

# Life Cycles

**Background:** We're learning that plants and animals go through a series of changes as they grow. These changes are called "life cycles."

**Design Challenge:** Design and create a poster that illustrates the life cycle of one plant or animal. Be ready to use your poster to teach others about the life cycle you illustrate.

**Criteria:** Your poster must

- show the complete life cycle of one plant or animal
- be at least 12 by 12 inches, but no larger than 18 by 18 inches
- have a title
- have at least one pop-up
- have at least one lever-operated moving part.



<b>Materials:</b> Select from the list below.	<b>Tools:</b> Select from the list below.
<ul style="list-style-type: none"><li>• construction paper</li><li>• craft sticks</li><li>• flattened cardboard</li><li>• glue</li><li>• paper fasteners (limit 3)</li><li>• pipe cleaners (limit 5)</li><li>• scrap paper</li><li>• tag board or poster board</li><li>• tape (limit 12 inches)</li><li>• yarn</li></ul>	<ul style="list-style-type: none"><li>• hole punch</li><li>• pushpin paper drill</li><li>• ruler</li><li>• scissors</li><li>• yardstick</li></ul>

**Targeted Standard of Learning:** Science 2.4  
Supporting SOL: English 2.1, 2.2, 2.3; Science 2.1; Mathematics 2.11

**Targeted Standard for Technological Literacy:** 11  
Supporting STL: 8, 9, 10

## Tips for Teachers

### Targeted Standard of Learning:

- Science 2.4 The student will investigate and understand that plants and animals undergo a series of orderly changes as they mature and grow. Key concepts include
- a) animals life cycles; and
  - b) plant life cycles.

**Supporting SOL:** English 2.1, 2.2, 2.3; Science 2.1; Mathematics 2.11

### Targeted Standard for Technological Literacy:

- 11 Students will develop the abilities to apply the design process.

**Supporting STL:** 8, 9, 10

Prior Knowledge & Skill	Materials & Preparation	Safety Issues	Class Management	Materials Provided	Design Process
<ul style="list-style-type: none"><li>• Exposure to life cycles of plants and animals</li></ul>	<ul style="list-style-type: none"><li>• Check Design Brief for recommended materials. Teacher may substitute materials.</li><li>• Teacher has the option to add tools, such as colored pencils, markers, or crayons.</li></ul>	<ul style="list-style-type: none"><li>• Discuss proper use of tools.</li></ul>	<ul style="list-style-type: none"><li>• Groups of two or three recommended</li></ul>	<ul style="list-style-type: none"><li>• Design Brief</li><li>• Guided Portfolio (adapt as appropriate/ optional)</li><li>• Rubric Assessments</li></ul>	Follow the Design Process: <ul style="list-style-type: none"><li>• Restate the problem.</li><li>• Brainstorm solutions.</li><li>• Create the best solution.</li><li>• Test the solution.</li><li>• Evaluate the solution.</li></ul>



Guided Portfolio, p2

Name \_\_\_\_\_



**2. Brainstorm solutions.** Sketch and/or describe some possible solutions.




Name \_\_\_\_\_

**4. Test your solution.**

Does your poster have a title? YES NO

- What is the title of your poster?

Does your poster show a complete life cycle? YES NO

- What life cycle does your poster illustrate?
- Explain the life cycle.

Does your poster have at least one pop-up? YES NO

- Explain how the mechanism works.

Does your poster have at least one lever-operated moving part? YES NO

- Explain how the mechanism works.

Is your poster at least 12 by 12 inches, but no larger than 18 by 18 inches? YES NO

- How tall is your poster? \_\_\_\_\_
- How wide is your poster? \_\_\_\_\_

Guided Portfolio, p5

Name \_\_\_\_\_

**5. Evaluate your solution.**

Was it the best solution? Why, or why not?

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Look back at your brainstorming page. Would one of your other ideas have worked better? Why, or why not?

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What did you learn by designing and creating this poster?

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## Rubric for Life Cycles

Name \_\_\_\_\_ Date \_\_\_\_\_

0—no evidence; 1—limited understanding; 2—some understanding with room for improvement; 3—good understanding with room for improvement; 4—substantial understanding

<b>Design Brief Rubric</b>	<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
The student restated the problem in his/her own words.					
The student brainstormed more than one idea.					
The student shared problems that occurred and their solutions through written notes or oral communication per teacher's instructions.					
The student tested the poster to make sure it					
• has a title					
• shows a complete life cycle					
• has at least one pop-up					
• has at least one lever-operated moving part					
• is at least 12 by 12 inches but no larger than 18 by 18 inches.					
The student evaluated how he/she could make it better next time.					

# Rubric for Life Cycles

Name \_\_\_\_\_ Date \_\_\_\_\_

0—no evidence; 1—limited understanding; 2—some understanding with room for improvement; 3—good understanding with room for improvement; 4—substantial understanding

<b>Oral Communication Rubric</b>	<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
<b>2.1</b> The student will demonstrate an understanding of oral language structure. <ul style="list-style-type: none"> <li>a) Create oral stories to share with others.</li> <li>b) Create and participate in oral dramatic activities.</li> <li>c) Use correct verb tenses in oral communication.</li> <li>d) Use increasingly complex sentence structures in oral communication.</li> <li>e) Begin to self-correct errors in language use.</li> </ul>					
<b>2.2</b> The student will expand understanding and use of word meanings. <ul style="list-style-type: none"> <li>a) Increase listening and speaking vocabularies.</li> <li>b) Use words that reflect a growing range of interests and knowledge.</li> <li>c) Clarify and explain words and ideas orally.</li> <li>d) Identify and use synonyms and antonyms.</li> <li>e) Use vocabulary from other content areas.</li> </ul>					
<b>2.3</b> The student will use oral communication skills. <ul style="list-style-type: none"> <li>a) Use oral language for different purposes: to inform, to persuade, to entertain, to clarify, and to respond.</li> <li>b) Share stories or information orally with an audience.</li> <li>c) Retell information shared by others.</li> <li>d) Follow three- and four-step directions.</li> <li>e) Give three- and four-step directions.</li> </ul>					

## Standards of Learning

### English (2010)

#### *Oral Language*

- 2.1 The student will demonstrate an understanding of oral language structure.
- a) Create oral stories to share with others.
  - b) Create and participate in oral dramatic activities.
  - c) Use correct verb tenses in oral communication.
  - d) Use increasingly complex sentence structures in oral communication.
  - e.) Begin to self-correct errors in language use.
- 2.2 The student will expand understanding and use of word meanings.
- a) Increase listening and speaking vocabularies.
  - b) Use words that reflect a growing range of interests and knowledge.
  - c) Clarify and explain words and ideas orally.
  - d) Identify and use synonyms and antonyms.
  - e) Use vocabulary from other content areas.
- 2.3 The student will use oral communication skills.
- a) Use oral language for different purposes: to inform, to persuade, to entertain, to clarify, and to respond.
  - b) Share stories or information orally with an audience.
  - c) Retell information shared by others.
  - d) Follow three- and four-step directions.
  - e) Give three- and four-step directions.

### Mathematics (2009)

#### *Measurement*

- 2.11 The student will estimate and measure
- a) length to the nearest centimeter and inch;
  - b) weight/mass of objects in pounds/ounces and kilograms/grams, using a scale; and
  - c) liquid volume in cups, pints, quarts, gallons, and liters.

## **Science** (2010)

### *Scientific Investigation, Reasoning, and Logic*

- 2.1 The student will demonstrate an understanding of scientific reasoning, logic, and the nature of science by planning and conducting investigations in which
- a) observations and predictions are made and questions are formed;
  - b) observations are differentiated from personal interpretation;
  - c) observations are repeated to ensure accuracy;
  - d) two or more characteristics or properties are used to classify items;
  - e) length, volume, mass, and temperature are measured in metric units and standard English units, using the proper tools;
  - f) time is measured using the proper tools;
  - g) conditions that influence a change are identified and inferences are made;
  - h) data are collected and recorded, and bar graphs are constructed using numbered axes;
  - i) data are analyzed, and unexpected or unusual quantitative data are recognized;
  - j) conclusions are drawn;
  - k) observations and data are communicated;
  - l) simple physical models are designed and constructed to clarify explanations and show relationships; and
  - m) current applications are used to reinforce science concepts.

### *Life Processes*

- 2.4 The student will investigate and understand that plants and animals undergo a series of orderly changes as they mature and grow. Key concepts include
- a) animals life cycles; and
  - b) plant life cycles.

## **Standards for Technological Literacy**

Standard 8: Students will develop an understanding of the attributes of design.

Standard 9: Students will develop an understanding of engineering design.

Standard 10: Students will develop an understanding of the role of troubleshooting, research and development, invention and innovation, and experimentation in problem solving.

Standard 11: Students will develop the abilities to apply the design process.

## Please give us some feedback.

Complete the form below to let us know how this design brief worked for you and your students. Please be specific so that we might use your suggestions to improve the activity. *You can fill this out on your computer, or you can print it, fill it out manually, and scan it.*

Teacher: \_\_\_\_\_

School: \_\_\_\_\_

School division: \_\_\_\_\_

Design brief title: \_\_\_\_\_

<b>Background</b>	<i>Put an X in the appropriate column:</i>	Needs to be rewritten	Needs minor adjustment	Is ready for classroom use
Does it set the context for the activity?				
Is it age-appropriate in language, length, and complexity?				
Does it reference prior learning and/or research that the students did that will facilitate designing a solution to a problem?				
Is it detailed enough that an adult will understand the purpose for the design brief?				
COMMENTS. <i>If any of the questions above are marked other than "ready for classroom use," please provide suggestions here.</i>				

<b>Design Challenge</b>	Needs to be rewritten	Needs minor adjustment	Is ready for classroom use
Does the challenge support your curriculum?			
Is it age-appropriate in language, length, and complexity?			
Is it detailed enough that an adult will understand the purpose for the design brief?			
COMMENTS. <i>If any of the questions above are marked other than "ready for classroom use," please provide suggestions here.</i>			

<b>Criteria</b> Criteria are part of the challenge. They set the limitations for the design. They are not directions.	Needs to be rewritten	Needs minor adjustment	Is ready for classroom use	N/A
Are the limitations age-appropriate?				
Do the limitations encourage critical thinking?				
Is the application of mathematic knowledge/skills integrated into the criteria? If not, should the skill area be addressed?				
Is the application of science knowledge/skills integrated into the criteria? If not, should the skill area be addressed?				
Is the application of social studies knowledge/skills integrated into the criteria? If not, should the skill area be addressed?				
Are language skills integrated into the criteria? If not, should the skill area be addressed?				
COMMENTS. <i>If any of the questions above are marked other than "ready for classroom use," please provide suggestions here.</i>				

<b>Materials</b> Materials help set the limitations for the design. The list should include materials that might work.	Needs to be rewritten	Needs minor adjustment	Is ready for classroom use	N/A
Does the materials list encourage a variety of design solutions?				
Does the materials list include a variety of choices for joining items?				
Does the materials list include materials that force students to make decisions?				
COMMENTS. <i>If any of the questions above are marked other than "ready for classroom use," please provide suggestions here.</i>				

<b>Tools</b> Tools can be used in the construction of the designed product. They are used to manipulate materials. They cannot become part of the product.	Needs to be rewritten	Needs minor adjustment	Is ready for classroom use
Are the tools listed age appropriate?			
Are all tools needed for the activity included?			
COMMENTS. <i>If any of the questions above are marked other than "ready for classroom use," please provide suggestions here.</i>			

<b>Standards of Learning</b>	Yes	No
Does the design brief reinforce the targeted Standard of Learning(s)?		
Are the supporting Standards of Learning appropriate?		
What Standards of Learning would you add or remove?		

<b>Standards for Technological Literacy</b>	Yes	No
Does the design brief reinforce the targeted Standard(s) for Technological Literacy?		
Are the supporting Standards for Technological Literacy appropriate?		
What Standards for Technological Literacy would you add or remove?		

<b>Tips for Teachers</b>	Yes	No
Are the tips listed in the chart helpful for a first-time teacher?		
What tips would you add?		

<b>Guided Portfolio</b>	Needs to be rewritten	Needs minor adjustment	Is ready for classroom use
Are the instructions and questions age appropriate and clear?			
In the "Test your solution" section, do the questions force students to thoroughly test their solutions?			
In the "Evaluate your solution" section, do the questions force students to honestly evaluate their solutions			
COMMENTS. <i>If any of the questions above are marked other than "ready for classroom use," please provide suggestions here.</i>			

<p><b>Additional Comments</b> Please use this area to provide general suggestions for improving this design brief.</p>