

# 3-D VISUALIZATION AND ANIMATION



## PURPOSE

To evaluate each contestant's preparation for employment and to recognize outstanding students for excellence and professionalism in the field of 3-D visualization and animation.

First, download and review the General Regulations at: [updates.skillsusa.org](http://updates.skillsusa.org).

## ELIGIBILITY

Open to a team of two active SkillsUSA members enrolled in programs using 3-D imaging and animation as an occupational objective.

## CLOTHING REQUIREMENT

### Class E: Contest specific — Business Casual

- Official SkillsUSA white polo shirt
- Black dress slacks (accompanied by black dress socks or black or skin-tone seamless hose) or black dress skirt (knee-length, accompanied by black or skin-tone seamless hose)
- Black leather closed-toe dress shoes

These regulations refer to clothing items that are pictured and described at: [www.skillsusastore.org](http://www.skillsusastore.org). If you have questions about clothing or other logo items, call 800-401-1560 or 703-956-3723.

**Note:** Contestants must wear their official contest clothing to the contest orientation meeting.

## EQUIPMENT AND MATERIALS

1. Supplied by the technical committee:
  - a. Space for practical development including table space for two personal computers and two chairs
  - b. 110-volt power outlet  
Three 24"x36" sheets for concept art and storyboard layout

- c. 64 GB USB3 drives to be available for contest practical submissions.
2. Supplied by the contestants:
    - a. Two complete graphics work stations including personal computers, monitors and input devices. Contestants may use any brand or type of personal computer from any source (a hometown computer dealer may be willing to serve as a team sponsor). Software must be preloaded and configured. Contestants should test the system carefully prior to the competition. Limited technical assistance will be available at setup and on contest day. The computer hardware must meet or exceed the minimum recommended system requirements from the manufacturer of the software of choice. We strongly recommend that the minimum requirements are exceeded, and recommended configurations are used whenever possible. For example, Autodesk's 3ds Max requirements can be found at this link: <http://tinyurl.com/3ds-MAX-requirements-SkillsUSA>
    - b. Contestants may bring the software of their choice. Software package(s) must be capable of producing both 2-D and 3-D renderings and animations. **Note:** Proof of licensing for software programs installed on the contestants' computers must be provided to the technical committee at the pre-contest meeting.
    - c. Two 6' multiple-outlet surge protectors
    - d. Paper and art supplies for storyboard development to include colored pencils, two 11"x17" tablets, chalk, glue stick, charcoal and regular pencils. These supplies are subject to approval of the technical committee.
    - e. Contestants may bring published reference books and software manuals. Reference materials may not take up more than 1/2 cubic foot of space per team member (total of 1 cubic foot).
    - f. All competitors must create a one-page résumé and submit a hard copy to the technical committee chair at

orientation. Failure to do so will result in a 10-point penalty.

**Note:** Your contest may also require a hard copy of your résumé as part of the actual contest. Check the Contest Guidelines and/or the updates page on the SkillsUSA website at [updates.skillsusa.org](http://updates.skillsusa.org).

## SCOPE OF THE CONTEST

The contest is defined by industry standards as set by the current technical standards within the industry. The contest is a two-person team event and tests technical knowledge, production skills, creative/artistic abilities and storyboarding.

### Knowledge Performance

The contest will include a written exam assessing technical knowledge, production skills and creative/artistic abilities.

### Skill Performance

The contest is a two-person event assessing the ability of the team to produce high-quality images and an animated short subject using 3-D computerized images. A practical visual design problem will be given, the scope of which should be viable within the seven-hour practical competition period. The problem will consist of a topic to communicate, its context and target audience, a rough script to follow, and an emotion or graphical effect that should be illuminated in the still and animated output.

### Contest Guidelines

1. Preparation of the animation must include the development of a storyboard. However, in the real world the final output is of paramount importance and the storyboard only a means to that end. So, the storyboarding process will be used to judge contestants on:
  - a. Teamwork skills
  - b. Ability to creatively reach consensus on a design solution
  - c. Ability to organize their efforts
  - d. Ability to verbally and visually express ideas between team members and to the client (in this case, the judges)

2. Three to five still images from varied scenes and perspectives must be rendered with and without wireframe in 1080p resolution (1920x1080 pixels) and true color (24, 32 or 64 bits per pixel) and submitted to the judges' station on the supplied USB drive at the completion of the practical competition. Still images must be output to either: TIF(F), TGA, PNG or JPG. These images should clearly show superiority in modeling, texturing, lighting and composition.
3. Render animation at 720p resolution (1280x720 pixels) and medium color depth (16 bit) for playback (with a minimum length of 15-second/450 frames, or as specified in the practical instructions). Animation must be output to either Microsoft Movie (AVI), Macintosh Quicktime (MOV) files or MPEG-4 (MP4, M4A) and submitted to the judges' station on the supplied USB drive at the completion of the practical competition. The animation should clearly show superiority in composition, staging and the use of motion and object manipulation over time. Anticipation and scene transitions, object stretching and squashing and/or other techniques should be employed to create a sense of realism or graphic impact as defined by the visual design practical problem.
4. During the contest, the contestants will work as a team. No assistance will be given by other teams, instructors or observers. Limited technical assistance for computer or software malfunction may be given by appropriate manufacturers' representatives.
5. Teams will each be given the same amount of time to accomplish the problem. Everyone will begin at the same time and take a required lunch break, and no one will be allowed to work past the contest conclusion.
6. The technical committee reserves the right to videotape the animation.
7. The technical committee will be responsible not only for developing the practical for the competition, but also for developing the evaluation tool by which to objectively measure competitors' performance. Judging criteria will be general in nature and will be done from the completed storyboard, still images and

animation. Specific criteria will be based on the demonstration of competency in those elements of design, animation and clearly depicting the theme. Emphasis in judging will be placed on the graphical impact and effectiveness in addressing the design problem. Some areas for consideration include:

- a. Planning — The storyboarding process, the degree to which the output images/animation clearly and creatively communicates the solution to the problem without the benefit of support materials
  - b. Modeling — Creation of 3-D objects. The degree to which the animation realistically and accurately portrays something about the problem
  - c. Animating — Defined motion of objects
  - d. Rendering — Final rendered output. A quality measured in terms of how well directions are followed in telling the story, the visual impact of the problem solution and the judges assessment of the design, revision, final editing and presentation of the design problem's solution
  - e. Real-Time Engine rendering/preview – digital artists need to understand the full context of how their artwork is used. Teams should be able to import their assets into a real-time engine, tweak textures, lighting, and UVW maps to generate previews or renderings of their artwork in context.
  - f. UI/Controllers – custom user interface (UI) elements and animation controllers are often required to maximize the utility of the digital art. Teams should be able to automate animation sequences and actions with simple, custom controllers.
  - g. Originality – Creative Techniques.
  - h. Illustration of the theme — An overall measurement of the distinctiveness of submitted output, including the degree to which the use of technology, aesthetics, lighting and composition demonstrate development of a superior product
8. The setup, configuration and tear-down of all contestant-provided equipment will be the responsibility of the team.

## **Standards and Competencies**

### **VA 1.0—Solve a problem or tell a story in a two- dimensional format**

- 1.1 Identify previsualization and/or storyboard design techniques
  - 1.1.1 Define how a problem will be solved or how a story will be told without the benefit of support materials
  - 1.1.2 Describe the concept with enough artistic depth visually and verbally to allow the viewer to accurately visualize the final 3-D output

### **VA 2.0—Model a computer-generated object**

- 2.1 Create three-dimensional objects using the appropriate technology
  - 2.1.1 Apply geometry-deforming methods to create computer-generated models that possess shape, color, materials and surface maps
  - 2.1.2 Create models that are photo-realistic, artistic and/or graphically pleasing

### **VA 3.0—Create a three-dimensional scene**

- 3.1 Light, animate and render a scene, including created model(s)
  - 3.1.1 Apply appropriate light and shadow to models and surfaces in a scene to convey the proper level of realism
  - 3.1.2 Assign motion to objects and/or cameras in a scene
  - 3.1.3 Use bones, links and other forward and inverse kinematics to create complex animation of created objects
  - 3.1.4 Create cameras, with or without motion attached, to properly view a scene
  - 3.1.5 Create the final rendered output of a high-quality scene to a still image or animation using appropriate rendering technology

### **VA 4.0—Demonstrate originality and creativity in telling the story**

- 4.1 Create a final product that has an emotional impact on the viewer

- 4.1.1 Select aesthetically pleasing elements
- 4.1.2 Select elements that will evoke an appropriate emotional response from the viewer

**VA 5.0—Demonstrate the ability to work in a team environment**

- 5.1 Cooperate with others to achieve the solution to a problem or convey a story
  - 5.1.1 Demonstrate consensus-building skills
  - 5.1.2 Apply verbal and visual communication skills to convey ideas between team members and to a client

**Committee Identified Academic Skills**

The technical committee has identified that the following academic skills are embedded in this contest.

**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. NCTM Principles and Standards for School Mathematics. For more information, visit: <http://www.nctm.org>.

**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: <http://www2.mcrel.org/compendium/browse.asp>.

**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.ncte.org/standards](http://www.ncte.org/standards).