

## 6-12 SCIENCE INSTRUCTIONAL MODELS

### LEARNER-CENTERED MODEL

#### SUGGESTED STRATEGIES

The learner-centered pathway allows for higher levels of inquiry and student autonomy as they build conceptual understanding and work individually and/or collaboratively to complete research, projects or design challenges. Students may need guidance on project planning and guidance on time and task allocation.

Incorporate different asynchronous, synchronous learning, and non-tech based learning support.

- [Virtual Virginia](#) (Offers online core academic courses and modules)
- Teacher generated modules and/or packet support
- Textbook and online resources (simulations, WebQuests, scientific literature, etc.)

Provide timely feedback to students - this may include:

- Shared Google documents of common questions and teacher responses
- [Padlet](#) (a virtual, collaborative multimedia board)
- Office hours using multiple communication channels, as appropriate.

Provide students with a collaborative learning space - this may include:

- Division communication platforms
- Email
- Digitally through [Flipgrid](#)

#### RESOURCES

- [BayBackpack Action Projects](#): A collection of many environmental stewardship projects.
- [PBS Design challenges for middle school](#) Provides a description of the design process and five design challenge plans.
- [Envision Learning Performance Assessment Bank](#) A searchable collection of performance tasks.
- [Citizen Science](#): Provides opportunities for students to engage in real-world investigations and explorations.
- [6-12 Online Resources](#) - additional resources

#### SAMPLE WEEK-LONG AGENDA

(Maximum instruction in science 2.5 hours/week)

##### *Monday:*

Office hours with the teacher. Feedback/support should be provided to students throughout the process as needed.

- The teacher introduces parameters of the project, essential questions, outlines standards/content to be covered and performance expectations of the project/design challenge. Ancillary materials should be included at this time.
- Team projects: students work collaboratively to determine questions or define problems based on the project parameters, determine and distribute tasks, determine a schedule for completing tasks, and provide opportunities for group discussion.
- Individual project: The student determines questions or problems to address within the parameters of the assigned project, determines steps toward completion of the project, and constructs timeline for completion.

##### *Tuesday:*

Submit a project plan to the teacher. Begin work individually and/or collaboratively to complete the project.

##### *Wednesday-Thursday:*

Work individually and/or collaboratively to complete projects.

##### *Friday:*

Team/Individual project reflection submitted to the teacher. Include questions, concerns, successes, and challenges. The teacher would use these reflections the following week during office hours to provide feedback to students. Teachers would use this feedback to determine additional ancillary support needed by individuals or students to support learning.

This process would continue until the conclusion of the project.



## 6-12 SCIENCE INSTRUCTIONAL MODELS

### TEACHER-CENTERED MODEL

#### SUGGESTED STRATEGIES

The teacher-centered pathway uses confirmation and structured inquiry as students apply content to assigned coursework. The role of the teacher in this pathway is to provide direct support for students with both content and the science and engineering processes. Students create work products that are shared largely between themselves and their respective teachers.

Implement a weekly approach to planning instruction to include learning guidelines and outcome rubrics (if applicable)

Allow student choice in scheduling individual learning times to meet weekly learning expectations outside of scheduled synchronous learning opportunities.

Provide consistent weekly communication including feedback on student work. This may include:

- Shared Google documents of common questions and teacher responses
- [Padlet](#) (a virtual, collaborative multimedia board) as a medium for sharing feedback
- Office hours using multiple communication channels, as appropriate.

Incorporate different asynchronous, synchronous learning, and non-tech based learning support. This may include:

- [Virtual Virginia](#) modules
- Teacher generated modules and/or packet support
- Textbook and online resources to include simulations, WebQuests, and scientific literature

#### RESOURCES

- [Open SciEd](#): High-quality middle grades science instructional materials.
- [NASA.gov](#): Teacher resources with activities, professional development, and materials.
- [PHet](#): Simulations to support chemistry and physics concepts.
- [6-12 Online Resources](#) - additional resources

#### SAMPLE WEEK-LONG AGENDA

(Maximum instruction in science 2.5 hours/week)

##### *Monday:*

Office hours with the teacher. Feedback/support should be provided to students throughout the process as needed.

- The teacher provides content (synchronous or asynchronous) and instructional expectations and essential question(s) for the week (Video, lecture/reading, PPT-Interactive Notes, etc).
- Synchronous or asynchronous content may be continued through the week as the teacher deems appropriate to support student learning.

##### *Tuesday:*

Students engage in individual exploration of the content through teacher-provided materials.

##### *Wednesday- Thursday:*

Students individually work on the teacher assigned products using content provided through synchronous and asynchronous instruction.

##### *Friday:*

Student submits product or reflection as described in teacher's weekly expectations. Teachers should plan to provide timely and relevant feedback to students.



## 6-12 SCIENCE INSTRUCTIONAL MODELS

### HYBRID MODEL

#### SUGGESTED STRATEGIES

The hybrid pathway allows for a balance between student and teacher-centered learning approaches of instruction and employs different levels of inquiry as appropriate. This pathway provides a foundation of concept support provided by the teacher with opportunities for students to apply the content and science and engineering practices in the completion of individual and/or group projects and challenges. Students may need guidance on project planning and guidance on time and task allocation.

Incorporate different asynchronous, synchronous learning, and non-tech based learning support. This may include:

- Virtual Virginia modules
- Teacher generated modules and/or packet support
- Textbook and online resources to include simulations, WebQuests, and scientific literature.

Allow student choice in scheduling individual learning times to meet weekly learning expectations outside of scheduled synchronous learning opportunities.

Provide timely feedback to students - this may include:

- Shared Google documents of common questions and teacher responses
- [Padlet](#) (a virtual, collaborative multimedia board)
- Office hours using multiple communication channels, as appropriate.

Utilize student reflections and recognize they can be completed in various formats to include those that do and do not include technology.

#### RESOURCES

- [36 Resources for STEM Project-Based Activities](#) A list of customizable STEM Projects.
- [Smithsonian Science Education Center](#) Resources for K-8 students and teachers
- [NASA.gov](#): Teacher resources with activities, professional development, and materials.
- [PHet](#): Simulations to support chemistry and physics concepts.
- [6-12 Online Resources](#) - additional resources

#### SAMPLE WEEK-LONG AGENDA

(Maximum instruction in science 2.5 hours/week)

##### *Monday:*

Office hours with teacher feedback/support should be provided to students throughout the process as needed.

- The teacher introduces the unit overview or weekly agenda including assignments, essential question(s), and project guidelines.
- The teacher provides instructional delivery of content. This may be done online (synchronous or asynchronous) or through informative packets.

##### *Tuesday-Thursday:*

Students engage in individual or collaborative exploration of the content through teacher provided materials. The teacher provides ongoing instruction as well as feedback to students on all tasks completed and submitted.

- Team projects: Students work collaboratively to determine and distribute tasks, roles in completing tasks, and to schedule opportunities for group discussion.
- Individual projects: Student determines steps toward completion of the project, and constructs timeline for completion.

##### *Friday:*

Students submit work to the teacher based on expectations in the weekly agenda.

- Students will continue to work independently and/or collaboratively on projects and assigned work.
- Opportunities to reflect on the work accomplished and plans for the upcoming week should be provided to students.
- Teachers should plan to provide timely and relevant feedback to students.

This process would continue until the conclusion of the project.