

## Divide to Multiply – Individual Work Scoring Sheet

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

Place a score (1-4) in each row corresponding to the student's college readiness level.

**Exceeding College Ready (4):** Substantially exceeds the performance expectations**College Ready (3):** Shows proficiency in all of the performance expectations**Approaching College Ready (2):** Meets only some of the performance expectations**Initiating College Ready (1):** Does not yet meet the performance expectations

KEY COGNITIVE SKILLS	Student's Self-Assessment	Instructor's Score
<b>Reasoning</b> (constructs well-reasoned arguments to explain phenomena, validate conjectures, or support positions)		
<b>Academic Behaviors</b> (self-monitors learning needs and seeks assistance when needed; uses good study habits; strives for accuracy and precision; perseveres to complete and master tasks)		
<b>Work Habits</b> (works independently)		
<b>Academic Integrity</b> (attributes ideas and info to sources; evaluates sources for quality, validity, credibility, and relevance; understands and adheres to ethical codes of conduct)		
FOUNDATIONAL SKILLS	Student's Self-Assessment	Instructor's Score
<b>Reading Across the Curriculum</b> (analyzes textual information critically)		
<b>Writing Across the Curriculum</b> (composes and revises drafts)		
<b>Research Across the Curriculum</b> (knows which topic(s) are to be investigated; explores research topic; evaluates the reliability of sources; synthesizes and organizes information effectively; designs and presents an effective product; integrates source material)		
<b>Technology</b> (uses technology appropriately to gather information)		
SCIENCE STANDARDS	Student's Self-Assessment	Instructor's Score
<b>Nature of Science: Scientific Ways of Learning and Thinking</b> (exercises cognitive skills in science; exercises collaborative and safe lab practices; demonstrates literacy in current scientific technology; effectively communicates scientific information)		
<b>Foundational Skills: Scientific Applications of Communication</b> (demonstrates appropriate reading and writing practices for science; presents scientific information accurately; demonstrates research literacy)		
<b>Biology</b> (understands and describes the process of cytokinesis in plant and animal cells and how this process is related to growth)		

See reverse for  
comments.

Score	College Readiness Level
39-44	Exceeding College Ready
32-38	College Ready
17-31	Approaching College Ready
0-16	Initiating College Ready

Total Score: \_\_\_\_\_

Grade: \_\_\_\_\_

See Scoring Guide for grade  
conversion chart.

**Divide to Multiply – Group Work Scoring Sheet**

Group Name(s): \_\_\_\_\_

Place a score (1-4) in each row corresponding to the student's college readiness level.

**Exceeding College Ready (4):** Substantially exceeds the performance expectations**College Ready (3):** Shows proficiency in all of the performance expectations**Approaching College Ready (2):** Meets only some of the performance expectations**Initiating College Ready (1):** Does not yet meet the performance expectations

KEY COGNITIVE SKILLS		Group's Assessment	Instructor's Score
<b>Reasoning</b> (gathers evidence to support arguments, findings, or lines of reasoning)			
<b>Academic Behaviors</b> (strives for accuracy and precision; perseveres to complete and master tasks)			
<b>Work Habits</b> (works collaboratively)			
FOUNDATIONAL SKILLS		Group's Assessment	Instructor's Score
<b>Research Across the Curriculum</b> (explores a research topic fully; designs and presents an effective product)			
<b>Technology</b> (uses technology to gather information appropriately)			

Score	College Readiness Level
14-20	Exceeding College Ready
12-13	College Ready
6-11	Approaching College Ready
0-5	Initiating College Ready

**Total Score:** \_\_\_\_\_**Grade:** \_\_\_\_\_**Comments:**

See Scoring Guide for grade conversion chart.

## Divide to Multiply – Scoring Guide for Individual Work

*Note: The letters and numbers of the skills below refer to their designation in the College and Career Readiness Standards.*

### KEY COGNITIVE SKILLS

#### B. Reasoning

##### 3. Gather evidence to support arguments, findings, or lines of reasoning.

*College Ready Description:* Student references examples, graphs, and past experiences when making logical arguments. Student finds supporting evidence when none is currently present.

*Evidence for Scoring:* Student may reference observations made while looking at cells under the microscope to justify their storyboard for mitosis.

#### D. Academic Behaviors

##### 1. Self-monitor learning needs and seek assistance when needed.

*College Ready Description:* Student keeps a mindful eye on his or her integration of knowledge as it progresses and is able to ask fellow students and the instructor for help.

*Evidence for Scoring:* Student is comfortable admitting he or she does not know an answer and is willing to re-examine the material to relearn.

##### 2. Use study habits necessary to manage academic pursuits and requirements.

*College Ready Description:* Student looks over the material he or she needs to incorporate and tries to come up with a logical approach to complete the task in the allotted time.

*Evidence for Scoring:* Student is able to pool information and ideas that were generated during the initial brainstorming and research stages in order to design a model to represent mitosis.

##### 3. Strive for accuracy and precision.

*College Ready Description:* Student approaches problems in a step-by-step manner to make sure they do not miss any key steps. Student is not satisfied with incomplete arguments and tries to reason out the logical arguments in a complete and full manner. Student uses technical vocabulary accurately and precisely in the essay.

*Evidence for Scoring:* Student will not simply move on to the next question once he or she finds an answer, but instead will make sure the response is correct and well-reasoned by checking alternative answers and testing the limits of the chosen response.

##### 4. Persevere to complete and master tasks.

*College Ready Description:* Student writes a complete, well-written essay reflecting the improvements of revisions.

*Evidence for Scoring:* Student's essay includes information that answers all three questions posed in the Student Notes for this assignment.

## E. Work Habits

### 1. Work independently.

*College Ready Description:* Student can work through the problems by themselves.

*Evidence for Scoring:* Student does not wait until the group work to start thinking about the activity.

## F. Academic Integrity

### 1. Attribute ideas and information to source materials and people.

*College Ready Description:* Student adequately documents the work of others and uses standard bibliographic and reference formats.

*Evidence for Scoring:* Student appropriately cites the source of information collected.

### 2. Evaluate sources for quality of content, validity, credibility, and relevance.

*College Ready Description:* Student adequately documents the work of others and uses standard bibliographic and reference formats.

*Evidence for Scoring:* Student cites published books and reference materials that have undergone some form of review, rather than simply drawing from Wikipedia and other open-access, unverified sources of information.

### 4. Understand and adhere to ethical codes of conduct.

*College Ready Description:* Student adequately documents the work of others.

*Evidence for Scoring:* Student does not represent work as being original when it was actually gathered from another source.

## FOUNDATIONAL SKILLS

## A. Reading Across the Curriculum

### 5. Analyze textual information critically.

*College Ready Description:* Student effectively distills research into a correct and concise answer to the assigned question.

*Evidence for Scoring:* Student answers the question with relevant information.

## B. Writing Across the Curriculum

### 3. Compose and revise drafts.

*College Ready Description:* Student composes a complete draft of the written essay and effectively revises it.

*Evidence for Scoring:* Student includes all significant points in the original draft and revises the draft based on appropriate reviewer comments.

## C. Research Across the Curriculum

### 1. Understand which topics or questions are to be investigated.

*College Ready Description:* Student takes the description of the assignment and figures out how the information is to be used in completing the goal.

*Evidence for Scoring:* Given a broad and challenging problem, student is able to break the primary question into subsidiary questions and develop appropriate strategies for addressing each one.

### 2. Explore a research topic.

*College Ready Description:* Student locates and identifies a variety of relevant research sources for the essay and finds relevant information within those sources.

*Evidence for Scoring:* Student's essay contains citations to several sources and information gathered from each of those.

### 4. Evaluate the validity and reliability of sources.

*College Ready Description:* Student distinguishes between reliable and unreliable sources of information.

*Evidence for Scoring:* Student cites published books and reference materials that have undergone some form of review, rather than simply drawing from Wikipedia and other open-access, unverified sources of information.

### 5. Synthesize and organize information effectively.

*College Ready Description:* Student sees how the data given in the graphs and tables are related to each other and how to organize this data in a way that is useful.

*Evidence for Scoring:* Student produces a report in which relevant information is prominently displayed, and the relevance of the information to the research question is made very clear.

### 6. Design and present an effective product.

*College Ready Description:* Student delivers an engaging presentation that clearly communicates the events of each stage of mitosis.

*Evidence for Scoring:* Student correctly identifies events that occur during each stage for the chromosomes, nucleus, centrosome, spindle, and cell.

### 7. Integrate source material.

*College Ready Description:* Student effectively answers the questions about mitosis using his or her own words. Student effectively describes the mitosis model using his or her own words.

*Evidence for Scoring:* Student's description concisely summarizes the events in each stage.

### 8. Present final product.

*College Ready Description:* Student prepares and presents scientific/technical information in appropriate formats for various audiences.

*Evidence for Scoring:* Student's model is well developed and appropriate, and these characteristics are evident in the presentation.

## E. Technology

### 1. Use technology to gather information.

*College Ready Description:* Student uses appropriate methods to collect necessary information.

*Evidence for Scoring:* Student uses the microscope to identify stages of mitosis.

## SCIENCE STANDARDS

### I. Nature of Science: Scientific Ways of Learning and Thinking

#### A.1, 2. Cognitive skills in science.

*College Ready Description:* Student utilizes skepticism, logic, and professional ethics in science. Student uses creativity and insight to recognize and describe patterns in natural phenomena.

*Evidence for Scoring:* Student thinks logically through all the steps of the process of creating a complete and effective model. Student asks questions such as “What if we change this?” and follows through to see how different changes in parts of the model affect the overall quality of the representation of mitosis.

#### C.1. Collaborative and safe working practices.

*College Ready Description:* Student collaborates on joint projects.

*Evidence for Scoring:* All group members equally participate, and one does not do all the work while the others sit and do nothing.

#### D.1. Current scientific technology.

*College Ready Description:* Student demonstrates literacy in computer use.

*Evidence for Scoring:* Student is able to find appropriate reference material and illustrative diagrams using Internet resources.

#### E.1, 2. Effective communication of scientific information.

*College Ready Description:* Student uses several modes of expression to describe or characterize natural patterns and phenomena; these models of expression include narrative, numerical, graphical, pictorial, symbolic, and kinesthetic. Student uses essential vocabulary of the discipline being studied.

*Evidence for Scoring:* Student selects a model that appropriately illustrates the stages of mitosis and effectively explains that model to the class.

### III. Foundational Skills: Scientific Applications of Communication

#### A.1. Scientific writing.

*College Ready Description:* Student uses correct applications of writing practices in scientific communication.

*Evidence for Scoring:* Student produces an essay intended to inform the reader about how regulation of mitosis is related to cancer cells.

**B.3. Scientific reading.**

*College Ready Description:* Student recognizes scientific and technical vocabulary in the field of study and uses this vocabulary to enhance clarity of communication.

*Evidence for Scoring:* Student appropriately incorporates the proper terminology used to describe the stages and relevant aspects of mitosis.

**C.1. Presentation of scientific/technical information**

*College Ready Description:* Student prepares and presents scientific/technical information in appropriate formats for various audiences.

*Evidence for Scoring:* Student presents the model of mitosis to the class, focusing on the technical accuracy and appropriateness of the model. Student presents his or her essay to the instructor, focusing on informing the reader of how regulation of mitosis is related to cancer cells.

**D.1. Research skills/information literacy.**

*College Ready Description:* Student uses search engines, databases, and other digital electronic tools effectively to locate information.

*Evidence for Scoring:* Student is able to find appropriate reference material and illustrative diagrams using Internet resources.

**VI. Biology****A.4, 5. Structure and function of cells.**

*College Ready Description:* Student describes the major features of mitosis and relates this process to growth and asexual reproduction. Student understands the process of cytokinesis in plant and animal cells and how this process is related to growth.

*Evidence for Scoring:* Student's essay accurately describes how cytokinesis is related to growth of cancer cells.

**Divide to Multiply – Scoring Guide for Group Work**

*Note: The letters and numbers of the skills below refer to their designation in the College and Career Readiness Standards.*

**KEY COGNITIVE SKILLS****B. Reasoning****3. Gather evidence to support arguments, findings, or lines of reasoning.**

*College Ready Description:* Group is able to answer the assigned question correctly and coherently.

*Evidence for Scoring:* Group's answer is concise and reflects a synthesis of the group's research, not a conglomeration.

## D. Academic Behaviors

### 3. Strive for accuracy and precision.

*College Ready Description:* Group answers the questions correctly and includes only relevant information. Group creates a mitosis model that shows the correct attributes for each phase of mitosis.

*Evidence for Scoring:* Group's model accurately presents the state of the nuclear membrane, positions of the chromosomes, status of the spindle and centrioles, and degree of cytokinesis in each phase that is depicted.

### 4. Persevere to complete and master tasks.

*College Ready Description:* Group presents the mitosis model with consistent quality throughout.

*Evidence for Scoring:* Group's model depicts each of the mitosis phases with similar detail, and the group offers a thorough presentation that contains appropriate detail throughout.

## E. Work Habits

### 2. Work collaboratively.

*College Ready Description:* Group communicates effectively, works efficiently, and uses the skills of all members to adequately answer the question and design and present their model.

*Evidence for Scoring:* Group's presentation is delivered smoothly or communicated fully and the contributions of each group member are evident.

## FOUNDATIONAL SKILLS

## C. Research Across the Curriculum

### 2. Explore a research topic.

*College Ready Description:* Group thoroughly researches the events during the phases of mitosis and the specifics of the cell chosen to model.

*Evidence for Scoring:* Group's model is clearly a plant or animal cell of the appropriate species, given the number of chromosomes modeled.

### 6. Design and present an effective product.

*College Ready Description:* Group designs and presents a model that clearly communicates the details of the phases of mitosis.

*Evidence for Scoring:* Group's representations of each cellular component are clearly distinguishable, identifiable, and consistent through all the phases.

### 8. Present final product.

*College Ready Description:* Group prepares and presents scientific/technical information in appropriate formats for various audiences.

*Evidence for Scoring:* Group's model is well developed and appropriate, and these characteristics are evident in the presentation.



## E. Technology

### 1. Use technology to gather information.

*College Ready Description:* Group uses appropriate online methods to collect necessary information.

*Evidence for Scoring:* Group cites literature that includes a mix of sources from library databases and/or reputable websites.

## Divide to Multiply – Scoring Instructions

There are two scoring sheets for this CRA: one for individual work and one for group work. Use either or both as desired for your class.

Place a score (1-4) in each row of the scoring sheet corresponding to the student's college readiness level.

**Exceeding College Ready (4):** Substantially exceeds the performance expectations

**College Ready (3):** Shows proficiency in all of the performance expectations

**Approaching College Ready (2):** Meets only some of the performance expectations

**Initiating College Ready (1):** Does not yet meet the performance expectations

Suggested Grade Conversion:

This chart reflects equal weight given to each skill. As key cognitive skills, foundational skills, and discipline content knowledge are all important elements of college readiness, we recommend this grading approach. However, you may certainly choose to implement different weights to particular scales and assign a grade at your discretion.

Individual Work:

Score	Grade		Score	Grade		Score	Grade		Score	Grade
44	100		35	90		26	79		17	70
43	99		34	88		25	78		16	68
42	98		33	86		24	77		15	66
41	97		32	85		23	76		14	64
40	96		31	84		22	75		13	62
39	95		30	83		21	74		12	60
38	94		29	82		20	73			
37	93		28	81		19	72			
36	92		27	80		18	71			

Group Work:

Score	Grade		Score	Grade		Score	Grade		Score	Grade
20	100		15	96		10	80		5	67
19	99.5		14	95		9	77.5		4	63.5
18	99		13	90		8	75		3	60
17	98		12	85		7	72.5			
16	97		11	82.5		6	70			