

## 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](http://www.skillsusa.org) > Shop > Educational Materials Catalog.

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### Standards and Competencies

#### Solve a problem or tell a story in a two-dimensional format

- Identify pre-visualization and/or conceptual design techniques
- Identify the importance of storyboarding for an animated sequence
- Define how a problem will be solved or how a story will be told without the benefit of support materials
- Describe the concept with enough artistic depth visually and verbally to allow the viewer to accurately visualize the final 3-D output

#### Model a computer generated object

- Scene navigation and management
- Use of appropriate naming techniques for objects
- Use of pivots, construction planes and transforms
- Create three-dimensional objects using 2D spline modeling
- Combine 2D and 3D objects using compound creation tools
- Create three-dimensional objects using geometry modeling modifiers
- Create & utilize AEC extended objects

#### Design a three-dimensional set/scene

- Determine & utilize appropriate lighting methods
- Apply direct, photometric, and mental ray lighting to a set/scene
- Utilize shadowing methods
- Assign scene materials
- Navigating the material editor
- Select a material type
- Select material shaders
- Utilize bit maps and procedural maps
- Utilize UVW mapping and channels
- Utilize alpha channels in maps
- Create cameras, with or without motion attached, to properly view a scene
- Utilize cameras on paths
- Control the interpolation of splines used for camera path controllers
- Create the final rendered output of a high quality scene to a still image or animation using appropriate rendering technology
- Configuring mental ray settings
- Select proper exposure controls to work with mental ray

#### Create an animated sequence

- Setting key controls
- Create a motion path & utilize path constraints
- Set up a range of frames
- Controlling multiple object parameters through wiring techniques
- Utilize track view & dope sheets
- Simulate motion with Reactor
- Linking objects

**Demonstrate originality and creativity in telling the story**

- Create a final product that emotionally impacts the viewer
- Select aesthetically pleasing elements
- Select elements that will evoke an appropriate emotional response from the viewer

**Demonstrate the ability to collaborate in a team environment**

- Cooperate with others to achieve the solution to a problem or convey a story
- Demonstrate consensus-building skills
- Apply verbal and visual communication skills to convey ideas between team members and to a client
- Determining and utilizing file formats and layer management

**Demonstrate the ability to assess and improve a project**

- Using material override with mental ray to check lighting
- Using the light listertool to check light values
- Turning on object properties to view trajectories
- Refine exposure control values
- Find missing bitmaps

**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

**Source:** NCTM Principles and Standards for School Mathematics. To view high school standards, visit: [standards.nctm.org/document/chapter7/index.htm](http://standards.nctm.org/document/chapter7/index.htm). Select “Standards” from menu.

#### **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/](http://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](http://www.readwritethink.org/standards/index.html).