3-D Visualization and Animation Blueprint

This Blueprint contains the subject matter content of this Skill Connect Assessment. This Blueprint does NOT contain the information one would need to fully prepare for a SkillsUSA Championships contest. Please refer to the SkillsUSA Championships Technical Standards CD-ROM for the current year or purchase and download the relevant “Contest Singles.” Both are available through www.skillsusa.org > Shop > Educational Materials Catalog.

Standards and Competencies
Competencies are weighted throughout the assessment. The percent shown is the weight of the competency. There are 50 questions per assessment.

Concept & Design
- Identify pre-visualization and/or conceptual design techniques to tell a story
- Identify the importance of storyboards/animatic for an animated sequence
- Focus on the elements and the principles of design for a 3d animated short

Project Management
- Demonstrate proper object naming
- Demonstrate how to add objects in layers
- Demonstrate how to save files
- Demonstrate how to backup files
- Demonstrate how to set a project folder
- Demonstrate how to set undo levels
- Demonstrate how to group objects
- Create a selection set
- Understand how to work in a team

3D Modeling
- Edit splines/2D curves to create 3D models viewport shading modes
- Use Extrude, Loft and Revolve/Lathe commands to make a 3D geometry from 2D shapes
- Demonstrate knowledge of pivot points in creating 3D models from 2D shapes
- Demonstrate knowledge of how to set up units for scene creation
- Model from the world origin
- Use the Bend, Taper, Twist and Lattice functions to modify 3D geometry
- Utilize the Extrude command for polygonal modeling
- Utilize the Bridge command for polygonal modeling
- Maintain a good edge loop workflow whole modeling
- Weld and merge vertices and edges
- Demonstrate knowledge of beveling or chamfering edges
- Demonstrate knowledge of Quads vs Tris
- Demonstrate knowledge of mirroring geometry
- Demonstrate knowledge of smoothing geometry
- Demonstrate knowledge of transforms
Lighting your scene
- Utilize different light types in the scene
- Demonstrate understanding of basic color theory
- Utilize three point lighting
- Apply standard light theory
- Demonstrate ability to light only certain objects in your scene
- Apply light intensity to a scene
- Demonstrate understanding of light color
- Demonstrate understanding of shadows

Placing Cameras in your scene
- Demonstrate knowledge of camera angles—Close up, Extreme close up, Medium closeup, Establishing shot
- Demonstrate knowledge of the Rule of Thirds
- Demonstrate knowledge of focal length
- Demonstrate knowledge of safe Frames
- Utilize background images within camera placement
- Demonstrate knowledge of clip planes
- Demonstrate knowledge of depth of field

Texturing
- Demonstrate knowledge of the importance of mapping
- Utilize 2D and 3D procedural textures
- Utilize bitmaps as your textures
- Demonstrate the importance of alpha channels in maps
- Demonstrate knowledge of different shaders such as Blinn, Phong, and Anisotropic
- Demonstrate knowledge of transparency and opacity
- Utilize the specular feature
- Utilize the ambient feature
- Utilize the diffuse feature
- Utilize the reflections feature
- Utilize the raytrace feature

Animation
- Understand how to set keyframes with autokey and set key
- Demonstrate how to animate on a path
- Understand the importance of the Curve/Graph Editor for animation
- Understand the importance of the Dope Sheet in manipulating keyframes
- Demonstrate knowledge of Frames Per Second (fps)
- Demonstrate knowledge of object hierarchy with linking and parenting
- Utilize playback controls
- Demonstrate how to preview an animation
- Demonstrate how to copy and paste keyframes
- Understand the importance of Safe Frames in animation
- Utilize safe frames
- Demonstrate knowledge of animation principles and animation states
Rendering

- Render files into an .avi or a .mov format
- Correctly render still images
- Apply proper render resolution to files
- Utilize motion blur
- Utilize antialiasing

Effects

- Utilize the glow effect
- Utilize the fire effect
- Utilize the smoke effect
- Utilize the fog effect

Committee Identified Academic Skills

The SkillsUSA national technical committee has identified that the following academic skills are embedded in the 3-D visualization and animation training program and assessment:

Math Skills

- Use fractions to solve practical problems
- Use proportions and ratios to solve practical problems
- Solve practical problems involving percentages
- Measure angles
- Apply transformations (rotate or turn, reflect or flip, translate or slide and dilate or scale) to geometric figures
- Construct three-dimensional models
- Solve problems involving symmetry and transformation

Science Skills

- Use knowledge of physical properties (shape, density, solubility, odor, melting point, boiling point, color)
- Use knowledge of the nature and technological applications of light
- Use knowledge of speed, velocity and acceleration

Language Arts Skills

- Provide information in conversations and in group discussions
- Provide information in oral presentations
- Demonstrate use of verbal communication skills: word choice, pitch, feeling, tone and voice
- Demonstrate comprehension of a variety of informational texts
- Organize and synthesize information for use in written and oral presentations
- Demonstrate knowledge of appropriate reference materials
- Demonstrate narrative writing

Connections to National Standards

State-level academic curriculum specialists identified the following connections to national academic standards.

Math Standards

- Geometry
- Measurement
• Problem solving
• Communication
• Connections
• Representation


Science Standards
• Understands forces and motion
• Understands the nature of scientific inquiry

Source: McREL compendium of national science standards. To view and search the compendium, visit: www.mcrel.org/standards-benchmarks/.

Language Arts Standards
• 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
• 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
• Students participate as knowledgeable, reflective, creative and critical members of a variety of literacy communities
• Students use spoken, written and visual language to accomplish their own purposes (e.g., for learning, enjoyment, persuasion and the exchange of information)

Source: IRA/NCTE Standards for the English Language Arts. To view the standards, visit: www.readwritethink.org/standards/index.html.