**LEARNING DIMENSIONS of Making & Tinkering**

Students gain valuable learning experiences while making and tinkering. Use this framework to notice, support, document, and design assessments for student learning — and to reflect on how your tinkering environment, activities, and facilitation may have supported or impeded such outcomes.

<table>
<thead>
<tr>
<th>Initiative &amp; Intentionality</th>
<th>Problem Solving &amp; Critical Thinking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Setting one’s own goal</td>
<td>Troubleshooting through iterations</td>
</tr>
<tr>
<td>Taking intellectual and creative risks; working without a blueprint</td>
<td>Moving from trial-and-error to fine tuning through increasingly focused inquiries</td>
</tr>
<tr>
<td>Complexifying over time</td>
<td>Developing work-arounds</td>
</tr>
<tr>
<td>Persisting through and learning from failures</td>
<td>Seeking ideas, assistance, and expertise from others</td>
</tr>
<tr>
<td>Adjusting goals based on physical feedback and evidence</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Conceptual Understanding</th>
<th>Creativity &amp; Self-Expression</th>
<th>Social &amp; Emotional Engagement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Controlling for variables as projects complexify</td>
<td>Responding aesthetically to materials and phenomena</td>
<td>Building on or remixing the ideas and projects of others</td>
</tr>
<tr>
<td>Constructing explanations</td>
<td>Connecting projects to personal interests and experiences</td>
<td>Teaching and helping one another</td>
</tr>
<tr>
<td>Using analogues and metaphors to explain</td>
<td>Playfully exploring</td>
<td>Collaborating and working in teams</td>
</tr>
<tr>
<td>Leveraging properties of materials and phenomena to achieve design goals</td>
<td>Expressing joy and delight</td>
<td>Recognizing and being recognized for accomplishments and contributions</td>
</tr>
<tr>
<td></td>
<td>Using materials in novel ways</td>
<td>Developing confidence</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Expressing pride and ownership</td>
</tr>
</tbody>
</table>

© 2017