

**CG & 3D Animation Skills  
National Academic Standards  
Cross Reference**

This cross reference addresses the following [academic standard](#) sets:

- [Science Content](#)
- [Math](#)
- [Language Arts](#)
- [Technology](#)

**General Academic Cross Reference**

<b>1. Employability/Professional</b>	
<b>1.1. Professional Skills</b>	
<ul style="list-style-type: none"> <li>• Use drawing media and related materials (e.g., paper, printers, scanners, digital cameras)</li> </ul>	<a href="#">M3a</a> , <a href="#">M3b</a> , <a href="#">M3i</a> , <a href="#">M3j</a> , <a href="#">T3</a> , <a href="#">T8</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a> , <a href="#">T30</a> , <a href="#">T32</a>
<ul style="list-style-type: none"> <li>• Create freehand sketches/storyboarding</li> </ul>	<a href="#">S1a</a> , <a href="#">S1e</a> , <a href="#">S6b</a> , <a href="#">M3a</a> , <a href="#">M3b</a> , <a href="#">M3i</a> , <a href="#">M4a</a> , <a href="#">L4</a> , <a href="#">L5</a> , <a href="#">L12</a>
<ul style="list-style-type: none"> <li>• Prepare a comprehensive scientific presentation</li> </ul>	<a href="#">S1a</a> , <a href="#">S6b</a> , <a href="#">S8a</a> , <a href="#">S8b</a> , <a href="#">L4</a> , <a href="#">L5</a> , <a href="#">L6</a> , <a href="#">L8</a> , <a href="#">L12</a> , <a href="#">T8</a> , <a href="#">T17</a> , <a href="#">T22</a> , <a href="#">T23</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a> , <a href="#">T28</a> , <a href="#">T29</a> , <a href="#">T31</a>
<ul style="list-style-type: none"> <li>• Meet deadlines</li> </ul>	<a href="#">S2a</a> , <a href="#">L4</a> , <a href="#">L5</a> , <a href="#">L12</a> , <a href="#">T25</a> , <a href="#">T27</a>
<ul style="list-style-type: none"> <li>• Cooperate with a team</li> </ul>	<a href="#">S2a</a> , <a href="#">L4</a> , <a href="#">L5</a> , <a href="#">L12</a>
<ul style="list-style-type: none"> <li>• Teaching Others</li> </ul>	<a href="#">S1a</a> , <a href="#">S1c</a> , <a href="#">S2a</a> , <a href="#">S6b</a> , <a href="#">S7f</a> , <a href="#">S8a</a> , <a href="#">L4</a> , <a href="#">L5</a> , <a href="#">L12</a>
<ul style="list-style-type: none"> <li>• Research background information</li> </ul>	<a href="#">S1a</a> , <a href="#">S1b</a> , <a href="#">S2a</a> , <a href="#">S6b</a> , <a href="#">S7f</a> , <a href="#">S8a</a> , <a href="#">S8b</a> , <a href="#">M1a</a> , <a href="#">M1e</a> , <a href="#">M1h</a> , <a href="#">M1i</a> , <a href="#">M3a</a> , <a href="#">M3b</a> , <a href="#">M3j</a> , <a href="#">M3m</a> , <a href="#">M4a</a> , <a href="#">M5c</a> , <a href="#">L3</a> , <a href="#">L7</a> , <a href="#">L8</a> , <a href="#">T1</a> , <a href="#">T2</a> , <a href="#">T3</a> , <a href="#">T7</a> , <a href="#">T8</a> , <a href="#">T17</a> , <a href="#">T22</a> , <a href="#">T23</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a> , <a href="#">T30</a> , <a href="#">T32</a> , <a href="#">T33</a> , <a href="#">T34</a>
<ul style="list-style-type: none"> <li>• Interviewing/Journalism skills</li> </ul>	<a href="#">L3</a> , <a href="#">L4</a> , <a href="#">L5</a> , <a href="#">L6</a> , <a href="#">L7</a> , <a href="#">L8</a> , <a href="#">L12</a> , <a href="#">T1</a> , <a href="#">T2</a> , <a href="#">T3</a> , <a href="#">T7</a> , <a href="#">T8</a> , <a href="#">T17</a> , <a href="#">T22</a> , <a href="#">T23</a> , <a href="#">T24</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a> , <a href="#">T28</a> , <a href="#">T29</a> , <a href="#">T30</a> , <a href="#">T31</a> , <a href="#">T32</a> , <a href="#">T33</a> , <a href="#">T34</a>
<b>2. Computer Skills</b>	
<b>2.1. Hardware</b>	
<ul style="list-style-type: none"> <li>• Demonstrate proper care of equipment</li> </ul>	<a href="#">T17</a> , <a href="#">T21</a> , <a href="#">T23</a>
<ul style="list-style-type: none"> <li>• Operate and adjust input devices (e.g., mouse, keyboard, tablet)</li> </ul>	<a href="#">T17</a> , <a href="#">T21</a> , <a href="#">T23</a>
<ul style="list-style-type: none"> <li>• Operate and adjust output device (printer)</li> </ul>	<a href="#">T17</a> , <a href="#">T21</a> , <a href="#">T23</a>
<ul style="list-style-type: none"> <li>• Correct handling and operation of storage media</li> </ul>	<a href="#">T17</a> , <a href="#">T21</a> , <a href="#">T23</a>
<ul style="list-style-type: none"> <li>• Start and shut down work station</li> </ul>	<a href="#">T17</a> , <a href="#">T21</a> , <a href="#">T23</a>
<ul style="list-style-type: none"> <li>• Adjust monitor controls for comfort and usability</li> </ul>	<a href="#">T17</a> , <a href="#">T21</a> , <a href="#">T23</a>
<ul style="list-style-type: none"> <li>• Recognize availability of information services (e.g., email, internet)</li> </ul>	<a href="#">T3</a> , <a href="#">T17</a> , <a href="#">T23</a> , <a href="#">T27</a> , <a href="#">T28</a> , <a href="#">T29</a> , <a href="#">T30</a> , <a href="#">T31</a> , <a href="#">T32</a> , <a href="#">T33</a> , <a href="#">T34</a>
<b>2.2. Software</b>	
<ul style="list-style-type: none"> <li>• Ability to open, edit, and save a file</li> </ul>	<a href="#">T21</a> , <a href="#">T23</a>
<ul style="list-style-type: none"> <li>• Use one or more programs to achieve desired results</li> </ul>	<a href="#">T1</a> , <a href="#">T2</a> , <a href="#">T3</a> , <a href="#">T8</a> , <a href="#">T17</a> , <a href="#">T21</a> , <a href="#">T22</a> , <a href="#">T23</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a> , <a href="#">T28</a> , <a href="#">T29</a> , <a href="#">T30</a> , <a href="#">T31</a> , <a href="#">T32</a> , <a href="#">T33</a> , <a href="#">T34</a>
<ul style="list-style-type: none"> <li>• Efficiency in using one or more programs</li> </ul>	<a href="#">T1</a> , <a href="#">T2</a> , <a href="#">T3</a> , <a href="#">T8</a> , <a href="#">T17</a> , <a href="#">T21</a> , <a href="#">T22</a> , <a href="#">T23</a> ,
Special thanks to Pia Maffei, Applied-Ideas, Inc. <a href="http://www.applied-ideas.com">www.applied-ideas.com</a>	
<b>2.3. Physical and Safety Needs</b>	
<ul style="list-style-type: none"> <li>• Demonstrate an understanding of ergonomic</li> </ul>	<a href="#">T3</a> , <a href="#">T7</a> , <a href="#">T8</a> , <a href="#">T17</a> , <a href="#">T21</a> , <a href="#">T23</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a> , <a href="#">T28</a> , <a href="#">T29</a> , <a href="#">T30</a> , <a href="#">T31</a> , <a href="#">T32</a> , <a href="#">T33</a> , <a href="#">T34</a>
<ul style="list-style-type: none"> <li>• Create and maintain a work environment</li> </ul>	<a href="#">L3</a> , <a href="#">L4</a> , <a href="#">L5</a> , <a href="#">L6</a> , <a href="#">L8</a> , <a href="#">T3</a> , <a href="#">T7</a> , <a href="#">T8</a> , <a href="#">T17</a> , <a href="#">T21</a> , <a href="#">T23</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a> , <a href="#">T28</a> , <a href="#">T29</a> , <a href="#">T30</a> , <a href="#">T31</a> , <a href="#">T32</a> , <a href="#">T33</a> , <a href="#">T34</a>

<b>3. 3D Animation Skills</b>	
<b>3.1. Animation Software UI and General Features</b>	
• Understanding Menu bars, Command panels, etc.	<a href="#">T17</a> , <a href="#">T23</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a>
• Software navigation/interaction	<a href="#">T17</a> , <a href="#">T23</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a>
• Help files	<a href="#">L7</a> , <a href="#">L8</a> , <a href="#">T17</a> , <a href="#">T23</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a>
• Coordinate system	<a href="#">M3e</a> , <a href="#">M3f</a> , <a href="#">T17</a> , <a href="#">T23</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a>
• Orthographic/Perspective Views	<a href="#">M3e</a> , <a href="#">M3f</a> , <a href="#">T17</a> , <a href="#">T23</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a>
• Viewport Navigation Control	<a href="#">M3e</a> , <a href="#">M3f</a> , <a href="#">T17</a> , <a href="#">T23</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a>
• Viewport Display types	<a href="#">T17</a> , <a href="#">T23</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a>
• Selecting objects and object sets	<a href="#">M3a</a> , <a href="#">T17</a> , <a href="#">T23</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a>
• Positional Transformations	<a href="#">M3g</a> , <a href="#">M3h</a> , <a href="#">T17</a> , <a href="#">T23</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a>
• Organizing objects by groups, selection sets, layers	<a href="#">S1a</a> , <a href="#">M3a</a> , <a href="#">M3b</a> , <a href="#">M4a</a> , <a href="#">T17</a> , <a href="#">T23</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a>
<b>3.2. Modeling</b>	
• Setting Units, Grids and Snaps	<a href="#">S1a</a> , <a href="#">M4a</a> , <a href="#">T8</a> , <a href="#">T17</a> , <a href="#">T22</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a> , <a href="#">T32</a>
• Creating 2D shapes	<a href="#">S1e</a> , <a href="#">M3a</a> , <a href="#">M3b</a> , <a href="#">M3e</a> , <a href="#">M3f</a> , <a href="#">M3i</a> , <a href="#">M3j</a> , <a href="#">M3m</a> , <a href="#">M4a</a> , <a href="#">L8</a> , <a href="#">L12</a> , <a href="#">T8</a> , <a href="#">T17</a> , <a href="#">T22</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a> , <a href="#">T32</a>
• 2D procedural modeling	<a href="#">S1e</a> , <a href="#">M2f</a> , <a href="#">M2k</a> , <a href="#">M3a</a> , <a href="#">M3b</a> , <a href="#">M3e</a> , <a href="#">M3f</a> , <a href="#">M3i</a> , <a href="#">M3j</a> , <a href="#">M3m</a> , <a href="#">M4a</a> , <a href="#">L8</a> , <a href="#">L12</a> , <a href="#">T8</a> , <a href="#">T17</a> , <a href="#">T22</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a> , <a href="#">T32</a>
• 2D sub-object editing	<a href="#">S1e</a> , <a href="#">M3a</a> , <a href="#">M3b</a> , <a href="#">M3e</a> , <a href="#">M3f</a> , <a href="#">M3i</a> , <a href="#">M3j</a> , <a href="#">M3m</a> , <a href="#">M4a</a> , <a href="#">T8</a> , <a href="#">T17</a> , <a href="#">T22</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a> , <a href="#">T32</a>
• 2D procedural modifiers	<a href="#">S1e</a> , <a href="#">M3a</a> , <a href="#">M3b</a> , <a href="#">M3e</a> , <a href="#">M3f</a> , <a href="#">M3i</a> , <a href="#">M3j</a> , <a href="#">M3m</a> , <a href="#">M4a</a> , <a href="#">T8</a> , <a href="#">T17</a> , <a href="#">T22</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a> , <a href="#">T32</a>
• Nested/Compound objects	<a href="#">S1e</a> , <a href="#">M3a</a> , <a href="#">M3b</a> , <a href="#">M3e</a> , <a href="#">M3f</a> , <a href="#">M3i</a> , <a href="#">M3j</a> , <a href="#">M3m</a> , <a href="#">M4a</a> , <a href="#">T8</a> , <a href="#">T17</a> , <a href="#">T22</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a> , <a href="#">T32</a>
• Creating 3D primitives	<a href="#">S1e</a> , <a href="#">M2f</a> , <a href="#">M2k</a> , <a href="#">M3a</a> , <a href="#">M3b</a> , <a href="#">M3e</a> , <a href="#">M3f</a> , <a href="#">M3i</a> , <a href="#">M3j</a> , <a href="#">M3m</a> , <a href="#">M4a</a> , <a href="#">T8</a> , <a href="#">T17</a> , <a href="#">T22</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a> , <a href="#">T32</a>
• Polygon Counter Utility	<a href="#">S1a</a> , <a href="#">M4a</a> , <a href="#">T8</a> , <a href="#">T17</a> , <a href="#">T22</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a> , <a href="#">T32</a>
• Object Cloning	<a href="#">S1a</a> , <a href="#">M3g</a> , <a href="#">M3h</a> , <a href="#">T17</a> , <a href="#">T23</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a>
• 3D procedural modeling	<a href="#">S1e</a> , <a href="#">M2f</a> , <a href="#">M2k</a> , <a href="#">M3a</a> , <a href="#">M3b</a> , <a href="#">M3e</a> , <a href="#">M3f</a> , <a href="#">M3i</a> , <a href="#">M3j</a> , <a href="#">M3m</a> , <a href="#">M4a</a> , <a href="#">T8</a> , <a href="#">T17</a> , <a href="#">T22</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a> , <a href="#">T32</a>
• 3D Sub-object editing	<a href="#">S1e</a> , <a href="#">M3a</a> , <a href="#">M3b</a> , <a href="#">M3e</a> , <a href="#">M3f</a> , <a href="#">M3i</a> , <a href="#">M3j</a> , <a href="#">M3m</a> , <a href="#">M4a</a> , <a href="#">T8</a> , <a href="#">T17</a> , <a href="#">T22</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a> , <a href="#">T32</a>
• Boolean and compound 3D objects	<a href="#">S1e</a> , <a href="#">M3a</a> , <a href="#">M3b</a> , <a href="#">M3e</a> , <a href="#">M3f</a> , <a href="#">M3i</a> , <a href="#">M3j</a> , <a href="#">M3m</a> , <a href="#">M4a</a> , <a href="#">T8</a> , <a href="#">T17</a> , <a href="#">T22</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a> , <a href="#">T32</a>
• Surface Types: Mesh, Poly, Patch, NURBS	<a href="#">S1e</a> , <a href="#">M3a</a> , <a href="#">M3b</a> , <a href="#">M3e</a> , <a href="#">M3f</a> , <a href="#">M3i</a> , <a href="#">M3j</a> , <a href="#">M3m</a> , <a href="#">M4a</a> , <a href="#">T8</a> , <a href="#">T17</a> , <a href="#">T22</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a> , <a href="#">T32</a>
• Box Modeling	<a href="#">S1e</a> , <a href="#">M3a</a> , <a href="#">M3b</a> , <a href="#">M3e</a> , <a href="#">M3f</a> , <a href="#">M3i</a> , <a href="#">M3j</a> , <a href="#">M3m</a> , <a href="#">M4a</a> , <a href="#">T8</a> , <a href="#">T17</a> , <a href="#">T22</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a> , <a href="#">T32</a>
<b>3.3. Cameras</b>	
• Target vs. Free cameras	<a href="#">S1a</a> , <a href="#">S1e</a> , <a href="#">M3a</a> , <a href="#">M3b</a> , <a href="#">M3e</a> , <a href="#">M3f</a> , <a href="#">M4a</a> , <a href="#">T3</a> , <a href="#">T8</a> , <a href="#">T17</a> , <a href="#">T22</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> ,

	<a href="#">T27</a> , <a href="#">T32</a> , <a href="#">T34</a>
• Camera focal length and parameters	<a href="#">S1a</a> , <a href="#">M1i</a> , <a href="#">M4a</a> , <a href="#">T8</a> , <a href="#">T17</a> , <a href="#">T22</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a> , <a href="#">T32</a>
• Ortho/Perspective cameras	<a href="#">S1a</a> , <a href="#">S1e</a> , <a href="#">M3a</a> , <a href="#">M3b</a> , <a href="#">M3e</a> , <a href="#">M3f</a> , <a href="#">M4a</a> , <a href="#">T8</a> , <a href="#">T17</a> , <a href="#">T22</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a> , <a href="#">T32</a>
• Rendering camera views	<a href="#">S1a</a> , <a href="#">M3a</a> , <a href="#">M3b</a> , <a href="#">L4</a> , <a href="#">L8</a> , <a href="#">L12</a> , <a href="#">T8</a> , <a href="#">T17</a> , <a href="#">T22</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a> , <a href="#">T31</a> , <a href="#">T32</a> , <a href="#">T34</a>
• Viewport Controls	<a href="#">M3e</a> , <a href="#">M3f</a> , <a href="#">T17</a> , <a href="#">T23</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a>
<b>3.4. Lighting</b>	
• Standard light theory, Angle of Incidence	<a href="#">S1a</a> , <a href="#">S1b</a> , <a href="#">S3b</a> , <a href="#">M3g</a> , <a href="#">M3h</a> , <a href="#">L4</a> , <a href="#">L7</a> , <a href="#">L12</a> , <a href="#">T3</a> , <a href="#">T7</a> , <a href="#">T8</a> , <a href="#">T17</a> , <a href="#">T22</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a> , <a href="#">T32</a> , <a href="#">T33</a> , <a href="#">T34</a>
• Three point studio lighting	<a href="#">S1a</a> , <a href="#">S1b</a> , <a href="#">T3</a> , <a href="#">T7</a> , <a href="#">T8</a> , <a href="#">T17</a> , <a href="#">T22</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a> , <a href="#">T32</a> , <a href="#">T33</a> , <a href="#">T34</a>
• Basic color theory	<a href="#">S1a</a> , <a href="#">S1b</a> , <a href="#">T3</a> , <a href="#">T7</a> , <a href="#">T8</a> , <a href="#">T17</a> , <a href="#">T22</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a> , <a href="#">T32</a> , <a href="#">T33</a> , <a href="#">T34</a>
• Define Standard light types: Omni, Spot, Direct	<a href="#">S1a</a> , <a href="#">S1e</a> , <a href="#">M3a</a> , <a href="#">M3b</a> , <a href="#">M3e</a> , <a href="#">M3f</a> , <a href="#">M4a</a> , <a href="#">T8</a> , <a href="#">T17</a> , <a href="#">T22</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a> , <a href="#">T32</a>
• Define Photometric Lights	<a href="#">S1a</a> , <a href="#">S1e</a> , <a href="#">M3a</a> , <a href="#">M3b</a> , <a href="#">M3e</a> , <a href="#">M3f</a> , <a href="#">M4a</a> , <a href="#">T8</a> , <a href="#">T17</a> , <a href="#">T22</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a> , <a href="#">T31</a> , <a href="#">T32</a> , <a href="#">T33</a> , <a href="#">T34</a>
• Scale and transforms for lights	<a href="#">S1a</a> , <a href="#">M3e</a> , <a href="#">M3f</a> , <a href="#">M3g</a> , <a href="#">M3h</a> , <a href="#">M4a</a> , <a href="#">T8</a> , <a href="#">T17</a> , <a href="#">T22</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a> , <a href="#">T32</a>
• Lighting Tools	<a href="#">S1a</a> , <a href="#">S1e</a> , <a href="#">M1i</a> , <a href="#">M4a</a> , <a href="#">T8</a> , <a href="#">T17</a> , <a href="#">T22</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a> , <a href="#">T32</a>
<b>3.5. Rendering</b>	
• Define Scanline render	<a href="#">T3</a> , <a href="#">T8</a> , <a href="#">T17</a> , <a href="#">T22</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a> , <a href="#">T32</a>
• Rendering Filters	<a href="#">S1a</a> , <a href="#">T3</a> , <a href="#">T8</a> , <a href="#">T17</a> , <a href="#">T22</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a> , <a href="#">T32</a>
• Basic rendering options	<a href="#">S1a</a> , <a href="#">S1b</a> , <a href="#">M1e</a> , <a href="#">M4a</a> , <a href="#">T3</a> , <a href="#">T8</a> , <a href="#">T17</a> , <a href="#">T22</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a> , <a href="#">T32</a>
• Print Sizing	<a href="#">S1a</a> , <a href="#">S1b</a> , <a href="#">M1e</a> , <a href="#">M4a</a> , <a href="#">T3</a> , <a href="#">T8</a> , <a href="#">T17</a> , <a href="#">T22</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a> , <a href="#">T32</a>
• Rendered Frame Window	<a href="#">T3</a> , <a href="#">T8</a> , <a href="#">T17</a> , <a href="#">T22</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a> , <a href="#">T32</a>
• Assign Renderer Viewport with lock	<a href="#">T3</a> , <a href="#">T8</a> , <a href="#">T17</a> , <a href="#">T22</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a> , <a href="#">T32</a>
• Compressed files vs. still sequences	<a href="#">M1e</a> , <a href="#">T3</a> , <a href="#">T8</a> , <a href="#">T17</a> , <a href="#">T22</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a> , <a href="#">T32</a>
<b>3.6. Materials</b>	
• Material Editor Access	<a href="#">T8</a> , <a href="#">T17</a> , <a href="#">T22</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a> , <a href="#">T32</a>
• Define Materials	<a href="#">S1a</a> , <a href="#">S1e</a> , <a href="#">T3</a> , <a href="#">T8</a> , <a href="#">T17</a> , <a href="#">T22</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a> , <a href="#">T32</a> , <a href="#">T34</a>
• Define Maps	<a href="#">S1a</a> , <a href="#">M1i</a> , <a href="#">M4a</a> , <a href="#">T3</a> , <a href="#">T8</a> , <a href="#">T17</a> , <a href="#">T22</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a> , <a href="#">T32</a> , <a href="#">T34</a>
• Mapping Coordinates	<a href="#">S1a</a> , <a href="#">M4a</a> , <a href="#">T8</a> , <a href="#">T17</a> , <a href="#">T22</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a> , <a href="#">T32</a>
• Material Editor UI	<a href="#">T8</a> , <a href="#">T17</a> , <a href="#">T22</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a> , <a href="#">T32</a>
• Create simple material	<a href="#">S1e</a> , <a href="#">M4a</a> , <a href="#">T8</a> , <a href="#">T17</a> , <a href="#">T22</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a> , <a href="#">T32</a>
• Shader Basic Parameters	<a href="#">M1i</a> , <a href="#">T7</a> , <a href="#">T8</a> , <a href="#">T17</a> , <a href="#">T22</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a> , <a href="#">T32</a>
• Extended Parameters	<a href="#">M1h</a> , <a href="#">M1i</a> , <a href="#">M4a</a> , <a href="#">T8</a> , <a href="#">T17</a> , <a href="#">T22</a> , <a href="#">T24</a> ,

	<a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a> , <a href="#">T32</a>
• UVW Map modifier	<a href="#">S1a</a> , <a href="#">M1i</a> , <a href="#">M3a</a> , <a href="#">M3b</a> , <a href="#">M4a</a> , <a href="#">T8</a> , <a href="#">T17</a> , <a href="#">T22</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a> , <a href="#">T32</a>
• Using Materials and Libraries	<a href="#">S1a</a> , <a href="#">S1e</a> , <a href="#">T8</a> , <a href="#">T17</a> , <a href="#">T22</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a> , <a href="#">T32</a>
• Changing Material Types	<a href="#">S1a</a> , <a href="#">S1b</a> , <a href="#">S1e</a> , <a href="#">S3b</a> , <a href="#">S6b</a> , <a href="#">M1i</a> , <a href="#">M4a</a> , <a href="#">T8</a> , <a href="#">T17</a> , <a href="#">T22</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a> , <a href="#">T31</a> , <a href="#">T32</a> , <a href="#">T34</a>
<b>3.7. Global Illumination</b>	
• Photometric definition vs. Standard	<a href="#">S1a</a> , <a href="#">S1b</a> , <a href="#">S1e</a> , <a href="#">S6b</a> , <a href="#">M1i</a> , <a href="#">M3a</a> , <a href="#">M3b</a> , <a href="#">M3e</a> , <a href="#">M3f</a> , <a href="#">M4a</a> , <a href="#">T8</a> , <a href="#">T17</a> , <a href="#">T22</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a> , <a href="#">T31</a> , <a href="#">T32</a> , <a href="#">T34</a>
• Global Illumination explanation	<a href="#">S1a</a> , <a href="#">S1b</a> , <a href="#">S1e</a> , <a href="#">S6b</a> , <a href="#">M1i</a> , <a href="#">M4a</a> , <a href="#">T8</a> , <a href="#">T17</a> , <a href="#">T22</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a> , <a href="#">T31</a> , <a href="#">T32</a> , <a href="#">T34</a>

• Radiosity explanation	<a href="#">S1a</a> , <a href="#">S1b</a> , <a href="#">S1e</a> , <a href="#">S6b</a> , <a href="#">M1i</a> , <a href="#">M4a</a> , <a href="#">T8</a> , <a href="#">T17</a> , <a href="#">T22</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a> , <a href="#">T31</a> , <a href="#">T32</a> , <a href="#">T34</a>
• Architectural Material types	<a href="#">S1a</a> , <a href="#">S1b</a> , <a href="#">S1e</a> , <a href="#">S3b</a> , <a href="#">S6b</a> , <a href="#">M1i</a> , <a href="#">M4a</a> , <a href="#">T8</a> , <a href="#">T17</a> , <a href="#">T22</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a> , <a href="#">T31</a> , <a href="#">T32</a> , <a href="#">T34</a>
<b>3.8. Animation</b>	
• Define keyframe	<a href="#">S1a</a> , <a href="#">S1b</a> , <a href="#">S3d</a> , <a href="#">M1e</a> , <a href="#">M2o</a> , <a href="#">M3g</a> , <a href="#">M3h</a> , <a href="#">T3</a> , <a href="#">T7</a> , <a href="#">T8</a> , <a href="#">T17</a> , <a href="#">T22</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a> , <a href="#">T32</a>
• Animation Position Controllers	<a href="#">S1b</a> , <a href="#">S3d</a> , <a href="#">M2o</a> , <a href="#">T8</a> , <a href="#">T17</a> , <a href="#">T22</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a> , <a href="#">T32</a>
• Animation UI	<a href="#">M1i</a> , <a href="#">M4a</a> , <a href="#">T8</a> , <a href="#">T17</a> , <a href="#">T22</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a> , <a href="#">T32</a>
• Create keys (position)	<a href="#">M3b</a> , <a href="#">M3e</a> , <a href="#">M3f</a> , <a href="#">M3g</a> , <a href="#">M3h</a> , <a href="#">M4a</a> , <a href="#">T8</a> , <a href="#">T17</a> , <a href="#">T22</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a> , <a href="#">T32</a>
• Create keys (rotation)	<a href="#">M3b</a> , <a href="#">M3e</a> , <a href="#">M3f</a> , <a href="#">M3g</a> , <a href="#">M3h</a> , <a href="#">M4a</a> , <a href="#">T8</a> , <a href="#">T17</a> , <a href="#">T22</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a> , <a href="#">T32</a>
• Inverse and Forward Kinematics	<a href="#">S1a</a> , <a href="#">S1b</a> , <a href="#">S1e</a> , <a href="#">S3d</a> , <a href="#">S6b</a> , <a href="#">M3a</a> , <a href="#">M3b</a> , <a href="#">M3e</a> , <a href="#">M3f</a> , <a href="#">M3g</a> , <a href="#">M3h</a> , <a href="#">M3i</a> , <a href="#">M3m</a> , <a href="#">T3</a> , <a href="#">T7</a> , <a href="#">T8</a> , <a href="#">T17</a> , <a href="#">T22</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a> , <a href="#">T32</a>
• Controllers and Constraints	<a href="#">S1b</a> , <a href="#">S3d</a> , <a href="#">M3b</a> , <a href="#">M3e</a> , <a href="#">M3f</a> , <a href="#">M3g</a> , <a href="#">M3h</a> , <a href="#">M4a</a> , <a href="#">T8</a> , <a href="#">T17</a> , <a href="#">T22</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a> , <a href="#">T32</a>
• Preview/Render animation	<a href="#">S1a</a> , <a href="#">S1b</a> , <a href="#">M1e</a> , <a href="#">M4a</a> , <a href="#">L4</a> , <a href="#">L12</a> , <a href="#">T3</a> , <a href="#">T8</a> , <a href="#">T17</a> , <a href="#">T22</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a> , <a href="#">T31</a> , <a href="#">T32</a> , <a href="#">T34</a>
<b>3.9. Effects</b>	
• Atmospherics definitions	<a href="#">S1a</a> , <a href="#">S1e</a> , <a href="#">S6b</a> , <a href="#">M1i</a> , <a href="#">M4a</a> , <a href="#">T8</a> , <a href="#">T17</a> , <a href="#">T22</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a> , <a href="#">T32</a>
• Fire, Fog, Volume Light Atmospheric Types	<a href="#">S1a</a> , <a href="#">S1e</a> , <a href="#">S6b</a> , <a href="#">M1i</a> , <a href="#">M3a</a> , <a href="#">M3b</a> , <a href="#">M3e</a> , <a href="#">M3f</a> , <a href="#">M3m</a> , <a href="#">M4a</a> , <a href="#">T8</a> , <a href="#">T17</a> , <a href="#">T22</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a> , <a href="#">T32</a>
• Standard Particles	<a href="#">S1a</a> , <a href="#">S1b</a> , <a href="#">S1e</a> , <a href="#">S3d</a> , <a href="#">S6b</a> , <a href="#">M1h</a> , <a href="#">M1i</a> , <a href="#">M3a</a> , <a href="#">M3b</a> , <a href="#">M3e</a> , <a href="#">M3f</a> , <a href="#">M3m</a> , <a href="#">M4a</a> , <a href="#">T3</a> , <a href="#">T8</a> , <a href="#">T17</a> , <a href="#">T22</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a> , <a href="#">T32</a> , <a href="#">T34</a>
• Advanced Particles	<a href="#">S1a</a> , <a href="#">S1b</a> , <a href="#">S1e</a> , <a href="#">S3d</a> , <a href="#">S6b</a> , <a href="#">M1h</a> , <a href="#">M1i</a> , <a href="#">M3a</a> , <a href="#">M3b</a> , <a href="#">M3e</a> , <a href="#">M3f</a> , <a href="#">M3m</a> , <a href="#">M4a</a> , <a href="#">T3</a> , <a href="#">T8</a> , <a href="#">T17</a> , <a href="#">T22</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a> , <a href="#">T32</a> , <a href="#">T34</a>
• Material Effects	<a href="#">S1a</a> , <a href="#">M1i</a> , <a href="#">M4a</a> , <a href="#">T3</a> , <a href="#">T8</a> , <a href="#">T17</a> , <a href="#">T22</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a> , <a href="#">T32</a> , <a href="#">T34</a>
• Object effects	<a href="#">S1a</a> , <a href="#">S1b</a> , <a href="#">S1e</a> , <a href="#">S3d</a> , <a href="#">S6b</a> , <a href="#">M1i</a> , <a href="#">M3a</a> , <a href="#">M3b</a> , <a href="#">M3e</a> , <a href="#">M3f</a> , <a href="#">M3g</a> , <a href="#">M3h</a> , <a href="#">M3m</a> , <a href="#">M4a</a> , <a href="#">T3</a> , <a href="#">T8</a> , <a href="#">T17</a> , <a href="#">T22</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a> , <a href="#">T32</a> , <a href="#">T34</a>

<b>3.10. Inverse Kinematics</b>	
<ul style="list-style-type: none"> <li>Define IK/FK</li> </ul>	<a href="#">S1a</a> , <a href="#">S1b</a> , <a href="#">S1e</a> , <a href="#">S3d</a> , <a href="#">S6b</a> , <a href="#">M3a</a> , <a href="#">M3b</a> , <a href="#">M3g</a> , <a href="#">M3h</a> , <a href="#">M3i</a> , <a href="#">M3m</a> , <a href="#">T3</a> , <a href="#">T7</a> , <a href="#">T8</a> , <a href="#">T17</a> , <a href="#">T22</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a> , <a href="#">T32</a>
<ul style="list-style-type: none"> <li>Parent/Child hierarchy</li> </ul>	<a href="#">S1a</a> , <a href="#">M3a</a> , <a href="#">M3b</a> , <a href="#">M3h</a> , <a href="#">T8</a> , <a href="#">T17</a> , <a href="#">T22</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a> , <a href="#">T32</a>
<ul style="list-style-type: none"> <li>Introduce HI Solver</li> </ul>	<a href="#">S1a</a> , <a href="#">S1b</a> , <a href="#">S1e</a> , <a href="#">S3d</a> , <a href="#">S6b</a> , <a href="#">M3a</a> , <a href="#">M3b</a> , <a href="#">M3h</a> , <a href="#">M3m</a> , <a href="#">T3</a> , <a href="#">T7</a> , <a href="#">T8</a> , <a href="#">T17</a> , <a href="#">T22</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a> , <a href="#">T32</a>
<ul style="list-style-type: none"> <li>Use Helpers</li> </ul>	<a href="#">S1a</a> , <a href="#">M3a</a> , <a href="#">M3b</a> , <a href="#">M3h</a> , <a href="#">M3m</a> , <a href="#">T3</a> , <a href="#">T7</a> , <a href="#">T8</a> , <a href="#">T17</a> , <a href="#">T22</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a> , <a href="#">T32</a>
<b>3.11. Physical Dynamics</b>	
<ul style="list-style-type: none"> <li>Define Dynamics and its purpose.</li> </ul>	<a href="#">S1a</a> , <a href="#">S1b</a> , <a href="#">S1e</a> , <a href="#">S3d</a> , <a href="#">S6b</a> , <a href="#">M1i</a> , <a href="#">M3a</a> , <a href="#">M3b</a> , <a href="#">M3g</a> , <a href="#">M3h</a> , <a href="#">M3i</a> , <a href="#">M3j</a> , <a href="#">M3m</a> , <a href="#">M4a</a> , <a href="#">T3</a> , <a href="#">T8</a> , <a href="#">T17</a> , <a href="#">T22</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a> , <a href="#">T31</a> , <a href="#">T32</a> , <a href="#">T33</a> , <a href="#">T34</a>
<ul style="list-style-type: none"> <li>Discuss Dynamics solutions</li> </ul>	<a href="#">S1a</a> , <a href="#">S1b</a> , <a href="#">S1e</a> , <a href="#">S3d</a> , <a href="#">S6b</a> , <a href="#">M1i</a> , <a href="#">M3a</a> , <a href="#">M3b</a> , <a href="#">M3e</a> , <a href="#">M3f</a> , <a href="#">M3g</a> , <a href="#">M3h</a> , <a href="#">M3m</a> , <a href="#">M4a</a> , <a href="#">T3</a> , <a href="#">T8</a> , <a href="#">T17</a> , <a href="#">T22</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a> , <a href="#">T31</a> , <a href="#">T32</a> , <a href="#">T33</a> , <a href="#">T34</a>
<b>3.12. Scripting</b>	
<ul style="list-style-type: none"> <li>Define scripting</li> </ul>	<a href="#">T3</a> , <a href="#">T8</a> , <a href="#">T17</a> , <a href="#">T22</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a> , <a href="#">T32</a>
<ul style="list-style-type: none"> <li>Open a script</li> </ul>	<a href="#">S1a</a> , <a href="#">L6</a> , <a href="#">L12</a> , <a href="#">T3</a> , <a href="#">T8</a> , <a href="#">T17</a> , <a href="#">T22</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a> , <a href="#">T32</a>
<ul style="list-style-type: none"> <li>Scripts in different forms</li> </ul>	<a href="#">S1a</a> , <a href="#">T3</a> , <a href="#">T8</a> , <a href="#">T17</a> , <a href="#">T22</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a> , <a href="#">T32</a>
<ul style="list-style-type: none"> <li>Macro recording</li> </ul>	<a href="#">T3</a> , <a href="#">T8</a> , <a href="#">T17</a> , <a href="#">T22</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a> , <a href="#">T32</a>
<b>3.13. Scene Assembly (basic composition)</b>	
<ul style="list-style-type: none"> <li>Culmination of the elements into a completed scene</li> </ul>	<a href="#">S1a</a> , <a href="#">T8</a> , <a href="#">T17</a> , <a href="#">T22</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a> , <a href="#">T32</a>
<ul style="list-style-type: none"> <li>Asset Browser</li> </ul>	<a href="#">S1a</a> , <a href="#">L7</a> , <a href="#">L12</a> , <a href="#">T8</a> , <a href="#">T17</a> , <a href="#">T22</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a> , <a href="#">T32</a>
<ul style="list-style-type: none"> <li>Merge</li> </ul>	<a href="#">S1a</a> , <a href="#">T8</a> , <a href="#">T17</a> , <a href="#">T22</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a> , <a href="#">T32</a>
<ul style="list-style-type: none"> <li>Replace</li> </ul>	<a href="#">S1a</a> , <a href="#">M3e</a> , <a href="#">T8</a> , <a href="#">T17</a> , <a href="#">T22</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a> , <a href="#">T32</a>
<ul style="list-style-type: none"> <li>Save Selected</li> </ul>	<a href="#">S1a</a> , <a href="#">T8</a> , <a href="#">T17</a> , <a href="#">T22</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a> , <a href="#">T32</a>
<ul style="list-style-type: none"> <li>File &gt; Archive</li> </ul>	<a href="#">S1a</a> , <a href="#">T8</a> , <a href="#">T17</a> , <a href="#">T22</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a> , <a href="#">T32</a>
<ul style="list-style-type: none"> <li>Rename Objects tool</li> </ul>	<a href="#">S1a</a> , <a href="#">T8</a> , <a href="#">T17</a> , <a href="#">T22</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a> , <a href="#">T32</a>
<ul style="list-style-type: none"> <li>Color Clipboard</li> </ul>	<a href="#">S1a</a> , <a href="#">T8</a> , <a href="#">T17</a> , <a href="#">T22</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a> , <a href="#">T32</a>
<ul style="list-style-type: none"> <li>Rendering Options</li> </ul>	<a href="#">S1a</a> , <a href="#">T8</a> , <a href="#">T17</a> , <a href="#">T22</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a> , <a href="#">T32</a>

• Environment background	<a href="#">S1a</a> , <a href="#">T8</a> , <a href="#">T17</a> , <a href="#">T22</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a> , <a href="#">T32</a>
• Viewport background	<a href="#">S1a</a> , <a href="#">T8</a> , <a href="#">T17</a> , <a href="#">T22</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a> , <a href="#">T32</a>
• Shadow, Reflection, and Filter Options	<a href="#">S1a</a> , <a href="#">S1b</a> , <a href="#">T8</a> , <a href="#">T17</a> , <a href="#">T22</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a> , <a href="#">T32</a>
• Preview	<a href="#">S1a</a> , <a href="#">L4</a> , <a href="#">L12</a> , <a href="#">M1e</a> , <a href="#">M4a</a> , <a href="#">T8</a> , <a href="#">T17</a> , <a href="#">T22</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a> , <a href="#">T32</a>
• Final render	<a href="#">S1a</a> , <a href="#">L4</a> , <a href="#">L12</a> , <a href="#">M1e</a> , <a href="#">M4a</a> , <a href="#">T8</a> , <a href="#">T17</a> , <a href="#">T22</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a> , <a href="#">T31</a> , <a href="#">T32</a> , <a href="#">T34</a>
• File Output type; Compression and quality	<a href="#">S1a</a> , <a href="#">M1e</a> , <a href="#">T3</a> , <a href="#">T8</a> , <a href="#">T17</a> , <a href="#">T22</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a> , <a href="#">T32</a>

<b>4. Additional Academic Topics</b>	
4.1. Methods of presenting information	<a href="#">S2a</a> , <a href="#">S5a</a> , <a href="#">S5f</a> , <a href="#">S6b</a> , <a href="#">S7f</a> , <a href="#">S8a</a> , <a href="#">S8b</a> , <a href="#">L3</a> , <a href="#">L4</a> , <a href="#">L5</a> , <a href="#">L6</a> , <a href="#">L7</a> , <a href="#">L8</a> , <a href="#">L12</a> , <a href="#">T3</a> , <a href="#">T8</a> , <a href="#">T17</a> , <a href="#">T22</a> , <a href="#">T23</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a> , <a href="#">T28</a> , <a href="#">T29</a> , <a href="#">T31</a> , <a href="#">T32</a> , <a href="#">T33</a> , <a href="#">T34</a>
4.2. Preparation for presenting	<a href="#">S2a</a> , <a href="#">S5a</a> , <a href="#">S5f</a> , <a href="#">S6b</a> , <a href="#">S7f</a> , <a href="#">S8a</a> , <a href="#">S8b</a> , <a href="#">L3</a> , <a href="#">L4</a> , <a href="#">L5</a> , <a href="#">L6</a> , <a href="#">L7</a> , <a href="#">L8</a> , <a href="#">L12</a> , <a href="#">T3</a> , <a href="#">T8</a> , <a href="#">T17</a> , <a href="#">T22</a> , <a href="#">T23</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a> , <a href="#">T28</a> , <a href="#">T29</a> , <a href="#">T31</a> , <a href="#">T32</a> , <a href="#">T33</a> , <a href="#">T34</a>
4.3. Text Annotation in 3D	<a href="#">S2a</a> , <a href="#">S5a</a> , <a href="#">S5f</a> , <a href="#">S6b</a> , <a href="#">S7f</a> , <a href="#">S8a</a> , <a href="#">S8b</a> , <a href="#">M1i</a> , <a href="#">M3a</a> , <a href="#">M3b</a> , <a href="#">M3e</a> , <a href="#">M3f</a> , <a href="#">M3g</a> , <a href="#">M3h</a> , <a href="#">M3i</a> , <a href="#">M3j</a> , <a href="#">M3m</a> , <a href="#">M4a</a> , <a href="#">L3</a> , <a href="#">L4</a> , <a href="#">L5</a> , <a href="#">L6</a> , <a href="#">L7</a> , <a href="#">L8</a> , <a href="#">L12</a> , <a href="#">T3</a> , <a href="#">T8</a> , <a href="#">T17</a> , <a href="#">T22</a> , <a href="#">T23</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a> , <a href="#">T28</a> , <a href="#">T29</a> , <a href="#">T31</a> , <a href="#">T32</a> , <a href="#">T33</a> , <a href="#">T34</a>
4.4. Complete and make presentation	<a href="#">S2a</a> , <a href="#">S5a</a> , <a href="#">S5f</a> , <a href="#">S6b</a> , <a href="#">S7f</a> , <a href="#">S8a</a> , <a href="#">S8b</a> , <a href="#">M1e</a> , <a href="#">M1i</a> , <a href="#">M4a</a> , <a href="#">M5c</a> , <a href="#">L3</a> , <a href="#">L4</a> , <a href="#">L5</a> , <a href="#">L6</a> , <a href="#">L7</a> , <a href="#">L8</a> , <a href="#">L12</a> , <a href="#">T3</a> , <a href="#">T8</a> , <a href="#">T17</a> , <a href="#">T22</a> , <a href="#">T23</a> , <a href="#">T24</a> , <a href="#">T25</a> , <a href="#">T26</a> , <a href="#">T27</a> , <a href="#">T28</a> , <a href="#">T29</a> , <a href="#">T31</a> , <a href="#">T32</a> , <a href="#">T33</a> , <a href="#">T34</a>

\_ **Appendix A - Tables of Academic Standards**

† Note: marked standards are addressed in the Animation Academy.

\_ † **Science Content Standards from NCSESA Grades: 9 – 12**  
**National Council for Science Education Standards Assessment**

\_ **S1 † UNIFYING CONCEPTS AND PROCESSES**

- a) † Systems, order and organization
- b) † Evidence, models, and explanation
- c) † Change, constancy and explanation
- d) Evolution and equilibrium
- e) † Form and Function

\_ **S2 † SCIENCE AS INQUIRY**

In the vision presented by the *Standards*, inquiry is a step beyond "science as a process," in which students learn skills, such as observation, inference, and experimentation. The new vision includes the "processes of science" and requires that students combine processes and scientific knowledge as they use scientific reasoning and critical thinking to develop their understanding of science. Engaging students in inquiry helps students develop

- a) † Abilities necessary to do scientific inquiry
- b) Understanding and applying scientific method

\_ **S3 † PHYSICAL SCIENCES**

The standards for physical science, life science, and earth and space science describe the subject matter of science using three widely accepted divisions of the domain of science. Science subject matter focuses on the science facts, concepts, principles, theories, and models that are important for all students to know, understand, and use.

- a) Structure of atoms
- b) † Structure and properties of matter
- c) Chemical reactions
- d) † Motions and forces
- e) Conservation of energy and increase in disorder
- f) Interactions of energy and matter

\_ **S4 † LIFE SCIENCES**

- a) The cell
- b) Molecular basis of heredity
- c) Biological evolution
- d) Interdependence of organisms
- e) † Matter, energy, and organization in living systems
- f) Behavior of organisms.

\_ **S5 † EARTH AND SPACE SCIENCES**

- a) † Energy in the earth system
- b) Origin and evolution of the earth system
- c) † Meteorology
- d) Geochemical cycles
- e) Origin and evolution of the universe.
- f) † Astronomy

\_ **S6 † SCIENCE AND TECHNOLOGY**

The science and technology standards establish connections between the natural and designed worlds and provide students with opportunities to develop decision-making abilities. They are not standards for technology education; rather, these standards emphasize abilities associated with the process of design and fundamental understandings about the enterprise of science and its various linkages with technology.

- a) Characteristics of technological design
- b) † Understanding relationship between science and technology

### \_ S7 †SCIENCE AND SOCIETAL CHALLENGES

An important purpose of science education is to give students a means to understand and act on personal and social issues. The science in personal and social perspectives standards help students develop decision-making skills.

- a) Personal and community health
- b) Population growth
- c) Natural resources
- d) Environmental quality
- e) Natural and human-induced hazards
- f) †Science and technology in local, national, and global challenges.

### \_ S8 †HISTORY AND ENTERPRISE OF SCIENCE

In learning science, students need to understand that science reflects its history and is an ongoing, changing enterprise. The standards for the history and nature of science recommend the use of history in school science programs to clarify different aspects of scientific inquiry, the human aspects of science, and the role that science has played in the development of various cultures.

- a) †Science as a human endeavor
- b) †Nature of scientific knowledge
- c) Historical perspectives

## \_ †Math Standards from NCTM Grades: 9 – 12 National Council of Teachers of Mathematics

### M1 †Number and Operations

\_ †Understand numbers, ways of representing numbers, relationships among numbers, and number systems.

- a) †develop a deeper understanding of very large and very small numbers and of various representations of them;
- b) compare and contrast the properties of numbers and number systems, including the rational and real numbers, and understand complex numbers as solutions to quadratic equations that do not have real solutions;
- c) understand vectors and matrices as systems that have some of the properties of the real-number system;
- d) use number-theory arguments to justify relationships involving whole numbers.

\_ †Understand meanings of operations and how they relate to one another.

- e) †judge the effects of such operations as multiplication, division, and computing powers and roots on the magnitudes of quantities;
- f) develop an understanding of properties of, and representations for, the addition and multiplication of vectors and matrices;
- g) develop an understanding of permutations and combinations as counting techniques.

\_ †Compute fluently and make reasonable estimates.

- h) †develop fluency in operations with real numbers, vectors, and matrices, using mental computation or paper-and-pencil calculations for simple cases and technology for more-complicated cases.
- i) †judge the reasonableness of numerical computations and their results.

### M2 †Algebra Standard

\_ †Understand patterns, relations, and functions.

- a) generalize patterns using explicitly defined and recursively defined functions;
- b) understand relations and functions and select, convert flexibly among, and use various representations for them;
- c) analyze functions of one variable by investigating rates of change, intercepts, zeros, asymptotes, and local and global behavior;
- d) understand and perform transformations such as arithmetically combining, composing, and inverting commonly used functions, using technology to perform such operations on more-complicated symbolic expressions;
- e) understand and compare the properties of classes of functions, including exponential, polynomial, rational, logarithmic, and periodic functions;
- f) †interpret representations of functions of two variables

- <sup>†</sup>Represent and analyze mathematical situations and structures using algebraic symbols.
  - g) understand the meaning of equivalent forms of expressions, equations, inequalities, and relations;
  - h) write equivalent forms of equations, inequalities, and systems of equations and solve them with fluency—mentally or with paper and pencil in simple cases and using technology in all cases;
  - i) use symbolic algebra to represent and explain mathematical relationships;
  - j) use a variety of symbolic representations, including recursive and parametric equations, for functions and relations;
  - k) <sup>†</sup>judge the meaning, utility, and reasonableness of the results of symbol manipulations, including those carried out by technology.
  
- Use mathematical models to represent and understand quantitative relationships.
  - l) identify essential quantitative relationships in a situation and determine the class or classes of functions that might model the relationships;
  - m) use symbolic expressions, including iterative and recursive forms, to represent relationships arising from various contexts;
  - n) draw reasonable conclusions about a situation being modeled.
  
- <sup>†</sup>Analyze change in various contexts.
  - o) <sup>†</sup>approximate and interpret rates of change from graphical and numerical data.

### M3 <sup>†</sup>Geometry Standard

- <sup>†</sup>Analyze characteristics and properties of two and three dimensional geometric shapes and develop mathematical arguments about geometric relationships.
  - a) <sup>†</sup>analyze properties and determine attributes of two- and three-dimensional objects;
  - b) <sup>†</sup>explore relationships (including congruence and similarity) among classes of two- and three-dimensional geometric objects, make and test conjectures about them, and solve problems involving them;
  - c) establish the validity of geometric conjectures using deduction, prove theorems, and critique arguments made by others;
  - d) use trigonometric relationships to determine lengths and angle measures.
  
- <sup>†</sup>Specify locations and describe spatial relationships using coordinate geometry and other representational systems.
  - e) <sup>†</sup>use Cartesian coordinates and other coordinate systems, such as navigational, polar, or spherical systems, to analyze geometric situations;
  - f) <sup>†</sup>investigate conjectures and solve problems involving two- and three-dimensional objects represented with Cartesian coordinates.
  
- <sup>†</sup>Apply transformations and use symmetry to analyze mathematical situations.
  - g) <sup>†</sup>understand and represent translations, reflections, rotations, and dilations of objects in the plane by using sketches, coordinates, vectors, function notation, and matrices;
  - h) <sup>†</sup>use various representations to help understand the effects of simple transformations and their compositions.
  
- <sup>†</sup>Use visualization, spatial reasoning, and geometric modeling to solve problems.
  - i) <sup>†</sup>draw and construct representations of two- and three-dimensional geometric objects using a variety of tools;
  - j) <sup>†</sup>visualize three-dimensional objects and spaces from different perspectives and analyze their cross sections;
  - k) use vertex-edge graphs to model and solve problems;
  - l) use geometric models to gain insights into, and answer questions in, other areas of mathematics;
  - m) <sup>†</sup>use geometric ideas to solve problems in, and gain insights into, other disciplines and other areas of interest such as art and architecture.

### M4 <sup>†</sup>Measurement Standard

- <sup>†</sup>Understand measurable attributes of objects and the units, systems, and processes of measurement.
  - a) <sup>†</sup>make decisions about units and scales that are appropriate for problem situations involving measurement.
  
- Apply appropriate techniques, tools, and formulas to determine measurements.
  - b) analyze precision, accuracy, and approximate error in measurement situations;

- c) understand and use formulas for the area, surface area, and volume of geometric figures, including cones, spheres, and cylinders;
- d) apply informal concepts of successive approximation, upper and lower bounds, and limit in measurement situations;
- e) use unit analysis to check measurement computations.

### **M5 †Data Analysis and Probability Standard**

\_ †Formulate questions that can be addressed with data and collect, organize, and display relevant data to answer them.

- a) understand the differences among various kinds of studies and which types of inferences can legitimately be drawn from each;
- b) know the characteristics of well-designed studies, including the role of randomization in surveys and experiments;
- c) †understand the meaning of measurement data and categorical data, of univariate and bivariate data, and of the term variable;
- d) understand histograms, parallel box plots, and scatterplots and use them to display data;
- e) compute basic statistics and understand the distinction between a statistic and a parameter.

\_ Select and use appropriate statistical methods to analyze data

- f) for univariate measurement data, be able to display the distribution, describe its shape, and select and calculate summary statistics;
- g) for bivariate measurement data, be able to display a scatterplot, describe its shape, and determine regression coefficients, regression equations, and correlation coefficients using technological tools;
- h) display and discuss bivariate data where at least one variable is categorical;
- i) recognize how linear transformations of univariate data affect shape, center, and spread;
- j) identify trends in bivariate data and find functions that model the data or transform the data so that they can be modeled.

\_ Develop and evaluate inferences and predictions that are based on data

- k) use simulations to explore the variability of sample statistics from a known population and to construct sampling distributions;
- l) understand how sample statistics reflect the values of population parameters and use sampling distributions as the basis for informal inference;
- m) evaluate published reports that are based on data by examining the design of the study, the appropriateness of the data analysis, and the validity of conclusions;
- n) understand how basic statistical techniques are used to monitor process characteristics in the workplace.

\_ Understand and apply basic concepts of probability

- o) understand the concepts of sample space and probability distribution and construct sample spaces and distributions in simple cases;
- p) use simulations to construct empirical probability distributions;
- q) compute and interpret the expected value of random variables in simple cases;
- r) understand the concepts of conditional probability and independent events;
- s) understand how to compute the probability of a compound event.

### **†Language Arts Standards from NCTE Grades: 9 – 12 National Council of Teachers of English**

#### **\_ L1 Reading for Perspective**

Students read a wide range of print and non-print texts to build an understanding of texts, of themselves, and of the cultures of the United States and the world; to acquire new information; to respond to the needs and demands of society and the workplace; and for personal fulfillment. Among these texts are fiction and nonfiction, classic and contemporary works.

#### **\_ L2 Understanding the Human Experience**

Students read a wide range of literature from many periods in many genres to build an understanding of the many dimensions (e.g., philosophical, ethical, aesthetic) of human experience.

#### **\_ L3 †Evaluation Strategies**

Students apply a wide range of strategies to comprehend, interpret, evaluate, and appreciate texts. They draw on their prior experience, their interactions with other readers and writers, their knowledge of word meaning and of other texts, their word identification strategies, and their understanding of textual features (e.g., sound-letter correspondence, sentence structure, context, graphics).

– **L4<sup>†</sup> Communication Skills**

Students adjust their use of spoken, written, and visual language (e.g., conventions, style, vocabulary) to communicate effectively with a variety of audiences and for different purposes.

– **L5<sup>†</sup> Communication Strategies**

Students employ a wide range of strategies as they write and use different writing process elements appropriately to communicate with different audiences for a variety of purposes.

– **L6<sup>†</sup> Applying Knowledge**

Students apply knowledge of language structure, language conventions (e.g., spelling and punctuation), media techniques, figurative language, and genre to create, critique, and discuss print and non-print texts.

– **L7<sup>†</sup> Evaluating Data**

Students conduct research on issues and interests by generating ideas and questions, and by posing problems. They gather, evaluate, and synthesize data from a variety of sources (e.g., print and non-print texts, artifacts, people) to communicate their discoveries in ways that suit their purpose and audience.

– **L8<sup>†</sup> Developing Research Skills**

Students use a variety of technological and information resources (e.g., libraries, databases, computer networks, video) to gather and synthesize information and to create and communicate knowledge.

– **L9 Multicultural Understanding**

Students develop an understanding of and respect for diversity in language use, patterns, and dialects across cultures, ethnic groups, geographic regions, and social roles.

– **L10 Applying Non-English Perspectives**

Students whose first language is not English make use of their first language to develop competency in the English language arts and to develop understanding of content across the curriculum.

– **L11 Participating in Society**

Students participate as knowledgeable, reflective, creative, and critical members of a variety of literacy communities.

– **L12<sup>†</sup> Applying Language Skills**

Students use spoken, written, and visual language to accomplish their own purposes (e.g., for learning, enjoyment, persuasion, and the exchange of information).

– **<sup>†</sup>Technology Standards from ITEA\* Grades: 9 - 12**  
**International Technical Educators Association**

*\*Note: The ITEA standards address technology concepts. They are numbered 1-20. We've included additional standards which address applied technology and related psycho-motor skills which we gathered from various state standards. These additions are numbered 21-34.*

– **<sup>†</sup>The Nature of Technology**

1. <sup>†</sup>Develop an understanding of the characteristics and scope of technology.
2. Develop an understanding of the core concepts of technology.
3. <sup>†</sup>Develop an understanding of the relationships among technologies and the connections between technology and other fields of study.

– **<sup>†</sup>Technology and Society**

4. Develop an understanding of the cultural, social, economic, and political effects of technology.
5. Develop an understanding of the effects of technology on the environment.
6. Develop an understanding of the role of society in the development and use of technology.
7. <sup>†</sup>Develop an understanding of the influence of technology on history.

– †**Design**

8. † Develop an understanding of the attributes of design.
9. Develop an understanding of engineering design.
10. Develop an understanding of the role of troubleshooting, research and development, invention and innovation, and experimentation in problem solving.

– **Abilities for a Technological World**

11. Develop abilities to apply the design process.
12. Develop abilities to use and maintain technological products and systems.
13. Develop abilities to assess the impact of products and systems.

– †**The Designed World**

14. Develop an understanding of and be able to select and use medical technologies.
15. Develop an understanding of and be able to select and use agricultural and related biotechnologies.
16. Develop an understanding of and be able to select and use energy and power technologies.
17. † Develop an understanding of and be able to select and use information and communication technologies.
18. Develop an understanding of and be able to select and use transportation technologies.
19. Develop an understanding of and be able to select and use manufacturing technologies.
20. Develop an understanding of and be able to select and use construction technologies.

– †**Basic Technology Operations\***

21. † Demonstrate a sound understanding of the nature and operation of technology systems.
22. † Understanding and demonstrating modeling, scenarios.
23. † Show proficiency in the use of technology.

– †**Technology Productivity Tools\***

24. † Use technology tools to enhance learning, increase productivity, and promote creativity.
25. † Use productivity tools to collaborate in constructing technology-enhanced models, prepare publications, and produce other creative works.
26. † Practice responsible use of technology systems, information, and software.
27. † Develop positive attitudes toward technology uses that support lifelong learning, collaboration, personal pursuits, and productivity.

– †**Technology Communication Tools\***

28. † Use telecommunications to collaborate, publish, and interact with peers, experts, and other audiences.
29. † Use a variety of media and formats to communicate information and ideas effectively to multiple audiences.

– †**Technology Research Tools\***

30. † Use technology to locate, evaluate, and collect information from a variety of sources.
31. Use technology tools to process data and report results.
32. † Evaluate and select new information resources and technological innovations based on the appropriateness for specific tasks.

– †**Technology Problem-Solving and Decision-Making Tools\***

33. † Use technology resources for solving problems and making informed decisions.
34. † Employ technology in the development of strategies for solving problems in the real world.