

Program Approach of Middle & High Science(Direct from BJU Press)

The BJU Press middle and high school science program uses a lab-based approach to equip students to ethically engage in the work of science. Our program teaches science content from an ethical perspective based on a biblical worldview and explores what science can do through strategic modeling in inquiry labs and collaborative STEM experiences. We then direct students to use their critical-thinking and problem-solving skills to develop workable models that will help them find appropriate solutions. To that end, each chapter includes opportunities for extended study that will challenge students to harness and develop their scientific understanding and laboratory skills to serve God and to serve others. They will complete case studies, evaluate existing scientific models, and follow web quests that will require them to collect and analyze data. Ultimately, we want to equip teachers so that they can prepare a generation of student scientists who can use 21st century skills to solve real-world problems within the framework of a biblical worldview and who live in a way that's biblically faithful.

Extending Scientific Knowledge & Skills

Students will be able to develop solutions to real-world problems only with a thorough understanding and knowledge of the sciences, scientific principles, and laboratory skills. Most elementary students will have had introductions to the sciences and valuable laboratory skills, but future science study will be more enjoyable and comprehensible if students continue to expand their understanding in each successive science course.

BJU Press begins each middle and high school science course with an overview of the work of science and foundational biblical themes that should shape a Christian's understanding of the major issues in that field. Students will also regularly review the three-element foundation of Christian ethics: biblical principles, biblical outcomes, and biblical motivations. In addition to supporting the students' worldview shaping, we also support their continued learning development. Our standards-based student

textbooks use age-appropriate language to support learning and retention and include stunning visuals to illustrate concepts. Thoughtfully crafted chapter objectives and essential questions help students to look for key information as they read, and chapter reviews give easy-to-use bulleted reviews for each chapter.

To prepare students for college and potential careers, we highlight scientific careers and interdisciplinary opportunities related to the sciences they study and provide direction on how to pursue a field that interests them. Students need to see every opportunity they have for continued study. God uses the experiences they have in their middle and high school courses to lead them to His plan for their lives.

Applying Scientific Knowledge & Skills

Knowledge often means very little without experience. Lab activities provide a vital opportunity for students to get hands-on application of the skills they're learning in class. In a broader sense, students gain the critical-thinking skills they need to ask better questions and create strong hypotheses by completing lab activities. BJU Press middle and high school science lab manuals are designed to help guide students through hands-on activities that build critical-thinking skills and refine students' observational skills and their capacity to follow directions. Consistent lab work gives students an opportunity to develop and mature their way of thinking. Beyond critical thinking, each lab is also designed to accomplish specific science content learning objectives. Mini labs within the student edition and guided discovery labs in the lab manuals of BJU Press materials give students abundant opportunities for application and for practice with technology, including probe ware technology.

By offering inquiry and STEM activities, we give students even more opportunities to learn hands on and apply the skills from the classroom. These activities give students ownership over the creative process, whether in groups or individually. Inquiry labs require students to use the scientific process and ask questions, form hypotheses, design investigations, analyze data, draw conclusions, communicate results, and often, ask additional questions. These activities foster curiosity and require students to think more critically than they would with traditional activities that spell out procedures and goals for them.

In addition, STEM activities require students to apply the engineering design process and use scientific inquiry, mathematical reasoning, and technology. To be successful in these activities, students must also develop 21st century skills, including collaboration, problem solving, and communication. They learn what works, not just in the scientific process, but also with other people. BJU Press lab manual STEM activities present

opportunities for students to refine their methods so that they discover more effective solutions and learn that many problems have more than one solution.

Enabling Students to Use & Create Models

Throughout the BJU Press science program, we show students how scientists use models to explain, describe, and represent the world more accurately. Models allow scientists to test their theories and apply predictions, especially when they're working with forces and structures that are too large or too small to be observed or that no longer exist today. For example, the double-helix model of DNA brought biology to the field of molecular genetics. The heliocentric model of the solar system more accurately answered the questions proposed by observations of the night sky. We explain how historical documents, eggs, and bones help us create models and study the behavior and habitats of extinct species such as the elephant bird or dinosaurs. When scientists proposed these models, they didn't have the resources or capabilities to prove their theories. They created their models to accurately describe the natural world and then made predictions based on their models. As we know, scientists have had to adjust existing models to accommodate new information and observations, like the heliocentric model. We teach students about models to show that science is not a progression toward greater truth. It's a quest for more workable models.

To equip students to create and use predictive models of the natural world, student lab manuals in BJU Press's middle and high school science program include technology-based modeling tools. Students will use graphing technology to create mathematical models and scatterplots in spreadsheet activities. Other activities use internet modeling tools to create models of molecules and atoms. Teachers can also choose activities that require students to use apps on their devices to create animated models and explore the spread and severity of viruses. They will then use the models they create to link presentations and phenomena.

Equipping Students to Interpret Informational Text & Apply Knowledge

One of the biggest challenges for science students can be interacting with rich informational texts. Science-related informational texts use discipline-specific vocabulary and technical scientific diagrams. A prepared student can interpret scientific studies, engage with the information, evaluate it from a biblical worldview, and answer

ethical questions presented in a study. To properly prepare and equip students, we fill our textbooks with opportunities to engage with informational texts on a high level. Not only are the textbooks themselves informational texts, but the additional recommended ethics boxes and web quests will challenge students to find more informational texts to read and learn from. Our textbooks introduce students to the vocabulary they will need, and present scientific diagrams that give students an opportunity to practice visual-analysis skills. In assigned ethics boxes and web quests, students get to apply and further develop their informational-text reading skills to real-world situations, and then they will write responses to what they have learned.