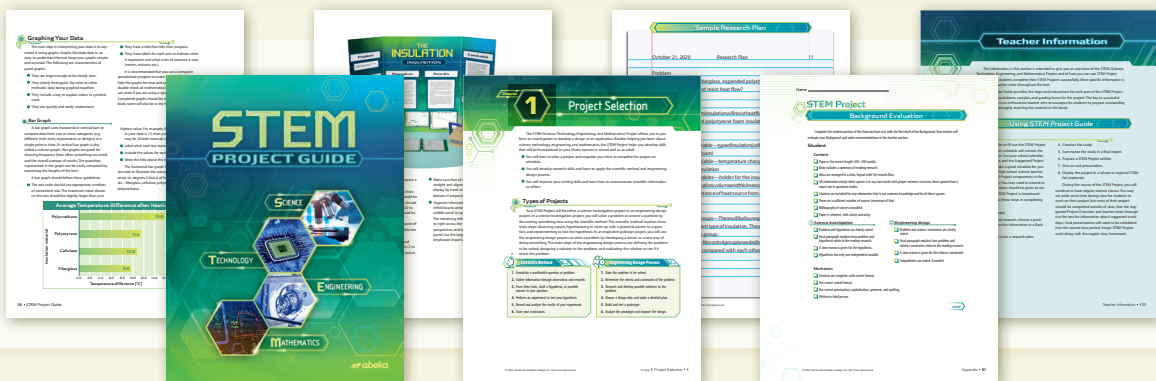


# Using *STEM Project Guide* with *Biology: God's Living Creation* Fourth Edition



## Replacing *Science in Action* with *STEM Project Guide* in your Biology course will provide several benefits:

- Deepens students' ability to apply scientific and engineering reasoning through a STEM Project.
- Allows students to complete either a science-investigation or engineering-design project.
- Guides students to complete the project independently, from topic selection through presentation of results.
- Includes detailed information on science and engineering processes and data analysis, including experimental design, graphing, and significant figures.
- Provides continuity by using project format and instructions familiar from earlier grades.
- Based on guidelines of major STEM fairs.
- Provides forms in checklist format to aid in project evaluation and grading.
- Has Teacher Key with detailed helps for guiding students through the project.

The STEM Project (Science Project) directions in the Fourth Edition of *Biology: God's Living Creation* Teacher Edition are based on using *Science in Action*. The table in this document provides a recommended timeline for replacing *Science in Action* with the new *STEM Project Guide*. Follow this timeline for the STEM Project instead of using the assignments in the Teacher Edition daily lessons. Assign STEM Project homework as appropriate. For details about STEM Project components, assignments, and grading, refer to the *STEM Project Guide* Teacher Key.

The table also suggests pacing changes to accommodate the STEM Project. The Lesson column includes changes to the material taught or reviewed in class (including seatwork assigned

during homework check). The Homework column includes the homework changes corresponding to the pacing changes. Lessons that can be condensed to provide more time for STEM Project work are noted.

Lesson numbers in the table correlate with the suggested daily lessons in the *Biology: God's Living Creation* Teacher Edition and with the Biology video lessons from Abeka Academy. A blank cell in the STEM Project column indicates that there is no in-class work for the STEM Project; students should continue working on components already assigned. A blank cell in the Lesson or Homework column indicates that no pacing adjustments are needed.

# Using the *STEM Project Guide* with *Biology: God's Living Creation* Fourth Edition

Chapter	Lesson	Adjustment		
		STEM Project	Lesson	Homework
2	6	Preview logbook; assign to obtain for lesson (les.) 14.		
2	12			Read pp. 33–35. Answer p. 36, questions 1–3.
3	13		Teach <b>all</b> of section (sect.) 3.1.	Read pp. 36–39, to 3.3 Fruits. Answer p. 39, question 4.
		<b>Note:</b> In sect. 3.1, students may be familiar with the terms <i>flower</i> and <i>receptacle</i> , all terms in the subsection Flower Parts except <i>calyx</i> and <i>corolla</i> , and the distinction between staminate and pistillate flowers.		
3	14	Introduce STEM Project. Discuss logbook format and choosing a topic. Assign topic selection for les. 23.	Review sect. 3.1. Teach <b>all</b> of sect. 3.2.	
		<b>Note:</b> Students may be familiar with most concepts in sect. 3.2. Information less likely to be familiar is specific examples of design for pollination, the terms <i>polar nuclei</i> and <i>double fertilization</i> , and the article The Formation and Ripening of Fruits. The article People and Pollen may be omitted.		
3	16		Homework (hmk) check seatwork: Review pp. 36–39. Review sect. 3.2.	
3	17			Read pp. 47–52, to 4.3 Herbaceous Stems. Answer p. 48, question 2, and p. 52, question 3.
4	18		Teach <b>all</b> of sect. 4.1–4.2.	Read pp. 52–53, to 4.4 Vegetative Reproduction and Special Stems. Answer p. 53, questions 1, 2.
		<b>Note:</b> In sect. 4.1, all bold terms except <i>bundle scars</i> may be familiar. In sect. 4.2, the following items are likely to be familiar: overall structure (but not details) of bark and wood; the terms <i>pith</i> , <i>heartwood</i> , and <i>sapwood</i> ; and the subsection Annual Rings. The article The Power to Change Matter may be omitted.		
4	19	Topic Selection Workday.	Hmk check seatwork: Review pp. 47–52. Teach <b>all</b> of sect. 4.3.	
4	20		Hmk check seatwork: Review pp. 52–53. Review sect. 4.3.	
4	23	Topic selection due.		
5	25	Return approved topics. Introduce Background and problem. Assign Background first draft and problem selection for les. 32.	Teach sect. 5.1.	
		<b>Note:</b> All of sect. 5.1 is likely to be familiar except the subsections Modern Taxonomy and Evolutionary Misconceptions. Students may have seen eukaryotes vs. prokaryotes and the names of the six kingdoms.		

Chapter	Lesson	Adjustment		
		STEM Project	Lesson	Homework
6	32	Background first draft and problem selection due.		
7	33	Return Background first draft; assign second draft for les. 37.		
7	35	Return Problem Selection Worksheet. As needed, assign students to submit revised problems with the Background second draft.		
7	36	Introduce research plan.		
		<b>Note:</b> Students do not need to begin writing the research plan until the Background second draft has been submitted.		
7	37	Background second draft due. Assign research plan first draft for les. 47.		
8	47	Research plan first draft due.		
8	48	Return research plan first draft; assign second draft for les. 53.		
		<b>Note:</b> If you wish to schedule a research plan workday, either omit Lab 9 or condense les. 51–53 (sect. 9.1–9.2) into two lessons (as les. 52–53).		
9	53	Research plan second draft due.		
9	55	Return approved research plans. Students begin research; experimenting or prototyping and testing should be completed by les. 86. Introduce Getting Started Worksheet and weekly updates. Assign Getting Started Worksheet for les. 58.		
		<b>Note:</b> Schedule and assign weekly updates through les. 90. It is recommended that you plan them for the same day each week except when they would fall on a test day.		
9	58	Getting Started Worksheet due.		
12	76–80	Briefly review data analysis with this week's weekly update.		
		<b>Note:</b> You may wish to postpone the review of data analysis, depending on how far along students' projects are.		
13	86	Experimentation/testing completed. Introduce final report; assign first draft for les. 93. Have students sign up for oral presentations. (See below for presentation dates. Directions for the presentations will be given in les. 96.) Explain exhibit (due with the oral presentation).		

Chapter	Lesson	Adjustment		
		STEM Project	Lesson	Homework
14	93	Study (including data analysis) completed. Final report first draft due. Assign final report second draft and completed logbook for les. 98.		
14	96	Explain oral presentation.		
15	98	Final report second draft and completed logbook due.		
15–17	101–117	Oral presentations with exhibits.		
		<b>Note:</b> Plan two or three presentations per day. Adjust the schedule to fit the size of your class. Because of tests and labs, do not schedule oral presentations for les. 106, 107, and 113.		