

## SAMPLE QuEST Lessons

### Week Eight, Day One

**Topic:** Cell Cycle and DNA Replication

TEKS 6.11B

Science Explorer pages 170-173

#### Preparation

- Copy student activity sheets and make one teacher copy of each chart to use with the Elmo.
- Do all activities prior to instruction to ensure that you understand the content and procedures.

#### Materials

- Student activity charts and teacher copy for Elmo

#### Introduction

**Student Activity A** (10 minutes): Show What You Know Vocabulary Quiz.

**1. Student Activity B** (5 minutes): Warm up.

- Ask students “How do cells make more cells?” and have them write answer in student chart.
- Teacher note: To help with the warm up, display the pictures of the dividing yeast cells on the Elmo, located in Elmo Display 1 at the end of these lessons.
- After they have responded, lead a short discussion about cell division. Make sure that the students understand that in order to make more cells, the cells must divide. Tell them that this is how living things grow and repair themselves. Expected answers: Some students may wonder if cells reproduce by means of asexual or sexual reproduction, but without knowing these exact words. These terms will be introduced next week.

**3. Student Activity C** (14 minutes):

- Display cell diagrams located in Elmo Display 2 at the end of these lessons.
- Ask students “If the cell divides, which organelles would the 2 new cells need to have a copy of?” Teacher note: You may need to remind

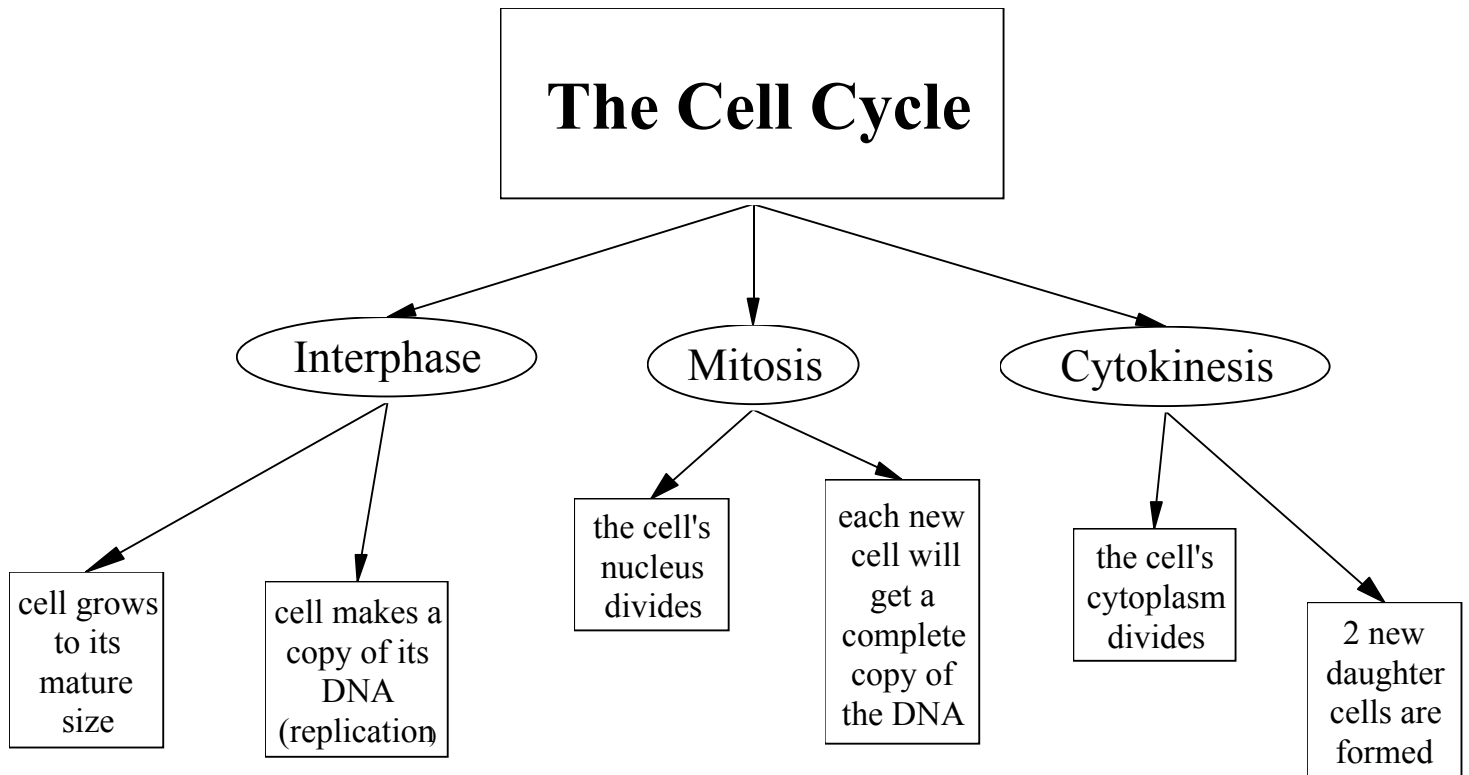
students that the nucleus, as the control center of the cell, has all of the information needed to make new organelles and to conduct the work of the cell.

- Think, pair, share: Have students look at Diagram One, located in Elmo Display 3 at the end of these lessons. Ask them: “Which cell (daughter cell A or daughter cell B) do they think could survive?” Teacher note: If it does not come out in the discussion, prompt the students by asking: What is in the nucleus that keeps all the information? They may recall that Chromosomes are in the nucleus and you can refer to their work from weeks 4 and 5 to review.
- Tell students to look at Diagram 2, located in Elmo Display 4 at the end of these lessons. Be sure to point out to the students that the original cell has 4 chromosomes.
- Ask them: Which cell (daughter cells C and D or daughter cells E and F) do you think could survive? Students should look at the diagrams, discuss with their partners and report their ideas to the class. Teacher note: If the students do not bring it up, make sure to point out that daughter cells E and F both have all 4 chromosomes, and therefore have ALL of the instructions needed. Daughter cells C and D only have 2 chromosomes,  $\frac{1}{2}$  the number of the original cell, and therefore do not have all the instructions necessary to survive.

## Application

### 1. Student Activity D (5 minutes):

- Define vocabulary (Cell cycle: Interphase, Mitosis and Cytokinesis.) As you discuss and define vocabulary words, write definitions on the teacher chart graphic organizer using the Elmo. Have students fill in graphic organizer with the definitions. See graphic organizer below for answers.



### Wrap-Up

#### 1. Student Activity E (3 minutes):

- Students should answer the question “Why are chromosomes important to the cell?”
  - Have students share answers as time permits. Expected student response: chromosomes contain all of the information needed for the cell to function. Without chromosomes, the cell could not function.

**2. Student Activity F (3 minutes):** Introduce the **Academic Word Glossary**. Review the words, definitions and pictures. Model writing a sentence for the first one or two words so students understand what is expected of them. For homework, students will be creating their own sentences using the words.

## Week Eight, Day Two

**Topic:** DNA Replication

TEKS 6.11B

Science Explorer pages 176-177

### Preparation

- Copy student activity sheets and make one teacher copy of each chart to use with the Elmo.
- Do all activities prior to instruction to ensure that you understand the content and procedures.

### Materials

- Student activity charts and teacher copy for Elmo (including the color copies for Activity C)
- Colored pencils
- Optional: Computer with internet access, one for the teacher or for pairs of students

### Introduction

1. Vocabulary Review (3 minutes) from Student Activity G on Day 1

2. **Student Activity A** (5 minutes): Warm-up

- Ask students: “In which part of the cell cycle (interphase, mitosis or cytokinesis) do the chromosomes make copies?” and “Why is it important for the cell to make copies of the chromosomes?” Possible Student Response: Interphase is the only correct answer for the first question. Answers may vary for the second question, but students should understand that the chromosomes (located inside the nucleus) contain all the information for directing the cells activities, including making new organelles.

### Application

1. **Student Activity B** (6 minutes):

- Tell students that chromosomes are made of a long chain of molecules called DNA (Deoxyribonucleic Acid.)
- Using the Elmo, show students the diagram of DNA located in Elmo Display 5 at the end of these lessons, page 176 from the textbook or #18 from the textbook’s Color Transparency book in the teacher’s kit.

Have them look at it for a minute, and share their observations with the class. It would be great to have them look at more than one of the options.

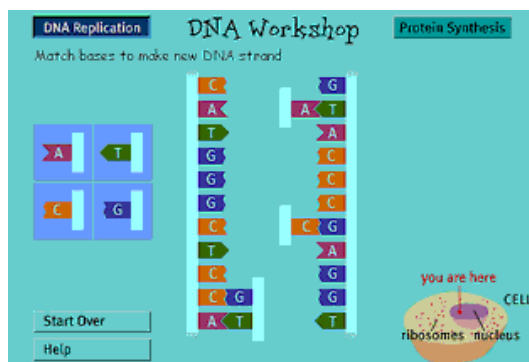
- Expected answer: students may notice and try to describe the shape and the pattern of the base pairing.
- Tell them that the shape of DNA is often described as a twisted ladder, or double helix. They might need help visualizing this, so any 3-D models you have would be helpful.

### 3. Student Activity C (10 minutes):

- Using the same diagram, point out to students the different base pairings (A-T and G-C). Have students practice making the complementary side of a DNA molecule, when given only one side to start with.
  - Teacher Note: Do the first 2 or 3 base pairings on the Elmo, so student know what to do. Be sure to review the answers after giving student a chance to fill in the pair.

### 3. Student Activity D (10 minutes):

- Using the Elmo, show students the diagram on page 177 or Color Transparency #19 from the textbook teacher's kit and show how the DNA strand is replicating itself.
- Point out how the 2 new strands are the same as the original strand. Describe to the students what is happening. Optional (but FANTASTIC): Have the students complete the DNA workshop at <http://www.pbs.org/wgbh/aso/tryit/dna/#> Click on DNA replication.



Teacher note: You could also do this as a demonstration or ask for individual student volunteers to match the pairs as you display the computer screen using the Elmo.

### Wrap-Up

**1. Student Activity E:** (3 minutes) Have students fill in the cloze in their student charts:

Chromosomes are made of \_\_\_DNA\_\_\_. The DNA replicates during \_\_\_Interphase\_\_\_\_\_, part of the cell cycle. The 2 new DNA molecules are exactly the \_\_\_same\_\_\_\_\_ as the old molecule. Adenine (A) always matches with \_\_\_Thymine\_\_\_\_\_. Cytosine (C) always matches with \_\_\_\_\_Guanine\_\_\_\_\_.

Go over the correct answers with the students.

**2. Student Activity F:** (3 minutes) Review **Academic Words Glossary Part Two** homework.

## Week Eight, Day Three

**Topic:** The Cell Cycle and DNA Replication

**TEKS 611.B**

**Science Explorer pages 170-177**

### Preparation

- Copy student activity sheets and make one teacher copy of each chart to use with the Elmo.
- Do all activities prior to instruction to ensure that you understand the content and procedures.
- Prepare the student slides by drying methylene stain on the slides, as described in the teacher's guide for the "Discover" activity on page 170.
- Prepare a yeast solution as described in the teacher's guide for the "Discover" activity on page 170.

### Materials

- Student activity charts and teacher copy for Elmo
- Slides prepared by the teacher with dried methylene stain
- Cover slips
- Prepared yeast culture (requires yeast, water and sugar)
- Droppers
- Small cups for yeast solution
- Prepared (fixed) slides of onion root tip, which has cells in different stages of the cell cycle.

### Introduction

1. Vocabulary Review (3 minutes)

2. **Student Activity A** (5 minutes): Warm-up.

- Students respond to the question "What are some of the rules of Microscope use?" Refer to microscope contracts and lessons from Week 3, reviewing how to use a microscope with the students.

### Application

1. **Student Activity B** (5 minutes to explain and model, 20 minutes to work):

Cell Observations.

- Group students for microscope work.

- Tell students to make a wet mount slide of the yeast solution by adding a drop of the yeast solution to the dried methylene stain. Tell them that the methylene stain helps make the cells more visible.
- Tell the students to look for dividing yeast cells under the magnification of their choice and to draw their observations in their student charts.
- Then tell students to look for different stages in the cell cycle using an onion root tip (a commercially prepared fixed slide) and draw their observations. Be sure to model for students and show examples of correctly titled drawings.

### Wrap-Up

**1. Student Activity C:** (4 minutes) Have students share their diagrams and discuss what they saw under the microcope.

**2. Student Activity D (3 minutes): Introduce the Technical Glossary.** Review the words and definitions. For homework, students:

1. Will write word in the line next to the word's definition.
2. Draw a picture of a word where there is a box.
3. Fill in the missing words in the definition in the Technical Words Practice section.

Model at least one example for each activity above so students understand what is expected of them.



# CELL CYCLE AND DNA REPLICATION

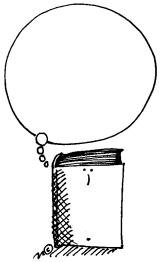
Day 1



## *Student Activity A* **SHOW WHAT YOU KNOW Vocabulary Quiz.**

Complete the vocabulary quiz on the separate sheet.

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## *Student Activity B* **WARM UP**

How do cells make more cells?

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## *Student Activity C* **CELL DIVISION**

Answer the questions below.

1. Look at the cell diagram that your teacher put on the Elmo. If the cell divides, which organelles would the 2 new cells need to have a copy of?

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2. Look at Diagram 1 that your teacher put on the Elmo. Which cell (daughter cell A or daughter cell B) do you think could survive? Why?

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QUEST: Week Eight, Day One

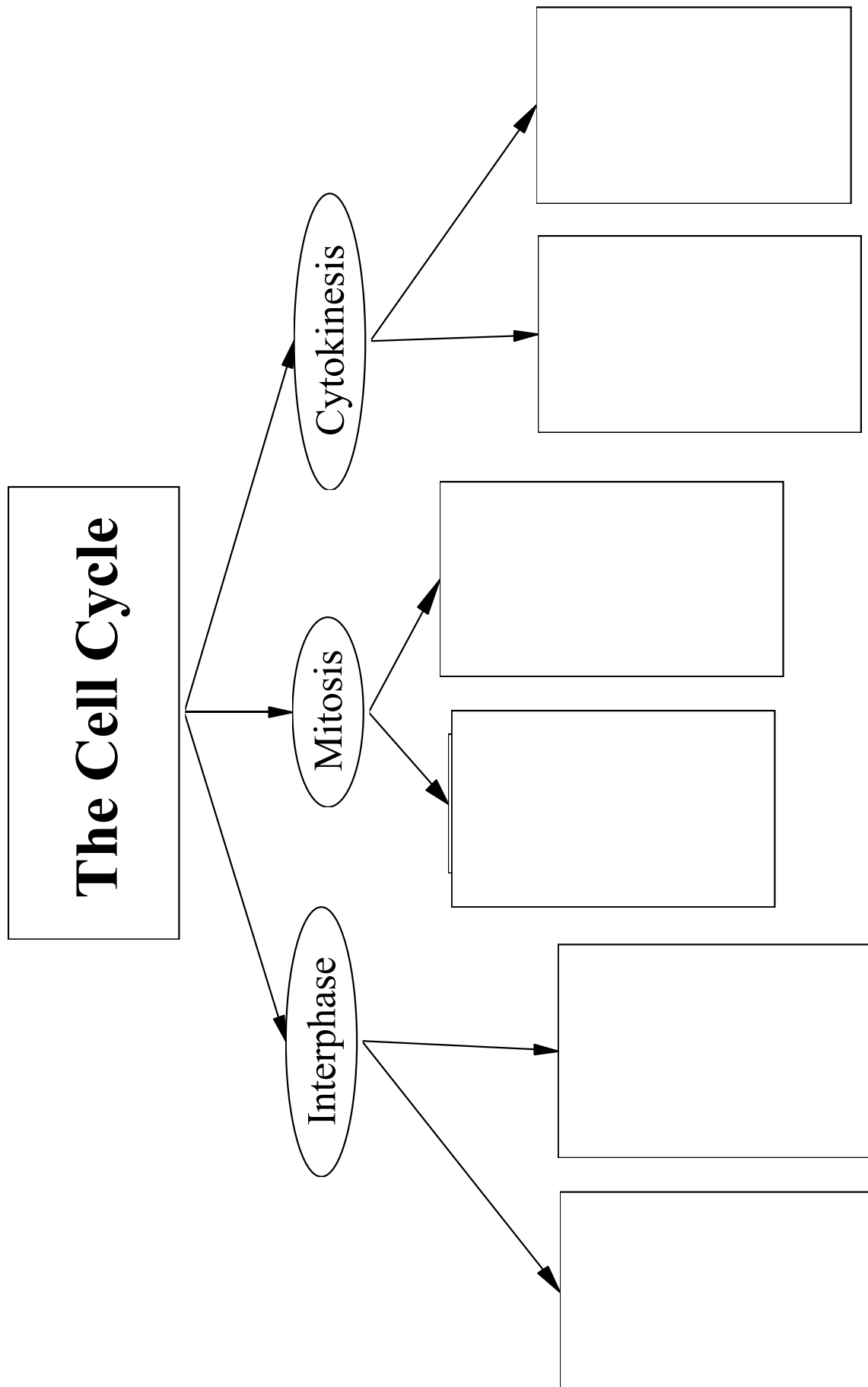
Student Activities A-D, Student Chart and Teacher Copy



*Student Activity D*

**VOCABULARY**

Fill in the graphic organizer with definitions.





*Student Activity E*

**WRAP UP**

Why are chromosomes important to the cell?

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*Student Activity F:*

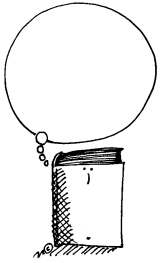
**GLOSSARY HOMEWORK**

Complete **Week 8 Academic Words Glossary, Part One**. For each word, read the definition, then write a sentence using that word.



# CELL CYCLE AND DNA REPLICATION

## Day 2



### *Student Activity A* **WARM UP**

In which part of the cell cycle (interphase, mitosis, or cytokinesis) do the chromosomes make copies? Why is it important for the cell to make copies of the chromosomes?

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### *Student Activity B* **OBSERVING A DNA MODEL**

Think about the DNA model that the teacher has shown you. Share your observations with the class.

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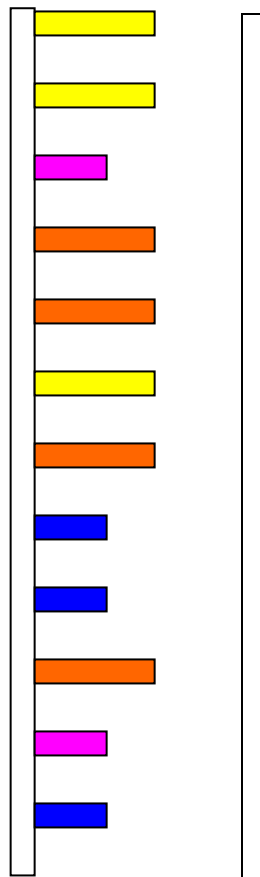


## Student Activity C FINISHING A DNA MOLECULE

This is one side of a DNA molecule. Use your pencil and colored pencils or markers to draw the other side. Be sure to match the bases correctly, with the correct size and color.

❖ Remember! A always matches with T and G always matches with C

Nitrogen Base	Shape and Color
Adenosine	
Thymine	
Cytosine	
Guanine	



If a section of DNA has the sequence AAGG, what will be the sequence on the other side of the molecule?

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### *Student Activity D* **WRAP UP**

Use the word bank to fill in the blanks with the right word.

Thymine DNA	Guanine different	Interphase Mitosis	same, Cytokinesis.
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Chromosomes are made of \_\_\_\_\_. The DNA replicates during \_\_\_\_\_, part of the cell cycle. The 2 new DNA molecules are exactly the \_\_\_\_\_ as the old molecule. Adenine (A) always matches with \_\_\_\_\_. Cytosine (C) always matches with \_\_\_\_\_.

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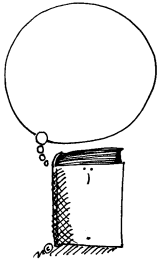
### *Student Activity E* **GLOSSARY HOMEWORK**

Complete **Week 8 Academic Words Glossary, Part Two**. For each word, read the definition, and then write a sentence using that word.



# CELL CYCLE AND DNA REPLICATION

## Day 3



### *Student Activity A*

What are some of the rules of Microscope use?

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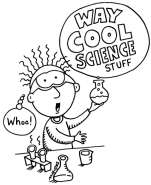
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### *Student Activity B*

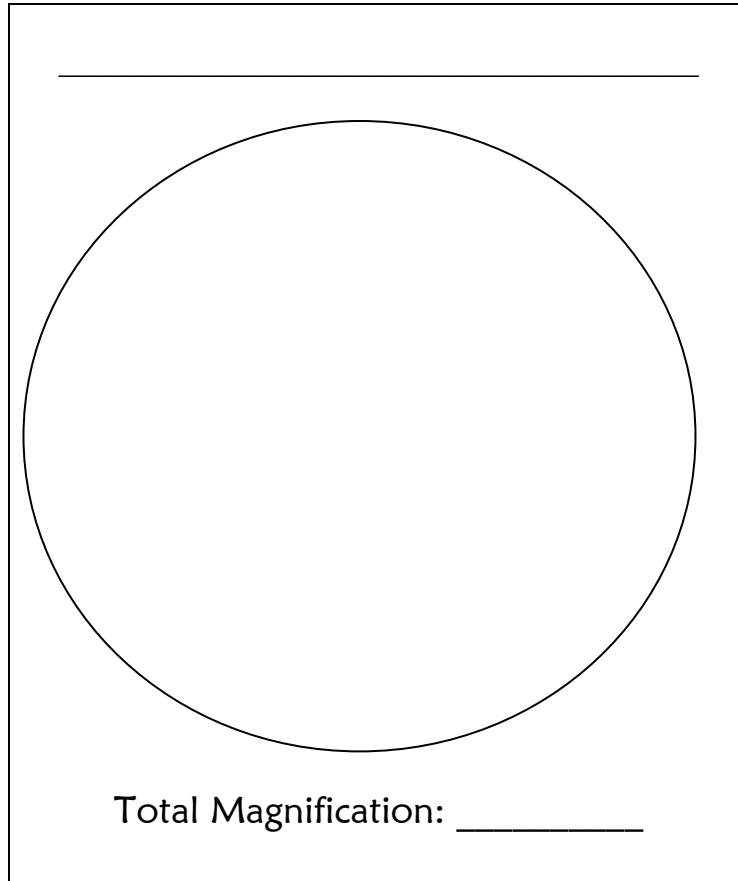
## CELL OBSERVATIONS

Follow the directions below to make observations of the yeast cells. When you are finished, follow the directions to make observations of the onion root cells.

### Yeast Cells Observations

- 1. Choose a slide that has dried blue methylene stain on it.
- 2. Add a drop of the prepared yeast solution to the dried stain.
- 3. Put the slide under the microscope. Start with low power. Focus, then move up to medium power.
- 4. Look at the slide through the microscope and find the yeast cells that are dividing. Move to high power if necessary.
- 5. Draw the dividing cells you see in the space below.
- 6. Write a title and your magnification.

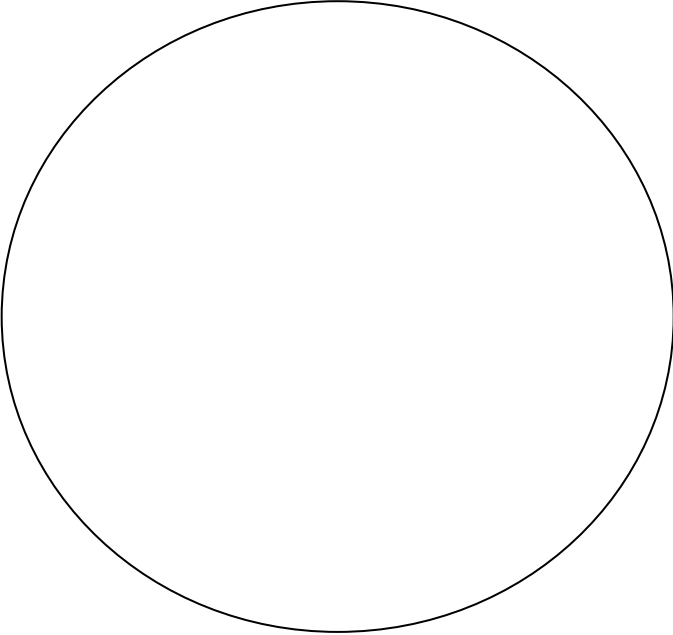
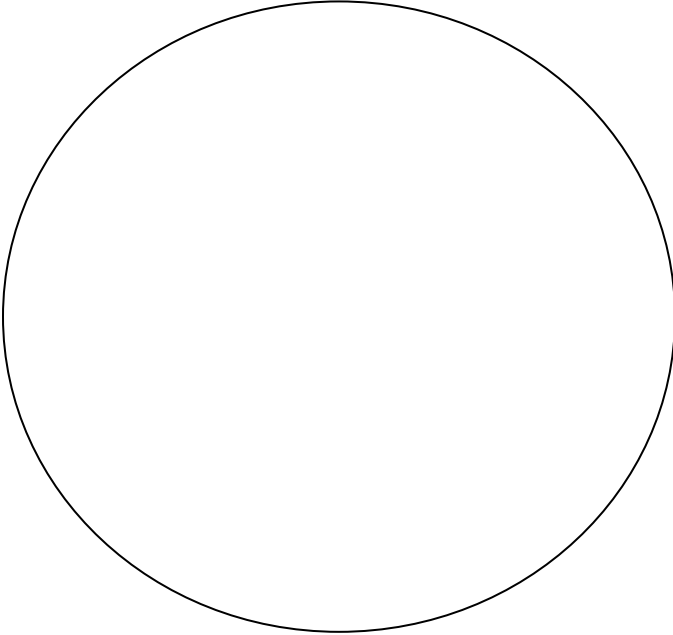




### Onion Root Observations

(To do when finished with the yeast observation.)

- 7. Choose a prepared onion slide.
- 8. Put the slide under the microscope. Start with low power, focus and then move on to medium and if necessary, high power.
- 9. Choose the best magnification for your slide. Look at the onion slide under the microscope and find different stages in the cell cycle.
- 10. Choose two of the different stages in the spaces below.
- 11. Write the stage as the title of each drawing.
- 12. Write the total magnification of each drawing.

<hr/>   Total Magnification: _____	<hr/>   Total Magnification: _____
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*Student Activity C*  
**GLOSSARY HOMEWORK**

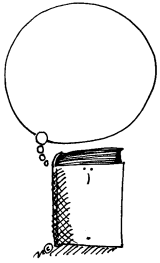
Complete **Week 8 Technical Glossary**. Read the definition for each word, and then write the word in the blank next to the sentence. If there is a box under the blank, draw a picture of the word. Then, in the last activity, write the correct word in the blank next to its definition.

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# CELL CYCLE AND DNA REPLICATION

## Day 4



### *Student Activity A* WARM UP

Interphase used to be described as a time during which the cell is “at rest.” That description is no longer considered correct. What does happen during interphase? Why do you think it used to be described that way?

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### *Student Activity B* GUIDED READING

After you discuss each question, answer the key questions and fill in the missing words for the auxiliary questions.

### Auxilliary Questions

**A1: What is the cell cycle?**

The \_\_\_\_\_ is the regular sequence of growth and division that \_\_\_\_\_ undergo.

**A2: The first stage of the cell cycle is called interphase. What happens during interphase?**

During \_\_\_\_\_, the cell grows to its mature size, makes a \_\_\_\_\_ of its DNA, and prepares to \_\_\_\_\_ into two cells.

**A3: What is DNA?**

\_\_\_\_\_ is a nucleic acid found in the \_\_\_\_\_ in a cell's nucleus. \_\_\_\_\_ is the \_\_\_\_\_ material that holds all the

information that the \_\_\_\_\_ needs to carry out its \_\_\_\_\_.

**A: Why is the replication of a cell's DNA so important?**

The \_\_\_\_\_ of a cell's DNA is very \_\_\_\_\_ because each daughter cell must have a comp set of DNA to survive]

**A: What happens during mitosis?**

During \_\_\_\_\_, one copy of the \_\_\_\_\_ is distributed into each of the two daughter cells.

**A: What happens during cytokinesis?**

During \_\_\_\_\_, the cytoplasm divides, distributing the \_\_\_\_\_ into each of the two new cells.

**A: What happens after cytokinesis?**

At the end of \_\_\_\_\_, each cell enters \_\_\_\_\_, and the \_\_\_\_\_ begins again.

**Key Question 1: What events take place during the 3 stages of the cell cycle?**


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***Student Activity C***

**WRAP UP**

Write an outcome sentence with one of these starters:

I still wonder, I learned, I think, I want to know...


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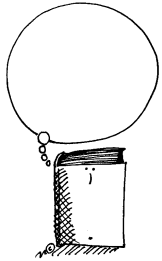


*Student Activity D*  
**GLOSSARY HOMEWORK**  
Complete Week 8 Vocabulary Review Homework.



## CELL CYCLE AND DNA REPLICATION

Day 5



### *Student Activity A* **WARM UP**

Why do cells have to divide?

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### *Student Activity B* **GUIDED READING**

After you discuss each question, answer the key questions and fill in the missing words for the auxiliary questions.

### Auxilliary Questions

**A1: Why is DNA replication important?**

DNA \_\_\_\_\_ ensures that each daughter \_\_\_\_\_ will have all of the genetic \_\_\_\_\_ it needs to carry out its activities.

**Key Question 2: What is the role of DNA Replcation?**

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## Auxilliary Questions

**A2: What does a DNA molecule look like?**

A \_\_\_\_\_ molecule looks like a \_\_\_\_\_ ladder, or spiral staircase.

**A3: What is a nitrogen base?**

Nitrogen \_\_\_\_\_ are molecules that combine the element \_\_\_\_\_ with other elements.

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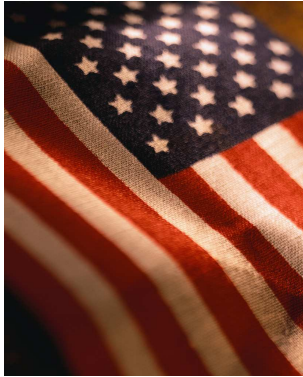


### *Student Activity C*

## **GLOSSARY HOMEWORK**

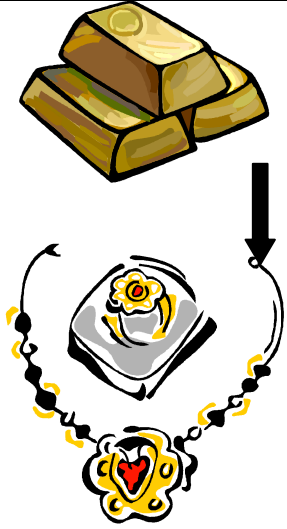


Use your **Academic Words Glossary**, **Technical Words Glossary**, and **Vocabulary Review Activity** to study all your vocabulary words to prepare yourself for the Show What you Know Vocabulary Quiz on Monday.

## Week Eight Academic Words Student Glossary, Part One

**Directions:** Read each word's definition, then write a sentence of your own.

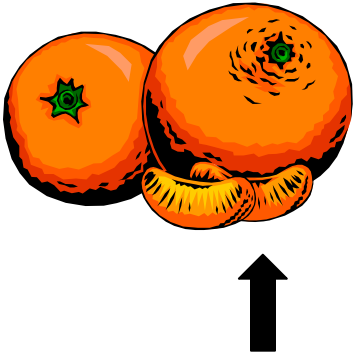


<p><b>alternating</b> <i>alternando</i></p>	<p><b>Alternating</b> means one thing following the other. The American flag has <u>alternating</u> red and white stripes.</p> <p><i>Alternando</i> significa variar lo está pasando haciendo una cosa primero y luego otra; luego volver hacer lo primero que hiciste; luego, repites el proceso.</p> <p><b>Your sentence:</b></p> <hr/> <hr/>	
<p><b>cycle</b> <i>ciclo</i></p>	<p>A <u>cycle</u> is a series of events that happen one after another in the same order, over and over again. This is a picture of part of the life <u>cycle</u> of a bean plant.</p> <p><i>Un ciclo</i> es una serie de eventos/ fases/ actos que pasa uno detrás del otro en el mismo orden, y ocurren una y otra vez.</p> <p><b>Your sentence:</b></p> <hr/> <hr/>	
<p><b>definite</b> <i>definido</i></p>	<p><b>Definite</b> means certain or clear. This butterfly's wings have a <u>definite</u> pattern, making the butterfly easy to identify.</p> <p><i>Definido</i> significa algo que es cierto o claro.</p> <p><b>Your sentence:</b></p> <hr/> <hr/>	





<p><b>element</b> <i>elemento</i></p>	<p>An <u>element</u> is a material from which all other materials are made. Gold is an <u>element</u> that is used to make jewelry and coins.</p> <p><i>Un <u>elemento</u> es uno de los materiales de los cuales otros materiales están hechos.</i></p> <p>Your sentence:</p> <hr/> <hr/>	 <p>The illustration shows three gold bars at the top. A black arrow points down to a necklace with a large, ornate gold pendant and a smaller gold flower-shaped charm. The necklace is made of black and gold beads.</p>
<p><b>period</b> <i>periodo</i></p>	<p>A <u>period</u> is a portion of time. These children are playing soccer on the playground during their recess <u>period</u>.</p> <p><i>Un <u>periodo</u> es un espacio de tiempo.</i></p> <p>Your sentence:</p> <hr/> <hr/>	 <p>The illustration shows two children on a green field. One child is wearing a purple shirt and the other is wearing an orange jacket and blue pants. A red soccer ball is on the ground near the child in the orange jacket.</p>
<p><b>revealed</b> <i>revelado</i></p>	<p>If something is <u>revealed</u>, it is made known or shown. The thief's mask covers his face, but if he takes it off, his face will be <u>revealed</u>.</p> <p><i>Si algo es <u>revelado</u>, es porque se da a conocer o porque se muestra.</i></p> <p>Your sentence:</p> <hr/> <hr/>	 <p>The illustration shows a thief wearing a green cap, a striped shirt, and a black mask. He is holding a small white bag and has a mischievous expression.</p>

## Week Eight Academic Words Student Glossary, Part Two

Read each word's definition, then write a sentence of your own.

<p><b>section</b> <i>sección</i></p>	<p>A <b>section</b> is a part or portion of something. The inside of an orange is divided into <u>sections</u>.</p> <p><i>Una <u>sección</u> es una parte o una porción de algo o de un todo.</i></p> <p><b>Your sentence:</b></p> <hr/> <hr/>	
<p><b>sequence</b> <i>secuencia</i></p>	<p>A <b>sequence</b> is the coming of one thing after another in a fixed order.</p> <p>It is important to add the ingredients in the correct <u>sequence</u>, or the cake will not turn out well.</p> <p><i>Una <u>secuencia</u> es una serie o una sucesión de cosas que pasan una detrás de la otra exactamente en el mismo orden.</i></p> <p><b>Your sentence:</b></p> <hr/> <hr/>	
<p><b>double</b> <i>doble</i></p>	<p><b>Double</b> means twice as many or as much.</p> <p>A <u>double</u> cheeseburger has two hamburger patties instead of just one.</p> <p><i><u>Doble</u> significa algo que está dos veces.</i></p> <p><b>Your sentence:</b></p> <hr/> <hr/>	

<p><b>key</b> <i>clave</i></p>	<p><b>Key</b> means very important, or a main part of something. Sugar and flour are <u>key</u> ingredients in a cake.</p> <p><i>Una <u>clave</u> es algo que resuelve o que explica el por qué de algo.</i></p> <p><b>Your sentence:</b></p> <hr/> <hr/>	
<p><b>during</b> <i>durante</i></p>	<p><b>During</b> means while something is happening. The people are eating popcorn <u>during</u> the movie.</p> <p><i><u>Durante</u> significa a través del tiempo.</i></p> <p><b>Your sentence:</b></p> <hr/> <hr/>	
<p><b>duplicate</b> <i>duplicar</i></p>	<p><b>Duplicate</b> means to make an exact copy of. A photocopier <u>duplicates</u> documents and papers.</p> <p><i><u>Duplicar</u> significa hacer una copia exacta de algo.</i></p> <p><b>Your sentence:</b></p> <hr/> <hr/>	