

# Flower Structures

## Argumentation (CER) Prompt

7.MS-LS.1-4 (MA Draft Revised Science and Technology/Engineering Standards)

Explain, based on evidence, how characteristic animal behaviors as well as specialized plant structures increase the probability of successful reproduction of animals and plants respectively.

Designed to accompany FOSS Diversity of Life, Investigation 7 (Plant Reproduction).

Aligned to work well with the Honey Bee Hive CER Prompt, possibly with a visit to the Museum of Science.

<https://docs.google.com/document/d/1WR6CxiV30ldR2vh3njOLTW9Zlwb9W8gtDBKPPJg3twU/edit?usp=sharing>

Resources:

- FOSS Diversity of Life Kit
- Visual Dissection of Alstroemeria Flower
  - <http://www.microscopy-uk.org.uk/mag/indexmag.html?http://www.microscopy-uk.org.uk/mag/artoct08/bj-peru.html>

Notes for Teachers:

- Graphic Organizers:
  - Try to offer a menu of graphic organizers for prewriting (including a blank page if students have a different structure in mind).
  - When using a graphic organizer, be clear to students about the purpose for the structure.
    - e.g. The reason there is a “Reasoning” box below every “Evidence” box is because we need to explain how each piece of evidence supports the claim.
- Rubrics--there are two different rubrics provided here
  - Teacher Rubric for Assessment
    - Clear outline for teachers of how to assess this particular prompt
    - DO NOT give to students--it clearly lists the expected claim, evidence, and line of reasoning.
  - Student Rubric
    - Share with students
    - Outline of what good claims, evidence, and reasoning are in general

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Explain, based on evidence, how characteristic animal behaviors as well as specialized plant structures increase the probability of successful reproduction of animals and plants respectively.

Ah'mani and Wydri walked past a flower garden on their way home. Ah'mani said, "Flowers are so stupid. Their only purpose is to look pretty and smell funny."

Wydri stopped and said, "I think they are really important for plants to survive."

*What is the primary function (purpose) of flowers?*

*Remember to include:*

- *Claim: Answer the question.*
- *Evidence: Use data and observations from your flower dissection lab to support your claim.*
- *Reasoning: Use information from readings or notes to explain why your evidence supports your claim.*



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## Flower Structures

### *Ideal Student Response*

Answer the question:

*What is the primary function (purpose) of flowers?*

The primary function of flowers is plant reproduction. A flower consists of many parts: the sepals, petals, pistil, and stamens. On the *Alstroemeria* flower, there are large sepals that cover the flower when it is just a bud. There are several colorful petals, some of which have small stripes on them. The *Alstroemeria* has six long stamens. Only some of mine has an anther attached to the end of the filament. Some of the anthers were dark and small, but others were capped with a longer, green structure. Finally, there is one central pistil in the flower. It looks skinny and white, similar to the filament of the anther, but the pistil splits into three parts at the end. The bottom of the pistil is the ovary, which looks large and green. Above that is the style, which connects to the stigma, or top, of the pistil. The stamens are the male parts of the flower. The anthers hold pollen, which hold the plant sperm cells. Petals are brightly colored to attract pollinators like bees. When a pollen grain finds its way to the stigma of another flower, it grows a pollen tube that passes through the style down to the ovary. The pistil is the female part of the flower because the ovary contains ovules which hold the egg cells. When the sperm cell fertilizes the egg cell, it will be able to develop into an embryo inside of a seed. Eventually, the seed has the potential to grow into a new plant.

## Teacher Rubric for Assessment: Flower Structures

	<i>4-Exemplary</i>	<i>3-Proficient</i>	<i>2-Needs Improvement</i>	<i>1-Critical Area</i>
<i>Claim</i>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Accurately states that reproduction is the primary function of flowers, using specific language that corresponds to the question.</li> <li><input type="checkbox"/> Written in complete, easy to understand sentence(s).</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Accurately states that reproduction is the primary function of flowers, using language that generally corresponds to the question.</li> <li><input type="checkbox"/> Written in complete, easy to understand sentence(s).</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Answers the question but uses vague or unclear language.</li> <li><input type="checkbox"/> Inaccurately or incompletely answers the question.</li> <li><input type="checkbox"/> Not written in complete, easy to understand sentence(s).</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Does not make a claim, or makes a completely inaccurate claim.</li> </ul>
<i>Evidence</i>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Provides specific, appropriate, and ample data or observations that supports claim, including:               <ul style="list-style-type: none"> <li><input type="checkbox"/> Sepals that protect the flower</li> <li><input type="checkbox"/> Petals that attract pollinators</li> <li><input type="checkbox"/> Stamens that hold pollen grains containing sperm cells</li> <li><input type="checkbox"/> Pistil that contains egg cells (or ovary)</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Provides specific, appropriate, and sufficient data or observations that supports claim. May include some inappropriate evidence</li> <li><input type="checkbox"/> Addresses 3 bullet points from Exemplary.</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Provides appropriate, but insufficient or unclear data or observations to support claim. May include some inappropriate evidence</li> <li><input type="checkbox"/> Addresses only 1-2 bullet points from Exemplary.</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Does not provide data or observations, or only provides inappropriate evidence (evidence that does not support claim).</li> </ul>
<i>Reasoning</i>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Correctly and clearly connects the evidence to the claim, showing how it supports reproduction as the primary function for flowers.</li> <li><input type="checkbox"/> Discusses in depth the process of fertilization in flowers.</li> <li><input type="checkbox"/> Applies concepts that go beyond the prompt, as appropriate</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Correctly and adequately connects the evidence to the claim, showing how it supports reproduction as the primary function for flowers.</li> <li><input type="checkbox"/> Discusses the process of fertilization in flowers.</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Correctly connects the evidence to the claim, but leaves out important details, and/or</li> <li><input type="checkbox"/> Restates the evidence without connecting it to the claim</li> <li><input type="checkbox"/> Partially discusses the process of fertilization in flowers.</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Does not provide reasoning, or only provides reasoning that does not connect evidence to the claim, and/or</li> <li><input type="checkbox"/> Provides an incomplete generalization or does not apply appropriate scientific concepts.</li> </ul>
<i>Writing:</i> <i>Use appropriate structure, grammar, and mechanics to communicate your argument.</i>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Writing contains no grammatical or spelling errors.</li> <li><input type="checkbox"/> Writing is clear, concise, and persuasive.</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Writing contains very few grammatical or spelling errors.</li> <li><input type="checkbox"/> Writing is clear, mostly concise, and well developed.</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Writing is fairly clear, with some grammatical or spelling errors.</li> <li><input type="checkbox"/> Writing could be more concise.</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Writing is difficult to follow, with many grammatical errors and no clear structure.</li> <li><input type="checkbox"/> Writing is either too wordy or too incomplete.</li> </ul>