Key Concepts:
• English language art nonfiction writing and creative writing
• Mathematical graphing
• Engineering tools for data collection and analysis
• Drawing for accuracy
• Art projects
• Performance art

Skills:
• Varies with project

Materials:
• Varies with project

Objective
Students will conduct a variety of interdisciplinary projects that expand their knowledge of butterflies and other insects. These projects can be done as at home assignments, or by small groups.

Background
The following projects and activities branch into other curriculum areas. Some of them are appropriate for a science class, or could be used in cooperation with other teachers in a middle-school or junior high. Teachers with self-contained classrooms could use them to integrate monarchs into other areas of their curriculum. They could also be used as “take-home” projects for all students, or for those students wanting to do additional work with this subject. Useful sources of information for students include the Internet, encyclopedias, books listed in the bibliography at the end of this curriculum, and the background information included with this curriculum.

Procedure
Have students choose one of the following projects to do either during or after the time that they rear insects. This list should only serve to give you ideas, there are many other possibilities!

1. Make drawings of all of the stages of insects that you observed, making them all to the same scale. If possible, include several drawings of the larval stage. Write what scale you are using (for example, 1:1 means you are drawing everything the actual size that it is; 2:1 means that you are drawing everything twice as big as it really is).

2. Graph the mass of your monarch or other insect over its entire development time. What type of graph best represents the data? Why? Analyze how the growth rate changes with time in a paragraph. Use the graph to support your claims. A dissection scope and organisms no longer alive are ideal for this activity.

3. Compare the growth of insects with complete and incomplete metamorphosis, or an insect with a mammal. Write a comparison paragraph for your topics. Be sure to use topic sentences along with support statements. You can also create a booklet that illustrates and describes the differences to a 3rd grader.

6. Study the differences between butterflies and moths, comparing both their bodies and their life-styles. Create something that highlights these differences (a table, chart, poster, etc.). Are there exceptions to the differences that you have learned about?
7. You have a cage containing three monarch pupae and ten third instar larvae (or some other insect) that you have been rearing at your house. An emergency has come up and you must leave town for a week. Write a handbook on the care and feeding of your insects for a neighbor who has agreed to care for them while you are gone. Be sure to include supplies needed, any instructions regarding feeding solutions that might need to be made, lighting requirements, etc. Try to plan for unforeseen situations that might occur.

8. The compound eyes of butterflies are bizarre! Use the library, internet, and other resources to relate the structure and function of the compound eye. Present your findings (e.g., a report, a poster, a drawing, a table, etc.): What is a compound eye? What other types of eyes do living organisms have? What view of the world does each eye provide? What colors, if any, do the different types of eyes discern? What are some possible advantages and disadvantages of each type of eye for the animals that have them?

9. Using materials from home, make a larger-than-life model of any life stage of monarchs. You can make it as accurate as possible, or not—maybe you could emphasize a particular trait like a cartoonist does.

10. Locate a larva of a different butterfly or moth, or another kind of insect. Keep a log book as you raise it to the pupa or adult stage. Predict how long it will remain in its pupa. Write a research paper about this insect.

11. Design a creative expression that relates to monarchs. You can use any medium, including reflective writing, poetry, sculpture, painting, drawing, music, or dance.

12. Compare the changes that occur during your monarch’s development to those that have occurred during your own development. Include photographs or drawings to illustrate your comparisons.