

**NOTE: THIS IS A RUBRIC FOR PhD PROGRESS CREATED BY NOAH DIFFENBAUGH**

• Rows contain different sub-areas of four broad areas of graduate competency (Research, Teaching, Coursework, and Community and Professionalism)

• Columns contain four benchmark time periods in the graduate degree (June of First Year, October of Second Year, Qualifying Exam/Advancement to Candidacy, Dissertation Defense/Graduation with PhD)

• Cells contain expected competency in a given area at a given benchmark time period

	June of First Year	October of Second Year	Qualifying Exam/Advance to Candidacy	Thesis Defense/Graduate with PhD
<b>Research</b>				
<i>Generate New Questions</i>	<ul style="list-style-type: none"> <li>• Capable of generating new questions related to topic of initial research</li> <li>• Begins to generate new questions outside of topic of initial research</li> </ul>	<ul style="list-style-type: none"> <li>• Capable of generating new and progressively more refined questions related to topic of initial research</li> <li>• Capable of generating new questions outside of topic of initial research</li> <li>• Begins to generate questions of sufficient breadth to form the topic of dissertation research</li> </ul>	<ul style="list-style-type: none"> <li>• Capable of generating and articulating a coherent suite of questions and hypotheses that are new and testable, and together will constitute an advance in understanding of a significant challenge</li> <li>• Capable of generating questions and hypotheses that extend beyond those posed in the dissertation proposal</li> </ul>	<ul style="list-style-type: none"> <li>• Consistently generates new questions and hypotheses that are new, significant, and testable</li> <li>• Capable of generating incisive follow-up questions and hypotheses that arise from initial results</li> <li>• Capable of clearly articulating a coherent and realistic vision for further research in the areas of the dissertation</li> <li>• Capable of clearly articulating a coherent and realistic vision for new research beyond the areas of the dissertation</li> </ul>
<i>Conduct Rigorous Analysis</i>	<ul style="list-style-type: none"> <li>• Capable of iteratively designing rigorous analysis to test specific hypotheses in close interaction with advisor</li> <li>• Capable of exploring the magnitude of uncertainty in results</li> </ul>	<ul style="list-style-type: none"> <li>• Capable of iteratively designing rigorous analysis to test specific hypotheses with moderate interaction with advisor</li> <li>• Capable of initial quantification of the magnitude of uncertainty in results</li> <li>• Capable of exploring relative contribution of different sources of uncertainty</li> </ul>	<ul style="list-style-type: none"> <li>• Capable of designing rigorous analysis to test specific hypotheses, including for "imaginary" hypotheses</li> <li>• Capable of designing analyses to quantify uncertainty in results, including for "imaginary" results</li> <li>• Capable of designing secondary analyses to test the robustness of results, including for "imaginary" results</li> </ul>	<ul style="list-style-type: none"> <li>• Independently designs and conducts rigorous hypothesis-driven analysis that tests the stated hypothesis, formally quantifies uncertainty, and tests robustness using well-designed secondary analysis</li> </ul>
<i>Critically Self-Evaluate Results</i>	<ul style="list-style-type: none"> <li>• Capable of critically evaluating results of analysis when prompted (i.e., by advisor or peer)</li> </ul>	<ul style="list-style-type: none"> <li>• Consistently evaluates results critically before moving on to subsequent analyses</li> <li>• Consistently demonstrates accurate recognition of results that are not credible or reliable</li> </ul>	<ul style="list-style-type: none"> <li>• Consistently evaluates results critically before moving on to subsequent analyses, and accurately recognizes those that are not credible or reliable</li> <li>• Capable of designing secondary analyses to test robustness of results</li> </ul>	<ul style="list-style-type: none"> <li>• Consistently evaluates results critically and designs secondary analyses to test robustness of results</li> </ul>

<i>Effectively Communicate Results</i>	<ul style="list-style-type: none"> <li>• Consistently communicates ideas clearly in writing</li> <li>• Presents ideas clearly in "small group" settings such as lab meetings</li> <li>• Capable of presenting intended research in a poster session</li> <li>• Initial familiarity with effective scientific visualization</li> </ul>	<ul style="list-style-type: none"> <li>• Consistently communicates ideas clearly in writing</li> <li>• Presents ideas clearly in "small group" settings such as lab meetings</li> <li>• Capable of effectively answering critical questions about research methods and results in "small group" settings such as lab meetings</li> <li>• Capable of presenting initial research results in a poster session</li> <li>• Increasing competency with effective scientific visualization</li> </ul>	<ul style="list-style-type: none"> <li>• Capable of writing a clearly written and clearly articulated proposal of dissertation research</li> <li>• Capable of presenting proposal of dissertation research orally using clear and compelling arguments supported by evidence</li> <li>• Capable of effectively answering critical questions about research methods and results in a dynamic, interactive setting</li> <li>• Capable of presenting research design and initial results in an oral presentation at a scientific conference</li> <li>• Competency with effective and compelling scientific visualization</li> </ul>	<ul style="list-style-type: none"> <li>• Capable of independently preparing a complete manuscript (text, figures, and tables) of sufficient quality for journal submission</li> <li>• Capable of presenting individual research projects and overall synthesis of complete body of research orally using clear and compelling arguments supported by evidence</li> <li>• Capable of answering critical questions about research methods and results in a clear and compelling manner, synthesizing own results and the results of others, in a dynamic, interactive setting</li> <li>• Capable of clearly articulating a vision for further research in the areas of the dissertation</li> <li>• Consistently employs effective and compelling scientific visualization</li> </ul>
<b>Teaching</b>				
<i>Serving as Teaching Assistant</i>	<ul style="list-style-type: none"> <li>• Capable of serving as Teaching Assistant in introductory undergraduate course in the earth, energy and environmental sciences</li> </ul>	<ul style="list-style-type: none"> <li>• Capable of serving as Teaching Assistant in introductory undergraduate course in the earth, energy and environmental sciences</li> </ul>	<ul style="list-style-type: none"> <li>• Capable of serving as Teaching Assistant in advanced undergraduate course in broad area of dissertation research (e.g., "climate change", "hydrology", "carbon cycle", etc)</li> </ul>	<ul style="list-style-type: none"> <li>• Capable of serving as Teaching Assistant in graduate course in specific area of dissertation research</li> </ul>
<i>"Guest" Teaching</i>			<ul style="list-style-type: none"> <li>• Capable of "delivering" a guest lecture or classroom activity provided by the Instructor in an undergraduate course in broad area of dissertation research (e.g., "climate change", "hydrology", "carbon cycle", etc)</li> </ul>	<ul style="list-style-type: none"> <li>• Capable of designing and developing multiple guest lectures or classroom activities in an undergraduate or graduate course in specific area of dissertation research</li> <li>• Capable of describing in detail the learning goals and structure of a new course</li> </ul>
<i>Course Development</i>				
<b>Coursework</b>				
<i>Coursework</i>	<ul style="list-style-type: none"> <li>• Able to succeed in introductory graduate coursework in area of dissertation research</li> </ul>	<ul style="list-style-type: none"> <li>• Able to excel in introductory graduate coursework in area of dissertation research</li> </ul>	<ul style="list-style-type: none"> <li>• Able to excel in introductory graduate coursework in area of dissertation research</li> <li>• Able to succeed in advanced graduate coursework in area of dissertation research</li> <li>• Able to succeed in introductory graduate coursework in areas</li> </ul>	<ul style="list-style-type: none"> <li>• Able to excel in advanced graduate coursework in area of dissertation research</li> <li>• Able to succeed in advanced graduate coursework in areas adjacent to dissertation research</li> </ul>

<b>Community and Professionalism</b>				
<i>Respectful Community</i>	<ul style="list-style-type: none"> <li>• Consistently adheres to School and University "respectful community" standards</li> <li>• Consistently treats advisor and peers respectfully</li> </ul>	<ul style="list-style-type: none"> <li>• Consistently adheres to School and University "respectful community" standards</li> <li>• Consistently treats advisor and peers respectfully</li> <li>• Begins to take some leadership in lab group activities</li> </ul>	<ul style="list-style-type: none"> <li>• Consistently adheres to School and University "respectful community" standards</li> <li>• Consistently treats advisor and peers respectfully</li> <li>• Consistently takes some leadership in lab group activities</li> </ul>	<ul style="list-style-type: none"> <li>• Consistently adheres to School and University "respectful community" standards</li> <li>• Consistently treats advisor and peers respectfully</li> <li>• Consistently shows positive leadership in lab group</li> <li>• Demonstrates leadership in Department and/or School community</li> <li>• May begin to demonstrate leadership in off-campus scientific and/or professional</li> </ul>
<i>Leadership</i>				