 控 (to control), the semantic radical on the left side, 手 (hand), indicates that the word meaning will include an action with a hand, and the phonetic radical on the right side 空 (kōng), helps the reader with character pronunciation “kòngg.”

3. compound

Compounds consist of at least two characters, neither of which is an affix, a character that on its own lacks meaning but when added to other characters becomes a meaningful unit. Most Chinese words are compounds. Compounds have various types of syntactic relationships.

A few compound types:

Verb-Object: 踢足球 (to kick soccer ball)、开球 (to kick of)、发誓 (to pledge)

Verb-Complement: 摔倒 (to fall down)、改进 (to improve and get better)、进来 (to come in)

Subject-Predicate: 天亮 (bright [sky is bright])

Number-Classifier: 各种 (various kinds)、一道 (a ray of...)、一片 (a patch of...)

Adverb-Verb: 慢跑 (to jog [to run slowly])、快走 (to hurry [to walk fast])

Verb-Verb-Noun: 栖息地 (habitat [to stay and rest at a place])

Adjective-Adjective-Noun: 浅桃色 (light peach color)、吉祥物 (mascot [happy and auspicious object])

4. word

A word is written with one or more Chinese characters. A word can consist of a single character (脚, foot), a compound (幸运, lucky), a duplicate (招招手, to wave), or an affixed form (第一, first, 第二, second, etc.).

CO LP 13.1.10	Support ideas/opinions using compound sentences with adverb 因此		
For example:			
	Approaching	Attaining	Expanding
	我们猜....., 因为它有.....	纱布有很多孔, 因此, 我们推测.....	由于尼龙纱窗布上有很多小孔, 因此, 我们推测.....
	We predict..., because it has ...	Cheesecloth has many holes, as a result, we predict...	Due to the many tiny holes on the nylon screen, as a result, we predict...
	海绵是不管用的, 因为它太厚了。	海绵太厚了, 水不能通过, 因此, 我们认为海绵是不管用的。	由于毡布不能让水一滴一滴地滴下来, 因此, 我们认为毡布是不管用的。

The sponge does not work well, because it is too thick.	The sponge is too thick and it does not allow enough water to pass through, as a result, we think a sponge does not work well.	Due to the fact that the felt lets water drip through slowly, as a result, we think it works well.
....., 因为 (because)..... 因为 (because)....., 所以 (so)....., 因此 (as a result, therefore),	由于 (due to)....., 因此 (as a result, therefore),
Form focus:, 因此 (as a result, therefore),		
因此 (as a result, therefore) is an adverb that can be used instead of the conjunction 因为 in the second clause.		
Noticing and awareness spotlight		
1. Use of 由于 (due to)		
由于 (due to)....., reflects a more formal register and is more likely to be used in written communication.		
2. Simple descriptive sentence (Subj. + 是 + adj. + 的)		
The “是 + adj. + 的” structure is commonly used to describe something or someone. For example, 海绵是 不 管用的。(The sponge does not work.)		

CC LP 13.1.11	Negotiate turn-taking	
For example:		
Approaching	Attaining	Expanding
该我了! My turn!	下一个该轮到谁了? Who is the next?	如果你不赶紧, 我们都不能往下进行。 If you don't hurry, none of us can move on to the next.
到你了! Your turn!	我觉得该你了。 I think it's your turn.	
下一个是谁? Who's next?	大家都在等你呢! All of us are waiting for you!	
下一个是你吗? Are you the next one?		

Learning Activity 2

Period I

1. Inform groups that they will be preparing and executing an in-class oral presentation of their first model membrane design, using the information that they have written on their completed handout MMIC 13-1 (EiE® {4-8}).

Note: *If possible, invite a local Chinese-speaking engineer or engineering student to provide authentic feedback to the students on their designs. When the engineer arrives in class (either during Period I or Period II), allow him/her time to introduce him/herself, talk about how s/he uses the engineering design process at work, and answer questions from the students.*

2. Inform the students that, in addition to receiving feedback from the teacher and their peers, they will also receive feedback from a professional engineer.
3. Elicit from students (without them looking) what questions they remember from MMIC 13-1 (EiE® {4-8}). As students correctly cite the questions, display them on the interactive whiteboard, p.4 of IWB.
4. Assign the following group presentation tasks (display tasks on page 3 of MMIC 13-IWB):
 - **Chinese Champion**
 - introduces the group members and presents the model membrane to the class, along with the materials used
 - reports and justifies materials selection
 - **Magnificent Materials Manager** reports the answers to questions #1 and #2 of MMIC 13-1 (EiE® {4-8})
 - **Remarkable Recorder** reports the answers to question #3 of MMIC 13-1 (EiE® {4-8})
 - **Terrific Taskmaster** reports the answers to question #4 of MMIC 13-1 (EiE® {4-8}) and thanks the audience
 - Any student in the group may answer questions that classmates might have
5. On page 5 of MMIC 13-IWB, elicit students' ideas about features of a good presentation.

Note: *If this is the students' first time giving oral presentations in the classroom, consider also searching the Internet for appropriate examples of "good" and "bad" presentations. The more students understand what is expected of them, the more successful they will be.*

6. Display page 6 of MMIC 13-IWB. **As a group**, students will listen to other groups' presentation and then use MMIC 13-3: *Group Feedback Form*, to give feedback on other groups' presentation. Pass out and allow students time to explore MMIC 13-3, ask questions, and be clear on how they will use this handout.
7. Display page 7 of MMIC 13-IWB. **As individuals**, each student will listen for specific information related to correct use of classifiers and words used to report volume on

handout MMIC 13-4: *Numbers, Classifiers and Volume*. Pass out and allow students to explore the handout, ask questions, and be clear on how they will use this handout.

8. Give students time to prepare and practice.
9. Close the period by asking students to discuss in their groups questions to help them connect this activity to the unit, its story, and to the outside world (page 8 of MMIC 13-IWB): “Why did Juan Daniel design a model membrane? Can you think of any other technologies that regulate water flow?” (Answer: *Shower, river dam, faucet, etc.*) Briefly share selected responses.

Note: *Period II must take place on the same day as Period I.*

Period II

Note: *Be sure to take a photo of each group’s initial model membrane design. This photo will be added to the whiteboard pages for display during the “improved” model membrane presentations (IPA 1). Photos of initial and “improved” model membranes will ultimately be attached in emails to the visiting engineer (IPA 4). If possible, also use a video recording device to record each presentation to allow thorough feedback to groups as they prepare for their Integrated Performance Assessment (IPA).*

1. Start the period by introducing MMIC 13-6/IPA 1-1: *Presentational (Oral) Scoring Rubric* and allowing students time to ask questions (pages 9-12 of MMIC 13-IWB).
2. Let students know how you will use the rubric: first as a tool to provide feedback (Group presentation #1, Model Membranes) and then as an evaluation tool (Group presentation #2, “Improved” Model Membranes).

Note: *If possible, a Mandarin-speaking engineer will also listen to students’ group presentations and provide additional feedback.*

3. Allow students a short time to practice presentations and review how to fill out MMIC 13-3: *Group Feedback Form*.
4. Each group will present their report to the class, displaying their model membrane for the class to see. Each member of the group will present his or her part of the presentation.
5. As student groups present, individual students should listen for specific features of the presentation and complete MMIC 13-4: *Numbers, Classifiers and Volume*.
6. Allow students (and visiting engineer) time after each presentation to ask questions, provide feedback, and make connections to their own model membranes.
7. After each presentation, the feedback groups will discuss, finalize, and turn in their completed handouts MMIC 13-3 and MMIC 13-4. During this time, the teacher will complete MMIC 13-6/IPA 1-1: *Presentational (Oral) Scoring Rubric* to use later during feedback conferences.
8. Collect handouts from all groups, making sure that they are correctly labeled.

9. Display page 13 of MMIC 13-IWB and introduce the self-assessment tool. Pass out MMIC 13-5: *Self-Assessment of Group Work*, and give students a chance to review it and ask any questions they may have. Then, ask students to individually reflect on and complete this assessment. Collect assessments.
10. Use MMIC 13-3: *Group Feedback Form*, MMIC 13-4: *Numbers, Classifiers and Volume*, MMIC 13-5: *Self-Assessment of Group Work*, and the teacher-completed MMIC IPA 13-6/1-1: *Presentational (Oral) Scoring Rubric* during group feedback conferences that will take place before the final oral presentation (Group presentation #2), Part One of the Integrated Performance Assessment.

Language Function-Form-Vocabulary Connections (Activity 2)		
CO LP 13.2.1	Report on things, actions, or events in past time using action verbs with 了 (temporal marker) and dependent time phrase	
Approaching	Attaining	Expanding
我们用两张咖啡过滤纸和一块毡布。 We use two coffee filters and one piece of felt.	两张咖啡过滤纸和一块毡布吸收了很多的水。 Two coffee filters and one piece of felt absorbed a lot of water.	昨天, 我们采用了两张咖啡过滤纸和一块毡布。 We used two coffee filters and one piece of felt yesterday.
No temporal marker, no adverb of time	Temporal marker 了 used	Temporal marker 了 and adverb of time used
Form focus: action verb + 了 (temporal marker) + adverb of time		
Past time can be communicated using “了”, adverbs of time or both.		
Noticing and awareness spotlight: Position of temporal marker “了”		
The temporal marker “了” is positioned either immediately after the main verb or at the end of the sentence/clause.		

CO LP 13.2.2	State quantities of materials using numbers and appropriate classifiers	
For example: 一张铝箔纸 (a piece of aluminum foil) 五张咖啡过滤纸 (five coffee filters) 三块纱布 (three pieces of cheesecloth) 两块海绵 (two sponges)		
Approaching	Attaining	Expanding
个 (gè) people and general object 家 (jiā) families and business establishments 件 (jiàn) clothing 棵 (kē) plants 只 (zhī) insects and animals 支 (zhī) rod-shaped objects, e.g., pencil, Chinese paint brush 把 (bǎ) small objects and objects with a handle, e.g., scissors, chair	张 (zhāng) thin and flat objects, e.g., aluminum foil, coffee filter 块 (kuài) pieces of small things, e.g., felt, sponge 位 (wèi) persons of status, e.g., professor, engineer 碗 (wǎn) things that come in bowls mostly, e.g., noodles, rice, water	滴 (dī) a drop/a drip used for liquid items 对 (duì) couple/pair: modifies anything that comes in pairs 架 (jià) planes and large vehicles and a few smaller electric objects such as radios

本 (běn) journals, books and files	场 (chǎng) events and happenings such as episode, e.g., soccer game	
Form Focus: Number + Classifier + Object (noun)		
Classifiers are used when counting objects (nouns). Almost all nouns have a corresponding classifier. When learning a noun it is always good to learn its classifier.		
Noticing and awareness spotlight		
1. The difference between 二 and 两		
二	两	
1) Counting: e.g., 一、二、三..... 2) Used in ordinal numbers: e.g., 第一 (first)、第二 (second)、第三 (third) 3) As last part of any higher number that ends in two: e.g., 十二 (12)、八十二 (82)	Used whenever a classifier is used to indicate “two of something”, see: Subj. + Verb + 两 + Classifier + Noun	
2. The difference between 只 and 支		
只 (zhī)	支 (zhī)	
只 is used for insects and animals.	支 is used for rod-shaped objects.	
These two classifiers are homophones. They have the same pronunciation but different uses and meanings.		

CO LP 13.2.3	State exact amount of liquids using fractions/decimals with units of measurement
For example: 二分之一杯 (a half of a cup) 四分之三杯 (three quarters of a cup) 118.34 毫升 (118.34 milliliters)	
Focus on form: Fractions/decimals	
Fractions begin with the denominator, followed by 分之 (parts of), and the numerator, e.g., # (denominator) + 分之 + # (numerator). When reporting decimals, the whole number before the period is expressed as a multi-digit number (e.g., 118.34; before the decimal point, 118 reads as 一百一十八 [one hundred and eighteen]), while the decimal is expressed as single digits (e.g., .34 reads as 点三四 [dot, three, four]).	

Noticing and awareness spotlight	
1. Units of measurement	
Units of measurement can function as nouns or classifiers. When units of measurement are nouns, no classifier is used. For example: Unit of measurement as noun: 118.34 毫升 (118.34 milliliters), 11.5 杯 (11.5 cups) Unit of measurement as classifier: 150 毫升水 (150 milliliters of water), 一杯水 (a cup of water) Other such units of measurement are 盎司 (ounce), 英尺 (foot), 英里 (mile), 磅 (pound), etc.	
2. 杯 (cup)	
杯 (cup) as physical object: use the classifier “个” (e.g., 一个杯子 [one cup]) 杯 (cup) as unit of measurement: do not use classifier (e.g., 11.5 杯 [11.5 cups]) 杯 (cup) as classifier: used as a classifier (e.g., 一杯水 [a cup of water])	

CO LP 13.2.4	Ask and answer questions using question words	
For example:		
Approaching	Attaining	Expanding
..... 吗? Use of ma 是不是.....? Is or is not?	谁.....? (Who) 什么.....? (What) 哪里.....? (Where) 什么时候.....? (When) 怎么.....? (How) 为什么.....? (Why)	几/多少? (How many) 哪(些).....? (Which)
Form focus: Placement of question words		
Most question words in English occur at the beginning of a sentence. However, question words in Chinese occur in a variety of positions. Generally, question words appear in the same position as the grammatical function they serve in the sentence. For example: 谁参加足球比赛? (Who is going to play the soccer game? [“Who” occurs in subject position]) 你看见几个足球运动员? (How many soccer players did you see? [“How many” is in the # position of the noun phrase # + classifier + noun])		
Noticing and awareness spotlight: Use of 吗? 吧? 呢?		
A few particles are commonly used at the end of questions. 吧? is used to invite agreement. 呢? is a tag question meaning “, and you?” 吗? is a question particle that is used when one expects a “yes” or “no” response.		

CO LP 13.2.5	Give emphasis to the specific direct object by using 把 or 让/使 construction and placing the direct object before the verb		
Approaching	Attaining	Expanding	
我的薄膜模型阻挡有害的东西在外面。 My model membrane blocks/stops harmful things outside.	我的薄膜模型（不）让水通过。 My model membrane should (not) let water pass through.	我的薄膜模型（不）让水慢慢地通过。 My model membrane should (not) let water pass through slowly.	
Subj. + Verb + Object + Complement (adv.) .	Subj. + 让/使-construction [让/使 + direct object + verb], such as, ...	Subj. + 让/使-construction [让/使 + direct object + verb], such as, ...	
Form focus: Use of 让/使-construction			
Similar to “把-sentence,” the “让/使-construction” allows one to place the direct object in front of the main verb, which is not typical word order in Chinese. This draws more attention to what is happening to the object itself.			

CO LP 13.2.6	Describe attributes of something/someone using the existential verb 有 with a modifying noun phrase		
Approaching	Attaining	Expanding	
水太多/太少/正好。 There is too much/too little/just right water. 我们有太多/太少/足够的水。 We have too much/too little/just right water.	(在)杯子里有太多/太少/足够/118.34 毫升的水。 There is too much/too little/just right/118.34 milliliters of water in the cup.	有太多/太少/足够/118.34 毫升的水通过了薄膜模型。 There is too much/too little/just right/118.34 milliliters of water that passed through the model membrane.	
Subj. (noun) + [be verb is omitted] + adverb 太多/太少/正好 too much/too little/just right We have...	Locative phrase + existential verb (有) + modifying noun phrase (adj. + 的 + noun)	Existential verb (有) + modifying noun phrase (adj. + 的 + noun) + Verb phrase	
Focus on form			
1. Locative phrase + existential verb (有) + modifying noun phrase			
The locative phrase, identifying the place where something exists, begins the sentence. The locative phrase is followed by the existential verb (有 [have]) and a modifying noun phrase.			

2. Modifying noun phrase [adj. + 的] + Head noun

Modifying phrases can be attributive adjectives followed by the particle 的, e.g., 光亮的 (shiny), 太少的 (too little). Modifying phrases are placed in front of the head noun they describe (e.g., 足够的水 just enough water).

CO LP 13.2.7 Support ideas/opinions using compound sentences with adverb 因此		
Approaching	Attaining	Expanding
我们用了....., 因为咖啡过滤纸让太多的水通过。 We used....., because coffee filters allowed too much water to pass through.	咖啡过滤纸让太多的水通过我们的薄膜模型, 因此, 我们用了..... Coffee filters allowed too much water to pass through our model membrane, as a result we used.....	由于太多的水通过了我们的薄膜模型, 因此, 我们用了..... Due to too much water passing through our model membrane, as a result we used.....
....., 因为 (because)..... 因为 (because)....., 所以 (so)....., 因此 (as a result, therefore),	由于 (due to)....., 因此 (as a result, therefore),
Form focus:, 因此 (as a result, therefore),		
因此 (as a result, therefore) is an adverb that can be used instead of the conjunction 因为 in the second clause.		
Noticing and awareness spotlight: Use of 由于 (due to)		
由于 (due to)....., reflects a more formal register and is more likely to be used in written communication.		

CO LP 13.2.8 Give reasons for actions/choices/preferences using preposition 为了		
Approaching	Attaining	Expanding
我们用了....., 因为咖啡过滤纸让太多的水通过。 We used....., because coffee filters allowed too much water to pass through.	为了让水流得慢一些, 我们用了更多的毡布。 In order to slow the rate of water flow we used more pieces of felt.	我们选择.....的原因是..... The reason that we chosewas....

....., 因为 (because)..... 因为 (because)....., 所以 (so).....	Preposition/coverb (为了/for the purpose of) + 让/使- construction [让/使+ Object + V + adv. phrase [得 (adv. marker) + adv.]], Subj. + V + adj. phrase [adv. 更 + adj. 多+ adj. marker 的] + Object.	Adjective phrase [Subj. pronoun + V + Object + 的] + Noun/Subject (原因)+ V(是)
Form focus: Use of 让/使-construction		
Similar to “把-sentence,” the “让/使-construction” allows one to place the direct object in front of the main verb, which is not typical word order in Chinese. This draws more attention to what is happening to the object itself.		
Noticing and awareness spotlight		
1. Placement of preposition/coverb		
Prepositions/coverbs such as 为了 (for the purpose of) introduce a noun phrase. Together, the preposition + noun phrase combination are typically placed before the main SVO in the sentence. In sentence initial position they add emphasis.		
2. Difference between 的 (de) and 得 (de)		
的 is used to modify a noun. 的 precedes the noun it modifies, e.g., adjective + 的 + noun; 得 is used to modify a verb. 得 follows the verb it modifies, e.g., V + 得 + adverb		

CO LP 13.2.9	Use a developing understanding of basic units of word formation in Chinese to infer and construct meaning with written text
Form focus: radical → character → compound/word	
1. radical	
A radical is the smallest meaningful orthographic unit in compound characters, for example, 虫 (insect) is used in the character 蛙 (frog). 虫 (insect) can also be a stand-alone character. There are three types of radicals: semantic (give information about character meaning) [手 (hand)], phonetic (give information about character pronunciation) [分 (fen) in the compound 纷 (one after another)], and perceptual (do not give information about character meaning or pronunciation, instead function as visual fillers) [此 (this, these in classical Chinese), however, in the compound 嘴 (mouth) the radical 此 functions as a perceptual radical providing information about neither meaning nor pronunciation].	
2. character	
A Chinese character is a meaningful orthographic unit that is always pronounced as one syllable. Chinese characters have evolved as a writing system over millennia and have developed in various ways.	

Some characters are **pictographs** that were originally drawings of concrete objects, for example, 雨 (rain), the four dots depicting the rain coming down from the sky; others are better described as **ideographs** because they were created as graphic representations of more abstract ideas such as the notion of “above”, 上, the stroke above the horizontal line indicating the idea of “above” or “up.” Another way to create characters was to combine two or more pictographs or ideographs to portray a new meaning, for example, 休 (to rest), a combination of the pictographs for person, 人, and a person leaning against a tree, 木. These types of characters are referred to as **ideogrammatic characters**.

Over 90% of Chinese characters were created as **phono-semantic compound characters** and are made up of a combination of semantic and phonetic radicals. For example, 控 (to control), the semantic radical on the left side, 手 (hand), indicates that the word meaning will include an action with a hand, and the phonetic radical on the right side 空 (kōng), helps the reader with character pronunciation “kòng.”

3. compound

Compounds consist of at least two characters, neither of which is an affix, a character that on its own lacks meaning but when added to other characters becomes a meaningful unit. Most Chinese words are compounds. Compounds have various types of syntactic relationships.

A few compound types:

Verb-Object: 踢足球 (to kick soccer ball)、开球 (to kick of)、发誓 (to pledge)

Verb-Complement: 摔倒 (to fall down)、改进 (to improve and get better)、进来 (to come in)

Subject-Predicate: 天亮 (bright [sky is bright])

Number-Classifier: 各种 (various kinds)、一道 (a ray of...)、一片 (a patch of...)

Adverb-Verb: 慢跑 (to jog [to run slowly])、快走 (to hurry [to walk fast])





Verb-Verb-Noun: 栖息地 (habitat [to stay and rest at a place])

Adjective-Adjective-Noun: 浅桃色 (light peach color)、吉祥物 (mascot [happy and auspicious object])

4. word

A word is written with one or more Chinese characters. A word can consist of a single character (脚, foot), a compound (幸运, lucky), a duplicate (招招手, to wave), or an affixed form (第一, first, 第二, second, etc.).

CO LP 13.2.10	Construct characters to form words and phrases adhering to character structure rules and stroke order guidelines
For example: Left-right: 叫、场 Top-bottom: 吉、只 Left, middle, right: 树、谁 Top, middle, bottom: 复、常	

One-part, totally enclosed: 国、回 Partially enclosed: 用, 原		
Approaching	Attaining	Expanding
One- and two-part characters One-part character 我、生 One-part, totally enclosed 国、回 Two-part characters Left-right: 叫、场 Top-bottom: 吉、只	Three-part characters Left, middle, right: 树、谁 Top, middle, bottom: 复、常 Left, top-right, bottom-right: 锋、纷 Top-left, bottom-left, right: 部、剂、劲 Left-top, right-top, bottom: 然、赞 Top, left-bottom, right-top: 死、前	Four + part characters Left-top, right-top, left-bottom, right bottom: 能、舒 Left, top-right, middle-right, bottom-right: 慢、镜 Left, middle, top-right, bottom-right: 游 Left, middle-top, middle-bottom, right: 湖
Form focus: Formation of Chinese characters		
1. Character structure rules		
<p>Chinese characters are called “square” characters because no matter how simple or complex, each character fits inside a square. Characters can usually be divided into different parts. These parts form character structures. There are four main structures: one-part structure, two-part structure, three-part structure, and four-part structure. These structures can be further divided into sub-parts.</p> <p>For example,</p> <p>Two-part structures:  (top/bottom),  (left/right)</p> <p>Three-part structures:  (left, top-right, bottom-right),  (top-left, bottom-left, right), etc.</p>		
2. Stroke order guidelines		
<p>General rules for writing Chinese characters are:</p> <ol style="list-style-type: none"> 1. Horizontal first, then vertical. 2. Top first, then bottom. 3. Left first, then right. 4. Left-slanted first, then right-slanted. 5. Outside first, then inside. 6. Center first, then both sides. 7. With “closed” characters, enter character first, then close it up. 		

CC LP 13.2.11	Express a personal opinion		
Approaching	Attaining	Expanding	
我觉得／想 I feel like/think...	在我看来..... It seems to me like...	我建议..... I suggest...	
也许／可能 (maybe, perhaps)	对我来说, In my opinion, ...	我的看法是..... My thoughts are...	
	我认为..... I believe/think ...	我是说..... What I mean is...	

CC LP 13.2.12	Express agreement/disagreement		
Approaching	Attaining	Expanding	
好。 Good.	你说得对。 You are correct.	我的想法跟你的一样。 I share your thoughts.	
我同意。 I agree.	你完全正确。 You're absolutely right.	我赞成。 I agree (more formal).	
我也是／同意。 I also + verb (am/agree).	我也是这么认为的。 I think so too.	我完全赞同。 I agree with you entirely.	
对。 Exactly/Correct.	我也不这么认为。 I don't think so either.		
不。 No.	我不是这么认为的。 I don't think so.	我的意见跟你的不同。 My suggestions are different from yours.	
不好。 Not good.	是, 可是你不觉得.....? Yes, but don't you think...	我想和你讨论讨论..... I must take issue with you on that.	
不同意。 I don't agree with you.	我觉得我不同意。 I'm afraid I have to disagree.	然而 However	
不对。 Not exactly.			
Noticing and awareness spotlight: Repetition of verb			
Repetition of a verb, e.g., 讨论讨论 (to discuss), can be used to soften the tone of voice.			

CC LP 13.2.13	Report events in past time using adverbs of time	
Approaching	Attaining	Expanding
星期一、星期二、星期三、 星期四、星期五、星期六、 星期天(日) seven days of the week 昨天 yesterday 第一、第二、第三..... ordinals: first, second, third... 今天早上 this morning	上个星期 last week 上次 last time 第一次 the first time 以前, 这次,before, this time, ... # 天(以)前 # days ago 过去 in the pass	上半个星期/月 earlier this week/month 上半天/年 earlier in the day/year
Noticing and awareness spotlight		
1. Placement of adverbs of time		
Adverbs of time are placed either at the beginning of the sentence or after the subject and before the main verb.		
2. Timeline as a vertical (not horizontal) concept		
If we imagine a vertical line to represent past, present, future time, then the Chinese use of the word 上 (literally “above”) to represent past time and 下 (literally “below”) to indicate future may be easier for English speakers to acquire.		
3. Use of “以”		
# 天(以)前 (# days ago): In this adverbial phrase, “以” is optional. 以前 (before): As a conjunction, “以” cannot be omitted.		

CC LP 13.2.14	Request feedback											
Approaching	Attaining	Expanding										
你觉得我们的薄膜模型怎么样? What do you think of our model membrane?	你觉得如何把我们的薄膜模型做得更好? How do you think we could improve our model membrane?	你认为如何使我们的薄膜模型工作得更好? Do you have any ideas/suggestions for how we could make our model membrane work even better?										
Subj. + V + Object + Question word	Subj. + V + Question word + 把-construction (把 + Object + V + 得 + adverb)	Subj. + V + Question word + 使-construction (使 + Object + V + 得 + adverb)										
Focus on form: Use of “把-sentence”												
The “把-sentence” allows one to place the direct object in front of the main verb, which is not typical word order in Chinese. This draws more attention to what is happening to the object itself.												
Noticing and awareness spotlight												
1. Placement of question words												
Most question words in English occur at the beginning of a sentence. However, question words in Chinese occur in a variety of positions. Generally, question words appear in the same position as the grammatical function they serve in the sentence. For example: 谁来吃晚饭? (Who is coming to dinner? [“Who” occurs in subject position]) 你看见几个人? (How many people did you see? [“How many” is in the # position of the noun phrase # + classifier + noun])												
2. Difference between 的 (de) and 得 (de)												
的 is used to modify a noun. 的 precedes the noun it modifies, e.g., adjective + 的 + noun; 得 is used to modify a verb. 得 follows the verb it modifies, e.g., V + 得 + adverb												
3. 得 as polyphone												
To be a polyphone, “duō yīn zì” (多音字) in Chinese, a character must have two or more pronunciations and multiple meanings. Each pronunciation goes with one meaning. For example: <table border="1" data-bbox="292 1606 1226 1869" style="margin-left: 20px;"> <tr> <td rowspan="2" style="vertical-align: middle;">得</td> <td style="border-right: 1px solid black; padding-right: 5px;">de</td> <td>说得好 V + 得 + adverb, a particle used between a verb and an adverb that modifies the verb</td> </tr> <tr> <td style="border-right: 1px solid black; padding-right: 5px;">děi</td> <td>得走 verb, meaning “have to, must”</td> </tr> <tr> <td rowspan="2" style="vertical-align: middle;">薄</td> <td style="border-right: 1px solid black; padding-right: 5px;">báo</td> <td>薄的 adj. + 的, meaning “thin”</td> </tr> <tr> <td style="border-right: 1px solid black; padding-right: 5px;">bó</td> <td>薄膜 no n, meaning “membrane”</td> </tr> </table>			得	de	说得好 V + 得 + adverb, a particle used between a verb and an adverb that modifies the verb	děi	得走 verb, meaning “have to, must”	薄	báo	薄的 adj. + 的, meaning “thin”	bó	薄膜 no n, meaning “membrane”
得	de	说得好 V + 得 + adverb, a particle used between a verb and an adverb that modifies the verb										
	děi	得走 verb, meaning “have to, must”										
薄	báo	薄的 adj. + 的, meaning “thin”										
	bó	薄膜 no n, meaning “membrane”										

Focused Learning Phase—“Through” Activities

Time: Learning Activity 3—45 minutes

Learning Activity 4—45 minutes

Note: *Learning Activity 4 must take place on a day when the following day of the week is also a school day. The activity will fail if it is completed prior to a weekend or holiday. However, activities 3 and 4 do not need to occur on the same day.*

Learning Activity 3

1. Place students in their working groups. They should rotate group roles so that they all have new responsibilities.
2. Ask students to work in their groups to recall the steps in the engineering design process. Debrief as a class and ask students to identify where, in the model membrane design process, the class is. (Answer: *Improve*).
3. Ensure that students know today’s objective is to learn from their first design and *improve* it.
4. Display page 14 of MMIC 13-IWB. Allow students time to brainstorm with partners what “improve” might look like for the model membrane design. Record answers on the board, highlighting the fact that improvements may be for some membranes to allow less water through yet for others to allow more water through.
5. Present today’s design challenge on the interactive whiteboard (pages 15-17): “With your group, you will practice the last step in the engineering design process: *Improve* your model membrane.”
 - a. You will discuss how to change or adjust your materials to create a model membrane that will slowly drip water to the imaginary (or plastic) frog at the bottom of your container.
 - b. You may combine these materials in any way that you think would work, learning from what did or did not work for you on your last model and from what did or did not work for the other groups’ models, as well as from what we learned about these materials in Lesson 11 (Students may refer to completed handout: MMIC 11-3: *Testing Model Membrane Materials* (EiE® {4-8})).
 - c. You may cut the materials to fit inside the container. All of your materials must fit in the container with the lid on.
 - d. When ready, with adult help, you will pour $\frac{1}{2}$ cup or 118.3 ml of water into your model membrane.
 - e. 24 hours later, you will observe and evaluate how much water has dripped through. Success = some water, up to $\frac{1}{4}$ cup (59.1 ml) will have dripped through in 24 hours.
6. Ask students to discuss the specific responsibilities of each group member (page 18 of MMIC 13-IWB).

- a. **Magnificent Materials Manager** in each group should return to the bins to take apart the prior model, pour out any water, and return the reusable materials to the materials table.
 - b. **Terrific Taskmaster** should ensure that everyone has the chance to share his/her opinions or ideas and check to see that the group is following the steps in the engineering design process (re-ask, re-imagine, re-plan, re-create).
 - c. **Chinese Champion** should be sure that everyone has a turn to give his or her opinion and help with Chinese language needs.
 - d. **Remarkable Recorder** will draw the improved design. S/he also writes the materials list, including the quantity of each material with the correct classifier, and writes the group's answer to question #2 of MMIC 13-2 (EiE® {4-10}) "*How will these changes improve your model membrane design?*" using a comparative sentence structure.
7. Call on one student for each role and ask them to state their particular responsibilities for the task. Invite other students with the same role to add any ideas.
 8. Display page 19 on the whiteboard and pass out MMIC 13-2 (EiE® {4-10}) to each group, one copy per group. Allow time for students to preview and discuss the handout.
 9. Model the brainstorming process for improving the teacher's model membrane design. Be sure to use language functions, forms, and vocabulary that students will need to be successful with the task and stay in Mandarin. Invite students to listen carefully to the language used and tell them that you will be listening for this same language as you observe their group work.
 10. Give students time to brainstorm improvements for their model membranes. Post the following sample sentences on page 20 of the interactive whiteboard to facilitate "suggesting" and "comparing":

Chinese	English
我们用.....吧!	Let's use...
我建议用.....代替.....。	I suggest/recommend trying ... instead of
.....可能比.....更 useful/适合。	... may be more useful/suitable than

11. Once groups have finished their improved plans (including a complete materials list), they should read it out loud to the teacher for approval.
12. Upon approval, groups should put away their materials list, design plan, and EiE® materials.

Language Function-Form-Vocabulary Connections (Activity 3)		
CO LP 13.3.1	State quantities of materials using numbers and appropriate classifiers	
For example: 一张铝箔纸 (a piece of aluminum foil) 五张咖啡过滤纸 (five coffee filters) 三块纱布 (three pieces of cheesecloth) 两块海绵 (two sponges)		
Approaching	Attaining	Expanding
个 (gè) people and general object 家 (jiā) families and business establishments 件 (jiàn) clothing 棵 (kē) plants 只 (zhī) insects and animals 支 (zhī) rod-shaped objects, e.g., pencil, Chinese paint brush 把 (bǎ) small objects and objects with a handle, e.g., scissors, chair 本 (běn) journals, books and files	张 (zhāng) thin and flat objects, e.g., aluminum foil, coffee filter 块 (kuài) pieces of small things, e.g., felt, sponge 位 (wèi) persons of status, e.g., professor, engineer 碗 (wǎn) things that come in bowls mostly, e.g., noodles, rice, water 场 (chǎng) events and happenings such as episode, e.g., soccer game	滴 (dī) a drop/a drip used for liquid items 对 (duì) couple/pair: modifies anything that comes in pairs 架 (jià) planes and large vehicles and a few smaller electric objects such as radios
Form Focus: Number + Classifier + Object (noun)		
Classifiers are used when counting objects (nouns). Almost all nouns have a corresponding classifier. When learning a noun it is always good to learn its classifier.		
Noticing and awareness spotlight		
1. The difference between 二 and 两		
二	两	
1) Counting: e.g., 一、二、三..... 2) Used in ordinal numbers: e.g., 第一 (first)、第二 (second)、第三 (third) 3) As last part of any higher number that ends in two: e.g., 十二 (12)、八十二 (82)	Used whenever a classifier is used to indicate “two of something”, see: Subj. + Verb + 两 + Classifier + Noun	

2. The difference between 只 and 支	
只 (zhī)	支 (zhī)
只 is used for insects and animals.	支 is used for rod-shaped objects.
These two classifiers are homophones. They have the same pronunciation but different uses and meanings.	

CO LP 13.3.2	Order a series of events using sequencing adverbs		
Approaching	Attaining	Expanding	
第一、第二、第三..... Ordinals: first, second, third... 首先,, 然后,, , 最后,, First, ..., later, ..., finally, ... 开始 in the beginning 先.....,后..... ...before..., ...after...	首先,, 再,, 接下来, ,, Initially, ..., then, ..., next, ... 起先、起初 in the beginning 后来 later on 那以后 after that 结束 at the end	于是 consequently, as a result 总之 in conclusion 稍后 afterwards 最终 at the end	
For example:			
第一步是.....。在第一步里, 他.....。 第二步是.....。在第二步里, 他.....。 第三步是.....。在第三步的时候, 他.....。 The first step was _____. In the first step, Juan Daniel _____. The second step was _____. In the second step, he _____. The third step is _____. In the third step, he _____.	在第一场足球比赛, Juan Daniel 一开始的时候踢进了第一球, 后来 José Eduardo 把 Juan Daniel 推倒了, Juan Daniel 的胳膊受伤了。最后, Juan Daniel 要在板凳上休息。 In the first soccer game, Juan Daniel scored a goal at the beginning of the game, later on José Eduardo pushed him down and his arm was hurt. Finally, Juan Daniel had to sit on the bench.	在上星期第一场足球比赛, Juan Daniel 和队友们起初先进了一球, 稍后, 正当 Juan Daniel 鼓足劲儿要出脚的时候, 突然有人用力地推了一下他的肩膀。于是, Juan Daniel 的胳膊受伤了, 他不可以比赛。 In the first soccer game last week, Juan Daniel's team was winning at the beginning, then, when Juan Daniel was about to kick the soccer ball again, suddenly someone shoved his shoulder hard. As a result, his arm was hurt and he could not play.	

Form focus: Placement of sequencing adverbs
Sequencing adverbs are usually placed at the beginning of the sentence and set off with a comma.
Noticing and awareness spotlight
1. Use of punctuation mark “、” vs. “，”
<p>In written Chinese, “、” is typically used when you want to list a series of actions or items. For example,</p> <p>工程设计步骤的五个步骤：提问题、思考、在家中找材料并设计、制作、测试和改进。 The five steps of the Engineering Design Process are: Ask questions, imagine solutions, make a plan, create a model, and improve it.</p> <p>Written Chinese also has the “，” (comma). The comma is used to set off a dependent clause or an adverbial phrase.</p> <p>上星期冠军赛的时候，Juan Daniel 和队友们起初落后，稍后他们用工程设计步骤制定了一个取胜的好办法，于是他们取得了胜利。</p> <p>In the championship game last week, Juan Daniel’s team was losing at the beginning, afterwards they came up with a plan using the engineering design process, and finally, they won the game.</p>

CO LP 13.3.3	Describe attributes of persons/places/things using modifying phrases	
For example: 有小孔的铝箔纸 (the aluminum foil that has tiny holes) 厚厚的、用塑料做的海绵 (the sponge that is thick and made of plastic)		
Approaching	Attaining	Expanding
白色的 (white) 银色的 (silver) 厚(厚)的 (thick) 薄(薄)的 (thin) 光亮的 (shiny)	有小孔的 (that has tiny holes) 没孔的 (that does not have holes)	吸收水分的 (that absorbs water) 用纸做的 (that is made of paper)
Attributive adjective [adj. + 的] + Head noun	Relative clause [(没)有 + noun + 的] + Head noun	Relative clause [verb + noun + 的] + Head noun
Form focus: Relative clause [verb + noun + 的] + Head noun		
Modifying phrases can be either attributive adjectives, e.g., 光亮的 (shiny) or relative clauses, e.g., 有 (have) 小孔 (tiny holes) + 的 (that has tiny holes). Modifying phrases are placed in front of the head noun (e.g., 有小孔的铝箔纸).		

Noticing and awareness spotlight	
1. The negation of 有 (have) is 没有	
The negative particle 没 (méi), not 不 (bù), must be used to negate 有 (yǒu) [have]. 没 can be used by itself to express 没有 (méi yǒu). If 没 is used by itself, 有 is assumed such that 没 = 没有.	
2. Adjective repetition	
厚厚的 (thick)、薄薄的 (thin) Use of double adjectives is typical for young children.	

CO LP 13.3.4	Recount events in simple past time using action verbs with 了 (temporal marker) and dependent time phrase/clause in complex sentence	
For example:		
Approaching	Attaining	Expanding
我们发现了.....不管用。 We found ... did not work well.	当我们测试尼龙纱窗布的时候，我们看见了水穿过得很快。 When we tested the nylon screen, we saw that water passed through it quickly.	经过测试有一个孔的铝箔纸后，我/我们发现了水流得很快。 After testing the aluminum foil with one hole, I/we found that it made the water flow slowly.
我们学到了葡萄干吸收水。 We learned that a raisin absorbs water.	在葡萄干的实验中，我们学到了薄膜可以让水通过。 In the raisin experiment, we learned that a membrane can let water pass through.	在葡萄干的实验中，我们学到了薄膜可以让水通过，也可以阻挡沙。 In the raisin experiment, we learned that a membrane can let some things pass through and block other things.
Simple past time using action verb with temporal marker 了	Use of dependent time phrase in complex sentence and temporal marker 了	Use of dependent time clause in complex sentence and temporal marker 了
Form focus		
1. Use of 了 as temporal marker		
Simple past time can be communicated using 了 (temporal marker), e.g., action verb + 了 (temporal marker). The temporal marker “了” is positioned either immediately after the main verb or at the end of the sentence/clause.		

2. Use of dependent time phrase/clause in complex sentence

Mandarin uses adverbs of time and adverb of time phrases to connect two clauses and form one complex sentence.

The first clause may consist of

- An adverb of time placed at the end of the first clause [noun + adverb of time 的时候], e.g., 足球比赛的时候, (While at the soccer game, ...)
- or an adverb of time phrase that is separated into two parts [当 (part 1) + simple SVO sentence + 的时候 (part 2)], e.g., 当我们测试尼龙纱窗布的时候, (When we tested the nylon screen, ...).

For example,

Noun/simple SVO sentence + adverb of time phrase 以后.....后 (after), + main clause.

Noun/simple SVO sentence + adverb of time 以前 (before), + main clause.

Noun/simple SVO sentence + adverb of time phrase 当.....的时候 (when/while at), + main clause.

Noticing and awareness spotlight

1. Use of temporal marker “了” with “verb + verb complement” structure

When a two-character “verb + verb complement” structure is used, the temporal marker “了” must be placed after the verb complement.

For example,

[我] 看到了。(I saw.)

However, if the verb complement consists of two characters instead of just one, then “了” can be placed either after the one-character first main verb or after the two-character verb complement.

For example,

他走了出来。(He walked out of there.)

他走出来了。(He walked out of there.)

2. Use of particles 的、地、得

的 (de) is used when an adjective and/or a pronoun modifies a noun. The form is:

Adj./pron. + 的 + Noun, for example, 炎热的夏天 (sweltering summer), 我们的薄膜模型 (our model membrane design)

地 (de) is used when an adverb modifies a verb. The form is:

Adv. + 地 + Verb (unlike in English!), for example, 高兴地欢呼 (cheer happily)

得 (de), as a potential complement, is used as a complement to further describe a main verb/adjective. It is placed after the verb/adjective it describes. The form is:

Verb/adjective + 得 + degree complement

The degree complement can be made up of an adverb or a noun phrase.

For example,

我跑得快。(I ran fast.) (得 + adverb as degree complement)

薄膜有一些小得眼睛都看不见的孔。(Membranes have holes that are too small to see.)

(得 + noun phrase as degree complement).





CO LP 13.3.5	Make comparison between two things using A + 比 (comparison marker) + B + (更) + adjective structure		
Approaching	Attaining	Expanding	
铝箔纸跟毡布不一样。 The aluminum foil and the felt are different.	有小孔的铝箔纸比海绵更合适。 The aluminum foil with tiny holes is more suitable than the sponge.	有小孔的铝箔纸比海绵更能控制水流。 The aluminum foil with tiny holes can control the water flow better than the sponge.	
A + 跟 (and) + B + 一样 (same)/不一样 (different)	A + 比 + B + (更) + adj.	A + 比 + B + + (更) + verb phrase	
Form focus: A + 比 + B + (更) + Adjective			
“A” and “B” can be either nouns or noun phrases. 比 (comparison marker) is positioned between A and B with the adjective placed after B.			
Noticing and awareness spotlight: Use of 更 (even, even more)			
The adverb 更 is placed before the adjective. It is often omitted if the adjective is monosyllabic; it is typically used if the adjective is multisyllabic.			

CO LP 13.3.6	Suggest an alternative idea using serial verb construction with pivotal noun phrase		
Approaching	Attaining	Expanding	
我们用有小孔的铝箔纸，没用海绵。 We used the aluminum foil with tiny holes, we didn't use the sponge.	我们用咖啡过滤纸代替有小孔的铝箔纸。 We used the coffee filter instead of the aluminum foil with tiny holes.	为什么不用毡布代替尼龙纱窗布? Why don't we use the felt instead of the nylon screen?	
Parallel SVO sentence construction used to first confirm and then disconfirm.	Subj. + Verb ₁ + Object ₁ + Verb ₂ + Object ₂	为什么不 (why not) + Verb ₁ + Object ₁ + Verb ₂ + Object ₂	

Form focus: Subj. + Verb₁ + Object₁ + Verb₂ + Object₂
A serial verb construction refers to a sentence with two or more verbs that are connected by one and the same event. One type of serial verb constructions is called the pivotal construction. A pivotal construction contains a noun phrase (Object ₁) that “pivots” between functioning as the object of Verb ₁ and the subject of Verb ₂ .
Noticing and awareness spotlight: Use of 没(有)
The negative particle 没(有) is also used to indicate that an action DID NOT happen in the past; “不 (bù) + verb” is used to indicate that an action DOES NOT happen in the present or WILL NOT happen in the future. For example: 1. 我 <u>不</u> 吃早饭。I don't eat breakfast. (habit) 2. 我 <u>没</u> 吃早饭。I haven't eaten breakfast.

CO LP 13.3.7	Predict cause-effect relationship using hypothetical conditional sentences with 如果/要是……, (那么)…… and the adjectival verb 可能		
Approaching	Attaining	Expanding	
我想有孔的铝箔纸可能更好。它会阻挡太多的水通过。 I think the aluminum foil with holes is perhaps better. It will block too much water from passing through.	如果/要是你们用咖啡过滤纸代替海绵, 我觉得更多的水可能会通过。 If you use coffee filters instead of the sponge, then I think more water may pass through.	如果/要是你们用咖啡过滤纸代替海绵, 我觉得薄膜模型的效果可能会更好, 因为咖啡过滤纸比海绵能少吸收水分。 If you use coffee filters instead of the sponge, then I think the model membrane may work better, because coffee filters absorb less water than a sponge.	
可能 (maybe, perhaps)	要是/如果……, ……(可能)……	要是/如果……, ……(可能)……, 因为……	
Form focus: 要是/如果……, ……(可能)……			
The hypothetical conditional sentence consists of two parts: <ul style="list-style-type: none"> • The If-clause (要是/如果) expressing the conditional hypothesis • The main clause expressing the respective result; usually contains adverb “perhaps/maybe” (可能) 			

Noticing and awareness spotlight: the difference between 能 and 会
<p>能 and 会 are both auxiliary verbs meaning “can” or “may.” They are used interchangeably. However, there is a difference between them:</p> <p>会 (huì) specifies a learned, acquired skill or a mental ability;</p> <p>能 (néng) means having the physical ability or opportunity to do something unless a condition prevents it.</p> <p>For example:</p> <p>我会游泳，可是我今天不能游泳，因为我的腿受伤了。</p> <p>I can swim, but I cannot today, because my leg is injured.</p>

CO LP 13.3.8	Construct characters to form words and phrases adhering to character structure rules and stroke order guidelines		
Approaching	Attaining	Expanding	
<p>One- and two-part characters</p> <p>One-part character 我、生</p> <p>One-part, totally enclosed 国、回</p> <p>Two-part characters Left-right: 叫、场 Top-bottom: 吉、只</p>	<p>Three-part characters</p> <p>Left, middle, right: 树、谁 Top, middle, bottom: 复、常 Left, top-right, bottom-right: 锋、纷 Top-left, bottom-left, right: 部、剂、劲 Left-top, right-top, bottom: 然、赞 Top, left-bottom, right-top: 死、前</p>	<p>Four + part characters</p> <p>Left-top, right-top, left-bottom, right bottom: 能、舒 Left, top-right, middle-right, bottom-right: 慢、镜 Left, middle, top-right, bottom-right: 游 Left, middle-top, middle-bottom, right: 湖</p>	
Form focus: Formation of Chinese characters			
1. Character structure rules			
<p>Chinese characters are called “square” characters because no matter how simple or complex, each character fits inside a square. Characters can usually be divided into different parts. These parts form character structures. There are four main structures: one-part structure, two-part structure, three-part structure, and four-part structure. These structures can be further divided into sub-parts.</p> <p>For example,</p> <p>Two-part structures:  (top/bottom),  (left/right)</p> <p>Three-part structures:  (left, top-right, bottom-right),  (top-left, bottom-left, right), etc.</p>			

2. Stroke order guidelines

General rules for writing Chinese characters are:

1. Horizontal first, then vertical.
2. Top first, then bottom.
3. Left first, then right.
4. Left-slanted first, then right-slanted.
5. Outside first, then inside.
6. Center first, then both sides.
7. With “closed” characters, enter character first, then close it up.

CO LP 13.3.9	Use a developing understanding of basic units of word formation in Chinese to infer and construct meaning with written text
Form focus: radical → character → compound/word	
1. radical	
<p>A radical is the smallest meaningful orthographic unit in compound characters, for example, 虫 (insect) is used in the character 蛙 (frog). 虫 (insect) can also be a stand-alone character. There are three types of radicals: semantic (give information about character meaning) [手 (hand)], phonetic (give information about character pronunciation) [分 (fen) in the compound 纷 (one after another)], and perceptual (do not give information about character meaning or pronunciation, instead function as visual fillers) [此 (this, these in classical Chinese), however, in the compound 嘴 (mouth) the radical 此 functions as a perceptual radical providing information about neither meaning nor pronunciation].</p>	
2. character	
<p>A Chinese character is a meaningful orthographic unit that is always pronounced as one syllable. Chinese characters have evolved as a writing system over millennia and have developed in various ways.</p> <p>Some characters are pictographs that were originally drawings of concrete objects, for example, 雨 (rain), the four dots depicting the rain coming down from the sky; others are better described as ideographs because they were created as graphic representations of more abstract ideas such as the notion of “above”, 上, the stroke above the horizontal line indicating the idea of “above” or “up.” Another way to create characters was to combine two or more pictographs or ideographs to portray a new meaning, for example, 休 (to rest), a combination of the pictographs for person, 人, and a person leaning against a tree, 木. These types of characters are referred to as ideogrammatic characters.</p> <p>Over 90% of Chinese characters were created as phono-semantic compound characters and are made up of a combination of semantic and phonetic radicals. For example, 控 (to control), the semantic radical on the left side, 手 (hand), indicates that the word meaning will include an action with a hand, and the phonetic radical on the right side 空 (kōng), helps the reader with character pronunciation “kòngg.”</p>	

3. compound
Compounds consist of at least two characters, neither of which is an affix, a character that on its own lacks meaning but when added to other characters becomes a meaningful unit. Most Chinese words are compounds. Compounds have various types of syntactic relationships.
A few compound types: <i>Verb-Object</i> : 踢足球 (to kick soccer ball)、开球 (to kick of)、发誓 (to pledge) <i>Verb-Complement</i> : 摔倒 (to fall down)、改进 (to improve and get better)、进来 (to come in) <i>Subject-Predicate</i> : 天亮 (bright [sky is bright]) <i>Number-Classifier</i> : 各种 (various kinds)、一道 (a ray of...)、一片 (a patch of...) <i>Adverb-Verb</i> : 慢跑 (to jog [to run slowly])、快走 (to hurry [to walk fast]) <i>Verb-Verb-Noun</i> : 栖息地 (habitat [to stay and rest at a place]) <i>Adjective-Adjective-Noun</i> : 浅桃色 (light peach color)、吉祥物 (mascot [happy and auspicious object])
4. word
A word is written with one or more Chinese characters. A word can consist of a single character (脚, foot), a compound (幸运, lucky), a duplicate (招招手, to wave), or an affixed form (第一, first, 第二, second, etc.).

CC LP 13.3.10	Give a command using serial verb construction		
Approaching	Attaining	Expanding	
用/试一试海绵吧! Use/Try the sponge!	我建议用/试一试..... I suggest we use/try...	为什么不用/试一试毡布? Why don't you use/try the felt?	
我们用/试一试海绵吧! Let's use/try sponge!	你可以用/试一试..... You may use/try.....	我们最好用/试一试毡布. You'd better use/try the felt.	
Verb + noun + 吧 (ba)!	Subj. + Verb ₁ + Verb phrase (verb ₂ + noun phrase)	为什么不 (Why not) + Verb + Object	
Form focus: Subj. + Verb ₁ + Verb phrase (verb ₂ + noun phrase)			
A serial verb construction refers to a sentence with two or more verbs that are connected by one and the same event. In this type of serial verb construction the second verb is a verb phrase that functions as the object of the sentence.			
Noticing and awareness spotlight: Use of 吧 (ba)			
吧 (ba) is a particle that is used at the end of a sentence to indicate a suggestion.			

CC LP 13.3.11	Express a personal opinion		
Approaching	Attaining	Expanding	
我觉得／想 I feel like/think...	在我看来..... It seems to me like...	我建议..... I suggest...	
也许／可能 (maybe, perhaps)	对我来说, In my opinion, ...	我的看法是..... My thoughts are...	
	我认为..... I believe/think ...	我是说..... What I mean is...	

CC LP 13.3.12	Ask for clarification about feedback/advice/idea		
For example:			
Approaching	Attaining	Expanding	
你说什么? What did you say?	我没听懂, 请你再说一次。 I didn't understand, could you please say it again?	你可不可以重复一遍? Could you repeat it one more time?	
我不懂。 I didn't understand that.	你是不是说..... Did you say...	请你再跟我讲一讲。 Please explain it to me one more time.	
什么意思? What does it mean?	你说的是.....的意思吗? Does what you said mean...?	你可以给我解释一下吗? Could you explain that to me?	
Form focus: Nominalization using 的 (e.g., 你说的是.....)			
A verb/verb phrase can become a noun by placing the particle 的 (de) after it. For example, the verb phrase 你说 (you say) can function as a noun phrase 你说的, meaning "what you say" in 你说的是 (What you say is...).			
Noticing and awareness spotlight: Use of 吗? 吧? 呢?			
A few particles are commonly used at the end of questions. 吧? is used to invite agreement. 呢? is a tag question meaning "..., and you?" 吗? is a question particle that is used when one expects a "yes" or "no" response.			

CC LP 13.3.13	Express agreement/disagreement		
Approaching	Attaining	Expanding	
不。 No. 不好。 Not good. 不同意。 I don't agree with you. 不对。 Not exactly.	我不是这么认为的。 I don't think so. 是，可是你不觉得.....? Yes, but don't you think... 我觉得我不同意。 I'm afraid I have to disagree.	我的意见跟你的不同。 My suggestions are different from yours. 我想和你讨论讨论..... I must take issue with you on that. 然而 However	
Noticing and awareness spotlight: Repetition of verb			
Repetition of a verb, e.g., 讨论讨论 (to discuss), can be used to soften the tone of voice.			

CC LP 13.3.14	Negotiate to reach consensus		
Approaching	Attaining	Expanding	
好吧。 OK. 我同意。 I agree.	我同意你的想法。 I agree with your idea. 我也一样。 Same here.	不约而同。 We reach the consensus without consulting with each other.	

Learning Activity 4

1. Engage students' academic language through a brief warm-up activity, practicing classifiers. For example, have a volunteer bring a materials box to the front of the room, and pull out various items. Allow students to call out the correct "Number + Classifier + Object" phrase. Solicit responses as to whether or not these phrases are correct, then guide students through a choral repetition of the phrase.

Note: Refer to the steps on p. 110 of the EiE® binder. This will help you prepare to lead the class through steps #2-6 to create their improved model membrane.

2. Display page 21 of MMIC 13-IWB. Student groups should prepare for this work period; the **Magnificent Materials Manager** will pick up the necessary materials for the improved design, the **Remarkable Recorder** will make sure that the design model is present, the **Terrific Taskmaster** will work to keep group members focused in order to complete models in the designated time period, and the **Chinese Champion** will ensure that Chinese is the only language spoken.
3. For additional language practice during the work period and to preview the follow-up writing assignment, circulate and ask the students in each group to describe what their group is using in their model and why. Repeat select responses orally and/or by writing them on the board.
4. Have students bring their finished models to the plastic bins.
5. When all models are assembled and arranged, adults will assist students in pouring $\frac{1}{2}$ cup or 118.3 ml of water from the pitcher into a measuring cup.
6. Students should then pour the water into the center of the model.
7. Finally, the **Magnificent Materials Manager** will put the lid on the model (and may tape it shut, if necessary), and make sure that all group members help clean up their work area.
8. Leave the models for 24 hours.

Note: *If students see that the water went through their model membrane immediately, they may feel sad or upset. Please help them to understand that this is an important part of the design process. Engineers often try many times to improve a design before they find one that works well.*

Expansion Phase—“Beyond” Activities

Time: Learning Activity 5—20 minutes

Students will be given a short time to draw and label their group’s plan in their individual journals. This will give each student a chance to practice and review the vocabulary and concepts from the day.

1. Ask students to draw and label their group’s model membrane plans in their science journals. Students should also write 1-2 sentences under the model telling what materials their group chose to use in their improved design and why. Encourage students to use two or more functions in each sentence (page 22 of MMIC 13-IWB), for example:

Chinese	English
我们用了两张有小孔的铝箔纸代替五张咖啡过滤纸，因为我们觉得它们可以让更多的水通过我们的薄膜模型。	We used two pieces of aluminum foil with tiny holes instead of five coffee filters because we think it may allow more water to pass through our model membrane.

2. Students may also include comments or reflection on how well their group worked together. They may also refer to examples already written on the board.

Language Function-Form-Vocabulary Connections (Activity 4-5)		
CO LP 13.4-5.1	State quantities of materials using numbers and appropriate classifiers	
For example: 一张铝箔纸 (a piece of aluminum foil) 五张咖啡过滤纸 (five coffee filters) 三块纱布 (three pieces of cheesecloth) 两块海绵 (two sponges)		
Approaching	Attaining	Expanding
个 (gè) people and general object 家 (jiā) families and business establishments 件 (jiàn) clothing 棵 (kē) plants 只 (zhī) insects and animals 支 (zhī) rod-shaped objects, e.g., pencil, Chinese paint brush 把 (bǎ) small objects and objects with a handle, e.g., scissors, chair 本 (běn) journals, books and files	张 (zhāng) thin and flat objects, e.g., aluminum foil, coffee filter 块 (kuài) pieces of small things, e.g., felt, sponge 位 (wèi) persons of status, e.g., professor, engineer 碗 (wǎn) things that come in bowls mostly, e.g., noodles, rice, water 场 (chǎng) events and happenings such as episode, e.g., soccer game	滴 (dī) a drop/a drip used for liquid items 对 (duì) couple/pair: modifies anything that comes in pairs 架 (jià) planes and large vehicles and a few smaller electric objects such as radios
Form Focus: Number + Classifier + Object (noun)		
Classifiers are used when counting objects (nouns). Almost all nouns have a corresponding classifier. When learning a noun it is always good to learn its classifier.		
Noticing and awareness spotlight		
1. The difference between 二 and 两		
二	两	
1) Counting: e.g., 一、二、三..... 2) Used in ordinal numbers: e.g., 第一 (first)、第二 (second)、第三 (third) 3) As last part of any higher number that ends in two: e.g., 十二 (12)、八十二 (82)	Used whenever a classifier is used to indicate “two of something”, see: Subj. + Verb + 两 + Classifier + Noun	

2. The difference between 只 and 支	
只 (zhī)	支 (zhī)
只 is used for insects and animals.	支 is used for rod-shaped objects.
These two classifiers are homophones. They have the same pronunciation but different uses and meanings.	

CO LP 13.4-5.2	Recount events in simple past time using action verbs with 了 (temporal marker) and dependent time phrase/clause in complex sentence		
For example:			
	Approaching	Attaining	Expanding
	我们发现了.....不管用。 We found ... did not work well.	当我们测试尼龙纱窗布的时候，我们看见了水穿过得很快。 When we tested the nylon screen, we saw that water passed through it quickly.	经过测试有一个孔的铝箔纸后，我/我们发现了水流得很快。 After testing the aluminum foil with one hole, I/we found that it made the water flow slowly.
	我们学到了葡萄干吸收水。 We learned that a raisin absorbs water.	在葡萄干的实验中，我们学到了薄膜可以让水通过。 In the raisin experiment, we learned that a membrane can let water pass through.	在葡萄干的实验中，我们学到了薄膜可以让水通过，也可以阻挡沙。 In the raisin experiment, we learned that a membrane can let some things pass through and block other things.
	Simple past time using action verb with temporal marker 了	Use of dependent time phrase in complex sentence and temporal marker 了	Use of dependent time clause in complex sentence and temporal marker 了
Form focus			
1. Use of 了 as temporal marker			
Simple past time can be communicated using 了 (temporal marker), e.g., action verb + 了 (temporal marker). The temporal marker “了” is positioned either immediately after the main verb or at the end of the sentence/clause.			
2. Use of dependent time phrase/clause in complex sentence			
Mandarin uses adverbs of time and adverb of time phrases to connect two clauses and form one complex sentence. The first clause may consist of			
<ul style="list-style-type: none"> An adverb of time placed at the end of the first clause [noun + adverb of time 的时候], e.g., 足球比赛的时候, (While at the soccer game, ...) 			

- or an adverb of time phrase that is separated into two parts [当 (part 1) + simple SVO sentence + 的时候 (part 2)], e.g., 当我们测试尼龙纱窗布的时候, (When we tested the nylon screen,...).

For example,

Noun/simple SVO sentence + adverb of time phrase 以后.....后 (after), + main clause.

Noun/simple SVO sentence + adverb of time 以前 (before), + main clause.

Noun/simple SVO sentence + adverb of time phrase 当.....的时候 (when/while at), + main clause.

Noticing and awareness spotlight

1. Use of temporal marker “了” with “verb + verb complement” structure

When a two-character “verb + verb complement” structure is used, the temporal marker “了” must be placed after the verb complement.

For example,

[我] 看到了。(I saw.)

However, if the verb complement consists of two characters instead of just one, then “了” can be placed either after the one-character first main verb or after the two-character verb complement.

For example,

他走了出来。(He walked out of there.)

他走出来了。(He walked out of there.)

2. Use of particles 的、地、得

的 (de) is used when an adjective and/or a pronoun modifies a noun. The form is:

Adj./pron. + 的 + Noun, for example, 炎热的夏天 (sweltering summer), 我们的薄膜模型 (our model membrane design)

地 (de) is used when an adverb modifies a verb. The form is:

Adv. + 地 + Verb (unlike in English!), for example, 高兴地欢呼 (cheer happily)

得 (de), as a potential complement, is used as a complement to further describe a main verb/adjective. It is placed after the verb/adjective it describes. The form is:

Verb/adjective + 得 + degree complement

The degree complement can be made up of an adverb or a noun phrase.

For example,





我跑得快。(I ran fast.) (得 + adverb as degree complement)

薄膜有一些小得眼睛都看不见的孔。(Membranes have holes that are too small to see.)

(得 + noun phrase as degree complement).

CO LP 13.4-5.3	Give emphasis to the specific direct object by using 把 or 让/使 construction and placing the direct object before the verb		
Approaching	Attaining	Expanding	
我的薄膜模型阻挡有害的东西在外面。 My model membrane blocks/stops harmful things outside.	我的薄膜模型（不）让水通过。 My model membrane should (not) let water pass through.	我的薄膜模型（不）让水慢慢地通过。 My model membrane should (not) let water pass through slowly.	
Subj. + Verb + Object + Complement (adv.) .	Subj. + 让/使-construction [让/使 + direct object + verb], such as, ...	Subj. + 让/使-construction [让/使 + direct object + verb], such as, ...	
Form focus: Use of 让/使-construction			
Similar to “把-sentence,” the “让/使-construction” allows one to place the direct object in front of the main verb, which is not typical word order in Chinese. This draws more attention to what is happening to the object itself.			

CO LP 13.4-5.4	Construct characters to form words and phrases adhering to character structure rules and stroke order guidelines		
Approaching	Attaining	Expanding	
For example: Left-right: 叫、场 Top-bottom: 吉、只 Left, middle, right: 树、谁 Top, middle, bottom: 复、常 One-part, totally enclosed: 国、回 Partially enclosed: 用, 原			
One- and two-part characters	Three-part characters	Four + part characters	
One-part character 我、生 One-part, totally enclosed 国、回 Two-part characters Left-right: 叫、场 Top-bottom: 吉、只	Left, middle, right: 树、谁 Top, middle, bottom: 复、常 Left, top-right, bottom-right: 锋、纷 Top-left, bottom-left, right: 部、剂、劲 Left-top, right-top, bottom: 然、赞 Top, left-bottom, right-top: 死、前	Left-top, right-top, left-bottom, right bottom: 能、舒 Left, top-right, middle-right, bottom-right: 慢、镜 Left, middle, top-right, bottom-right: 游 Left, middle-top, middle-bottom, right: 湖	

Form focus: Formation of Chinese characters	
1. Character structure rules	
<p>Chinese characters are called “square” characters because no matter how simple or complex, each character fits inside a square. Characters can usually be divided into different parts. These parts form character structures. There are four main structures: one-part structure, two-part structure, three-part structure, and four-part structure. These structures can be further divided into sub-parts.</p> <p>For example,</p> <p>Two-part structures:  (top/bottom),  (left/right)</p> <p>Three-part structures:  (left, top-right, bottom-right),  (top-left, bottom-left, right), etc.</p>	
2. Stroke order guidelines	
<p>General rules for writing Chinese characters are:</p> <ol style="list-style-type: none"> 1. Horizontal first, then vertical. 2. Top first, then bottom. 3. Left first, then right. 4. Left-slanted first, then right-slanted. 5. Outside first, then inside. 6. Center first, then both sides. 7. With “closed” characters, enter character first, then close it up. 	

CO LP 13.4-5.5	Use a developing understanding of basic units of word formation in Chinese to infer and construct meaning with written text
Form focus: radical → character → compound/word	
1. radical	
<p>A radical is the smallest meaningful orthographic unit in compound characters, for example, 虫 (insect) is used in the character 蛙 (frog). 虫 (insect) can also be a stand-alone character. There are three types of radicals: semantic (give information about character meaning) [手 (hand)], phonetic (give information about character pronunciation) [分 (fen) in the compound 纷 (one after another)], and perceptual (do not give information about character meaning or pronunciation, instead function as visual fillers) [此 (this, these in classical Chinese), however, in the compound 嘴 (mouth) the radical 此 functions as a perceptual radical providing information about neither meaning nor pronunciation].</p>	
2. character	
<p>A Chinese character is a meaningful orthographic unit that is always pronounced as one syllable. Chinese characters have evolved as a writing system over millennia and have developed in various ways.</p>	

Some characters are **pictographs** that were originally drawings of concrete objects, for example, 雨 (rain), the four dots depicting the rain coming down from the sky; others are better described as **ideographs** because they were created as graphic representations of more abstract ideas such as the notion of “above”, 上, the stroke above the horizontal line indicating the idea of “above” or “up.” Another way to create characters was to combine two or more pictographs or ideographs to portray a new meaning, for example, 休 (to rest), a combination of the pictographs for person, 人, and a person leaning against a tree, 木. These types of characters are referred to as **ideogrammatic characters**.

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A few compound types:

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Verb-Complement: 摔倒 (to fall down)、改进 (to improve and get better)、进来 (to come in)

Subject-Predicate: 天亮 (bright [sky is bright])

Number-Classifier: 各种 (various kinds)、一道 (a ray of...)、一片 (a patch of...)

Adverb-Verb: 慢跑 (to jog [to run slowly])、快走 (to hurry [to walk fast])

Verb-Verb-Noun: 栖息地 (habitat [to stay and rest at a place])

Adjective-Adjective-Noun: 浅桃色 (light peach color)、吉祥物 (mascot [happy and auspicious object])

4. word

A word is written with one or more Chinese characters. A word can consist of a single character (脚, foot), a compound (幸运, lucky), a duplicate (招招手, to wave), or an affixed form (第一, first, 第二, second, etc.).

CO LP 13.4-5.6	Support ideas/opinions using compound sentences with adverb 因此		
For example:			
	Approaching	Attaining	Expanding
	我们猜....., 因为它有.....	纱布有很多孔, 因此, 我们推测.....	由于尼龙纱窗布上有很多小孔, 因此, 我们推测.....

We predict...., because it has ...	Cheesecloth has many holes, as a result, we predict...	Due to the many tiny holes on the nylon screen, as a result, we predict.....
海绵是不管用的，因为它太厚了。	海绵太厚了，水不能通过，因此，我们认为海绵是不管用的。	由于毡布不能让水一滴一滴地滴下来，因此，我们认为毡布是不管用的。
The sponge does not work well, because it is too thick.	The sponge is too thick and it does not allow enough water to pass through, as a result, we think a sponge does not work well.	Due to the fact that the felt lets water drip through slowly, as a result, we think it works well.
....., 因为 (because)..... 因为 (because)....., 所以 (so)..... , 因此 (as a result, therefore),	由于 (due to)....., 因此 (as a result, therefore),
Form focus:, 因此 (as a result, therefore),		
因此 (as a result, therefore) is an adverb that can be used instead of the conjunction 因为 in the second clause.		
Noticing and awareness spotlight		
1. Use of 由于 (due to)		
由于 (due to)....., reflects a more formal register and is more likely to be used in written communication.		
2. Simple descriptive sentence (Subj. + 是 + adj. +的)		
The “是 + adj. +的” structure is commonly used to describe something or someone. For example, 海绵是不管用的。(The sponge does not work.)		

CC LP 13.4-5.7	Make a request using different degrees of politeness	
Approaching	Attaining	Expanding
我们需要两张咖啡滤纸。 We need two coffee filters. 我们要两张咖啡滤纸。 We want two coffee filters.	请给我们两张咖啡滤纸。 Please give us two coffee filters.	麻烦您给我们两张咖啡滤纸。 Would you give us please?

Evidence of Learning

- Completed handouts:
 - MMIC 13-1 (EiE® {4-8})
 - MMIC 13-2 (EiE® {4-10})
 - MMIC 13-3: *Group Feedback Form*
 - MMIC 13-4: *Numbers, Classifiers and Volume*
 - MMIC 13-5: *Self-Assessment of Group Work*
- Oral presentation of the first model membrane design
- MMIC 13-6/IPA 1-1: *Presentational (Oral) Scoring Rubric*
- Groups' feedback (oral) on how the presenters could improve their design in the future
- Improved model membrane design
- Oral articulation (in response to teacher questions) of the improved model membrane design
- Science journal entries

Vocabulary List

Content-obligatory (CO)

了解 Recognize			
Pīnyīn	Characters	English meaning	Parts of speech
识记 Produce			
Pīnyīn	Characters	English meaning	Parts of speech
bái sè de/mǐ sè de	白色的/米色的	white/beige	adjective
bàn gè	半个	one half	measure word
bēi	杯	cup	noun
bó de	薄的	thin	adjective
bó mó	薄膜	membrane	noun
bù zhòu	步骤	step	noun
cái liào	材料	materials	noun
cè liáng	测量	to measure	verb
chéng gōng	成功	success	noun
fèn shù	分数	fraction	noun
gǎi jìn	改进	to improve	verb
gǎi jìn	改进	improve	verbal phrase
gài zi	盖子	lid	noun
gōng chéng shè jì bù zhòu	工程设计步骤	Engineering Design Process	noun
gōng chéng shī	工程师	engineer	noun
guān chá	观察	to observe	verb
hǎi mián	海绵	sponge	noun
háo shēng	毫升	milliliter	measure word
hòu	厚	thick	adjective
jì lù	记录	to record	verb
kā fēi guò lǜ zhǐ	咖啡过滤纸	coffee filter	noun
kē xué jiā	科学家	scientist	noun
lǚ bó zhǐ	铝箔纸	aluminum foil	noun
méi yǒu dòng/méi yǒu kǒng	没有洞/没有孔	does not have holes	verb
mó xíng	模型	to model/modeling	verb
ní lóng shā chuāng bù	尼龙纱窗布	nylon screen	noun
píng huá	平滑	smooth	adjective
qù jiě jué shí jì wèn tí	去解决实际问题	to solve real-world problems	verbal phrase

róng qì	容器	container	noun
shā bù	纱布	cheesecloth	noun
shǎn liàng	闪亮	shiny	adjective
shè jì	设计	to design	verb
shè jì	设计	plan	verbal phrase
shí yàn	实验	experiment	verb/noun
shì yí shì xīn de xiǎng fǎ	试一试新的想法	to try out new ideas	verbal phrase
sì fēn zhī yī	四分之一	one fourth/quarter	measure word
sī kǎo	思考	imagine	verbal phrase
tǐ jí	体积	volume	noun
tí wèn	提问	ask	verbal phrase
xiǎo shù	小数	decimal	noun
yè tǐ liáng bēi	液体量杯	measuring cup	noun
yǒu dòng/yǒu kǒng	有洞/有孔	has holes	verb
yǒu liǎng gè kǒng de lǚ bó zhǐ	有两个孔的铝箔纸	aluminum foil with two holes	noun phrase
yǒu yí gè kǒng de lǚ bó zhǐ	有一个孔的铝箔纸	aluminum foil with one hole	noun phrase
yùn yòng xiǎng xiàng lì	运用想象力	to use imagination	verbal phrase
zhān bù	毡布	felt	noun
zhì zuò	制作	create	verbal phrase
zhǐ zuò de	纸做的	made of paper	adjective
zǔ hé	组合	combination	noun

Content-compatible (CC)

了解 Recognize			
Pīnyīn	Characters	English meaning	Parts of speech
bǐ jiào jí	比较级	comparative expression	noun
biǎo dá de	表达的	presentational	adjective
biǎo xiàn	表现	performance	noun
biāo zhǔn	标准	criterion	noun
cè shì	测试	assessment	noun
fǎn kuì	反馈	feedback	noun
fǎn kuì quān	反馈圈	feedback loop	noun
fù hé jù	复合句	compound sentence	noun
jiāo liú de	交流的	interpersonal	adjective

lǐ jiě de	理解的	interpretive	adjective
lián dòng cí jié gòu	连动词结构	serial verb combination	noun
liàng cí	量词	classifiers	noun
píng fēn biǎo	评分表	rubric	noun
píng gū	评估	to evaluate	verb
qīng chǔ de yǎn shì	清楚地演示	clearly present	verbal phrase
quán bān	全班	whole class	noun
shì jué jiē chù	视觉接触	eye contact	noun
shù liàng	数量	quantity	noun
tóng xué píng gū	同学评估	peer evaluation	noun
xiǎo zǔ	小组	small group	noun
xiū shì yǔ	修饰语	modifying phrases	noun
zhèng què de shǐ yòng	正确地使用	correctly use	verbal phrase
zhì liàng	质量	quality	noun
zhǔn què de huì bào	准确地汇报	accurately report	verbal phrase
zì wǒ píng gū	自我评估	self-assessment	noun
zōng hé de	综合的	integrated	noun
识记 Produce			
Pīnyīn	Characters	English meaning	Parts of speech
bǎ tā zhé qǐ lái	把它摺起来	to fold something	verb
bǐ	比	to compare	verb
bó	薄	thin	adjective
bù fèn	部分	some	adverb
cái liào guǎn lǐ yuán	材料管理员	Magnificent Materials Manager	noun
cè shì	测试	to test	verb
chuān (dòng/kǒng)	穿 (洞/孔)	to pierce holes	verb
dà xiǎo shì zhōng	大小适中	right-sized	adjective
dài tì	代替	to replace	verb
dī	滴	to drip	verb
fēn céng	分层	to layer	verb
fù zé	负责	to be responsible for	verb
gǎi biàn	改变	to change	verb
gèng	更	even more	adverb
gèng duō	更多	at most	adverb phrase
gōng zuò guǎn lǐ yuán	工作管理员	Terrific Taskmaster	noun

guǎn yòng/bù guǎn yòng	管用 / 不管用	useful/not useful	adjective
hòu	厚	thick	adjective
jì huà	计划	to plan	verb
jì lù yuán	记录员	Remarkable Recorder	noun
jiǎn	剪	to cut	verb
kǒng	孔	small hole	noun
kòng zhì	控制	to control	verb
kuài	快	fast	adverb
màn	慢	slow	adverb
méi yǒu	没有	none	adverb
miáo shù	描述	to describe	verb
quán bù	全部	all	adverb
shì hé	适合	suitable	adjective
shōu jí	收集	to collect	verb
tài duō	太多	too much	adverb phrase
tài shǎo	太少	too little	adverb phrase
yǎn shì	演示	to present	verb
yǎn shì zhì jiǎn yuán	演示质检员	Polished Presenter	noun
yuē	约	approximately	adverb
zhé	折	to bend	verb
zhèng hǎo	正好	just right/exact amount	adverb phrase
zhōng	中	medium	adverb
zhōng wén dū chá yuán	中文督察员	Chinese Champion	noun

姓名： _____ 日期： _____

设计 #

工程设计步骤： 制作！



说明：仔细观察你们制作的薄膜模型，回答下列问题。

1. 24 小时后，液体量杯里收集了多少水？

2. 你们的薄膜模型让足够的水通过了吗？太多、太少还是正好？

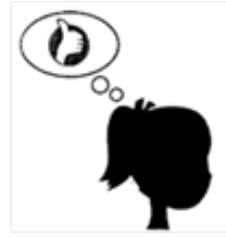
3. 你们薄膜模型的哪些部分成功了？为什么？

你们薄膜模型的哪些部分不理想？为什么？

姓名： _____ 日期： _____

设计 #

工程设计步骤： 改进！



说明：画一画怎样改进你们的薄膜模型。

Blank area for drawing and writing.

1. 写出需要的材料：

2. 你们会怎样改进薄膜模型？为什么？



小组意见反馈表

反馈小组成员名字: _____

演示小组成员名字: _____

说明: 反馈小组先讨论, 然后请记录员把下列问题的答案写下来。

圈出小组讨论结果:

1. 音量	这个小组的音量足够大吗?	够大/不够大
2. 发音	这个小组的发音足够清楚吗?	清楚/不清楚
3. 视觉	演示的时候, 这个小组有没有演示他们的薄膜模型或者画图说明?	有 / 没有
4. 看观众	说话的时候, 这个小组有没有看观众?	有 / 没有

写出答案:

5. 语速	说话的时候, 这个小组的语速太快、太慢、还是正好?	
-------	---------------------------	--

6. 这个小组的薄膜模型成功了吗? 为什么成功了或者为什么没有成功? 请用 2-3 个句子写出来。



Group Feedback Form

Feedback Group Members: _____

Presentation Group Members: _____

Directions: After discussing with your group, the recorder should record the answers to the following questions.

Circle your groups' response:

1. Volume	Did this group speak loudly enough?	Yes / No
2. Clarity	Was pronunciation of words clear enough?	Yes / No
3. Visuals	Did this group point to parts of their model membrane as they presented?	Yes / No
4. Eye Contact	When speaking, did this group look at the audience?	Yes / No

Write down your answer:

5. Speed	Did this group talk too fast, too slow, or just right?	
----------	--	--

6. Was this group's model membrane successful? Why or why not? Write 2-3 sentences to explain.

姓名: _____ 日期: _____

数词、量词和体积



说明:

1. 仔细听这个小组用的材料, 把你听到的数词和量词记录下来。
2. 记录你听到的液体体积。
3. 和你的小组成员讨论一下, 这个演示小组说的量词正确吗? 你们听到的体积一样吗?

演示小组成员名字: _____

数词	量词	可能用到的材料 (这个小组可能只用了下列一些材料)	他们说的量词对吗? 圈出答案。
		海绵	对 / 不对
		铝箔纸	对 / 不对
		有一个孔的铝箔纸	对 / 不对
		有两个孔的铝箔纸	对 / 不对
		毡布	对 / 不对
		咖啡过滤纸	对 / 不对
		纱布	对 / 不对
		尼龙纱窗布	对 / 不对
你还听到别的“数词+量词+名词”的组合了吗? 请把它们写下来。			
			对 / 不对
			对 / 不对
			对 / 不对

这个小组的液体量杯里收集了多少水?

回答: _____ 杯, 或者 _____ 毫升

Name: _____ Date: _____

Numbers, Classifiers (CL) and Volume

Directions:

1. Record the *number* and the *classifier (CL)* of each material as you listen to each group presentation.
2. Record the *volume* you hear.
3. Discuss with your group if the presenter used the correct classifiers and compare your answers about volume.



Presentation Group Members: _____

Number	CL	Possible Material (The group may not use all of the following.)	Did they use the correct CL for the material? Circle the answer.
		sponge	yes / no
		aluminum foil without holes	yes / no
		aluminum foil with one hole	yes / no
		aluminum foil with two holes	yes / no
		felt	yes / no
		coffee filter	yes / no
		cheesecloth	yes / no
		screen	yes / no
Write down any other combination (Number + CL + Noun) that you hear but is not found above:			
			yes / no
			yes / no
			yes / no

How much water collected in this group's liquid measuring cup?

Answer: _____ cup or _____ ml

姓名: _____ 日期: _____



小组工作自我评价

1. 在小组里你的工作是什么？（中文督察员、记录员、材料管理员、还是工作管理员）

2. 你认为你的工作什么地方做得好？

3. 你认为你的工作什么地方有困难？

4. 在小组里你有没有做到只说中文？如果没有，你不会用中文说的是什么？

5. 你觉得这次小组演示对你的中文有什么帮助？

6. 如果你还可以改进你们的小组演示，你会改进什么地方？

Name: _____ Date: _____



Self-Assessment of Group Work

1. What was your role within your group? (Magnificent Materials Manager, Chinese Champion, Remarkable Recorder, or Terrific Taskmaster)

2. What do you think you did well in your group role?

3. What was difficult for you in your group role?

4. Did you succeed in using only Chinese with other group members? In not, what were you unable to say?

5. In what ways do you think your Chinese improved because of this group presentation?

6. If you could change anything about your group's presentation, what would you change?

口语演示评分表

MMIC EIE® 《薄膜模型单元》，第十三课：表达能力（口头）

日期: _____ 学生 1: _____ 学生 2: _____

学生 3: _____ 学生 4: _____

- 4 = 优: 超越要求, 对教学目标的理解和运用的能力卓越
 3 = 良: 完善要求, 对教学目标的理解和运用的能力良好
 2 = 及格: 达到要求, 对教学目标的理解和运用的能力一般
 1 = 不及格: 达不到要求, 对教学目标的理解和运用的能力有限

- 必要条件: _____ 1. 都要讲话。
 _____ 2. 只用中文。
 _____ 3. 完成并且上交自我评价的《口语演示评分表》。

	标准	得分	评语
学科知识	准确地汇报液体量杯里收集了多少水	4 3 2 1	
	汇报薄膜模型是否成功	4 3 2 1	
	清楚地汇报薄膜模型有哪些部分成功了和成功的原因	4 3 2 1	
	清楚地汇报薄膜模型有哪些部分没有成功了和没有成功的原因	4 3 2 1	
	清楚地演示和评价薄膜模型的测试结果	4 3 2 1	
	清楚地演示为什么新的薄膜模型是对第一个薄膜模型的改进 **仅用于综合能力测试!	4 3 2 1	
	学科知识得分:	_____/24	

	标准	得分	评语
语言控制	正确用量词和计量单位	4 3 2 1	
	正确使用整数、分数和小数报告数量	4 3 2 1	
	准确地使用形容词短语来描述材料的属性	4 3 2 1	
	准确地使用“了”和时间副词来表示过去式汇报材料选择和测试结果	4 3 2 1	
	正确使用有副词“因此”或者“为了”的复合句	4 3 2 1	
	正确使用双动词结构来解释材料选择并汇报结果	4 3 2 1	
	正确使用比较级来比较第一个和改进的薄膜模型 **仅用于综合能力测试!	4 3 2 1	
	语言控制得分: _____/28		
演示技巧	介绍全部小组成员的名字和组内分工角色	4 3 2 1	
	和听众保持视觉交流并用自然的面部表情和肢体语言表现自信心	4 3 2 1	
	口头表达清楚自如	4 3 2 1	
	开头致敬结尾感谢	4 3 2 1	
	虚心看待评语并认真回答问题	4 3 2 1	
	演示技巧得分: _____/20		

总分: _____/72

66-72 优

58-65 良

50-64 及格

0-49 不及格

Presentational (Oral) Scoring Rubric

MMIC *Engineering is Elementary*® Model Membrane Unit, Lesson 13/IPA 1: Presentational (Oral) Task

Date: _____ Student 1: _____ Student 2: _____
 Student 3: _____ Student 4: _____

- 4 = Exceeding: Exceeds expectations and demonstrates exceptional command of unit goals.
- 3 = Achieving: Is above average and demonstrates very good command of unit goals.
- 2 = Partially achieving: Meets expectations and demonstrates adequate command of unit goals.
- 1 = Not achieving: Falls short of expectations and demonstrates poor command of unit goals.

- Non-negotiables:** _____ **1. All students must talk.**
 _____ **2. All students must speak only in Chinese.**
 _____ **3. All students must turn in self-assessments using this same rubric.**

	Criteria	Scale	Comments
Academic Content	Accurately report amount of water collected in the liquid measuring cup.	4 3 2 1	
	Report whether or not the model membrane was successful.	4 3 2 1	
	Clearly report what did work well with the model membrane and why.	4 3 2 1	
	Clearly report what didn't work well with the model membrane and why.	4 3 2 1	
	Clearly present an evaluation of the results of the model membrane test.	4 3 2 1	
	Clearly present how the new model membrane design was an <i>improvement</i> on the original design. **For IPA only!	4 3 2 1	
	Academic Content Total:		_____/24

	Criteria	Scale	Comments
Language Control	Correctly use classifiers to report materials and units of measurement.	4 3 2 1	
	Correctly use numbers/fractions/decimals to report quantities.	4 3 2 1	
	Accurately use modifying phrases to describe attributes of materials.	4 3 2 1	
	Accurately use action verbs with 了 (temporal marker) and adverbs of time to report materials selection and test results in past time.	4 3 2 1	
	Correctly use compound sentences with adverb 因此 or preposition 为了.	4 3 2 1	
	Accurately use serial verb construction with pivotal noun to justify materials selection and report results.	4 3 2 1	
	Accurately use comparative expressions to make comparisons between original and improved model membrane models. **For IPA only!	4 3 2 1	
	Language Control Total:		_____/28
Presentation Skills	Introduce all group members by name and group role.	4 3 2 1	
	Maintain eye contact with the audience and show genuine enthusiasm with appropriate facial expressions and body language.	4 3 2 1	
	Speak confidently and clearly.	4 3 2 1	
	Open/close presentation by greeting/thanking the audience.	4 3 2 1	
	Respond respectfully to student comments/questions after the presentation.	4 3 2 1	
	Presentation Skills Total:		_____/20

Final Points: _____/72

66-72 Exceeding

58-65 Achieving

50-64 Partially achieving

0-49 Not achieving

昨天，老师用了哪些材料来做他/她的薄膜模型？



昨天，老师向薄膜模型里倒了多少水？

从昨天开始应该有多少水通过老师的薄膜模型？

昨天，你们组用了哪些材料来做你们的薄膜模型？

昨天，你们组向薄膜模型里倒了多少水？

从昨天开始应该有多少水通过你们的薄膜模型？

中文督察员

- 鼓励和提醒大家说中文
- 讨论和评估你们的第一个薄膜模型，一起完成MMIC 13-1

材料管理员

- 领取你们组的薄膜模型
- 讨论和评估你们的第一个薄膜模型，一起完成MMIC 13-1

记录员

- 做记录
- 讨论和评估你们的第一个薄膜模型，一起完成MMIC 13-1

工作管理员

- 跟大家说一说这次的讨论任务
- 讨论和评估你们的第一个薄膜模型，一起完成MMIC 13-1

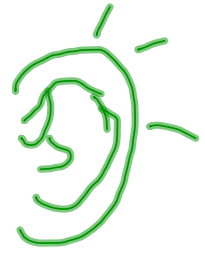
活动#1

MMIC 13-1

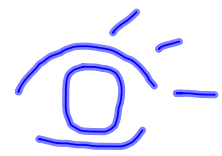
1. 24小时后，液体量杯里收集了多少水？
2. 你们的薄膜模型让足够的水通过了吗？太多、太少还是正好？
3. 你们薄膜模型的哪些部分成功了？为什么？
4. 你们薄膜模型的哪些部分不理想？为什么？



优秀汇报的特点



听起来。。。。



看起来。。。。

活动#2

中文督察员

- 介绍小组成员
- 介绍所用的薄膜模型材料和数量
- 选择材料的原因

材料管理员

- 汇报MMIC 13-1 (EiE® {4-8}) 的第一和第二道问题

记录员

- 汇报MMIC 13-1 (EiE® {4-8}) 的第三道问题

工作管理员

- 汇报MMIC 13-1 (EiE® {4-8}) 的第四道问题
- 感谢同学聆听报告

小组意见反馈表

说明：反馈小组先讨论，然后请记录员把下列问题的答案写下来。

注

圈出小组讨论结果：

1. 音量	这个小组的音量足够大吗？	够大/不够大
2. 发音	这个小组的发音足够清楚吗？	清楚/不清楚
3. 视觉	演示的时候，这个小组有没有演示他们的薄膜模型或者画图说明？	有 / 没有
4. 看观众	说话的时候，这个小组有没有看观众？	有 / 没有
写出答案：		
5. 语速	说话的时候，这个小组的语速太快、太慢、还是正好？	

6. 这个小组的薄膜模型成功了吗？为什么成功了或者为什么没有成功？请用 2-3 个句子写出来。

注

数词、量词和体积

说明：

1. 仔细听这个小组用的材料，把你听到的数词和量词记录下来。
2. 记录你听到的液体体积。
3. 和你的小组成员讨论一下，这个演示小组说的量词正确吗？你们听到的体积一样吗？



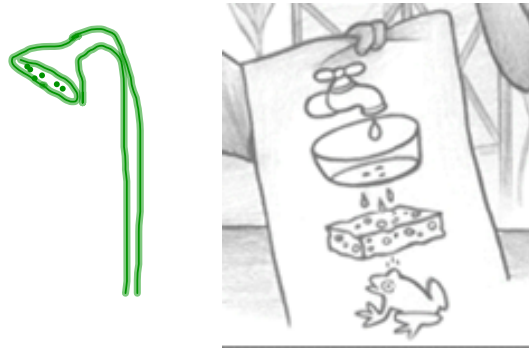
演示小组成员名字：_____

数词	量词	可能用到的材料 (这个小组可能只用了下列一些材料)	他们说的量词对吗？圈出答案。
		海绵	对 / 不对
		铝箔纸	对 / 不对
		有一个孔的铝箔纸	对 / 不对
		有两个孔的铝箔纸	对 / 不对
		毡布	对 / 不对
		咖啡过滤纸	对 / 不对

小组讨论

为什么Juan Daniel 要设计一个薄膜模型？

你能想到其他控制水流的技术吗？试跟伙伴说一说。



- 4 = 优: 超越要求, 对教学目标的理解和运用的能力卓越
- 3 = 良: 完善要求, 对教学目标的理解和运用的能力良好
- 2 = 及格: 达到要求, 对教学目标的理解和运用的能力一般
- 1 = 不及格: 达不到要求, 对教学目标的理解和运用的能力有限

- 必要条件:
- _____ 1. 都要讲话。
 - _____ 2. 只用中文。
 - _____ 3. 完成并且上交自我评价的《口语演示评分表》。

	标准	得分	评语
学科知识	准确地汇报液体量杯里收集了多少水	4 3 2 1	
	汇报薄膜模型是否成功	4 3 2 1	
	清楚地汇报薄膜模型有哪些部分成功了和成功的原因	4 3 2 1	
	清楚地汇报薄膜模型有哪些部分没有成功了和没有成功的原因	4 3 2 1	
	清楚地演示和评价薄膜模型的测试结果	4 3 2 1	
	清楚地演示为什么新的薄膜模型是对第一个薄膜模型的改进 **仅用于综合能力测试!	4 3 2 1	
	学科知识得分: _____/24		



	标准	得分	评语
口语陈述	正确使用量词和计量单位	4 3 2 1	
	正确使用整数、分数和小数报告数量	4 3 2 1	
	准确地使用形容词短语来描述材料的属性	4 3 2 1	
	准确地使用“了”和时间副词来表示过去式汇报材料选择和测试结果	4 3 2 1	
	正确使用有副词“因此”或者“为了”的复合句	4 3 2 1	
	正确使用双动词结构来解释材料选择并汇报结果	4 3 2 1	
	正确使用比较级来比较第一个和改进的薄膜模型 **仅用于综合能力测试!	4 3 2 1	
	语言控制得分: _____/28		



小组工作自我评价

1.在小组里你的工作是什么?(中文督察员、记录员、材料管理员、还是工作管理员)

2.你认为你的工作什么地方做得好?

3.你认为你的工作什么地方有困难?

4.在小组里你有没有做到只说中文?如果没有,你不会用中文说的是什么?

5.你觉得这次小组演示对你的中文有什么帮助?

6.如果你还可以改进你们的小组演示,你会改进什么地方?

演示技巧	介绍全部小组成员的名字和组内分工角色	4	3	2	1
	和听众保持视觉交流并用自然的面部表情和肢体语言表现自信	4	3	2	1
	口头表达清楚自如	4	3	2	1
	开头致敬结尾感谢	4	3	2	1
	虚心看待评语并认真回答问题	4	3	2	1
演示技巧得分:		_____/20			

总分: ____/72

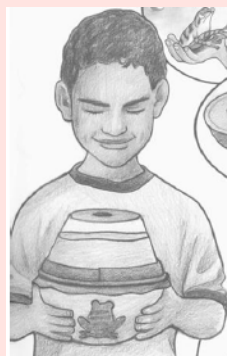
66-72 优

58-65 良

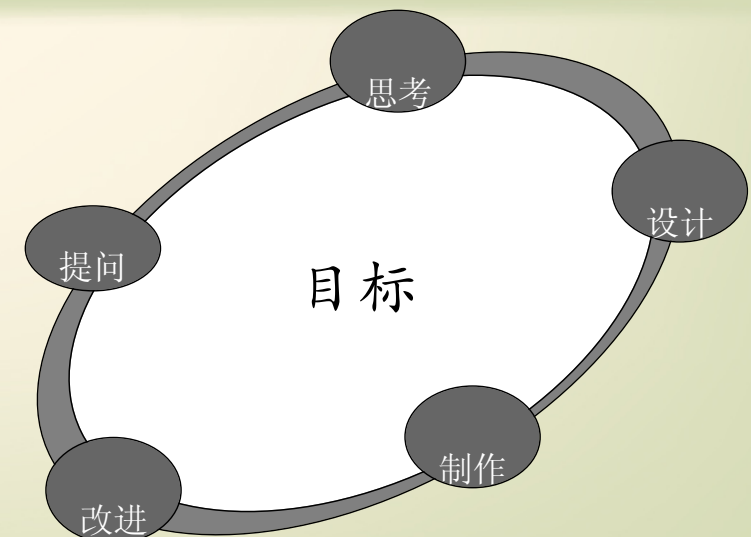
50-64 及格

0-49 不及格

我们该怎么改进我们的薄膜模型设计?

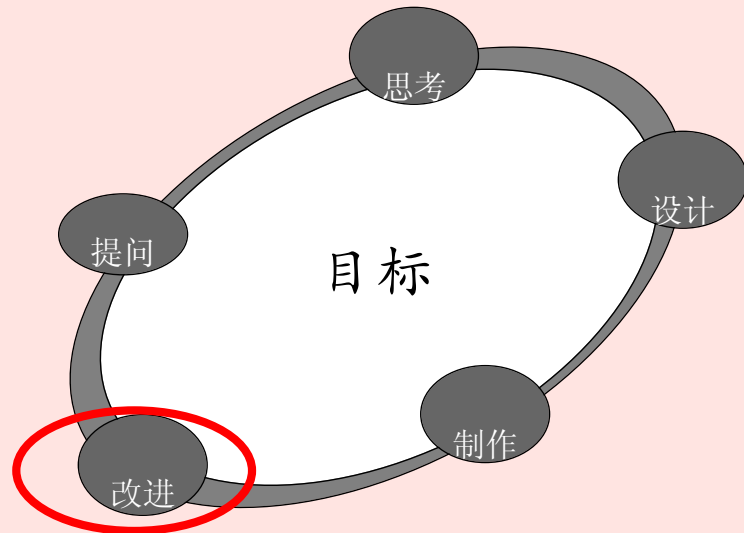


工程设计步骤





今天，你们会一起实践工程设计步骤的最后一步——改进你们的薄膜模型。



今天，你们要改进你们的薄膜模型。你们将：

- 从这六种材料中选出一些材料做一个薄膜模型，让水慢慢地滴到容器底部的塑料青蛙上。
- 你们可以用各种方法组合这六种材料。
- 把这些材料剪成适合放在容器里的大小，而且可以盖上盖子。
- 向薄膜模型里倒 1/2 杯（118.3 毫升）的水。
- 24 小时以后，看看多少水通过薄膜滴到杯底。 [杯底必须少于 1/4 杯的水 (59.1 毫升) 才算成功]



材料管理员

- 取回之前的薄膜模型
- 把模型里的水倒掉
- 归还可再用的材料到领取材料的桌子

工作管理员

- 确保每一位小组成员有机会说一说自己的看法
- 带领小组按照工程设计步骤讨论你们怎么样改进薄膜模型
- 工程设计步骤：提问、思考、设计、制作

中文督察员

- 鼓励大家只说中文
- 帮助小组成员使用正确的字词和短语

记录员

- 画出你们新的薄膜模型（改进）
- 使用正确的量词写出你们需要用的材料和数量
- 利用“…比…更…”的句型，解释这些改动如何改进你们的薄膜模型

活动#3

设计 #

工程设计步骤：
改进！



说明：画一画怎样改进你们的薄膜模型。

1. 写出需要的材料：

2. 你们会怎样改进薄膜模型？为什么？

活动#4

我们用……吧！

我建议用……代替……。

……可能比……更有用合适。



材料管理员

- 领取所需要的材料来制作你们改进后的薄膜模型
- 为完成后的薄膜模型盖上盖子
- 完成任务后，协助清理、整理工作

工作管理员

- 鼓励大家专注在任务上，按时完成任务
- 完成任务后，协助清理、整理工作

中文督察员

- 鼓励大家只说中文
- 提醒大家只说中文
- 完成任务后，协助清理、整理工作

记录员

- 让大家按照所画的图，制作薄膜模型
- 看管改进后的薄膜模型
- 完成任务后，协助清理、整理工作

我们用了两张有小孔的铝箔纸
代替五张咖啡过滤纸，

因为我们觉得它们可以让更多的
水通过我们的薄膜模型。

