

SEC – Polymer Science Blueprints

This document contains the blueprints for the concentration areas
in secondary Polymer Science.

| Course Code(s) | Test Code | Program Name |
|---------------------------|--------------|-----------------|
| 994500, 994502,994503 | 11546Y1-2015 | Polymer Science |
| 994501, 994504, 994505 | 11546Y2-2015 | Polymer Science |
| 994501, 994504, 994505 | 11546PB-2015 | Polymer Science |

| Curriculum | Perkins Assessment 2016-17 | | Teacher Evaluation Pilot 2016-17 | | | |
|-----------------|----------------------------|--------------------|----------------------------------|--------------|-------------|--------------|
| | Y1 Post-Test | Y2 Post-Test | Y1 Baseline | Y1 Post-Test | Y2 Baseline | Y2 Post-Test |
| Polymer Science | MS-CPAS2* | PBA* and MS-CPAS2* | NA* | NA* | NA* | NA* |

* These assessments are subject to change based on funding and policy changes/updates. Information for test coordinators will be disseminated on the ordering process for the national certification by the Research and Curriculum Unit at Mississippi State University.

MS-CPAS2 Blueprint Summary

Assessment: Polymer Science
Test Code: 11546Y1-2015
CIP Code: 150607
Course Codes: 994500, 994502, 994503
Type: CP

The MS-CPAS2 Blueprint Summary indicates the number of assessment questions related to each unit on the assessment and indicates the relative emphasis placed on each unit. All of the listed competencies will appear on the assessment, but because of the length of the assessment, not every competency will be equally represented in the assessment.

The MS-CPAS2 Blueprint Summary includes a variety of information, which is explained below:

| Terms and Definitions | |
|------------------------------|---|
| Assessment: | This signifies the name of the assessment, which corresponds with the name of the pathway or program. |
| CIP Code: | Developed by the U.S. Department of Education's National Center for Education Statistics (NCES), CIP codes are a federal coding system utilized for assessment and reporting of fields of study and program completions activity tracking. |
| Test Code: | A unique code that serves to numerically identify a specific assessment |
| DOK Levels: | Based on Webb's Depth of Knowledge (DOK), this signifies the assessment item difficulty factor to be expected in each unit. The three levels are as follows: <i>1 = Recall and Reproduction, 2 = Skills and Concepts, 3 = Short-term Strategic Thinking</i> Some postsecondary programs will not use DOK levels until the next revision. |
| Instructional Hours: | The total number of hours assigned to a unit per the pathway's curriculum |
| Total Items: | The total number of items assigned to each unit on the assessment. It is calculated as follows: <i>(Unit Instructional Hours / Total Instructional Hours) * Total Active Items</i> |
| Active Items: | The number of items on the assessment that will be graded |
| Field-test Items: | The number of items that are being field-tested, or piloted, to determine their eligibility for inclusion as an Active Item on future assessments. These items are not graded and, thus, will not impact the student's final score. |
| Total Assessed Items: | The total number of items on the given assessment. It is calculated as follows: <i>Active Items + Field-test Items</i> |

For more information regarding this MS-CPAS2 Blueprint Summary, please contact the Mississippi Assessment Center by phone at 1.866.901.7433 or by e-mail at helpdesk@rcu.msstate.edu.



| Assessment: Polymer Science | | | | | |
|--|---|---|---|--------------|---------------------|
| Test Code: 11546Y1-2015 | | | | | |
| CIP Code: 150607 | | | | DOK Level(s) | Instructional Hours |
| Total Hours: 220 | | | | | Total Items |
| Unit 1: Not on CPAS | | | | | |
| Unit 2: Recycling | 1 | 2 | | 30 | 11 |
| 1. Relate plastics recycling/conservation principles and their effects on the environment | | | | | |
| Unit 3: Introduction to Chemistry | 1 | 2 | | 70 | 25 |
| 1. Apply inquiry-based and problem-solving processes and skills to scientific investigations. | | | | | |
| 2. Demonstrate an understanding of the atomic model of matter by explaining atomic structure, its contributions to chemical structures, and chemical bonding. | | | | | |
| 3. Develop an understanding of the periodic table. | | | | | |
| 4. Investigate compositions and properties of various mixtures and conditions that impact mixture formation and stability. | | | | | |
| 5. Identify common organic molecules, and relate their structures to chemical and physical properties. | | | | | |
| Unit 4: Chemistry of Polymers | 1 | 2 | 3 | 80 | 29 |
| 1. Relate small molecule chemistry to the production of polymers. | | | | | |
| 2. Recognize, define, and differentiate natural and synthetic polymers. | | | | | |
| 3. Relate rheology and viscosity to polymer properties | | | | | |
| 4. Explain how additives affect the properties of a polymeric material. | | | | | |
| 5. Explore how the chemistry of polymer preparation affects performance properties. | | | | | |
| Unit 5: Introduction to Polymer Processing | 1 | 2 | 3 | 40 | 15 |
| 1. Apply the principles of computer aided design and drafting (CADD) to create designs and prototypes of plastic parts | | | | | |
| 2. Explain how basic manufacturing techniques are used to convert polymer feedstock into plastic products and manufacture plastic parts using each processing technique. | | | | | |
| 3. Identify acceptable and unacceptable products for each processing technique. | | | | | |
| Active Items | | | | | 80 |
| Field-Test Items | | | | | 20 |
| TOTAL ASSESSED ITEMS | | | | | 100 |

MS-CPAS2 Blueprint Summary

Assessment: Polymer Science
Test Code: 11546PB-2015
CIP Code: 150607
Course Codes: 994501, 994504, 994505
Type: CP

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| Test Code: | A unique code that serves to numerically identify a specific assessment |
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| Total Assessed Items: | The total number of items on the given assessment. It is calculated as follows: <i>Active Items + Field-test Items</i> |

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| Assessment: Polymer Science Test Code: 11546PB-2015 CIP Code: 150607 Total Hours: 110 | DOK Level(s) | | | Instructional Hours |
|--|--------------|---|---|---------------------|
| | 1 | 2 | 3 | |
| Unit 8 Polymer Sythesis | 1 | 2 | 3 | 60 |
| 1. Explore how the chemistry of polymer preparation affects performance properties. | | | | |
| Unit 9 Surface Coatings | 1 | 2 | 3 | 20 |
| 1. Describe the production of various types of surface coatings. 2. Demonstrate the properties of coatings. | | | | |
| Unit 10 Composite Materials, Processing, and Applications | 1 | 2 | 3 | 30 |
| 1. Examine composite materials to determine how such materials affect the finish properties of a composite structure. 2. Demonstrate different composite processing methods and composite applications. | | | | |



MS-CPAS2 Blueprint Summary

Assessment: Polymer Science
Test Code: 11546Y2-2015
CIP Code: 150607
Course Codes: 994504, 994505, 994501
Type: CP

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| Test Code: | A unique code that serves to numerically identify a specific assessment |
| DOK Levels: | Based on Webb's Depth of Knowledge (DOK), this signifies the assessment item difficulty factor to be expected in each unit. The three levels are as follows: <i>1 = Recall and Reproduction, 2 = Skills and Concepts, 3 = Short-term Strategic Thinking</i> Some postsecondary programs will not use DOK levels until the next revision. |
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| Active Items: | The number of items on the assessment that will be graded |
| Field-test Items: | The number of items that are being field-tested, or piloted, to determine their eligibility for inclusion as an Active Item on future assessments. These items are not graded and, thus, will not impact the student's final score. |
| Total Assessed Items: | The total number of items on the given assessment. It is calculated as follows: <i>Active Items + Field-test Items</i> |

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| Assessment: Polymer Science | | | | | |
|--|---|---|---|--------------|---------------------|
| Test Code: 11546Y2-2015 | | | | | |
| CIP Code: 150607 | | | | DOK Level(s) | Instructional Hours |
| Total Hours: 170 | | | | | Total Items |
| Unit 7: Advanced Polymer Processing | 1 | 2 | | 40 | 19 |
| 1. Explain how advanced or multi-step manufacturing techniques are used to convert polymer feedstock into plastic products and manufacture plastic parts using each processing technique. 2. Differentiate between acceptable and unacceptable products for each processing technique | | | | | |
| Unit 8: Materials Science | 1 | 2 | 3 | 50 | 23 |
| 1. Demonstrate foundational understanding of materials science and materials processing for the four major classes of materials (metals, ceramics, polymers, and composites). 2. Analyze the relationship between metallic ores, metals, and the ceramic materials arising from oxidation of metallic material. | | | | | |
| Unit 9: Surface Coatings | 1 | 2 | 3 | 30 | 14 |
| 1. Describe the production of various types of surface coatings. 2. Demonstrate the properties of coatings. | | | | | |
| Unit 10: Composite Materials, Processing, and Applications | 1 | 2 | 3 | 50 | 24 |
| 1. Examine composite materials to determine how such materials affect the finish properties of a composite structure. 2. Demonstrate different composite processing methods and composite applications. | | | | | |
| Active Items | | | | | 80 |
| Field-Test Items | | | | | 20 |
| TOTAL ASSESSED ITEMS | | | | | 100 |