

Teacher's Guide: Reproduction: One Goal, Two Methods

Recommended Grade Level: 5-8

(also applicable to grades 9-12 for students requiring significant support in learning)

Suggested Time: About 50-60 minutes spread over one or more class periods, plus additional time to complete a writing assignment

Goals

Following are the big ideas that students should take away after completing this lesson:

- Reproduction is essential to the survival of a species
- All living things reproduce using either sexual or asexual methods of reproduction
- Each method of reproduction has its advantages and disadvantages

Vocabulary

- reproduction
- offspring
- traits
- clone
- genes
- natural selection

Key Literacy Strategies

Following are the primary literacy strategies students will use to complete this activity:

- Comparing and contrasting ideas (screen 9, writing assignment 1)
- Making inferences (screens 4, 6, and 8, writing assignment 2)
- Determining important information (screen 8, writing assignment 1)

Note: In addition to using the key literacy strategies listed above, students will use each of the strategies below to complete this lesson:

- Monitoring comprehension
- Synthesizing
- Making predictions
- Developing vocabulary
- Connecting prior knowledge to new learning
- Developing a topic in writing
- Identifying and using text features (photographs, captions, diagrams, and/or maps)

Overview

Reproduction: One Goal, Two Methods is a student-directed learning experience. However, while students are expected to work through the lesson on their own, teachers should be available to keep the lesson on track, organize groupings, facilitate discussions, answer questions, and ensure that all learning goals are met.

The following is a summary of the lesson screens:

Screen 1: Students learn that they will explore the subject of reproduction and the advantages and disadvantages of different methods.

- Screen 2: Students read that reproduction is essential for the survival of a species and that there are two basic methods of reproduction.
- Screen 3: Students learn what the goals are for the lesson, which skills they will be using to complete the lesson, and the important vocabulary words they will use during the lesson.
- Screen 4: Students read about the basics of asexual reproduction. They also write down their thoughts about why a living thing might choose this method of reproduction.
- Screen 5: Students read more about asexual reproduction, specifically about how amoebas go through this process. They then watch a video about a population of salamanders that reproduces asexually.
- Screen 6: Students read about the basics of sexual reproduction. They also write down their thoughts about how traits derived from two parents help a species survive.
- Screen 7: Students watch a video about two different species of fish that live in the same environment and reproduce using different methods. They then answer quiz questions to show comprehension of what they've learned so far.
- Screen 8: Students read a passage that details the advantages and disadvantages of each method of reproduction. After they have finished reading, they write down a definition of natural selection and explain how the environment can influence which reproductive method an animal uses.
- Screen 9: Students use an interactive activity to place phrases related to one of two methods of reproduction into the appropriate column.
- Screen 10: Students complete a vocabulary activity, then choose two words from the vocabulary list and write a new sentence for each word. This demonstrates their understanding of the words' meaning.

Final

Assignment: Students select and complete a writing assignment about the lesson topic.

Before the Lesson

- Go through each screen of the lesson, including all the interactive activities, so that you can experience ahead of time what students will be doing. As you go through each screen, jot down your own expectations for students' responses.
- Determine if students will be working individually or in pairs on the lesson. Some students may be able to work independently with little or no support. Students who are less familiar with the subject area or who struggle with literacy skills may benefit from working with another student. An effective way to do this is to pair a stronger student with a less able reader. You can also have students work individually on certain tasks and in pairs on others, depending on their experience and needs. If students will be working in pairs on any portion of the lesson, let them know if they will be expected to type in their notes individually or together.

- ❑ Provide instruction on key vocabulary (vocabulary words are defined in the lesson).
- ❑ Determine what students already know about sexual and asexual reproduction. Record their ideas on a chart. This will give you a sense of students' possible misconceptions and the background knowledge they have before beginning this lesson. If time allows, return to the chart after students have completed the lesson to add new learning and correct misconceptions. Note: You may want to record their new learning in a different colored ink so they can see how much they've learned.
- ❑ Arrange computers with Internet access so students can work individually or in pairs.
- ❑ Before students begin, suggest a timeline for completing the lesson, mention the different types of media they will encounter, and let them know how you expect them to submit their work. You may want to provide an outline of this information on a chart, chalkboard, or whiteboard, or as a handout.

Lesson Assessments

The following are descriptions of the lesson features that will be part of the packet of materials that they will submit. Students will use the packet for reference when writing their final assignment. It also serves as a formative assessment tool to monitor students' work as they're progressing through the lesson.

- **Notes** - Students take notes on screens 4, 6, and 8. If time allows, review their notes before students begin their writing assignment.
- **Multiple-choice quiz** - Students complete the quiz on screen 7. Walk around to make sure students answer all three questions in the quiz before they move on. If students click to go to the next page before they finish, their work on the quiz will not be saved.
- **Match It!** - Students complete a vocabulary activity on screen 10. They begin by placing the vocabulary terms into the correct sentences. After they finish and save their work, they will be able to check their answers against an answer key. When they are done, they will be asked to choose two vocabulary words and write a new sentence for each word. Sentences should demonstrate a clear understanding of the meaning of each word, and the words should be used specifically in the context of reproduction. (An example of an insufficient response is "Genes are inside the body.")
- **Compare It!** - Students complete the information sorting activity Compare It! on screen 9. Students will not be able to check their answers online, so you will need to provide them with correct answers when they are finished with the lesson. You can choose to review the answers as a class or return the corrected packet of materials to students before they begin the final assignment.

The following are the appropriate categories for each description:

Sexual Reproduction

- Offspring has two parents
- Strength in variety of offspring
- Each generation is different than the one that proceeds it

- Genes passed from generation to generation are “diluted,” or weakened
- Species may be better able to avoid catching a disease

Asexual Reproduction

- Offspring has one parent
 - Strength in numbers of offspring
 - Each generation is the same as the one that proceeds it
 - Genes passed from generation to generation are not “diluted,” or weakened
 - Species may be less able to avoid catching a disease
- **Final Assignment** - Students complete one final writing assignment. You can choose to let students make their own selection, or assign one according to your goals for the lesson. Use the rubric on page 6 to assess the writing assignments.

Lesson Aids and Extensions

Use the following suggestions to help students if they are stuck on a particular screen, as follow-up discussions to reinforce learning, and to prepare students for completing their writing assignments.

- **Watching Videos** - Encourage students to watch the videos more than once. After the initial viewing, provide students with a specific content focus to frame their next viewing(s) of the video. This will help them draw connections between the main topic and the information that the videos have to offer.
- **Participating in Discussions** - Organize class discussions or encourage students to talk about their questions in pairs. You may want to use the following discussion starters:
 - o What do you know about the traits you possess? Why do you have a certain eye color? Why is your hair straight or curly?
 - o If reproduction is universal among all living things, what do you know about how plants reproduce?
 - o Why does the narrator in the video on sexual reproduction call clones an “easy target” for parasites and diseases?
- **Reading the Passage** - Before they read the passage on screen 8, ask students to name any reasons they can think of to explain why more species use sexual reproduction than asexual reproduction. You may want to review the open-ended response question before they read.
- **Sharing Student Work** - It may be motivational, and a further learning opportunity, for students to post their final essays so that their classmates, peers, and/or parents can see them. This may also provide an opportunity for students to comment on and discuss each other’s essays.

If you do not already have access to an online writing community, Teaching Matters™ provides TeXT, free classroom publishing tools that allow teachers and students to create and publish their own online eZine. More information and a free signup are available at Teaching Matters: TeXT (<http://text.teachingmatters.org>).

- **Reflection and Self-Assessment** - After students have turned in their writing assignments, you can choose to have them assess their learning. Convene students as a whole class or in small groups to discuss the following questions.
 - o What did you learn?
 - o What was surprising?
 - o What questions do you still have?
 - o What was the easiest for you to understand and do?
 - o What was the most difficult?

Final Assignment Rubric
Reproduction: One Goal, Two Methods

1. Explain the advantages and disadvantages of sexual and asexual reproduction for the species that practice them. Use specific examples for each method of reproduction to support your ideas.
2. Explain in what ways you think offspring born from one parent might differ from those born from two parents. Use specific examples to support your ideas.

4	3	2	1
<p>Provides a clear and accurate response to the question. Ideas are elaborated, with three or more relevant supporting details from the reading passage, video, and other materials in the lesson.</p>	<p>Provides an adequate response to the question. Topic and ideas are generally well organized, with two relevant supporting details from the reading passage, video, and other materials in the lesson.</p>	<p>Provides a generally accurate response, with one supporting detail from the reading passage, video, and other materials in the lesson.</p>	<p>Provides an inaccurate response to the question or fails to address the question. May include misinterpretations. Understanding of the topic is not apparent.</p>
<p>Uses at least three vocabulary words (or a form of the vocabulary words) from the lesson, and uses them all correctly.</p>	<p>Uses two vocabulary words (or a form of the vocabulary words) from the lesson, and uses them both correctly.</p>	<p>Uses one vocabulary word (or a form of the vocabulary word) from the lesson, and uses it correctly.</p>	<p>Does not use any vocabulary words, or uses vocabulary words incorrectly.</p>

Scoring the Rubric

Here are two suggestions for scoring the final assignment rubric. Select the option that best meets your needs or develop your own grading system.

Option 1: This option provides one score for each submitted assignment.

Assign a score of 4 or below for the written response (first row of the rubric) and a score of 4 or below for the use of vocabulary (second row of the rubric), for a total maximum score of 8. The interpretation of scores is as follows:

Score	Grade	Narrative Interpretation
7-8	A	Excellent
5-6	B	Good
4	C	Adequate (Fair)
3 or below	D	Minimal

Option 2: This option provides two scores for each submitted assignment: one for written content and one for the use of key vocabulary. An advantage of separate scores is that you can weight students' comprehension and composition differently than you do their knowledge of vocabulary. It can also help you identify specific needs for future instruction.

Assign a score of 4 or below for the written response (first row of the rubric) and a score of 4 or below for the use of vocabulary (second row of the rubric) and then score them separately. The interpretation of scores is as follows:

Score	Grade	Narrative Interpretation
4	A	Excellent
3	B	Good
2	C	Adequate (Fair)
1	D	Minimal

The final grade may look like this: A/B (A for content and B for vocabulary use).