
Syllabus Development Guide: AP[®] Physics C: Mechanics

The guide contains the following sections and information:

Curricular Requirement	The curricular requirements are the core elements of the course. Your syllabus must provide clear evidence that each requirement is fully addressed in your course.
Scoring Components	Some curricular requirements consist of complex, multi-part statements. These particular requirements are broken down into their component parts and restated as “scoring components.” Reviewers will look for evidence that each scoring component is included in your course.
Evaluation Guideline(s)	These are the guidelines used by reviewers to evaluate the evidence in your syllabus. Use these guidelines to determine the level of detail reviewers require to demonstrate how the curricular requirements are met in your course.
Key Term(s)	To ensure the clarity of certain terms or expressions that may have multiple meanings, each of these terms is clearly defined.
Samples of Evidence	For each scoring component, three separate samples of evidence are provided. These statements provide clear descriptions of what acceptable evidence should look like.

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Curricular Requirement	<p>The course covers Newtonian mechanics in depth and provides instruction in each of the following six content areas outlined in the Course Description:</p> <ul style="list-style-type: none">• Kinematics• Newton’s laws of motion• Work, energy, and power• Systems of particles, linear momentum• Circular motion and rotation• Oscillations and gravitation
Scoring Component 1	<p>The course covers Newtonian mechanics in depth and provides instruction in kinematics.</p>
Evaluation Guideline(s)	<p>Mentioning a practice or topic delineated in the scoring component is sufficient evidence when the resource materials collectively address the required content. Specific chapters or sections need not be associated with the practice or topic. In addition, topical concepts need not be presented in the syllabus in any particular order, i.e. they need not be laid out in the strict order of the AP[®] Course Description outline.</p> <p>When the sub-topics outlined in the AP Course Description are not identified within the scoring component, they are not considered requisite. Syllabi do not need incontrovertible proof of every portion of a topic as listed in the AP Course Description. If a reasonable inference based on available evidence in the syllabus can be made about the presence of a practice or topic delineated in a scoring component, then the scoring component is satisfied.</p> <p>If the syllabus sufficiently cites (author, title, and edition) textbooks or materials included in the College Board’s example textbook lists and the practice or topic in the scoring component is identified as being taught, then the scoring component has been satisfied.</p>
Key Term(s)	<p>None at this time.</p>
Samples of Evidence	<ol style="list-style-type: none">1. The syllabus explicitly mentions 1/D and 2/D kinematics/motion and provides sufficient resources to demonstrate evidence of these topics.2. The syllabus explicitly and briefly describes a required lab(s) in 1/D and 2/D kinematics/motion.3. The syllabus explicitly mentions 1/D and 2/D kinematics/motion and provides a list with a brief description of the required lab(s) conducted pertaining to this topic.

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Curricular Requirement	<p>The course covers Newtonian mechanics in depth and provides instruction in each of the following six content areas outlined in the Course Description:</p> <ul style="list-style-type: none">• Kinematics• Newton’s laws of motion• Work, energy, and power• Systems of particles, linear momentum• Circular motion and rotation• Oscillations and gravitation
Scoring Component 2	<p>The course covers Newtonian mechanics in depth and provides instruction in Newton’s laws of motion.</p>
Evaluation Guideline(s)	<p>Mentioning a practice or topic delineated in the scoring component is sufficient evidence when the resource materials collectively address the required content. Specific chapters or sections need not be associated with the practice or topic. In addition, topical concepts need not be presented in the syllabus in any particular order, i.e. they need not be laid out in the strict order of the AP Course Description outline.</p> <p>When the sub-topics outlined in the AP Course Description are not identified within the scoring component, they are not considered requisite. Syllabi do not need incontrovertible proof of every portion of a topic as listed in the AP Course Description. If a reasonable inference based on available evidence in the syllabus can be made about the presence of a practice or topic delineated in a scoring component, then the scoring component is satisfied.</p> <p>If the syllabus sufficiently cites (author, title, and edition) textbooks or materials included in the College Board’s example textbook lists and the practice or topic in the scoring component is identified as being taught, then the scoring component has been satisfied.</p>
Key Term(s)	<p>None at this time.</p>
Samples of Evidence	<ol style="list-style-type: none">1. The syllabus explicitly mentions Newton’s laws of motion and provides sufficient resources to demonstrate evidence of this topic.2. The syllabus explicitly mentions Newton’s 1st, 2nd and 3rd laws of motion and provides sufficient resources to demonstrate coverage of this topic.3. The syllabus explicitly and briefly describes a required lab(s) in Newton’s laws of motion.

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Curricular Requirement	<p>The course covers Newtonian mechanics in depth and provides instruction in each of the following six content areas outlined in the Course Description:</p> <ul style="list-style-type: none"> • Kinematics • Newton’s laws of motion • Work, energy, and power • Systems of particles, linear momentum • Circular motion and rotation • Oscillations and gravitation
Scoring Component 3	<p>The course covers Newtonian mechanics in depth and provides instruction in work.</p>
Evaluation Guideline(s)	<p>Mentioning a practice or topic delineated in the scoring component is sufficient evidence when the resource materials collectively address the required content. Specific chapters or sections need not be associated with the practice or topic. In addition, topical concepts need not be presented in the syllabus in any particular order, i.e. they need not be laid out in the strict order of the AP Course Description outline.</p> <p>If a reasonable inference based on available evidence in the syllabus can be made about the presence of a practice or topic delineated in a scoring component, then the scoring component is satisfied.</p> <p>When the sub-topics outlined in the AP Course Description are not identified within the scoring component, they are not considered requisite. Syllabi do not need incontrovertible proof of every portion of a topic as listed in the AP Course Description.</p> <p>If the syllabus sufficiently cites (author, title, and edition) textbooks or materials included in the College Board’s example textbook lists and the practice or topic in the scoring component is identified as being taught, then the scoring component has been satisfied.</p>
Key Term(s)	<p>None at this time.</p>
<p>Samples of Evidence</p> <ol style="list-style-type: none"> 1. The syllabus explicitly mentions work and provides sufficient resources to demonstrate evidence of this topic. 2. The syllabus explicitly and briefly describes a required lab(s) in work. 3. The syllabus explicitly mentions work and provides a list with a brief description of the required lab(s) conducted pertaining to this topic. 	

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Curricular Requirement	The course covers Newtonian mechanics in depth and provides instruction in each of the following six content areas outlined in the Course Description: <ul style="list-style-type: none">• Kinematics• Newton’s laws of motion• Work, energy, and power• Systems of particles, linear momentum• Circular motion and rotation• Oscillations and gravitation
Scoring Component 4	The course covers Newtonian mechanics in depth and provides instruction in energy.
Evaluation Guideline(s)	<p>Mentioning a practice or topic delineated in the scoring component is sufficient evidence when the resource materials collectively address the required content. Specific chapters or sections need not be associated with the practice or topic. In addition, topical concepts need not be presented in the syllabus in any particular order, i.e. they need not be laid out in the strict order of the AP Course Description outline.</p> <p>If a reasonable inference based on available evidence in the syllabus can be made about the presence of a practice or topic delineated in a scoring component, then the scoring component is satisfied.</p> <p>When the sub-topics outlined in the AP Course Description are not identified within the scoring component, they are not considered requisite. Syllabi do not need incontrovertible proof of every portion of a topic as listed in the AP Course Description.</p> <p>If the syllabus sufficiently cites (author, title, and edition) textbooks or materials included in the College Board’s example textbook lists and the practice or topic in the scoring component is identified as being taught, then the scoring component has been satisfied.</p>
Key Term(s)	None at this time.
Samples of Evidence	<ol style="list-style-type: none">1. The syllabus explicitly mentions conservation of energy and provides sufficient resources to demonstrate evidence of these topics.2. The syllabus explicitly and briefly describes a required lab(s) in the conservation of energy.3. The syllabus explicitly mentions conservation of energy and provides a list with a brief description of the required lab(s) conducted pertaining to this topic.

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Curricular Requirement	The course covers Newtonian mechanics in depth and provides instruction in each of the following six content areas outlined in the Course Description: <ul style="list-style-type: none">• Kinematics• Newton’s laws of motion• Work, energy, and power• Systems of particles, linear momentum• Circular motion and rotation• Oscillations and gravitation
Scoring Component 5	The course covers Newtonian mechanics in depth and provides instruction in power.
Evaluation Guideline(s)	<p>Mentioning a practice or topic delineated in the scoring component is sufficient evidence when the resource materials collectively address the required content. Specific chapters or sections need not be associated with the practice or topic. In addition, topical concepts need not be presented in the syllabus in any particular order, i.e. they need not be laid out in the strict order of the AP Course Description outline.</p> <p>If a reasonable inference based on available evidence in the syllabus can be made about the presence of a practice or topic delineated in a scoring component, then the scoring component is satisfied.</p> <p>When the sub-topics outlined in the AP Course Description are not identified within the scoring component, they are not considered requisite. Syllabi do not need incontrovertible proof of every portion of a topic as listed in the AP Course Description.</p> <p>If the syllabus sufficiently cites (author, title, and edition) textbooks or materials included in the College Board’s example textbook lists and the practice or topic in the scoring component is identified as being taught, then the scoring component has been satisfied.</p>
Key Term(s)	None at this time.
Samples of Evidence	<ol style="list-style-type: none">1. The syllabus explicitly mentions power and provides sufficient resources to demonstrate evidence of this topic.2. The syllabus explicitly and briefly describes a required lab(s) in power3. The syllabus explicitly mentions power and provides a list with a brief description of the required lab(s) conducted pertaining to this topic.

Curricular Requirement	<p>The course covers Newtonian mechanics in depth and provides instruction in each of the following six content areas outlined in the Course Description:</p> <ul style="list-style-type: none"> • Kinematics • Newton’s laws of motion • Work, energy, and power • Systems of particles, linear momentum • Circular motion and rotation • Oscillations and gravitation
Scoring Component 6	<p>The course covers Newtonian mechanics in depth and provides instruction in systems of particles.</p>
Evaluation Guideline(s)	<p>Mentioning a practice or topic delineated in the scoring component is sufficient evidence when the resource materials collectively address the required content. Specific chapters or sections need not be associated with the practice or topic. In addition, topical concepts need not be presented in the syllabus in any particular order, i.e. they need not be laid out in the strict order of the AP Course Description outline.</p> <p>If a reasonable inference based on available evidence in the syllabus can be made about the presence of a practice or topic delineated in a scoring component, then the scoring component is satisfied.</p> <p>When the sub-topics outlined in the AP Course Description are not identified within the scoring component, they are not considered requisite. Syllabi do not need incontrovertible proof of every portion of a topic as listed in the AP Course Description.</p> <p>If the syllabus sufficiently cites (author, title, and edition) textbooks or materials included in the College Board’s example textbook lists and the practice or topic in the scoring component is identified as being taught, then the scoring component has been satisfied.</p>
Key Term(s)	<p>None at this time.</p>
<p>Samples of Evidence</p> <ol style="list-style-type: none"> 1. The syllabus explicitly mentions systems of particles/center of mass and provides sufficient resources to demonstrate evidence of this topic. 2. The syllabus explicitly and briefly describes a required lab(s) in systems of particles/center of mass. 3. The syllabus explicitly mentions systems of particles/center of mass and provides a list with a brief description of the required lab(s) conducted pertaining to this topic. 	

Curricular Requirement	<p>The course covers Newtonian mechanics in depth and provides instruction in each of the following six content areas outlined in the Course Description:</p> <ul style="list-style-type: none"> • Kinematics • Newton’s laws of motion • Work, energy, and power • Systems of particles, linear momentum • Circular motion and rotation • Oscillations and gravitation
Scoring Component 7	<p>The course covers Newtonian mechanics in depth and provides instruction in linear momentum.</p>
Evaluation Guideline(s)	<p>Mentioning a practice or topic delineated in the scoring component is sufficient evidence when the resource materials collectively address the required content. Specific chapters or sections need not be associated with the practice or topic. In addition, topical concepts need not be presented in the syllabus in any particular order, i.e. they need not be laid out in the strict order of the AP Course Description outline.</p> <p>If a reasonable inference based on available evidence in the syllabus can be made about the presence of a practice or topic delineated in a scoring component, then the scoring component is satisfied.</p> <p>When the sub-topics outlined in the AP Course Description are not identified within the scoring component, they are not considered requisite. Syllabi do not need incontrovertible proof of every portion of a topic as listed in the AP Course Description.</p> <p>If the syllabus sufficiently cites (author, title, and edition) textbooks or materials included in the College Board’s example textbook lists and the practice or topic in the scoring component is identified as being taught, then the scoring component has been satisfied.</p>
Key Term(s)	<p>None at this time.</p>
<p>Samples of Evidence</p> <ol style="list-style-type: none"> 1. The syllabus explicitly mentions conservation of linear momentum and provides sufficient resources to demonstrate evidence of this topic. 2. The syllabus explicitly and briefly describes a required lab(s) in conservation of linear momentum. 3. The syllabus explicitly mentions conservation of linear momentum and provides a list with a brief description of the required lab(s) conducted pertaining to this topic. 	

Curricular Requirement	<p>The course covers Newtonian mechanics in depth and provides instruction in each of the following six content areas outlined in the Course Description:</p> <ul style="list-style-type: none"> • Kinematics • Newton’s laws of motion • Work, energy, and power • Systems of particles, linear momentum • Circular motion and rotation • Oscillations and gravitation
Scoring Component 8	<p>The course covers Newtonian mechanics in depth and provides instruction in circular motion.</p>
Evaluation Guideline(s)	<p>Mentioning a practice or topic delineated in the scoring component is sufficient evidence when the resource materials collectively address the required content. Specific chapters or sections need not be associated with the practice or topic. In addition, topical concepts need not be presented in the syllabus in any particular order, i.e. they need not be laid out in the strict order of the AP Course Description outline.</p> <p>If a reasonable inference based on available evidence in the syllabus can be made about the presence of a practice or topic delineated in a scoring component, then the scoring component is satisfied.</p> <p>When the sub-topics outlined in the AP Course Description are not identified within the scoring component, they are not considered requisite. Syllabi do not need incontrovertible proof of every portion of a topic as listed in the AP Course Description.</p> <p>If the syllabus sufficiently cites (author, title, and edition) textbooks or materials included in the College Board’s example textbook lists and the practice or topic in the scoring component is identified as being taught, then the scoring component has been satisfied.</p>
Key Term(s)	<p>Circular motion: other than explicitly stating “circular motion,” instructors may provide evidence of coverage through lab activities relating to the topic. Instructors may also use the term “centripetal.”</p>
<p>Samples of Evidence</p> <ol style="list-style-type: none"> 1. The syllabus explicitly mentions circular motion/centripetal motion and provides sufficient resources to demonstrate evidence of this topic. 2. The syllabus explicitly and briefly describes a required lab(s) in circular motion/centripetal motion. 3. The syllabus explicitly mentions circular motion/centripetal motion and provides a list with a brief description of the required lab(s) conducted pertaining to this topic. 	

Curricular Requirement	<p>The course covers Newtonian mechanics in depth and provides instruction in each of the following six content areas outlined in the Course Description:</p> <ul style="list-style-type: none"> • Kinematics • Newton’s laws of motion • Work, energy, and power • Systems of particles, linear momentum • Circular motion and rotation • Oscillations and gravitation
Scoring Component 9	<p>The course covers Newtonian mechanics in depth and provides instruction in rotation.</p>
Evaluation Guideline(s)	<p>Mentioning a practice or topic delineated in the scoring component is sufficient evidence when the resource materials collectively address the required content. Specific chapters or sections need not be associated with the practice or topic. In addition, topical concepts need not be presented in the syllabus in any particular order, i.e. they need not be laid out in the strict order of the AP Course Description outline.</p> <p>If a reasonable inference based on available evidence in the syllabus can be made about the presence of a practice or topic delineated in a scoring component, then the scoring component is satisfied.</p> <p>When the sub-topics outlined in the AP Course Description are not identified within the scoring component, they are not considered requisite. Syllabi do not need incontrovertible proof of every portion of a topic as listed in the AP Course Description.</p> <p>If the syllabus sufficiently cites (author, title, and edition) textbooks or materials included in the College Board’s example textbook lists and the practice or topic in the scoring component is identified as being taught, then the scoring component has been satisfied.</p>
Key Term(s)	<p>None at this time.</p>
<p>Samples of Evidence</p> <ol style="list-style-type: none"> 1. The syllabus explicitly mentions rotational kinematics, rotational dynamics and conservation of angular momentum and provides sufficient resources to demonstrate evidence of these topics. 2. The syllabus explicitly and briefly describes a required lab(s) in rotational kinematics, rotational dynamics and conservation of angular momentum. 3. The syllabus explicitly mentions rotational kinematics, rotational dynamics and conservation of angular momentum and provides a list with a brief description of the required lab(s) conducted pertaining to these topics. 	

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Curricular Requirement	The course covers Newtonian mechanics in depth and provides instruction in each of the following six content areas outlined in the Course Description: <ul style="list-style-type: none">• Kinematics• Newton’s laws of motion• Work, energy, and power• Systems of particles, linear momentum• Circular motion and rotation• Oscillations and gravitation
Scoring Component 10	The course covers Newtonian mechanics in depth and provides instruction in oscillations.
Evaluation Guideline(s)	<p>Mentioning a practice or topic delineated in the scoring component is sufficient evidence when the resource materials collectively address the required content. Specific chapters or sections need not be associated with the practice or topic. In addition, topical concepts need not be presented in the syllabus in any particular order, i.e. they need not be laid out in the strict order of the AP Course Description outline.</p> <p>If a reasonable inference based on available evidence in the syllabus can be made about the presence of a practice or topic delineated in a scoring component, then the scoring component is satisfied.</p> <p>When the sub-topics outlined in the AP Course Description are not identified within the scoring component, they are not considered requisite. Syllabi do not need incontrovertible proof of every portion of a topic as listed in the AP Course Description.</p> <p>If the syllabus sufficiently cites (author, title, and edition) textbooks or materials included in the College Board’s example textbook lists and the practice or topic in the scoring component is identified as being taught, then the scoring component has been satisfied.</p>
Key Term(s)	Oscillations: may also use “simple harmonic motion.”
Samples of Evidence	<ol style="list-style-type: none">1. The syllabus explicitly mentions oscillations/simple harmonic motion and provides sufficient resources to demonstrate evidence of these topics.2. The syllabus explicitly and briefly describes a required lab(s) in oscillations/simple harmonic motion.3. The syllabus explicitly mentions oscillations/simple harmonic motion and provides a list with a brief description of the required lab(s) conducted pertaining to these topics.

Curricular Requirement	<p>The course covers Newtonian mechanics in depth and provides instruction in each of the following six content areas outlined in the Course Description:</p> <ul style="list-style-type: none"> • Kinematics • Newton’s laws of motion • Work, energy, and power • Systems of particles, linear momentum • Circular motion and rotation • Oscillations and gravitation
Scoring Component 11	<p>The course covers Newtonian mechanics in depth and provides instruction in gravitation.</p>
Evaluation Guideline(s)	<p>Mentioning a practice or topic delineated in the scoring component is sufficient evidence when the resource materials collectively address the required content. Specific chapters or sections need not be associated with the practice or topic. In addition, topical concepts need not be presented in the syllabus in any particular order, i.e. they need not be laid out in the strict order of the AP Course Description outline.</p> <p>If a reasonable inference based on available evidence in the syllabus can be made about the presence of a practice or topic delineated in a scoring component, then the scoring component is satisfied.</p> <p>When the sub-topics outlined in the AP Course Description are not identified within the scoring component, they are not considered requisite. Syllabi do not need incontrovertible proof of every portion of a topic as listed in the AP Course Description.</p> <p>If the syllabus sufficiently cites (author, title, and edition) textbooks or materials included in the College Board’s example textbook lists and the practice or topic in the scoring component is identified as being taught, then the scoring component has been satisfied.</p>
Key Term(s)	<p>Gravitation: if the topic is not listed as gravitation, then explicit mention of coverage of the universal law of gravitation and/or Kepler’s laws is needed.</p>
<p>Samples of Evidence</p> <ol style="list-style-type: none"> 1. The syllabus explicitly mentions gravitation and provides sufficient resources to demonstrate evidence of these topics. 2. The syllabus explicitly and briefly describes a required lab(s) in gravitation. 3. The syllabus explicitly mentions gravitation and provides a list with a brief description of the required lab(s) conducted pertaining to these topics. 	

Curricular Requirement	Introductory differential and integral calculus is used throughout the course.
Scoring Component 12	Introductory differential and integral calculus are used throughout the course.
Evaluation Guideline(s)	If a calculus course is mentioned as a pre- or co-requisite, or if a calculus-based textbook is identified, then this scoring component is met. Appropriate textbook must support a calculus-based course.
Key Term(s)	None at this time.
Samples of Evidence <ol style="list-style-type: none">1. The syllabus sufficiently sites an AP approved calculus-based textbook.2. The syllabus sufficiently sites an AP approved calculus-based textbook and explicitly mentions that introductory differential and integral calculus is used throughout the course.3. On the first page of the syllabus, after the introduction, the syllabus states, "Calculus is an important part of the course," and sufficiently sites an AP approved calculus-based textbook.	

Curricular Requirement	The course utilizes guided inquiry and student-centered learning to foster the development of critical thinking skills.
Scoring Component 13	The course utilizes guided inquiry and student-centered learning to foster the development of critical thinking skills.
Evaluation Guideline(s)	The syllabus must include some description of how students will meet these objectives. Evidence for the component may include: a discussion of teaching objectives/goals, descriptions of homework assignments, demonstrations, computer-based discussion boards, or lab activities with open-ended questions.
Key Term(s)	<p>Guided inquiry: the instructor guides students to make discoveries and develop knowledge about topics/questions presented in class. Students develop the strategies and methods for investigating and/or understanding the topic/question at hand.</p> <p>Student-centered learning: students are actively engaged in the learning process, not exclusively passive receivers of information from the instructor. A variety of learning styles are accommodated by the pedagogies employed.</p> <p>Critical thinking: the ability to define, clarify, make judgments, and draw conclusions on conceptual problems. Students are required to think beyond the rote facts and basic problem solving skills both individually and through class discussion.</p>
Samples of Evidence	
<ol style="list-style-type: none"> 1. By designing a hands-on investigation to answer a scientific question, students are required to confront a problem and solve it in an active, cooperative learning setting. 2. Students work in groups on pencil-and-paper to solve real world problems. For example, students determine combinations of appliances that may be used simultaneously without tripping a circuit breaker. 3. Students are asked to make a prediction about a physical system. The instructor then demonstrates the system for the class and then leads the class in discussion. 	

Curricular Requirement	The course includes a laboratory component comparable to a semester-long, college-level physics laboratory. Students spend a minimum of 20 percent of instructional time engaged in laboratory work. A hands-on laboratory component is required. Each student should complete a lab notebook or portfolio of lab reports.
Scoring Component 14	Students spend a minimum of 20 percent of instructional time engaged in laboratory work.
Evaluation Guideline(s)	This scoring component can be met either by an explicit statement and/or by an easy calculation of class schedule and class time engaged in laboratory work. Contradicting evidence will not fulfill this scoring component.
Key Term(s)	None at this time.
Samples of Evidence	
<ol style="list-style-type: none"> 1. The syllabus includes a list of required labs, the duration of the class, along with the approximate time spent completing each lab. With an easy calculation, one can determine that the total time spent engaged in laboratory work is 20 percent of class time. 2. The syllabus explicitly states at least one full class period a week is devoted to labs and a list of required labs is provided. 3. In addition to listing the required labs, the syllabus explicitly states the total number of hours spent in class and the total number of lab hours. The ratio of lab time to total contact hours is a minimum of 20 percent. 	

Curricular Requirement	The course includes a laboratory component comparable to a semester-long, college-level physics laboratory. Students spend a minimum of 20 percent of instructional time engaged in laboratory work. A hands-on laboratory component is required. Each student should complete a lab notebook or portfolio of lab reports.
Scoring Component 15	A hands-on laboratory component is required.
Evaluation Guideline(s)	<p>If the hands-on lab component meets the instructional time requirement and fulfills the objectives described in the Course Description, then the scoring component is satisfied—even if the lab contains additional virtual, simulated, or teacher-led lab investigations.</p> <p>Virtual and teacher-led demonstrations should be considered neither a virtual nor hands-on lab experience in and of themselves, though these elements may enhance the course’s primary laboratory component.</p> <p>This scoring component can be met either by an explicit statement and/or by an easy calculation of class schedule and class time engaged in laboratory work. Contradicting evidence will not fulfill this scoring component.</p> <p>Stating that the labs are hands on is sufficient, however, the hands-on nature of the experiments should be obvious in the description of the experiment.</p>
Key Term(s)	Hands-on laboratory: an interactive experience during which students directly observe and manipulate physical objects, materials, organisms, or phenomena in order to fulfill the learning objectives of a laboratory experience. These objectives include, but are not limited to, generating and exploring answers to experimental questions, gathering data and making observations, drawing and evaluating conclusions, and thinking and communicating effectively about science.
<p>Samples of Evidence</p> <ol style="list-style-type: none"> 1. The syllabus explicitly states that all required labs are hands-on. 2. The syllabus explicitly states that the hand-on labs alone meet the minimum 20 percent of instructional time. 3. The syllabus explicitly states that all required labs are hands-on and further demonstrates evidence by providing a description of the labs completed throughout the course. 	



Curricular Requirement	The course includes a laboratory component comparable to a semester-long, college-level physics laboratory. Students spend a minimum of 20 percent of instructional time engaged in laboratory work. A hands-on laboratory component is required. Each student should complete a lab notebook or portfolio of lab reports.
Scoring Component 16	Each student should complete a lab notebook or portfolio of lab reports.
Evaluation Guideline(s)	Each student must complete a lab notebook or portfolio of lab reports in order to meet the scoring component.
Key Term(s)	Portfolio: indicates a collection of lab reports. It does not have to be an actual physical portfolio. Formal lab reports are acceptable as well as lab notebooks in which entries are made as the lab activities are performed (mirroring the lab notebook that a practicing physicist would keep).
Samples of Evidence	
<ol style="list-style-type: none"> 1. The syllabus explicitly states students are required to complete written lab reports. 2. The syllabus explicitly states students are required to use a lab notebook for their labs. 3. At the beginning of the lab section, the syllabus states, “Students are required to keep a lab portfolio during the duration of the class. All work completed and relating to labs will be kept in this portfolio throughout the year. Additionally, students turn in their portfolios from time to time to receive a grade from the instructor.” 	