

Candidate: Qi Jiang Date: March 21<sup>st</sup>, 2018

Cooperating Teacher: \_\_\_\_\_ Grade level: 6<sup>th</sup> Grade

Subject Area: Science and TESOL Duration: 1 Hour

Title of Unit: Exploring the Solar System

Lesson Title: The Eight Planets orbiting the Sun

## **Lesson Plan**

### **1) Content Areas:**

Content areas include Science and TESOL. Students are required to learn some basic knowledge of the Solar system and usage of ordinal number with certain sentence structures. Students will know the basic characteristics of the Eight Planets, such as size, color and the order of orbits by which planets circle around the Sun, through collecting information from reading materials, video clip and exchanging views with classmates.

### **2) Purposes/Goals:**

The big idea of this lesson is that the Solar System has eight planets which orbit the Sun directly. Students are not required to remember the exact names of eight planets but some basic characteristics. What is more, they need to compare the distance, but not explicit value, between each planet and the Sun and use ordinal numbers with certain sentence structures to describe the order. Although students have learnt ordinal numbers from first to tenth previously, they have no idea how to use them yet. Classroom activities such as group work and small games are included.

Later, students are required to complete a take-home worksheet in order to review what they have learnt. Also, they can practice writing skills through the writing task on the worksheet and get some extra points.

### 3) Objectives:

#### *Language Objectives*

At the end of the class, students will be able to:

- Learn how to use ordinal numbers with certain sentence structures. The sentence structures include: (The name of a planet) is in (ordinal numeral) circle in the model; (The name of a planet) ranks (ordinal numeral) in size among the planets of the Solar System; (The name of a planet) ranks (ordinal numeral) in the distance from the Sun among the planets of the Solar system.
- Get knowledge of the names of the Eight Planets and some basic Astronomy technical terms.

#### *Content Objectives*

At the end of the class, students will be able to:

- Get basic knowledge of appearance characteristics of the Sun and the Eight Planets, such as size and color of the surface, of the Sun and the Eight Planets.
- Understand the importance of the Sun because of its middle place in the Solar System. This is the connection to the next lesson.

#### **4) National/New York State Standards:**

This lesson addresses part of NYS ESL standards for intermediate grades 5-8 students. The Standard 1 addresses that students will listen, speak, read and write in English for information and understanding. Basically, students will get basic information of the Solar System from reading relevant reading materials and watching a video clip which plays a song describing the characteristics of the Eight Planets. In line with performance indicator 12, students are able to convey information through spoken and written English using language features. What is more, performance indicator 13 addresses that students have opportunities to engage in collaborative activities through small groups to share and gather information. When conducting group work and playing games, students need to share their thoughts with group members using some Astronomy terms to build paper models and create sentences with ordinal number. Through completing the take-home worksheet, students are able to write down sentences with ordinal number and practice writing skills through composing a mini essay.

The Standard 4 addresses that students will listen, speak, read and write in English for classroom and social interaction. In line with performance indicator 8, students are able to negotiate and manage interactions to accomplish classroom tasks. The class will be divided into groups and each group is required to create a model of the Sun and the Eight Planet. They also need to exchange their views with the whole class to adjust their models. Through this class activity, students cooperate with each other to figure out the right order of the planets. In this process, they use English to interact and negotiate with each other.

This lesson also addresses part of NYS P-12 Common Core Learning Standards for English Language Arts & Literacy. Standard 8 of writing standards for Grade 5 students addresses that students are required to gather information from printed and digital sources and paraphrase information in notes. When students are watching the video clips, they are required to take notes of the basic characteristics of the Eight Planets. They can also use the reading materials as a reference. Additionally, the take-home worksheet is intended to let students recall what they have learned from the video clip and reading materials.

## **5) Assessment:**

### ***Formative Assessment***

When students are watching the video clip, they are required to take notes of the characteristics of the planets on the assigned worksheet based on the information from the reading materials and the video clip. Teacher can walk around the classroom to examine each student's notes. After students finish their work, teacher will publish the correct answers on the PowerPoint.

When students are creating the paper model, teacher can circulate from group to group to watch their learning process and provide them with detailed instructions. Teacher can randomly ask some of the students about why they create the model like this to ensure that every student has understood the learning materials. After students finish their work, they will present their models to the whole class. All groups will exchange views and adjust their models first. Teacher will provide feedback afterwards.

When students are doing tasks on ordinal numbers, they can choose to complete a group worksheet or play a small game. Each student is required to write down 2 sentences on the worksheet or take 2 roles in the game. During this process, teacher can circulate from group to group in order to watch their performance and give suggestions.

### ***Summative Assessment***

Every student is required to complete a take-home worksheet individually after class. The worksheet is divided into four parts (see Appendix 3). The first part includes the pictures of the Eight Planets, which are printed in black-and-white but different in size. Students are required to color them in appropriate color based on the different appearance characteristics of planets. The second part includes a picture of eight orbits. Students are required to put the names of planets on the right orbits. The third part of the worksheet is the language test. Students are required to write down sentences with provided structures to examine whether they have grasped the usage of ordinal numbers. Students need to create eight sentences to describe ranks of the planets. The fourth part is not required but provides bonus points. Students can compose a mini essay to introduce their favorite planet in the Solar System and explain their reasons. This question has no absolute answers but helps examine student's basic writing skills. This worksheet will be scored by the teacher according to the rubric. It is of great value to help the teacher ensure students have grasped the basic knowledge as well as help students review what they have learnt in class.

### **6) Community Knowledge and Experience:**

Students' Solar System models will be presented to the whole class as well as attach on the

exhibition board of the school. Through this exhibition, students are able to share their knowledge with students in other classes. It will help students build more social relationships and get more connected with others.

This lesson tells students that the Earth is not the only existing place in the world. Beyond the Earth, there are more planets, the Sun, the Solar System, the Galaxy and the Universe. Students and teacher are all small parts of the world. However, if students have scientific knowledge and dreams, they are able to explore the new and even unknown things as well as reach far beyond the Earth. Therefore, students should open their eyes and become more open-minded and far-sighted.

#### **7) Procedure and Resources:**

Time	Activity	Note
One day before the lesson	The teacher distributes reading materials to students. The reading materials include basic introduction to the Sun and the Eight Planets as well as explanations to some Astronomy terms. A picture which illustrates the orbits of the Eight Planets is shown, too, which will be used as reference for building models in the class. Students are required to view these materials before the class begins.	Reading materials

5 minutes	Students watch a video clip which plays a song with cartoon illustration. The song sings the characteristics of the Eight Planets out, such as size, color and distance, in an interesting way. Students are required to take some notes of these characteristics on the worksheet when watching it. After playing the video clip, teacher will use the PowerPoint to show students correct answers.	Computer and sound equipment; Overhead projector to show video and PowerPoint; Video Clip (cut from <a href="https://www.youtube.com/watch?v=_sQwruwZtAY">https://www.youtube.com/watch?v=_sQwruwZtAY</a> ); PowerPoint (See Appendix 1); Worksheet 1 (See Appendix 2)
20 minutes	The class is divided into 5 groups, with 4 students in one group, to build a paper model of the Solar System. Firstly, teacher will present a picture of sample model on the PowerPoint. Students will draw eight curves on the white construction paper as the orbits of the planets. Then, they will draw shapes of the Sun and planets in the color paper and cut them out. Students should pay attention to the different colors of the planet surfaces and the sizes of the planets. The model of the Sun should be placed in the middle of the circles first. The models of the planets should be laid out in the right order away from the Sun. To make the model of the solar system more permanent, students can glue the sun and planets onto the white construction paper. Finally, the students are required to write down the names of the planets besides the models with color pencils. If there is some time left, students can decorate the background part of the construction paper with sequins powder to make it fancier and look like space.	PowerPoint (See Appendix 1); White construction paper; Scissors; Glues; Color paper; Color pencils; Sequins powder; Tape

16 minutes	The whole class participates in the Art Gallery Display. Every group will attach their model onto the classroom wall with tape and inspect other groups' work. Every group will have a presenter to illustrate their model. Then, the teacher will mildly give suggestions and feedback. The best model will be voted by the whole class to be the teaching tool in the following teaching procedures.	Tape
7 minutes	Teacher will attach the best model which one group makes on the whiteboard. The PowerPoint will show three sentence structures and 8 ordinal numerals from first to eighth on the screen. The sentence structures include: (The name of a planet) is in (ordinal numeral) circle in the model; (The name of a planet) ranks (ordinal numeral) in size among the planets of the Solar System; (The name of a planet) ranks (ordinal numeral) in the distance from the Sun among the planets of the Solar system. Teacher will write down three sample sentences on the whiteboard. The sentences aim to describe certain characteristics of the planets with ordinal numerals. The whole class will read these examples out loud together.	Tape; Whiteboard and color markers; PowerPoint (See Appendix 1)



10 minutes	<p>The class will be divided into the same groups again and choose to complete group worksheet or play small game depending on their preference.</p> <p><b><i>Completing Group Worksheet</i></b></p> <p>The five groups will be distributed different worksheets with one single sentence structure to create eight sentences related to the Eight Planets. Each student in one group is responsible to create 2 sentences. The group members will correct each other's mistakes and write down the right sentences on the worksheet. When one group has finished their worksheet, the teacher can examine the sentences, point out mistakes and make explanations to them.</p> <p><b><i>Or Playing Small Game</i></b></p> <p>Each student in the group is responsible to take the role of two planets and act like them. Students will write the names of the planets on the name tags and attach them on their clothes. They can speak out the sentences with ordinal numerals and given structures in the first-person perspective to strengthen the impression and practice their oral English. For example, if a student acts as Earth, he or she could say "I am Earth and I rank fifth in size in the planets of the Solar System". During this process, teacher can watch their performance and give suggestions.</p>	Worksheet 2 (See Appendix 3); Name tags
2 minutes	<p>After every group has finished their worksheets or games, the teacher will collect the worksheets and conclude the easily wrong points which the students should pay more attention to when they do their after-class assignment. The teacher will also explain the importance of learning Astronomy knowledge and encourage the students to touch Astronomy more through watching popular science films and visiting Astronomy museums. Then, the teacher will assign the take-home worksheet and make brief explanations.</p>	Worksheet 3 (see in Appendix 4)

**8) Differentiated Instruction:**

This lesson conforms to the diverse learning needs of English language learners. Before the class, the reading materials which introduce the background and explain important vocabulary of this lesson are distributed to the students so that they can make preparations first. The take-home worksheet also caters to different English proficiency of students. The first three parts of the worksheet require all students to finish in order to review what they have learnt in class. The last part is not required but provides bonus points. Students with good English writing abilities can compose a mini essay to write down their favorite planet and explain the reasons. Teacher will collect and examine the worksheets. Students who receive low grades will have one-on-one tutoring in the next day. To cater to students' different learning strategies, when practicing using ordinal numbers and certain sentence structures, students can choose either writing worksheet or small games depending on their own preference.

**9) Applications, Connections, Extensions:**

This lesson, the first of three lessons in a unit, introduces the relationship between the Sun and the Eight Planets. Students are able to realize the important role of the Sun in the Solar System but still will be confused about why it is so important. In the following lesson, more knowledge about the characteristics and functions of the Sun will be introduced to the students. Students will figure out why the Sun is in the middle place of the Solar System and why all the Eight Planets orbit the Sun. Lesson three will talk about Earth and Moon. Although Earth is a planet, Moon

orbits Earth directly and orbits the Sun indirectly. Students can know more about the role of Earth which they live in in the Solar System. The whole unit aims to explore the Solar System. Through learning it, although students cannot get thorough knowledge of the Solar System, they can get the most basic one which is closely related to them, such as Earth where they live, the Sun and Moon which they can see in the sky. Extension will be made to the history of exploration experience of Moon and Mars by human.

As for the connection of language learning, students have learnt the ordinal numbers from first to tenth previously. However, they still have no idea how to use them and put them into sentences. Some of them even do not know the meaning of these numbers. Through this lesson, with the help of certain sentence structures and sample sentences, students are able to grasp the basic usage of ordinal number. Building language teaching on the real context of Astronomy is of great help because it can raise children's interest.

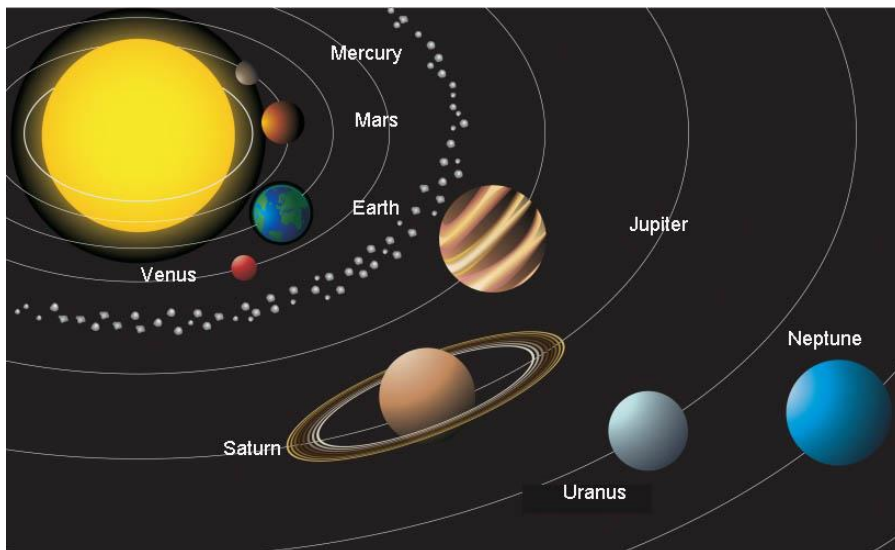
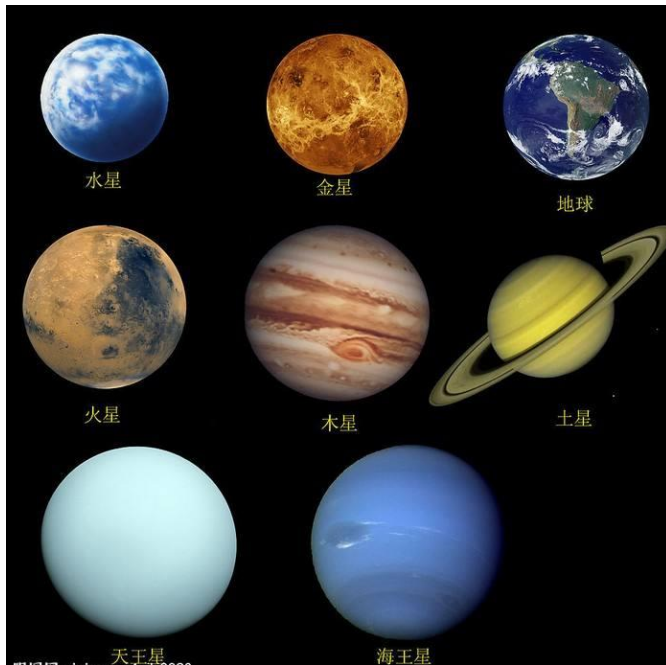
Appendix 1: PowerPoint

# The Eight Planets orbiting the Sun

Candidate: Qi Jiang

Subject Area: Astronomy and TESOL

Duration: 50 Minutes



## Characteristics and Ranks

	Rank of Volume (From big to small)	Color of Surface	Rank of Distance from the Sun (From close to far)
Mercury	8	Silver White	1
Venus	6	Brown Yellow	2
Earth	5	Blue	3
Mars	7	Orange Yellow	4
Jupiter	1	Orange Red	5
Saturn	2	Brown Yellow	6
Uranus	3	Sky Blue	7
Neptune	4	Dark Blue	8

## Sample Model



## Ordinal Number

Ordinal numbers are words representing rank in a sequential order. Pay attention to the use of “the”!

	Cardinal Number	Ordinal number
1	One	First
2	Two	Second
3	Three	Third
4	Four	Forth
5	Five	Fifth
6	Six	Sixth
7	Seven	Seventh
8	Eight	Eighth
9	Nine	Ninth

## Sentence Structures

- (The name of a planet) is in (ordinal number) circle in the model.
- (The name of a planet) ranks (ordinal number) in size among the planets of the Solar System.
- (The name of a planet) ranks (ordinal number) in the distance from the Sun among the planets of the Solar system.

## Sample Sentences

- Mercury is in the first circle in my model.
- Venus ranks second in the distance from the Sun among the planets of the Solar System.
- Earth ranks fifth in size among the planets of the Solar System.

## Appendix 2: Characteristic Table Worksheet

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Lesson Title: \_\_\_\_\_

**Please use numbers to represent the ranks of the planets. If you miss some information in the video, you may use the reading materials as reference.**

	Rank of Volume (From big to small)	Color of Surface	Rank of Distance from the Sun (From close to far)
Mercury			
Venus			
Earth			
Mars			
Jupiter			
Saturn			
Uranus			
Neptune			

Appendix 3: Group Worksheet (Three Different Forms)

**Structure One**

Group Members: \_\_\_\_\_

Date: \_\_\_\_\_

Lesson Title: \_\_\_\_\_

Please use this sentence structure to compose 8 different sentences. Each group member is responsible to complete 2 sentences. You can correct mistakes for each other.

**(The name of a planet) is in (ordinal numeral) circle in the model.**

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**Structure Two**

Group Members: \_\_\_\_\_

Date: \_\_\_\_\_

Lesson Title: \_\_\_\_\_

Please use this sentence structure to compose 8 different sentences. Each group member is responsible to complete 2 sentences. You can correct mistakes for each other.

**(The name of a planet) ranks (ordinal numeral) in size among the planets of the Solar System.**

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**Structure Three**

Group Members: \_\_\_\_\_

Date: \_\_\_\_\_

Lesson Title: \_\_\_\_\_

Please use this sentence structure to compose 8 different sentences. Each group member is responsible to complete 2 sentences. You can correct mistakes for each other.

**(The name of a planet) ranks (ordinal numeral) in the distance from the Sun among the planets of the Solar system.**

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## Appendix 4: Take-home Worksheet

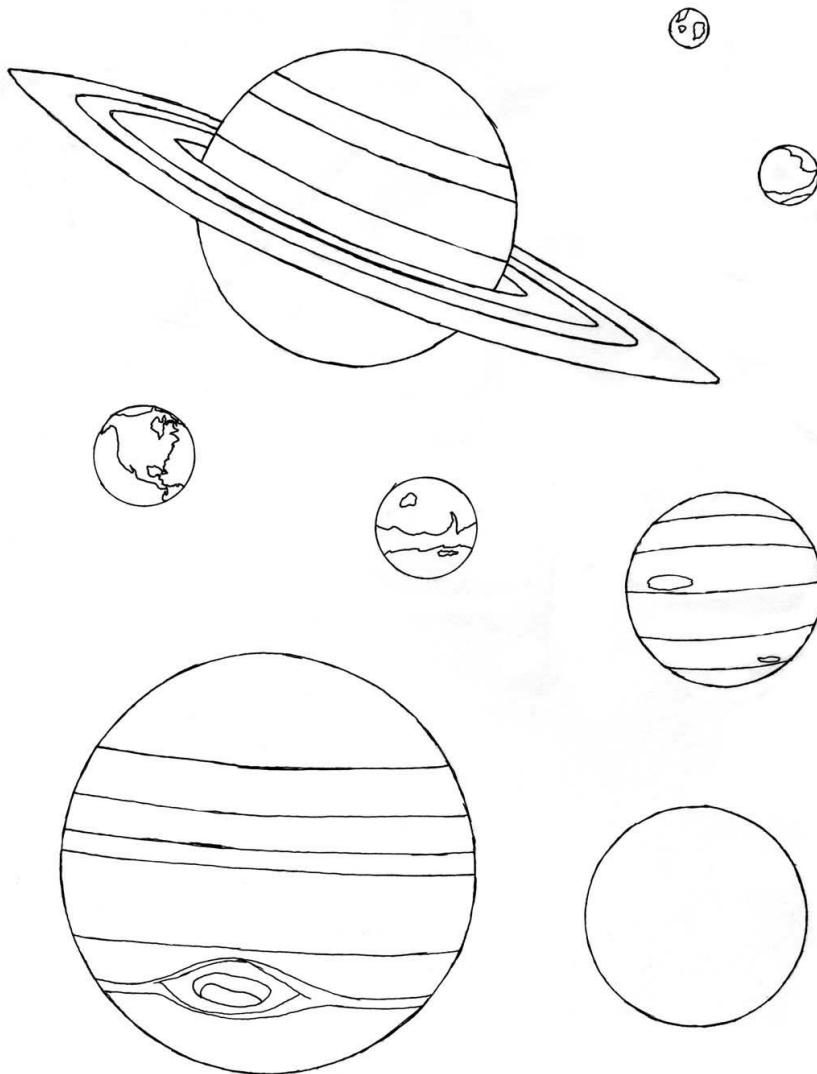
Name: \_\_\_\_\_

Date: \_\_\_\_\_

Lesson Title: \_\_\_\_\_

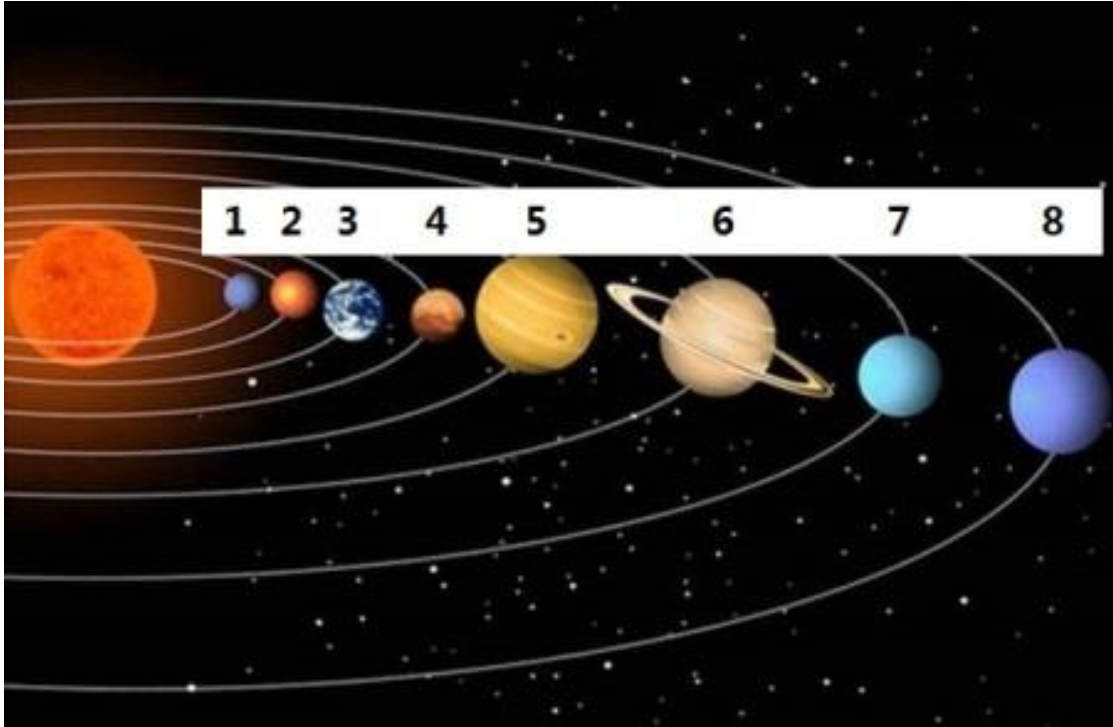
**Part One (4 points)**

Figure out which planet it is by the size and shape of each picture. Color it in the appropriate color according to its color of surface.



**Part Two (4 points)**

Here is a picture which illustrates how the Eight Planets orbit the Sun. Please put the names of the planets below the picture in the right order.



Names of the planets

1: \_\_\_\_\_

2: \_\_\_\_\_

3: \_\_\_\_\_

4: \_\_\_\_\_

5: \_\_\_\_\_

6: \_\_\_\_\_

7: \_\_\_\_\_

8: \_\_\_\_\_

**Part Three (8 points)**

Here are the two sentence structures which have been taught in class. Please create eight sentences with different ordinal numbers from first to eighth. You may use the pictures in Part One and Part Two for reference. Please follow the instructions.

Structure One:

**(The name of a planet) ranks (ordinal number) in size among the planets of Solar System.**

Please use the first four ordinal numbers to complete the sentences.

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Structure Two:

**(The name of a planet) ranks (ordinal number) in the distance from the Sun among the planets of the Solar system.**

Please use the next four ordinal numbers to complete the sentences.

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