

## **Lesson: Pollinator Symmetry**

**Grade Level:** Fourth Grade, Life Sciences

**Overview:** In this lesson, students will learn about the key role of **bilateral symmetry** in pollinators and flowers. Research scientists have observed the phenomenon of pollinator attraction to the color and to symmetrical appearance of plants. In fact, many animals and insects are symmetrical. This symmetry is important to the reproduction and survival of plants. Students will take this given knowledge and create bilateral symmetrical pollinators. Students will have to draw the mirror image by using mathematical shapes and lines. Students will then use a method of painting and folding to create a symmetrical insect and/or flower.

**Science content and standards:**

**Pennsylvania New Academic Standards for Science-**  
<https://www.pdesas.org/Page/Viewer/ViewPage/11>

**Fourth Grade: Life Sciences, From Molecules to Organisms: Structures and Processes**

**Standard 4-LS1-1:** Construct an argument that plants, and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.

**Science Practices:**

**APPENDIX F – Science and Engineering Practices in the NGSS**

<https://www.nextgenscience.org/sites/default/files/Appendix%20F%20%20Science%20and%20Engineering%20Practices%20in%20the%20NGSS%20-%20FINAL%20060513.pdf>

**Practice 6 Constructing Explanations and Designing Solutions**

- Construct an explanation of observed relationships (e.g., the distribution of plants in the backyard).
- Use evidence (e.g., measurements, observations, patterns) to construct or support an explanation or design a solution to a problem.

**Math content and standards:**

**Pennsylvania Academic Standards for Mathematics-**

<https://www.stateboard.education.pa.gov/Documents/Regulations%20and%20Statements/State%20Academic%20Standards/PA%20Core%20Math%20Standards.pdf>

**Mathematics- 2.3 Geometry**

**Standard- CC.2.3.4.A.3:** Recognize symmetric shapes and draw lines of symmetry.

**Math Practices:****Pennsylvania Common Core State Standards for Mathematical Practices.**

[https://static.pdesas.org/content/documents/Math\\_Practices\\_and\\_Grade\\_Progressions\\_rev%201-24-13.pdf](https://static.pdesas.org/content/documents/Math_Practices_and_Grade_Progressions_rev%201-24-13.pdf)

1. **Make sense of problems and persevere in solving them.**
  - Use concrete objects or pictures to help them conceptualize and solve problems.
2. **Look for and make use of structure.**
  - Generate number or shape patterns that follow a given rule.

**Science & Math Connection:**

**Relationships and Convergences Found in the Common Core State Standards in Mathematics (practices), Common Core State Standards in ELA/Literacy\*(student portraits), and A Framework for K-12 Science Education (science & engineering practices) Venn Diagram NSTA Science, Math, & ELA-**

<https://static.nsta.org/ngss/PracticesVennDiagram.pdf>

- S2. Develop and use models
- M4. Model with mathematics
- S5. Use mathematics & computational thinking

**Materials:**

- Pollinator Symmetry Student Guide
- Pencils
- Color pencils
- Paint & paint brushes
- Ruler

**Resources:**

- Student reading PDF version, "*The Mystery of Symmetry*"
- Pollinator Symmetry Student Guided worksheet
- List of symmetrical insects & video resource for students,  
<https://esplora.org/mt/insects-symmetry-and-fluttering-wings/>
- "*How to Build an Insect*" By: Roberta Gibson  
[https://www.amazon.com/How-Build-Insect-Roberta-Gibson/dp/1541578112/ref=sr\\_1\\_1?crid=3EW5QVPJZRJMK&keywords=how+to+build+an+insect&qid=1670956838&srefix=how+to+build+an+insect%2Caps%2C66&sr=8-1](https://www.amazon.com/How-Build-Insect-Roberta-Gibson/dp/1541578112/ref=sr_1_1?crid=3EW5QVPJZRJMK&keywords=how+to+build+an+insect&qid=1670956838&srefix=how+to+build+an+insect%2Caps%2C66&sr=8-1)

**Learning Objectives:**

- Students will learn about Bilateral Symmetry and reference to mathematical symmetry in shapes.
- Students will use an insect template, (Beetle & Bee) to make a symmetrical pollinator.

- Students will choose their own bilateral symmetrical insect with reference to the insect library of photos.

**Lesson Procedure:**

1. The teacher will introduce the lesson by having students read the passage and complete the guided questions in, "*The Mystery of Symmetry*".
2. Students will then use paint and brushes to complete the guided examples from the Pollinator Symmetry student guide.
3. The teacher will then show students the short video reference, <https://explora.org.mt/insects-symmetry-and-fluttering-wings/> .
4. The teacher will have students choose their own example of a symmetry insect or plant by using the insect examples as a reference, <https://explora.org.mt/insects-symmetry-and-fluttering-wings/> .

**Helpful tip: There are lots of symmetrical animals and plants out there! Have students use their technology devices to search for other examples of symmetrical pollinators!**

5. Students will use the following materials; ruler, pencil, and coloring materials to draw their own symmetrical insect and/or plant on the student guided worksheet.
6. The class will complete this unit by reading the following book, "*How to Build an Insect*"  
By: Roberta Gibson.