Steam Support :: Dota 2 Workshop

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HERO ABILITY MODEL OVERVIEW

- Hero ability models are a wide variety of creatures and units that act in conjunction with specific heroes.
- They are enabled when the hero has attained a certain level or casts certain spells.
- These units are NPCs or "Non-Player Characters"
- There are specific requirements for these NPCs that differ from wearable hero items or mounts ridden by heroes.
    - Hero wearable items and mounts rely on the hero's pre-existing skeleton, attachments, hitboxes, and animations. The community artist only provides the weighted mesh.
    - For ability models, the skeleton and animations are separate from the hero and may sometimes be custom tailored by community artists in addition to the mesh.
- Not all heroes use an ability model. Where applicable, these can be previewed in the Dota 2 loadout for that hero.

Details about the gameplay use of specific ability models can be viewed by selecting the relevant heroes on the <u>Dota 2 Heroes</u> page.

ABILITY MODEL TYPES

Hero wards tend to stay in one place and attack enemies. Juggernaut's Healing Ward is an exception - it can move about and can heal. These wards are not to be confused with sentry/observer wards that serve very different functions and can be used by any hero.

Wards for Venomancer, Witch Doctor, Juggernaut, and Pugna

True Forms/Ultimates/Shapeshifts are creatures the human hero temporarily transforms into.

Hero transforms for Lycan, Dragon Knight, Lone Druid, and Terrorblade

Summoned Units are usually creatures that can travel and attack enemies in order to assist the hero but also include Death Prophet's Exorcism ghosts and Clockwerk's Power Cogs.

Summoned Units for Lone Druid, Warlock, Broodmother, and Invoker

BUDGETS AND MODEL REQUIREMENTS

- For specific model and texture budgets for Ability Models and reference files of the default models, please see the individual hero links via the Hero Requirements page.
- Please note that our budgets refer to triangles, not polygons.
- Ability models need to stay within 60 bones.
- We no longer support .SMD file formats. Please submit your models and animations in .FBX or .DMX format.

- It is helpful if you tessellate your model into triangles before submission to confirm that the final mesh is what you intend. Otherwise our tools will triangulate the mesh but may have different results from what you'll see using your software.
- Our game is only able to support the skinning of 4 vertices per joint. Skinning to additional vertices will be removed or will cause a failure when community items go through our workshop compiler.
- Please make sure the bind pose for your ability model is oriented upright and facing forward. This orientation determines the placement of the hitboxes.
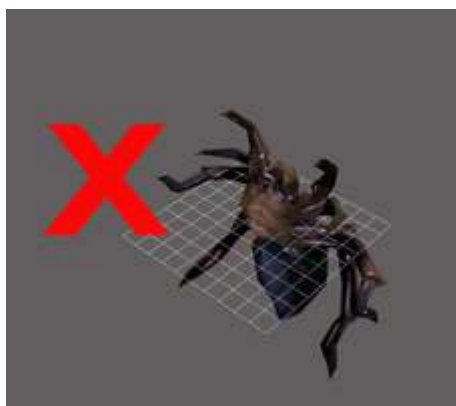
For general guidelines about authoring models and textures for Dota, please see our Asset Creation guidelines.

SUPPORTED ABILITY MODELS

These heroes have Ability Models that are enabled in the Source 2 Dota Workshop:

- Beastmaster - Hawk and Boar
- Broodmother - Spiderling
- Clockwerk - Power Cog
- Death Prophet - Exorcism Spirits
- Dragon Knight - Elder Dragon
- Invoker- Forged Spirit
- Juggernaut - Healing Ward
- Lone Druid - Spirit Bear and True Form
- Lycan - Shapeshift and Wolves

- Nature's Prophet - Treants
- Pugna - Nether Ward
- Shadow Shaman - Serpent Wards
- Terrorblade - Demon
- Tusk - Frozen Sigil
- Undying - Flesh Golem
- Venomancer - Plague Wards
- Warlock - Golem
- Witch Doctor - Death Ward

OTHER ABILITY MODELS

We will gradually enable more ability models for the Source 2 Dota workshop. Ability models with complicated technical needs may need special tool development before they can be automated in the workshop tool. Others may not be able to be supported at all.

DEFAULT OR CUSTOM ANIMATIONS?

- There are several options for handling animations for hero ability models, depending on the unit. You may be able to:
  - Use Valve's skeleton and animations for that unit.
  - Use Valve's skeleton and a mix of Valve and custom animations, as long as the transition poses match.
  - Use Valve's skeleton but create all new custom animations.
  - Use a custom skeleton and all custom animations.
- If your item uses an all new skeleton for a slot that also has a default skeleton option, please mark the "Custom Skeleton" checkbox in the workshop tool so that Valve's default animations are not accidentally applied to your custom skeleton.
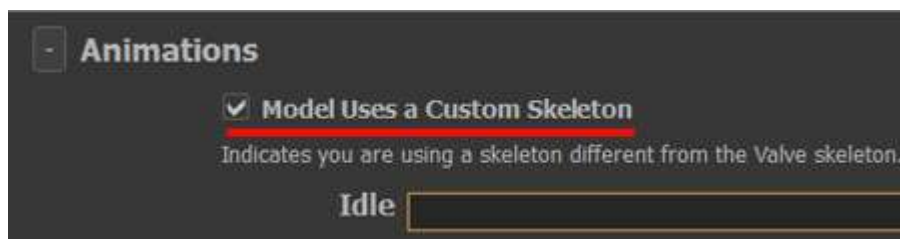
Some ability models with complicated needs for cloth, weightlists, modifiers, aiming, and animation blends may not have the option for artists to provide custom animations but will only allow a custom weighted mesh to be applied to Valve's default skeleton and animations. Ability models that currently require this are:

- Undying's Flesh Golem
- Lone Druid's True Form
- Dragon Knight's Elder Dragon
- Venomancer's Plague Wards
- Shadow Shaman's Serpent Wards

ABILITY MODEL ANIMATION GUIDELINES

- Attack - some units may have the option for several attack variations originating from both hands or from the mouth or tail.
- Aim - certain hero wards will need you to provide poses of them facing in several different directions. These are explained in the workshop tool.
- Ability - ability animations can show the units casting an ability, reacting to an ability or transforming into and out of the human form of the hero.
- Injured or other modifiers - These will be explained in the workshop submission tool. For injured attacks you can work from a copy of your regular attack animations and just make sure that they match their injured pose at the beginning and end.
- Turns - though optional, these right, left, and center poses are very helpful for generating smooth transitions during turns, especially for horizontal or long creatures that can otherwise look somewhat mechanical when turning.
- For general animation guidelines, see Workshop NPC Animation

HITBOXES

- Hitbox creation by community artists is not currently supported for the Source 2 Dota Workshop. Hitboxes are created by Valve artists once a custom NPC is accepted for the game.
- Temporary generic hitboxes are created by the workshop tool when you test your model in demo mode so that it can be selectable. These are not the final hitboxes.

ATTACHMENT POINTS

- An attachment is a static point bound to a bone in the skeleton. The names and number of attachments used varies with each type of NPC.
- You create these in the item workshop submission tool by naming the bones that these attaches will bind to.
- Some ability models that use Valve's default skeleton will have the default attach bone names automatically filled in.

- Once your model compiles you will have the option to adjust the attachment's position or orientation if necessary.
- Below are typical attachment points. These names are specific and case sensitive.
  - attach_hitloc - This attachment is required for every NPC item. "hitloc" stands for "Hit Location" and is used by the particle system to determine where projectile effects should travel to when fired at your NPC. For most creatures, the best place for "attach_hitloc" is a bone in the chest or head. Placing this attach in the root or on the ground results in projectiles traveling too low and is less appealing. For inorganic models, choose a location above the center of the model.
  - attach_attack1 - This attachment is required for NPCs that can attack or cast spells.
    - For units with ranged projectiles, this determines where projectiles will be created and launched from.
    - For melee units, place the attachment in the hand the unit attacks with. You may be asked to place an additional attach_attack2 in the other hand, the mouth or the tail.
  - attach_eye_l and attach_eye_r - These attachments are only used to apply Valve's default particles to some ability models. The workshop submission tool will say when these are required. Place these on the unit's eyes, making sure that the red X axis points in the direction the eye looks.
- Certain units, like Terrorblade's Demon or Warlock's Golem, may require additional attachments to position Valve's default particle effects. The workshop submission tool will explain these where needed.
- Details about designating and editing attachments in the workshop tool can be found on the Submitting Items page.
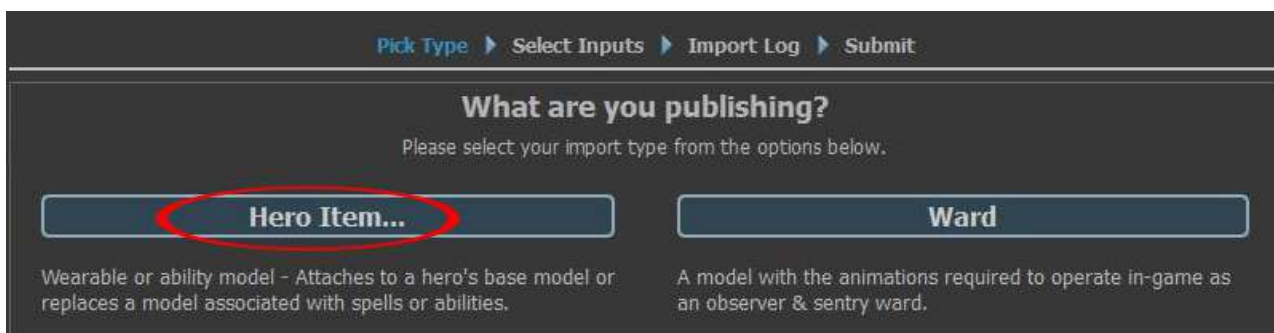
ABILITY MODEL TESTING

When Valve artists review custom NPCs they are mainly evaluated on how they look from above in game view. To test your custom ability models in game, you may need to attain a certain hero level or trigger certain events to spawn the units.

- You can now use the Demo Mode option buttons in the workshop tool.
- You can force a hero to level up by clicking the Level Up or Level to Max buttons or opening the game console and entering "sv_cheats 1" and then using "dota_dev hero_level <number>" in the console or entering "-lvlup <number>" in the in-game chat.
- Clicking the Free Spells or Refresh buttons or entering the console command "dota_ability_debug 1" will remove ability cooldowns so you can quickly recast spells.
- Most units can simply be spawned by clicking its ability icon or using the corresponding hotkey once your hero has attained the necessary level.

- Some units require a specific combination of levels, abilities or events to spawn:
  - To spawn Invoker's Forged Spirit, you need to have 1 instance of Quas and 2 instances of Exort. Then you select the Invoke ability, which creates an option to spawn a Forged Spirit.
  - To spawn Broodmother's Spiderlings, you need her Spawn Spiderlings Ultimate ability, then you need to cast this ability onto an enemy just before they die to spawn the Spiderlings.
  - To test the different level colors of Dragon Knight's Elder Dragon, you will need to level up the hero incrementally. You can also view the different materials by using the 'Texture' drop-down in the Preview Model page of the workshop tool.

SUBMITTING ABILITY MODELS

- Refer to the Submitting Items page for important general information about testing and submitting items.
- Ability models are submitted under the "Hero Item" category.

It is no longer necessary to maintain our file structure when preparing your item files. The workshop tool will place your files where they need to go.

ITEM TROUBLESHOOTING

If you have problems testing or submitting your item, see our Item Troubleshooting page.

Dota 2 Item Workshop Guidelines Homepage

# Steam Support :: Dota 2 Workshop

INTRODUCTION

Designing first-class items for Dota 2 requires more than just ability and a great idea. The aesthetics of Dota 2 are built from a set of principles that help keep each hero immediately and uniquely identifiable from above during gameplay. We're going to go over exactly what these principles are, how we used them to design the heroes and how you can apply them to custom items.

Be aware that the principles on this page are important general design concepts that apply to the readability and quality execution of all items, including inventive items that thoughtfully differ from the default colors and silhouettes. New insights have been added to this updated guide so please have another look even if you've read previous versions.

SILHOUETTE
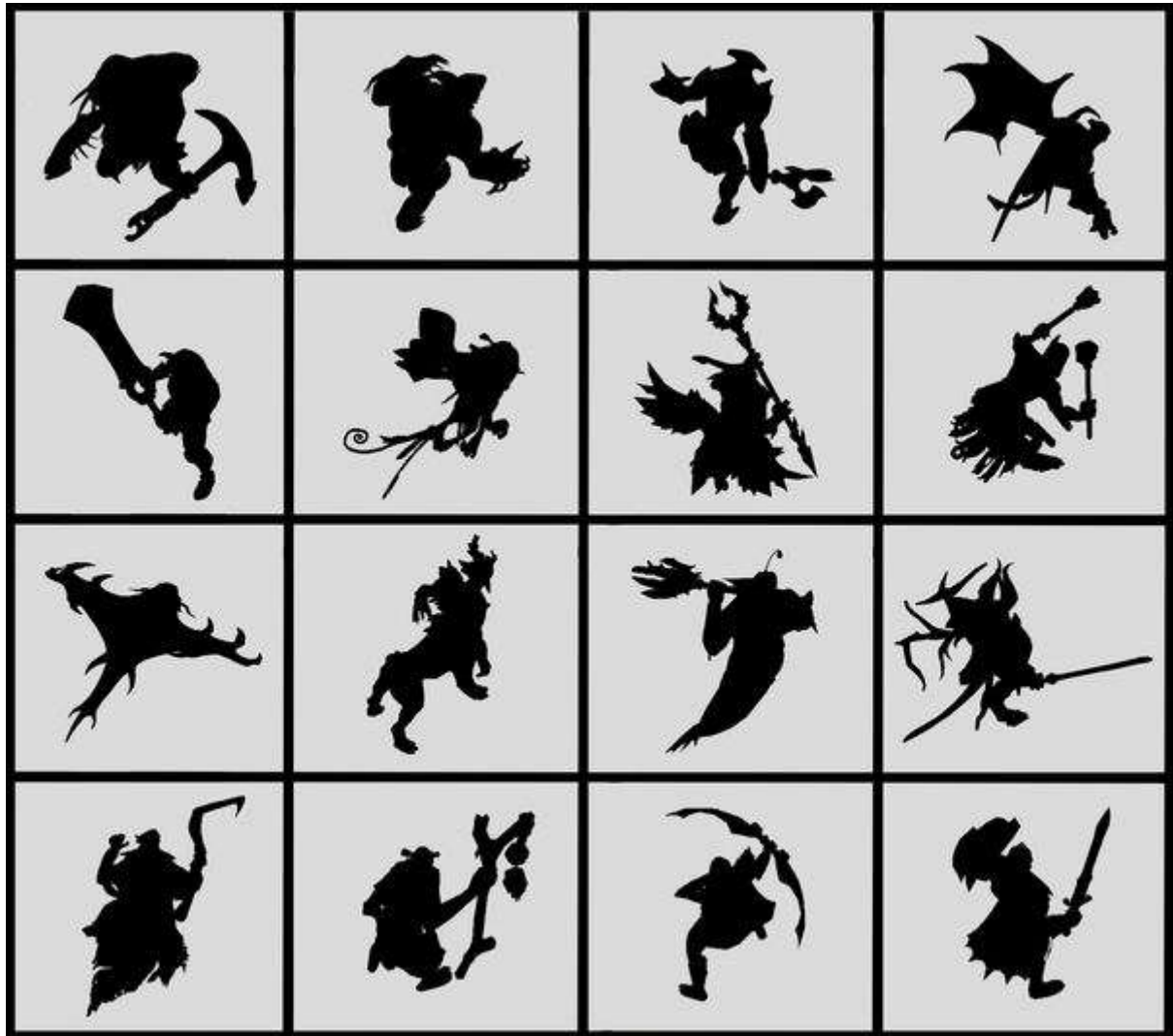
- A hero's silhouette must be clearly identifiable at first glance.
- The silhouette should show a character's orientation.
- Custom items are welcome to differ from the default silhouette of the hero as long as the character is still identifiable and the mesh is compatible with Valve's default hero skeleton and animations.
- To support the readability and directionality of the hero, drastically different silhouettes for some items could be balanced by more familiar colors or silhouettes for other items.
- The Dota heroes were designed with pose in mind. Even with custom items, the hero's pose should reinforce the character's strength, demeanor, and speed.
- Weapons need a unique read but should work to complement the character's design.
- Areas of rest with simple shapes can help balance complicated shapes in other areas.

VALUE GRADIENT - BEGINNING THE HIERARCHY

- "Value" is the range of lightness and darkness within a subject regardless of color and saturation. One can argue that value is more important than color to the design and the success of a character because not only is it used to create focal points, it creates the illusion of depth, and also helps give three-dimensionality to the object.
- Dota 2's default hero gradients generally move from darkest at feet/lower body to lightest at the upper body and head. This helps draw the player's eye to the most important areas of the character.
- Items that don't follow the 'darker below, lighter above' style of gradient may still work if they follow other principles on this page to ensure clear readability.
- If an item has large areas of the same color, gradient can bring variety and focus to avoid monotony.

VALUE PATTERNING - CREATING VISUAL INTEREST
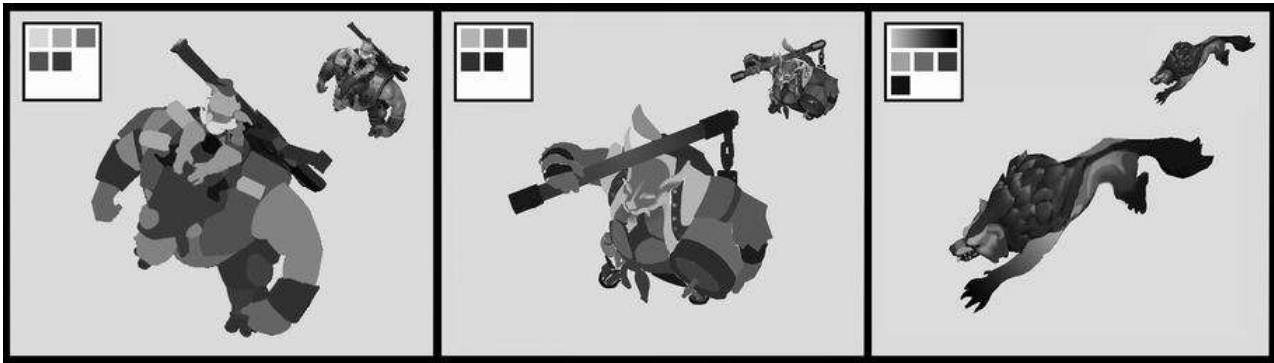
- The human eye instinctively looks for boundaries between areas of contrast, so it makes sense to establish contrasting blocks of value to highlight the various forms in our characters.
- Following the value gradient described above, we created more visual interest in Dota 2's heroes by increasing the value contrast between objects in the upper torso and keeping the lower torso objects with less contrast.
- Separating each unique piece on the character into its own value will also help it read as a distinct element.
- In characters that have no distinct item breaks (as seen in the wolf example above) gradients are used in order to establish patterns.
- Before adding color, test your value patterns in-game. Be sure the character's features are recognizable and that the most important features draw the eye.
- You can view values of heroes and their items in the workshop item tool by using the Hero Display Mode button to cycle through different render options or by entering convar r_hero_debug_render_mode 5 in the console.
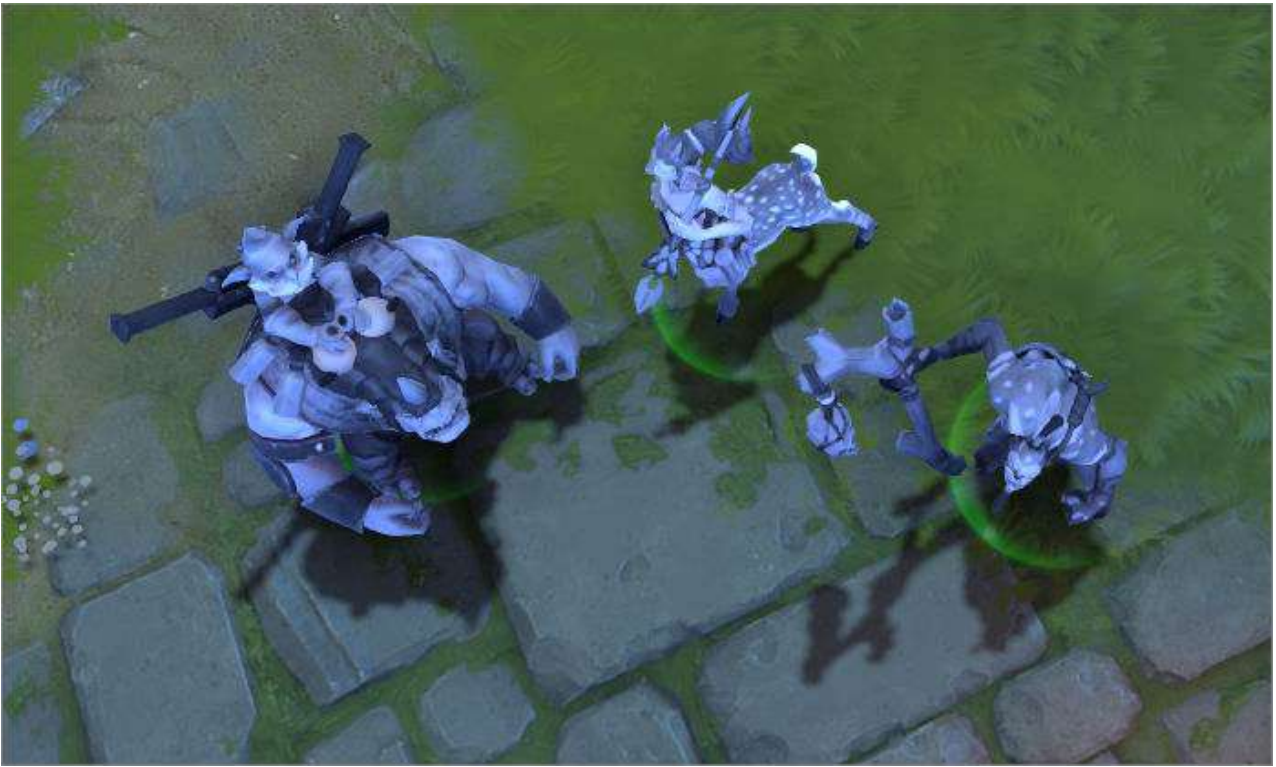
Absolute white and black should not be used in our game, since those colors don't react well to lighting, becoming flattened or overblown and losing detail.

Note how dark and light areas on the heroes below are handled to preserve detail and form

COLOR AND SATURATION - LESS IS MORE

- Start by selecting a primary color for your item set.
- Then select a secondary and tertiary color by using complementary, split complementary, analogous, or triadic color schemes (see Color Schemes below for more information).
- Keep color harmony while painting textures by only introducing new colors using blends of the original primary, secondary, and tertiary colors along with grayscale values.
- Custom items are welcome to differ from the default color scheme of the hero but you may need to find other ways to support the identification and directionality of the hero. An extreme color change for some items could be balanced by more familiar colors or silhouettes for other items.
- Avoid using colors which are dominant in the Dota map.
- Saturation (or intensity of the color) also draws the eye, so saturation levels should be less towards the lower body and increase towards the upper body.
- Stay away from all pure saturation colors, meaning that you should try not to use colors that max out the R, G, or B values in your color textures. This allows more head-room for the in-game lighting to correctly influence them.
- Choose very small areas for the highest saturation in order to re-enforce visual interest. Large areas of high saturation overwhelm the viewer and distract from the visual harmony of the character.

- Complicated texture details, high-contrast values or strong saturation can be balanced by <u>areas of rest</u> with fewer details, less value contrast and reduced saturation.
- Don't lose focus! Turn your character to greyscale as described above in Value Patterning and recheck the values during and after the coloring process.
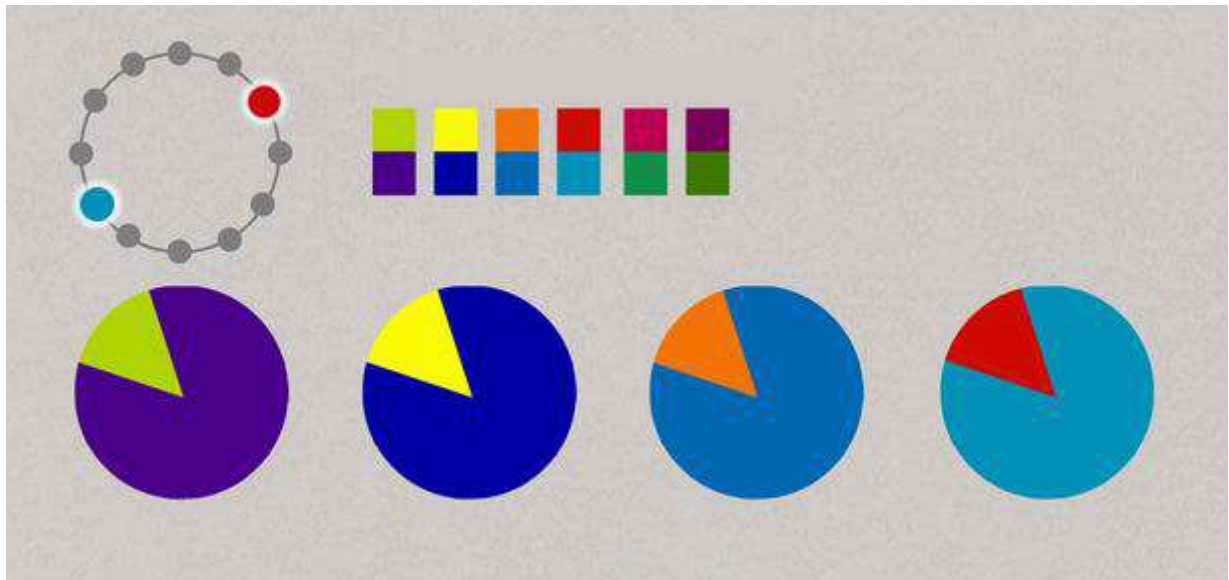
COLOR SCHEMES

Color schemes can be inventive but still harmonious if they are created using structured combinations of hues from the color wheel.
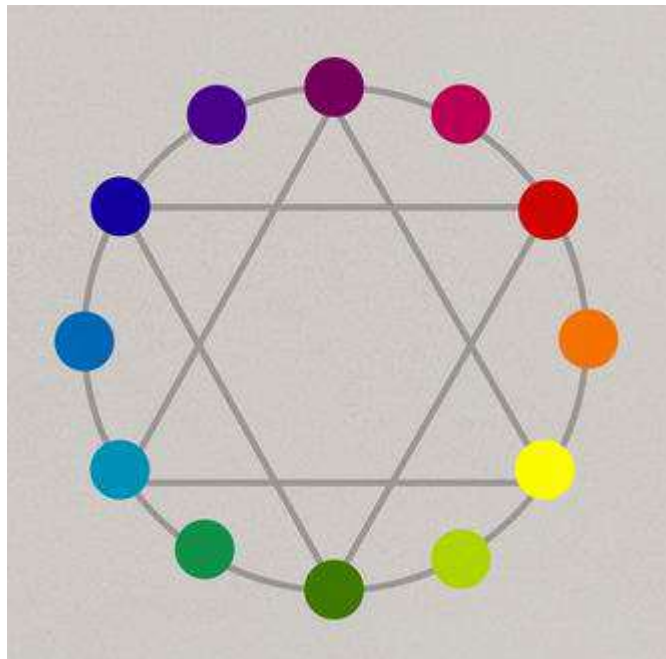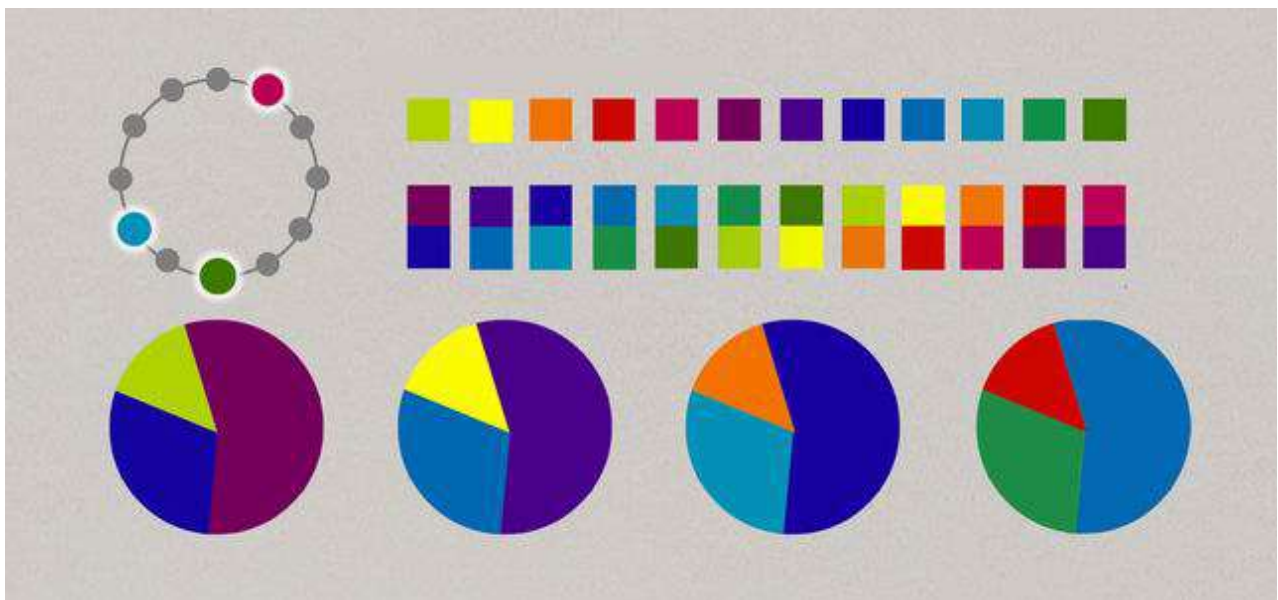

Complementary Color Schemes

Complimentary hues are on opposite sides of the color wheel. These opposing colors are more intense and "vibrate" when placed next to each other as they compete for your attention.

Split Complementary Color Schemes

One of the complementary colors is split off into a pair of neighboring hues.
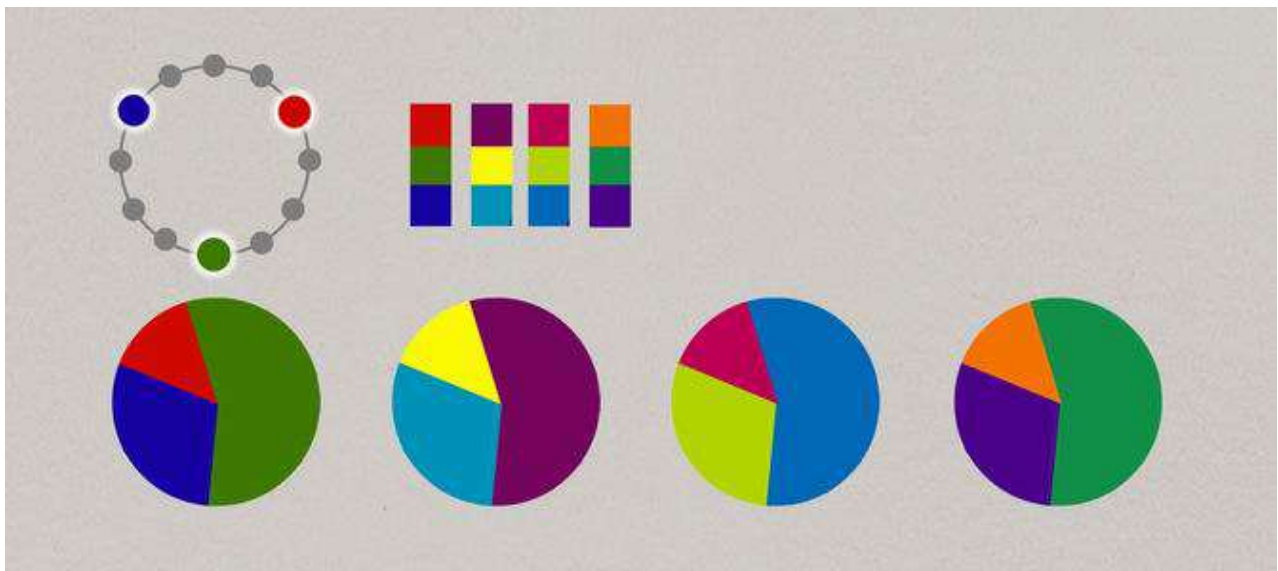

Analogous Color Schemes

Analogous colors are next to one another on the color wheel. These colors appear to "push" at each other, creating an optical illusion where each zone appears larger when it has your attention.
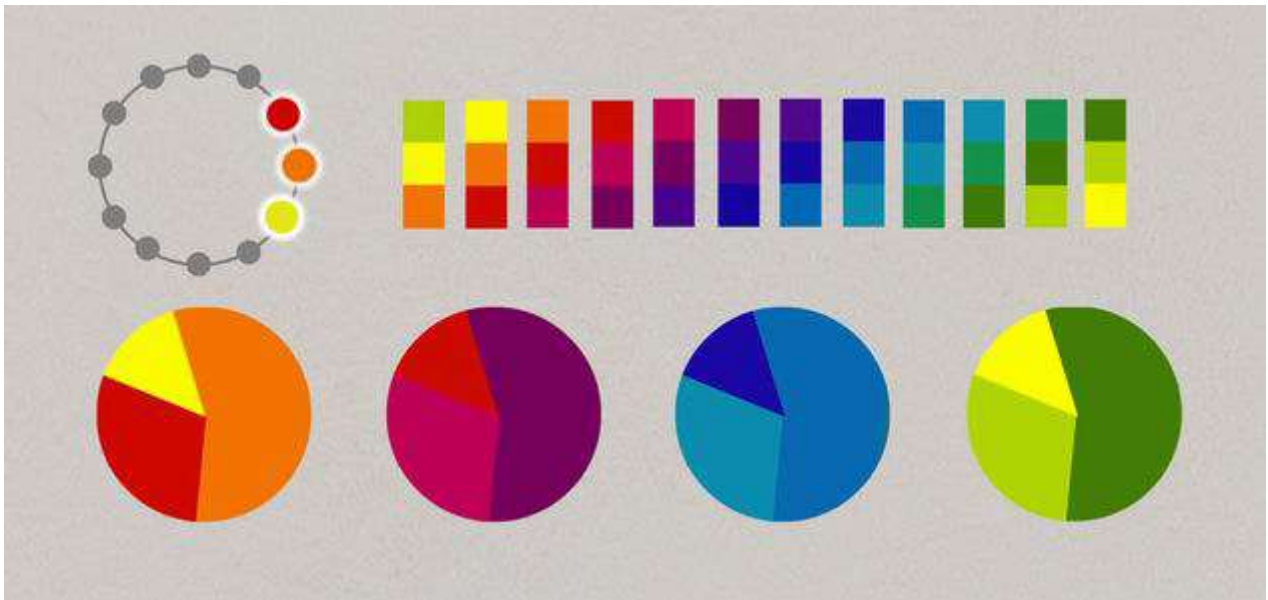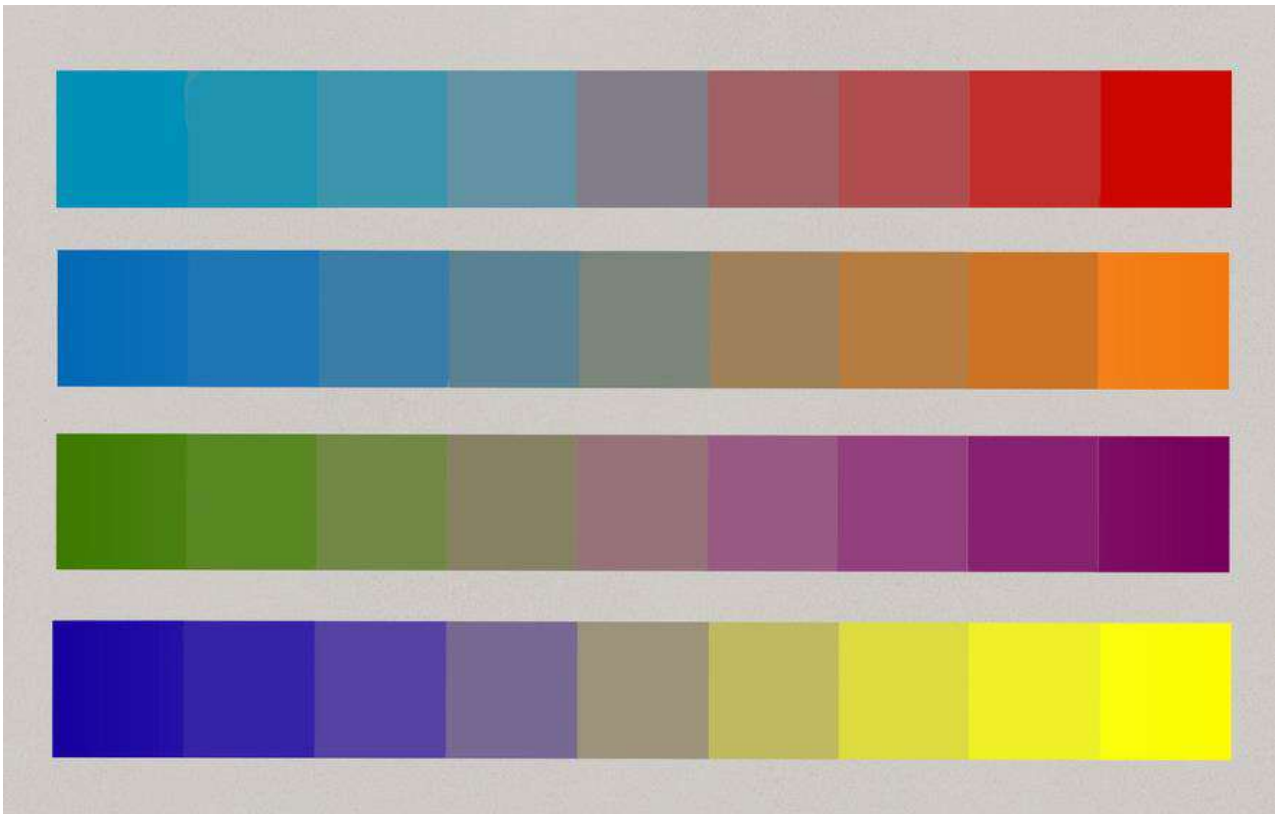
Triad Color Schemes

Triad hues are equidistant on the color wheel

COLOR MIXING

Once you've picked your source colors, mix, tint, and shade them in order to derive your full palette.

This example shows muted colors created by mixing complementary colors. The pure, saturated opposing colors become a desaturated grey tone as they are mixed together.
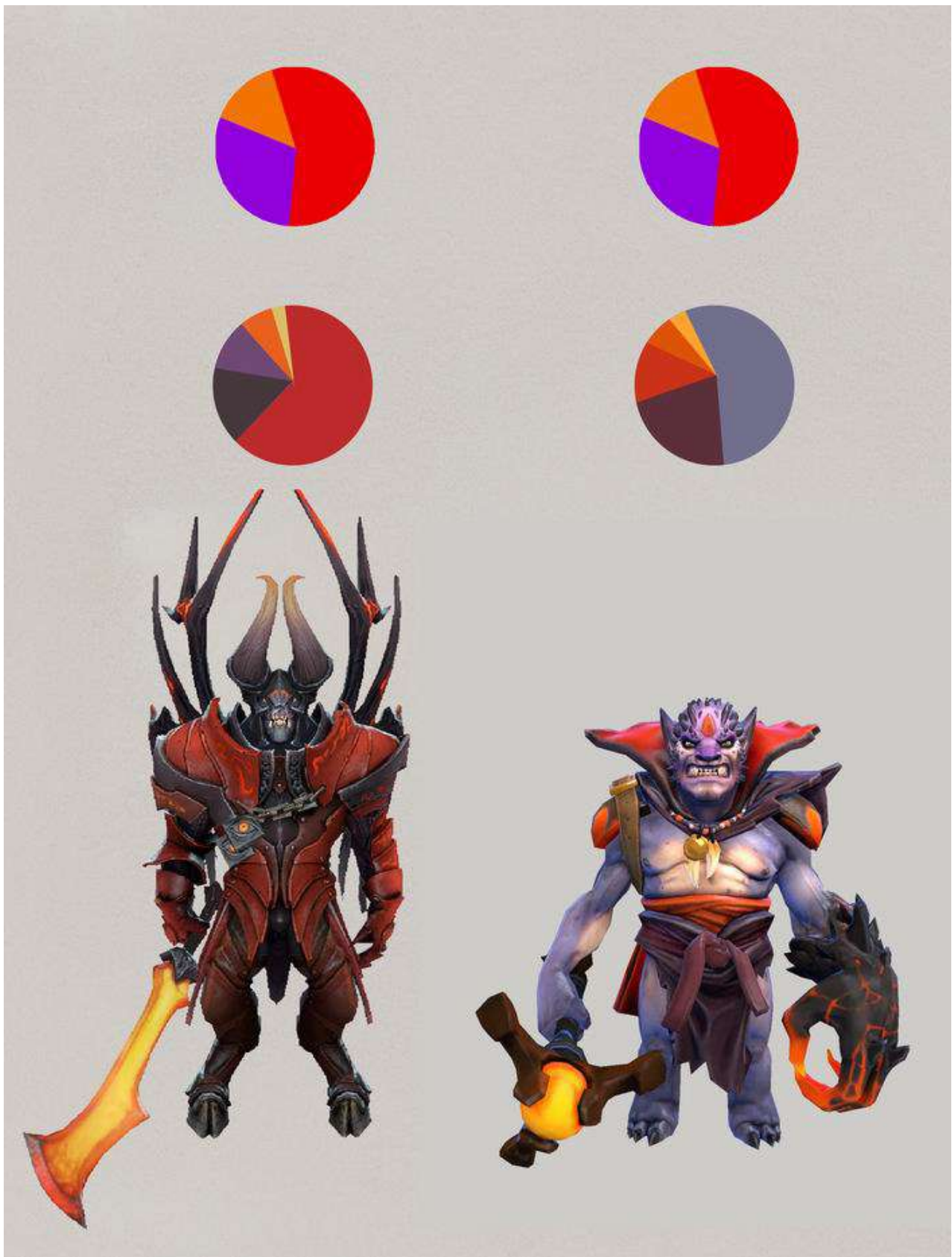
This example shows using black shade and white tint to adjust color values
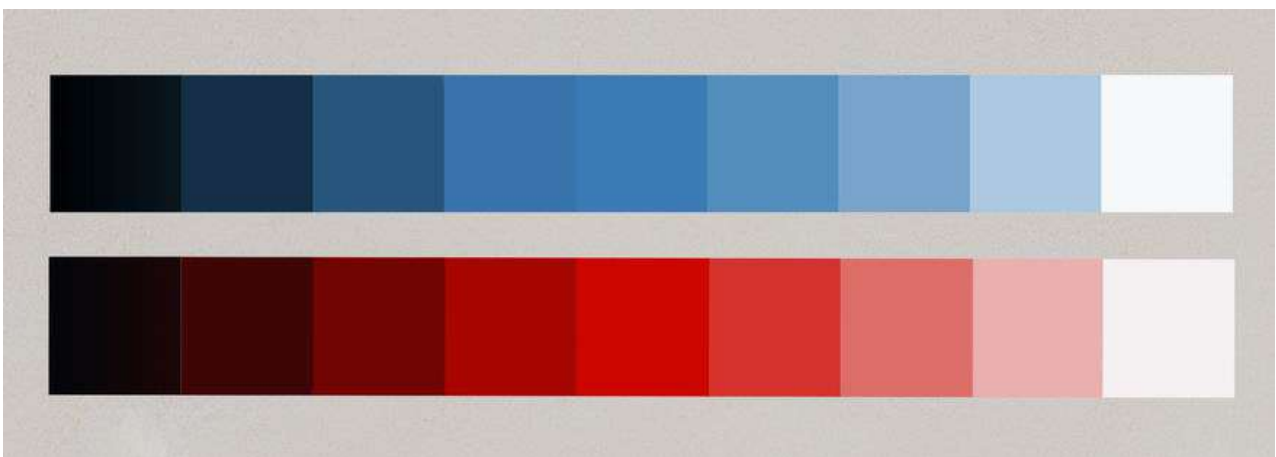
CHARACTER COLOR KEY PALETTES

- In the examples below, the palettes on the top are the starting palettes.
- The palettes on the bottom are modified using only colors blended from the starting palettes.

Doom and Lion are examples of Analogous palettes

Kunkka and Lycan are examples of Split Complementary palettes
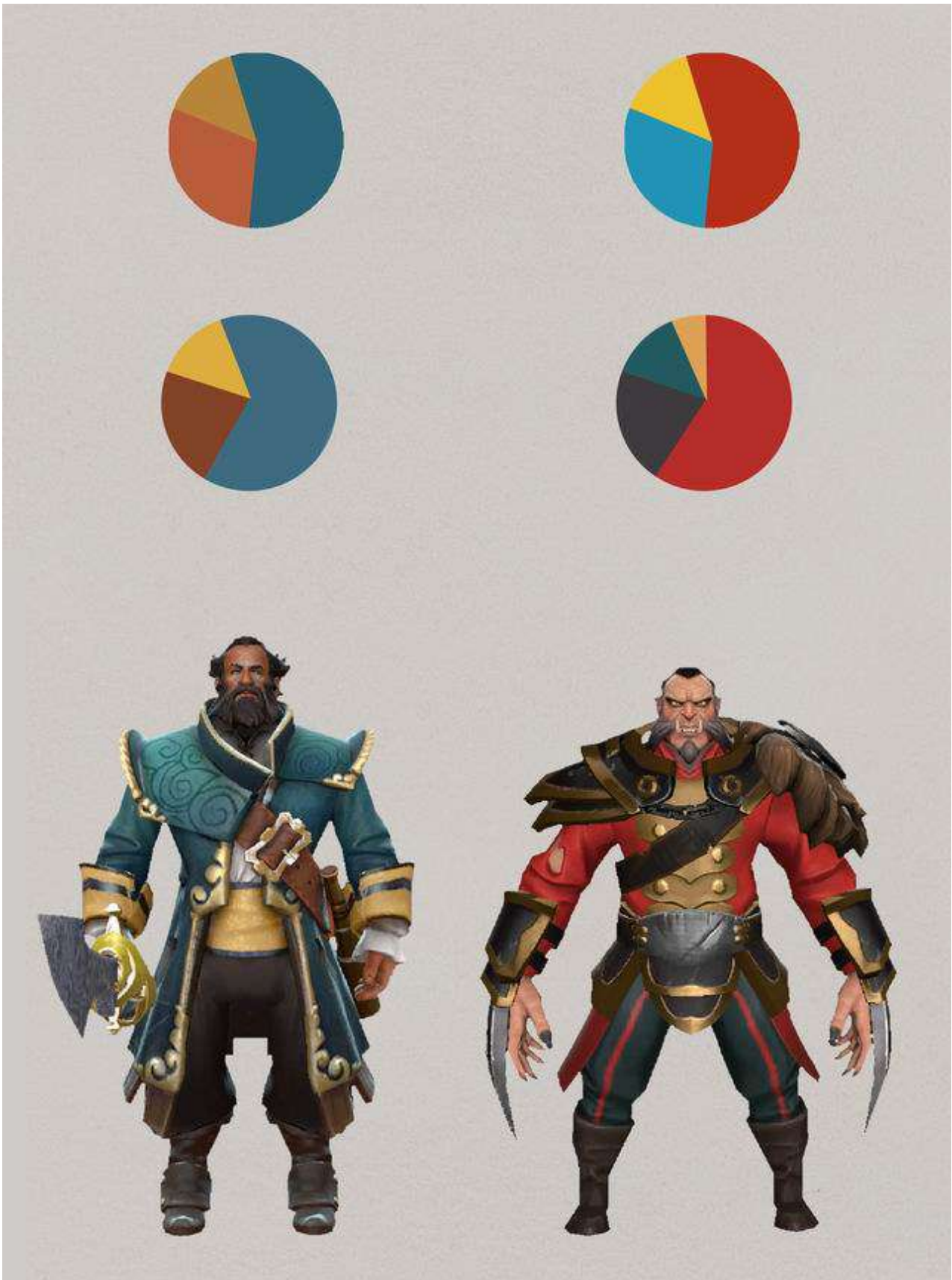
Beastmaster is an example of a Complementary palette.

AREAS OF REST AND DETAIL

- Large areas of visual complexity can overwhelm the eye and become monotonous.
- Balance areas of detail by adding larger areas of less detail where the eye can rest.
- By creating these larger less detailed zones, areas of detail will have a much greater visual impact.
- Detailed areas should comprise a small percentage of the overall character, and be concentrated in areas of importance.
- The scale of detail is relative to the size of the character in-game. Details that are too small simply become noise.
- Larger areas with less or no detail read much clearer from game perspective than highly detailed areas.
- You can add non-distracting detail on larger areas by keeping the values of the detail close to its background. The visible anatomy on Phantom Lancer, the stripes in the blue areas of Sven's armor, the stitched patches on Sniper's cape, and the True Form bear's brown fur are good examples of this.

EVALUATING CONTENT IN CONTEXT

- One of the most important ways to verify your work is to see it in context, which means placing the hero in different parts of the Radiant and Dire sides of the map during day and night.
- Be especially mindful of how lighter colors look in the more brightly lit Radiant side of the map during daytime.
- You can use the Toggle Day/Night button in the workshop tool or type dota_daynightcycle_toggle in the game console to toggle day and night.

- Be sure to test shapes, value, and color during each stage of the creation process.
- The workshop submission tool will allow you to preview over budget items in game so you can evaluate early versions of textures and meshes while it's easier to make adjustments.

- The in-game experience is how the character and items are ultimately going to be seen by the players, so check the model and textures often in the workshop previewing tool.

DIRECTIONALITY

- It is crucially important for players to instantly identify not only who a character is but which way they are facing so that movements during gameplay can be anticipated.
- Values, colors, details, and silhouettes help to define each hero's head, their weapon and the direction they are facing.

APPLICATION OF CONCEPTS

- Adjusting a hero's texture is a fast and easy way of resolving common readability issues.
- Below are examples of how Valve artists adjusted textures to improve readability during the development of Witch Doctor, Lion, and Beastmaster.
- Original versions are on the left, the revised versions with improved readability are on the right.

APPLICATION OF CONCEPTS - WITCH DOCTOR
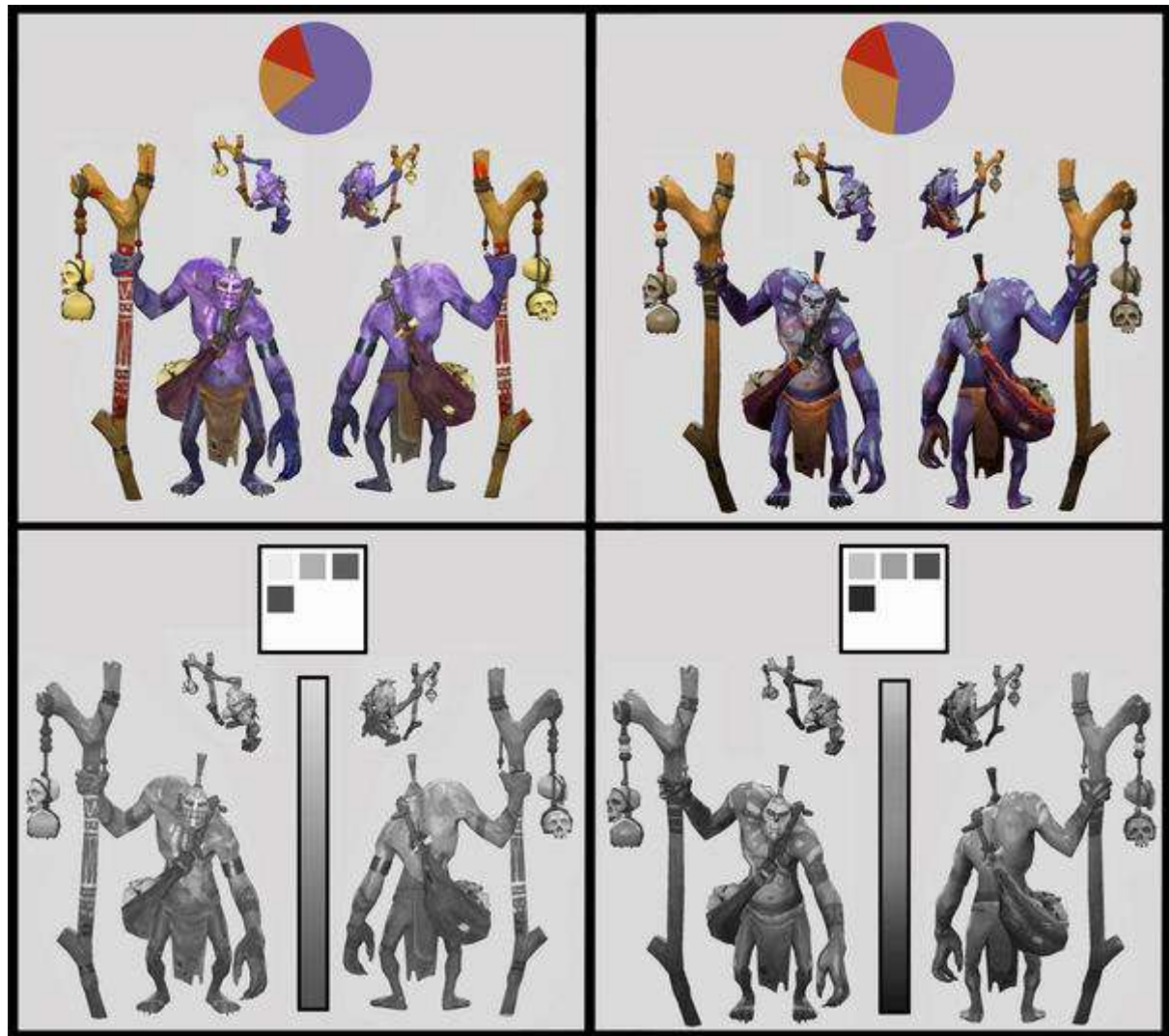
VALUE ADJUSTMENTS

- Increased the range in value overall allowing for more distinction between elements
- Created a more pronounced dark to light gradient from the feet to the upper torso
- Increased the amount value contrast towards the upper torso

COLOR ADJUSTMENTS

- Decreased saturation overall and increased only in areas of visual interest
- Added a secondary color into the skin to give it a more life-like appearance by faking skin's natural translucency (examples of this can be seen on the stomach and in areas of tension such as elbows, knees, and scapula)
- Gave face and body paint a contrasting color, using value and saturation to contrast against the skin, adding more visual interest to areas of the body

## APPLICATION OF CONCEPTS - LION
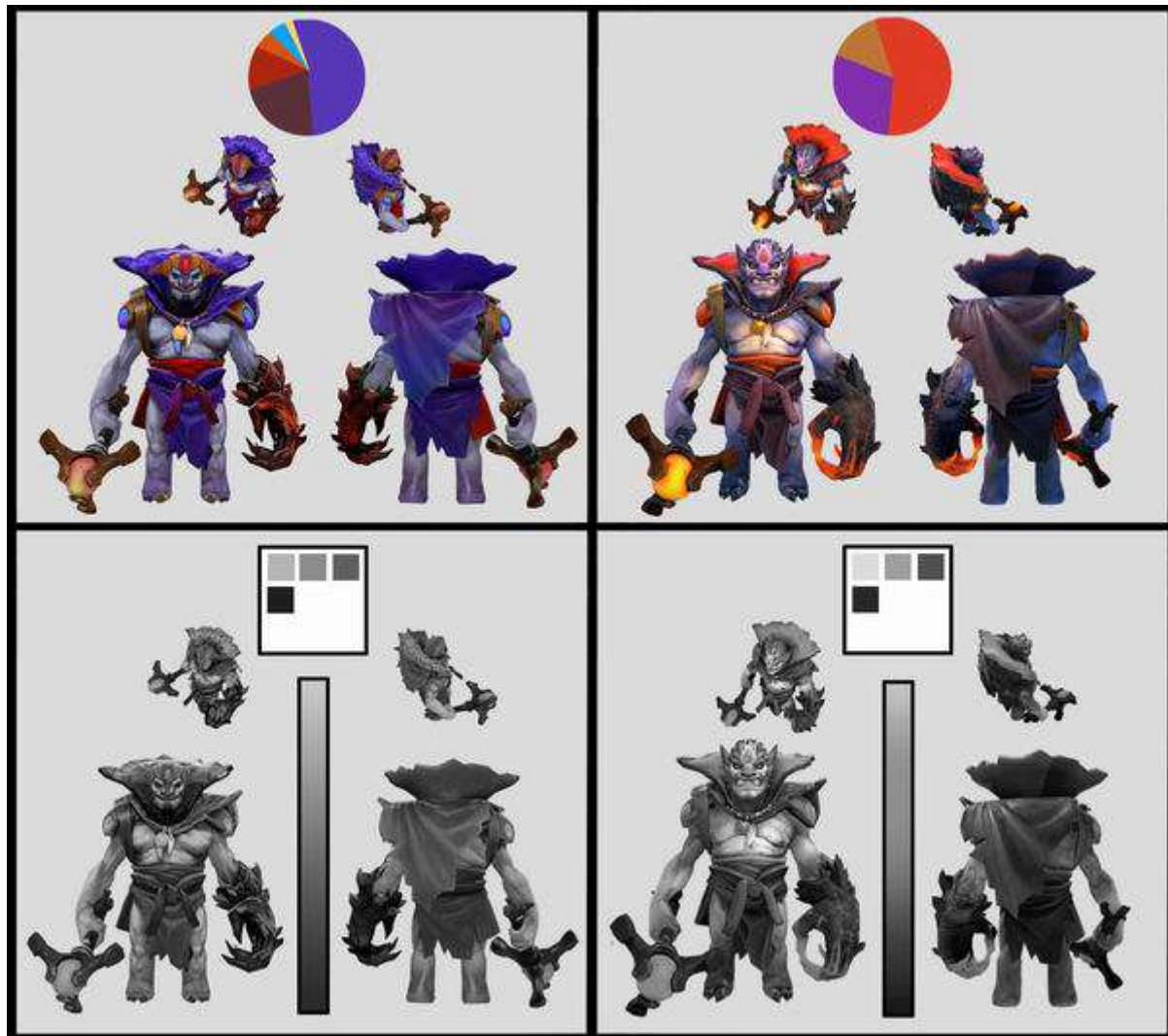
VALUE ADJUSTMENTS

- Created a more diffuse lighting scheme by taking away heavy painted-in shadows, such as under shoulder pads and in cloth.
- Brightened values in areas of detail such as eyes, teeth, and beads to create interest around the face.
- Adjusted specularity to better match material properties of skin and cloth.

COLOR ADJUSTMENTS

- Reduced color palette to an analogous color scheme.
- Decreased overall saturation and added more saturation towards visual landmarks like the mutated hand, tip of the wand, and shoulder pads.
- Added a secondary color into the skin to give it a more life-like appearance by faking skin's natural translucency (examples of this can be seen on the stomach, cheeks, inside of arms, and on the elbows).

APPLICATION OF CONCEPTS - BEASTMASTER
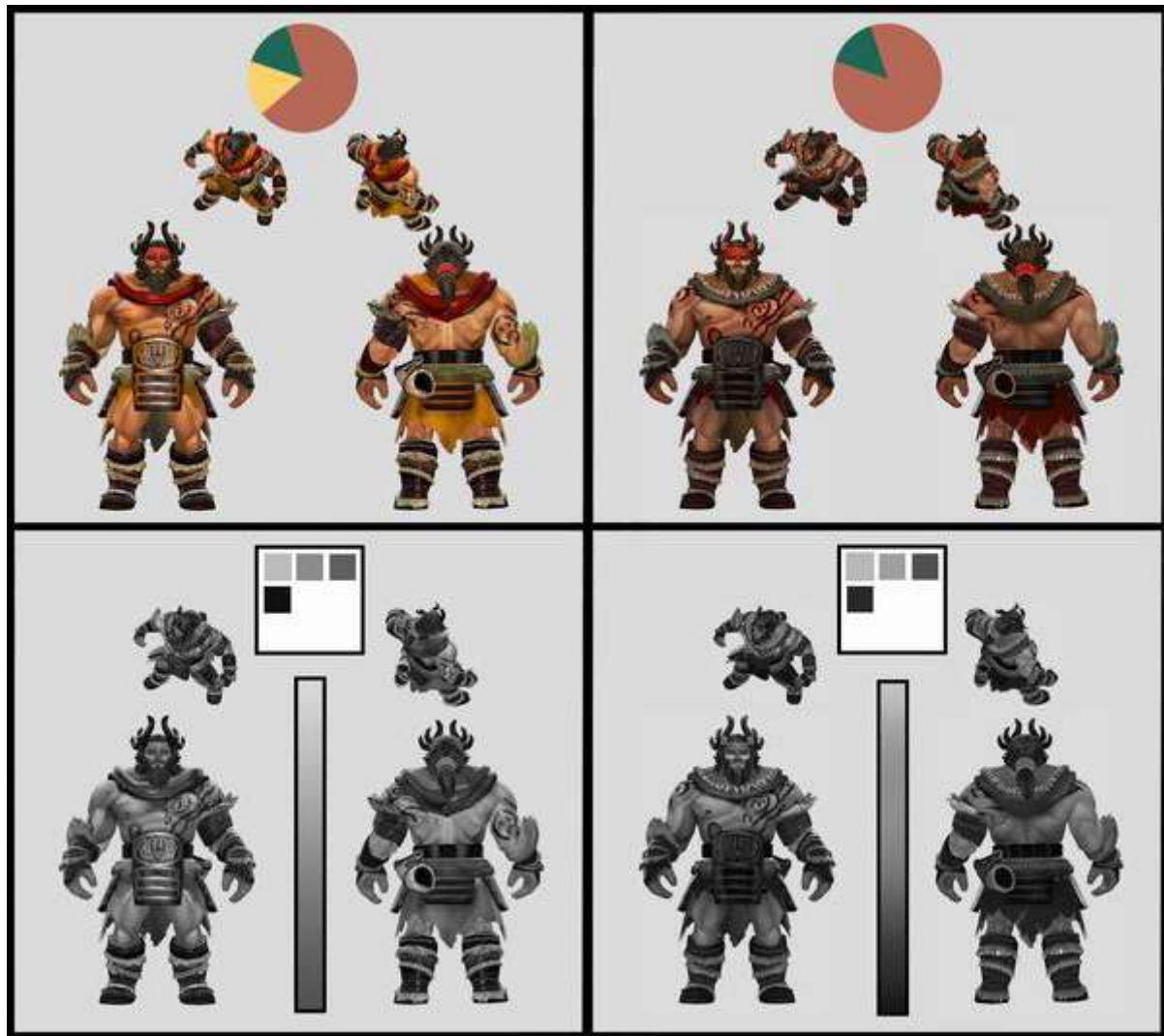
VALUE ADJUSTMENTS

- Created a more pronounced dark to light gradient from the feet to the upper torso.
- Reduced the contrast in the value patterning of the lower body.
- Simplified overall value of cowl and added stitches to create visual separation between 2 pieces.
- Increased value contrast within elements of the face

COLOR ADJUSTMENTS

- Reduced overall saturation and increased saturation in places of interest like the hair band and straps on horns
- Simplified colors to only muted complementary earth tones

GAME AND LOADOUT READABILITY

- Item design must support gameplay by reading well from above and at a distance in game view.
- Valve artists review items in game for this reason and give this view higher priority than how items look in the loadout.

- As mentioned previously, it should be clear to determine in game which way the hero is facing and where the head and weapon are.
- Interesting and appealing design elements on items should be visible from above in game view as well as in the loadout.
- In addition to the emphasis on game view, community artists still need to make sure that items are executed well for display in the portrait, loadout, and cinematic view, having good density of uvs on prominent areas and adding backface polygons where necessary.

SUMMARY

The items seen below were designed by Valve. Notice these points:

- The gradients, values, colors and detailed areas on the character's items work together with ample areas of rest to maintain visual interest.
- The shapes of the items make a clear silhouette that differs from the default but is still allows the hero to be identifiable.

Remember, maintaining a hero's identification doesn't mean that custom items must exactly follow the default item silhouettes or colors. To create inventive but still functional items, the artist needs to thoughtfully decide where to push the boundaries and where to balance those extremes by staying closer to familiar elements. Additional factors such as Valve's animations, character poses and speed of travel can contribute to hero identification and should be considered in conjunction with customized items. Frequently evaluating the items in game view, getting feedback from others, and being open to making adjustments can help artists achieve a good balance of novelty and readability. What is most important is that custom items visually support gameplay using all of the principles described on this page. Each of these aspects is an important part of Dota 2's unique design aesthetic.

For technical information about authoring models, shaders, uvs and more, please follow the links on the Dota 2 Item Workshop Guidelines Homepage

Steam Support :: Dota 2 Workshop

- Detail Mask Overview
- Terrorblade - Arcana and Ambient Textures
- Legion Commander - Arcana Textures
- Phantom Assassin - Arcana Textures
- Lone Druid - Ability Textures
- Earthshaker - Ability and Ambient Textures
- Sven - Ability Textures
- Rubick Ambient Textures
- Lycan Ultimate Ambient Textures
- Razor Ambient Textures

Detail Mask Overview

- If you are making items for heroes that have colored, glowing, or scrolling Arcana, ability, or ambient textures, you can add to the appeal of your items by authoring them to react to these.
    - Arcana textures can display on a hero's other items when an Arcana item is equipped.
    - Ability textures display only when a hero casts a certain ability spell.
    - Ambient textures display constantly, such as the texture flames on Chaos Knight's items but other heroes use this in a more subtle way that is still effective.
- Only Valve creates Arcana items but community artists have the option to make their item textures react when an Arcana is equipped.
- Arcana, ability, and ambient textures are accomplished through a combination of greyscale detail masks that community artists can author and Valve's default detail maps and default material settings that determine additional coloring, texture scrolling speed, and cubemaps among other things.
- If properly authored detail masks and color textures are not provided by the community artist, a workshop item will not display Arcana, ability, or ambient textures or colors.
- A detail mask will only work on a custom item if the hero's default or Arcana material has a detail mask enabled. It must use the Valve's default detail map for that hero.
- The strength or subtlety of the hues in an artist's color texture and the values in an artist's detail mask determine how vigorously the Arcana, ability, or ambient textures will display on their items.
- Valve artists have sometimes added detail masks to workshop items to help them display Arcana textures but moving forward we prefer that the community artists have the awareness of this need and provide the detail masks themselves.
- The item workshop submission tool is not currently able to let artists activate arcana textures on their items, but they will be able to preview ability and ambient textures.
- The links below will explain detail mask options for several heroes and Arcanas. Not all applicable heroes or items are covered but these examples should give an idea of practices that can be used in other situations.

Terrorblade - "Fractal Horns of Inner Abysm" Arcana and Ambient Textures

- Terrorblade's Arcana has an option to display alternate colors by using different Prismatic Gems.
- The Arcana uses Terrorblade's Head slot, but you have the option to author a detail mask for your head item so it can react to Terrorblade's default scrolling texture and blue-green ambient color when the Arcana is not equipped.

- Strong color or white in an artist's color texture means that a Terrorblade item will retain this coloring or the white areas regardless of how the detail mask is authored or what color Arcana or gem is applied. It is up to community artists to decide how much base item color or white is to remain when an Arcana or gem color is active and author the color and detail masks accordingly.
- The default detail map used for Terrorblade is white and grey to allow Arcanas, gems, and Terrorblade's default blue-green ambient to provide different colorings.
- All Terrorblade workshop items with detail masks will use this default scrolling detail map.

Terrorblade default detail map, weapon color, detail mask, and model display.

Dark and desaturated color combined with a high contrast detail mask creates one strong outline that will cleanly display the Arcana colors and scrolling textures beneath the Arcana particles. The image on the right shows both the blue (default) and red (Arcana) coloring and scrolling texture applied to the detail mask areas.

Terrorblade default detail map, head color, detail mask, and model display.

Even though the head item is replaced for the Arcana, the default head item still uses a detail mask to display the default ambient scrolling texture on the horns when the arcana is not equipped. Strong greenish coloring is retained from the color texture.
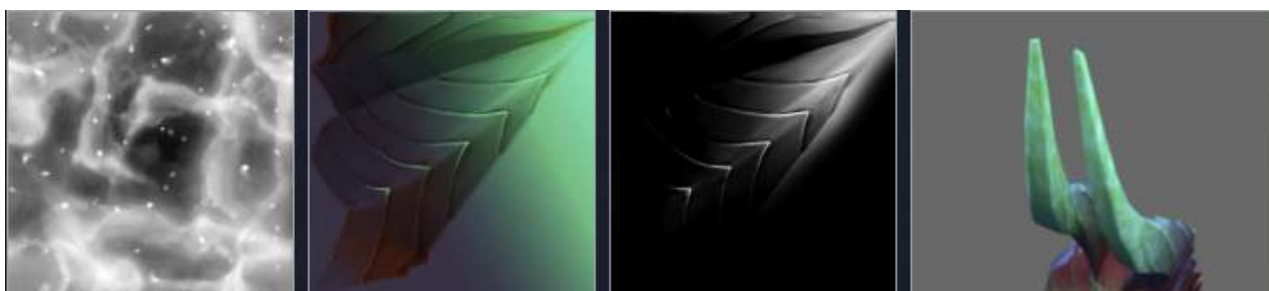
Terrorblade default detail map, demon color, detail mask, and game display.

The demon's very dark and desaturated color texture is designed to totally take its color from the Arcana, gems, or Terrorblade's default blue-green ambient. Combined with a detail mask that has small, fine details in a mix of strong and soft values means there will be a variety of added color and scrolling textures all over the demon's body.

Legion Commander - "Blades of Voth Domosh" Arcana

- This Arcana uses Legion Commander's weapon slot, changing from single weapon to dual wield swords.
- Because of this, there's no need to add an Arcana detail mask to a custom Legion Commander spear - it will never be used with the Arcana.
- Some of Legion Commander's default items have detail masks to pick up the Arcana texture when that item is equipped. The detail masks do not react when there is no Arcana.
- All Legion Commander workshop items with properly authored detail masks will use Valve's detail map and materials when the Arcana is equipped.

Legion Commander's Arcana detail map, banner color, detail mask, and game display
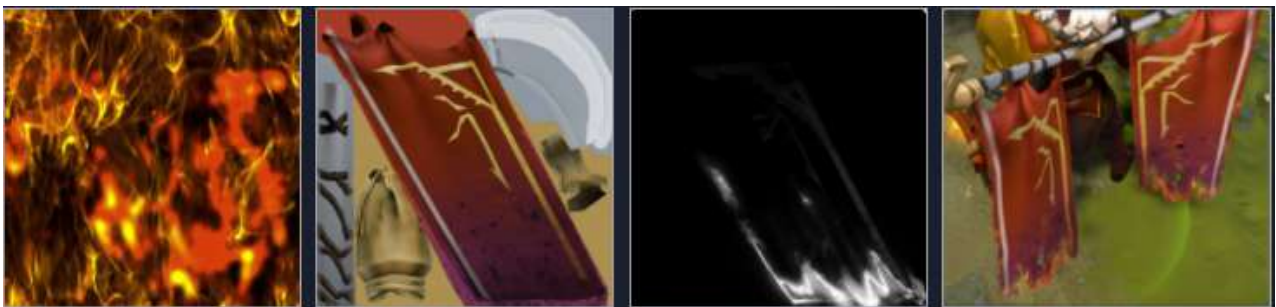
Phantom Assassin - "Manifold Paradox" Arcana Textures

- Phantom Assassin's Arcana uses the weapon slot, changing from single weapon to dual wield swords.
- Some of Phantom Assassin's default items have detail masks to pick up the Arcana texture when that item is equipped. The detail masks do not react when there is no Arcana.

Phantom Assassin's Arcana detail map, default helmet color, detail mask, and game display

Lone Druid - "Rabid" Ability Texture

- This ability displays a brightly glowing design that sits on top of a dark or medium valued color texture.
- The Rabid texture does not display well on top of white or very light base colors, so keep this in mind when designing the color texture for your items.
- The detail masks for Lone Druid's wearable items, Spirit Bear, and True Form are high contrast and focused on just a few areas.
- Don't author the detail mask to use an even, overall Rabid coloring on the Spirit Bear or True Form - this could look broken or cause confusion with other spell effects.
- Because the Rabid effect is an important visual cue for gameplay, have the areas that display the Rabid texture easily viewable from above in game view.

True Form color texture, detail mask, and Rabid texture game display

Spirit Bear color, detail mask, and Rabid game display

Earthshaker - "Enchant Totem" Ability and Ambient Textures

- Earthshaker's totem has a subtle scrolling ambient texture that constantly displays in the item's surface decorations.
- This turns into a vivid glowing scrolling texture when he uses his Enchant Totem ability.

Sven - "God's Strength" Ability Texture

- This ability affects textures in two ways:
    - It changes blue areas of Sven's body and items to a strong red color
    - It adds a scrolling gold texture to areas defined by the detail mask
- Any blue areas on your color textures that match Sven's default blue will turn red during this ability.
- It's best to use the detail mask for small, focused areas of each item rather than overwhelm too much of the surface with the gold texture.
- The gold scrolling texture will work best if it's against dark values on the color texture.
- Items with detail masks will use Valve's default gold detail map for Sven.

Sven's God's Strength detail map, sword color, detail mask, and game display
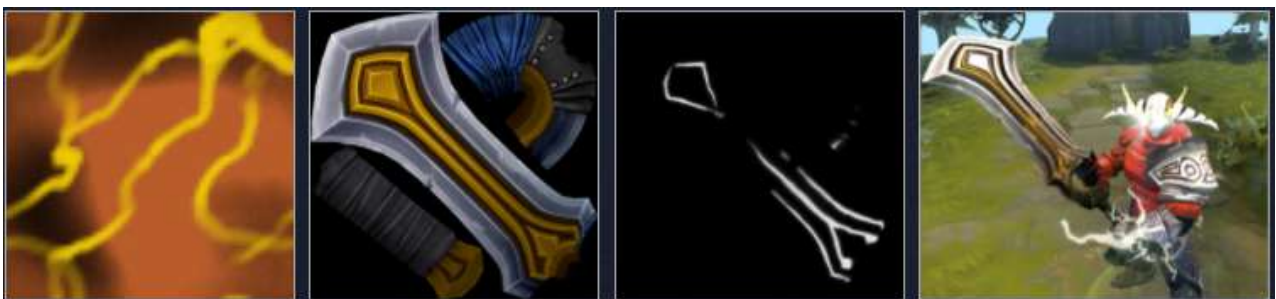
Rubick - Ambient Detail Map

This ambient, scrolling detail map of green bubbles displays constantly on Rubick items authored with a detail mask.

Rubick detail map, robe color, detail mask, and game display
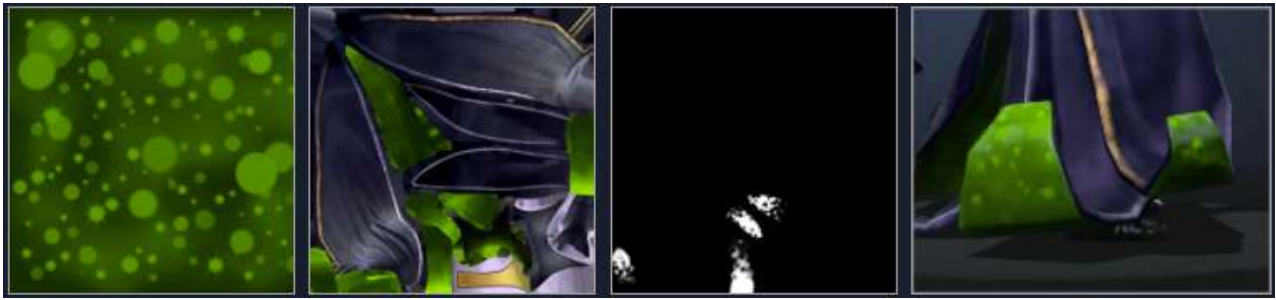
Lycan - Ultimate Ambient Detail Map

- This ambient scrolling texture for Lycan's Ultimate displays constantly.
- The detail mask is very faint but covers a large area and is very visible in game.

Lycan's Ultimate detail map, color, detail mask, and in-game display.

Razor - Ambient Detail Map

This ambient detail map of purplish electrical lightning displays constantly on Razor's base arms and any items authored with detail masks.

Razor detail map, body color, detail mask, and model display
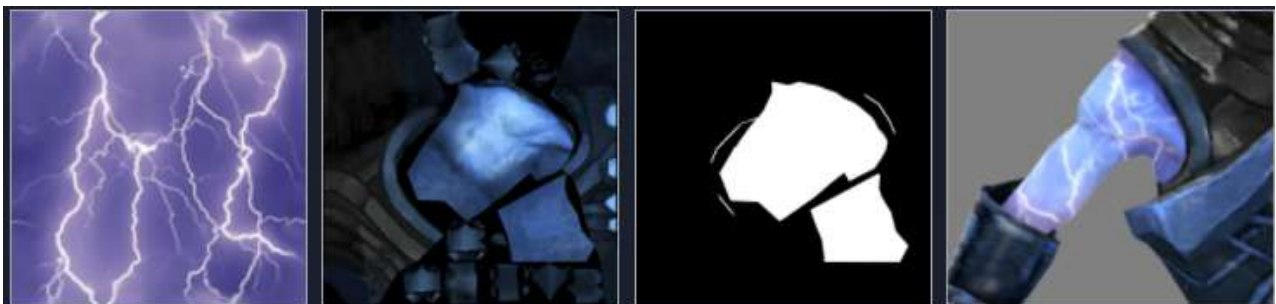
After reading through these notes, look again at how Arcana, Ability, and Ambient textures are displayed on these and other Dota heroes - you'll have much more insight about how these texture enhancements were accomplished.

Dota 2 Item Workshop Guidelines Homepage

Steam Support :: Dota 2 Workshop

- <u>EFFECTS MODEL OVERVIEW</u>
- <u>AUTHORING GUIDELINES</u>
- <u>PARTICLE VERTEX LIMITS AND CONTEXT</u>
- <u>AUTHORING EXAMPLE IN MAYA 2016</u>
- <u>ADDING THE EFFECTS MESH IN THE WORKSHOP TOOL</u>
- <u>EFFECTS MODEL PREVIEWING</u>

EFFECTS MODEL OVERVIEW

- Items which have vertex-based ambient effects on them by default, such as edge glows, require that item authors submit a mesh which defines where these particles should go on the custom shape of their item.
- A workshop item with an effects model will use the default ambient effect authored by Valve for that item and place the particles according to the position of the vertices.
- Hero items that require effects models include weapons for Abaddon, Anti-Mage, Bounty Hunter, Doom, Ember Spirit, Juggernaut, Kunkka, Phantom Assassin, and Skywrath Mage.
- Effects model ambient particles can display in different contexts for different heroes. Some display at all times, some only display when the hero has a certain ability enabled, some require first leveling up to a certain point before the related ability can be enabled.
- Vertex-based effects are not to be confused with particle effects that use attachment points or selection boxes on items.

AUTHORING GUIDELINES

- To author an effects model you create a new mesh, much like creating an LOD. However, this mesh will represent particle positions, one per vertex.
- Triangles, faces, and general connectivity do not matter on this mesh. The best way to create a mesh for this is to treat it as a single polygon.
- Keep in mind that particles will be created from all vertices in the mesh, so do not attempt to create valid convex or closed triangles in the traditional sense if this creates vertices in undesired locations.
- While it is possible to use the vertices from the original model mesh, generally speaking the density will not end up being appropriate for the effect.
- In addition, UV's, hard edges, etc. can create duplicate vertices in some cases which is generally undesirable.

PARTICLE VERTEX LIMITS AND CONTEXT

Here are the particle vertex count limits and ambient effect display context for effects models for these hero items:

- Abaddon - weapon - 128, constant
- Anti-Mage - weapon and offhand - 128 each, constant
- Bounty Hunter - weapon and offhand - 120 each, displays when Jinada ability (available at Level 1) is enabled and is not in cooldown.
- Doom - weapon - 48, constant
- Ember Spirit - weapon and offhand - 32 each, constant
- Juggernaut - weapon - 128, constant
- Kunkka - weapon - 64, displays when his Tidebringer ability (available at Level 1) is enabled and is not in cooldown.
- Phantom Assassin - weapon - 120, displays when Coup de Grace ability (available at Level 6) is enabled.
- Skywrath Mage - weapon - 128, constant
- Terrorblade - two part weapon in one slot - 128 total for both, constant
- Underlord - weapon - 80, displays when his Atrophy Aura ability (available at Level 1) is enabled and a nearby enemy dies while under the effect. Weapon particle display is stronger for hero deaths than for creep deaths and increases with the number of deaths.

AUTHORING EXAMPLE IN MAYA 2016

Below is an example of how to quickly create effects for an item in Maya 2016. Each type of modeling software will vary, but there should be equivalent processes in each.

First, start with your finished geometry. Select this mesh and Modify>Make Live. This will allow you to use the item's model mesh to draw vertices for your new effects mesh, while constraining them to the topology of the original.
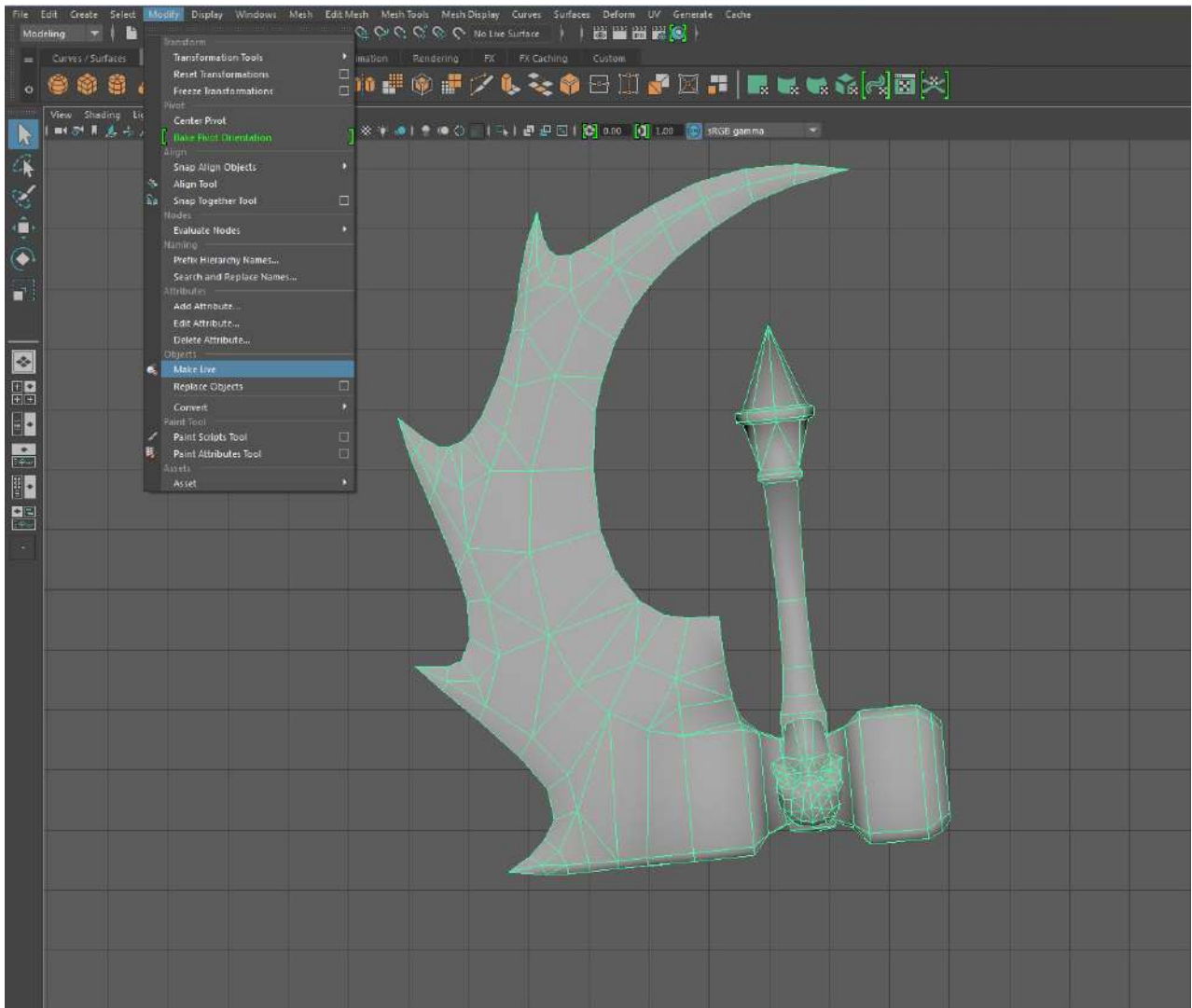
Next switch to the Mesh Tools>Create Polygon. This will allow you to draw the new effects mesh locked to the live geometry.
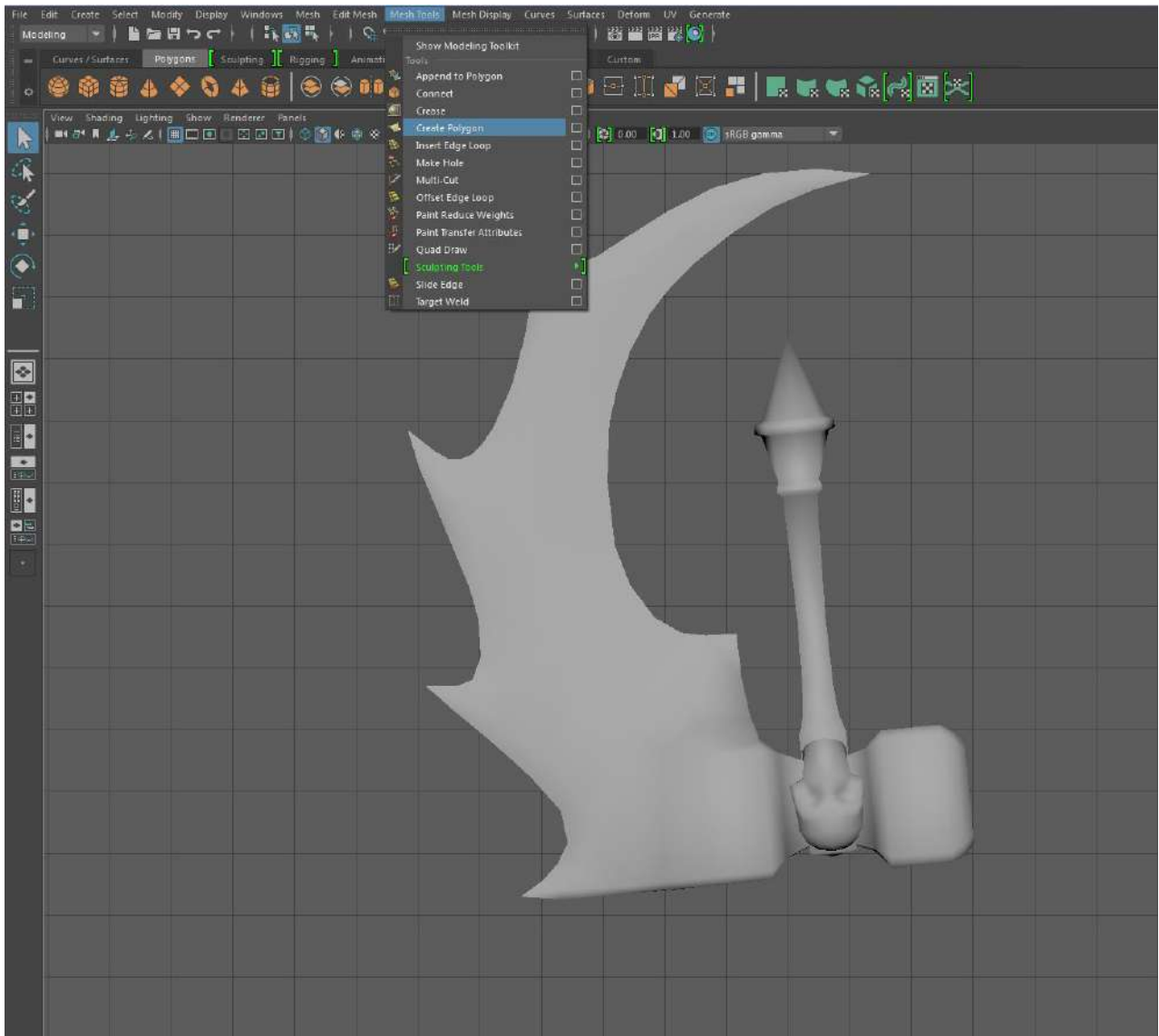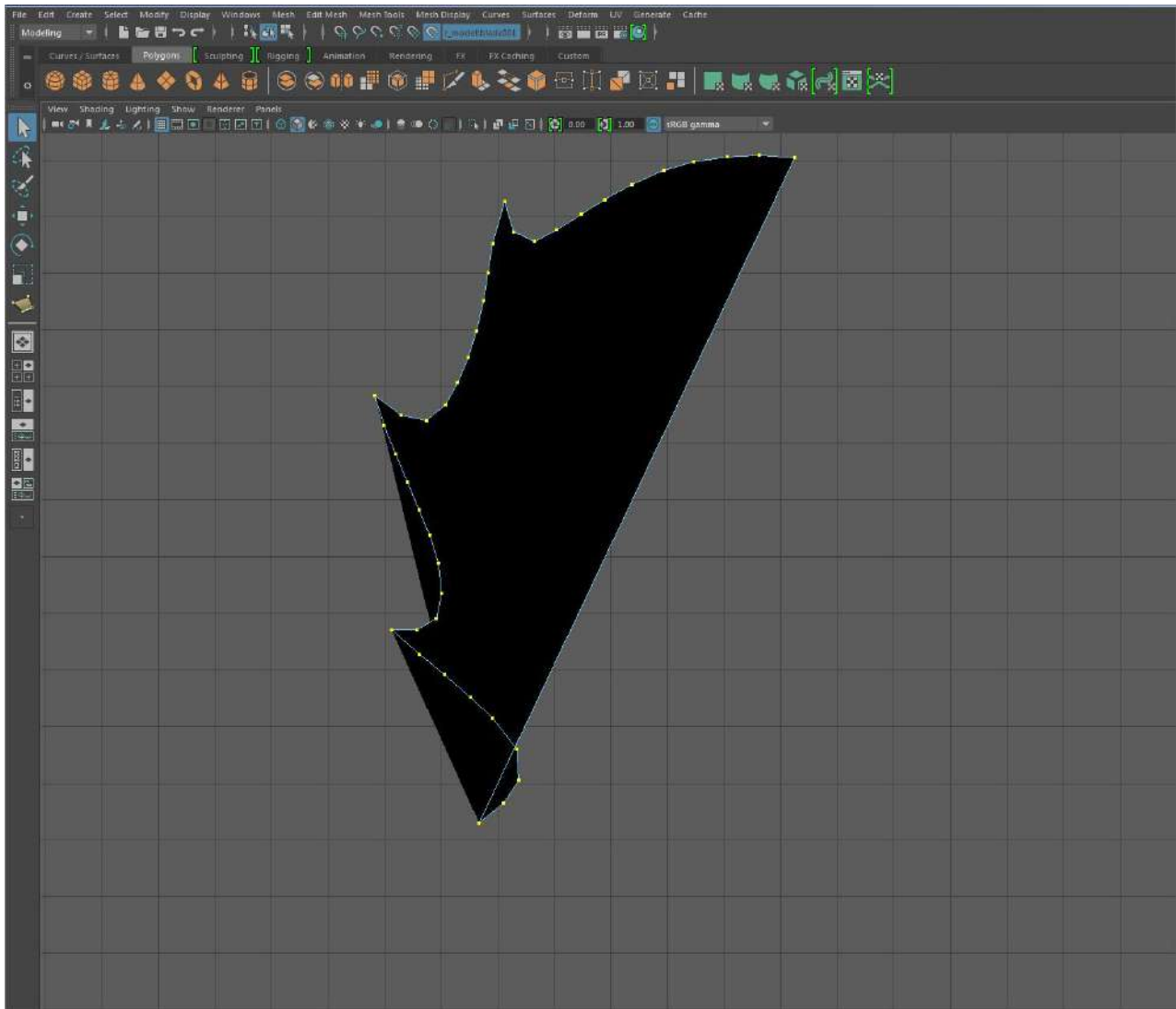
Draw points where you wish to see particles, such as along a blade edge.
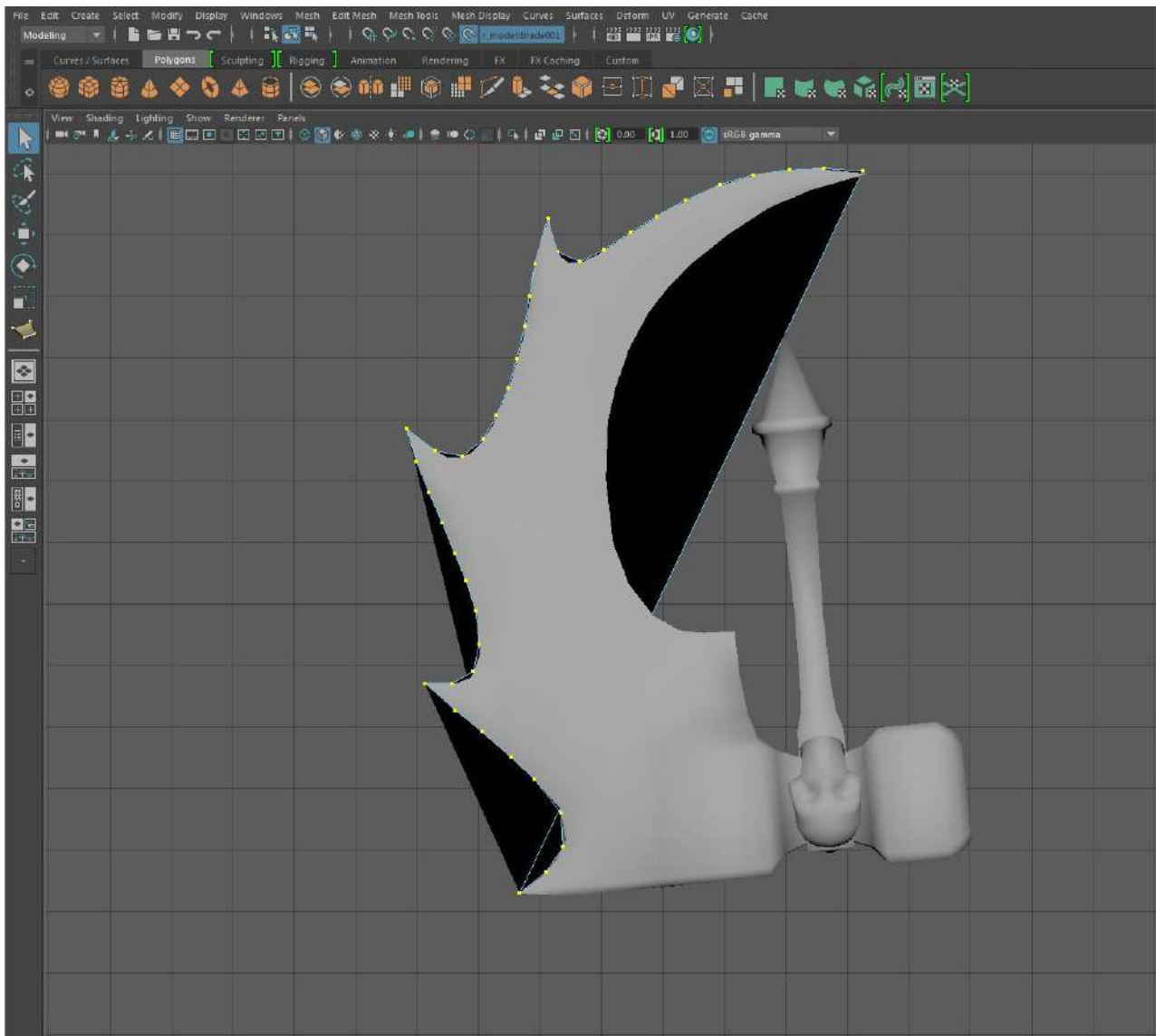
The density of these points will usually be higher than that of the normal mesh, as shown in the example below. It may require a bit of trial and error to get the proper density for the desired look.
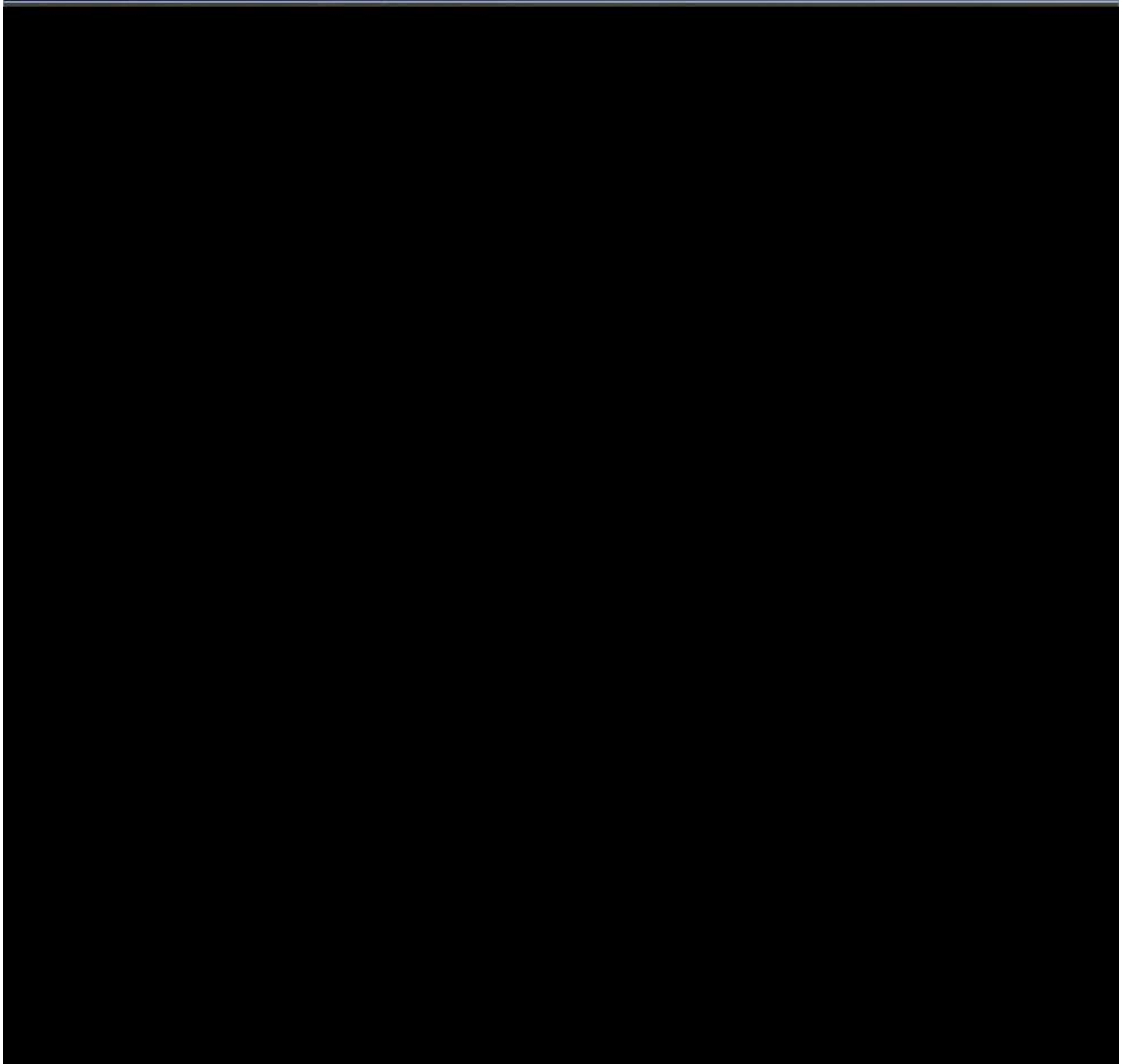
The entire effects mesh you create will be a single polygon.

- Once you've added all the points, you can export just the effects mesh as either an .fbx or .dmx file.
- Name your mesh the same as the item with an _fx postfix, similar to an LOD, for example itemname_weapon_fx.

ADDING THE EFFECTS MESH IN THE WORKSHOP TOOL

Heroes that have effects model requirements for their items will have an "Effects Mesh" entry between the "Meshes" and "Materials" entries on the workshop tool's "Select Inputs" page.
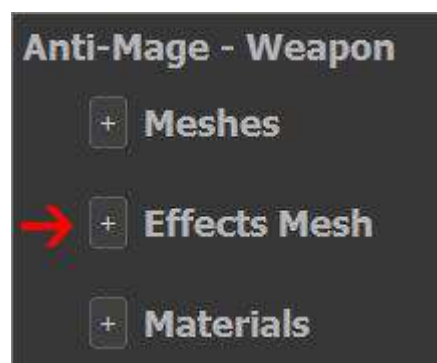
EFFECTS MODEL PREVIEWING

Loading the effects model along with the model meshes into the Dota 2 Workshop item submission tool should show you a preview of the default ambient particles on the model and in the demo mode loadout only if they are supposed to display all the time for that hero.
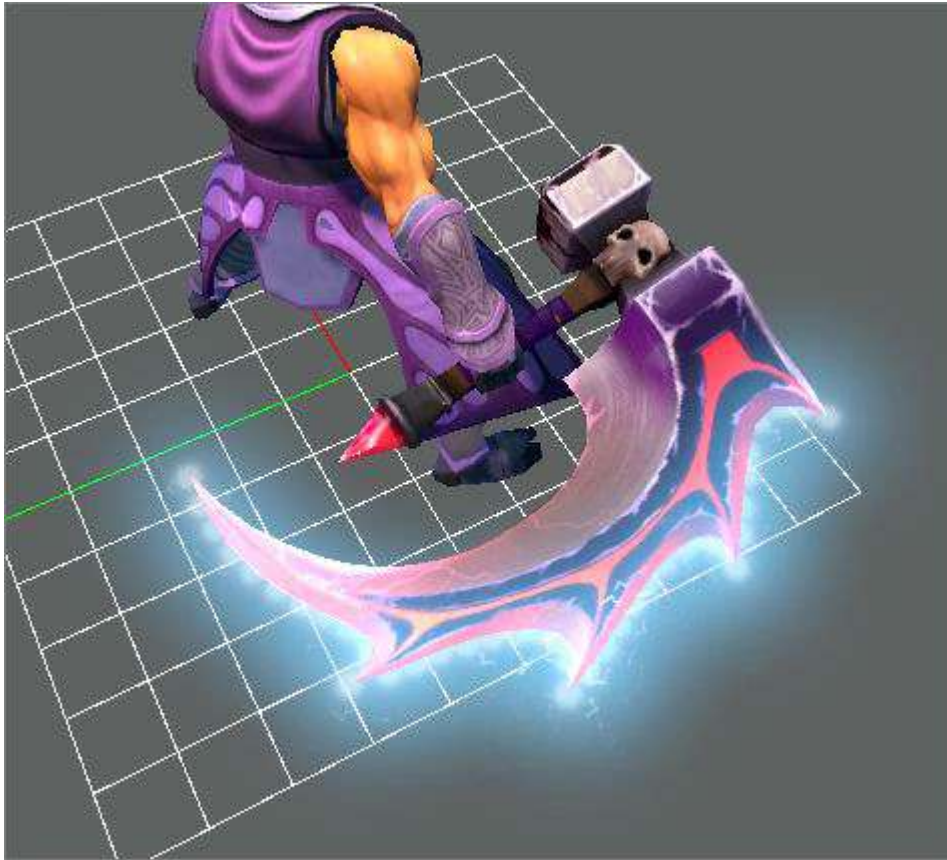
- If you don't see the effects model particles in the preview or loadout, they may only appear at a certain hero level or in a certain context which will require testing in game using demo mode.
- Look at the Particle Count and Context section above to see the conditions required to display effects model ambient particles for specific heroes.

Dota 2 Item Workshop Guidelines Homepage

Steam Support :: Dota 2 Workshop

- [WEARABLE ITEM TYPES AND ITEM SETS](#)
- [WEARABLE ITEM TECHNICAL REQUIREMENTS](#)
- [WEARABLE ITEM TESTING AND SUBMISSION](#)
- [SPECIAL WEARABLE ITEM CONSIDERATIONS](#)

WEARABLE ITEM TYPES AND ITEM SETS

- Hero wearable items can be:
    - Clothing
    - Helmets and Armor
    - Weapons
    - Mounts ridden by the hero
- Each hero has several "slots" that can be equipped with a variety of items. The number of slots and types of items vary for each hero.
- A full set of wearable items for a hero can be displayed on the Steam Dota workshop as a collection.
- In game, a collection of wearable items for a hero is known as an "item set".

- The images above show various item sets available for Luna that use Head, Weapon, Offhand Weapon (shield), Shoulder, and Mount item slots.

WEARABLE ITEM TECHNICAL REQUIREMENTS

- Hero wearable items - including mounts - use the hero's default skeleton, joint position, cloth, material settings, and animations.
- Hero wearable items need to be weighted to hero skeletons provided by Valve.
- Valve's hero reference models as well as information about each hero's item slots, texture and model budgets, and specific authoring requirements can be found through the Hero Resource page.
- Please note that our budgets refer to triangles, not polygons.
- It is helpful if you tessellate your model into triangles before submission to confirm that the final mesh is what you intend. Otherwise our tools will triangulate the mesh but may have different results from what you'll see using your software.
- Our game is only able to support the skinning of 4 vertices per joint. Skinning to additional vertices will be removed or will cause a failure when community items go through our workshop compiler.
- When creating hero items, be very aware of how the values, color palettes, gradients, and texture details of your items affect hero readability in game.
- You can differ from default colors and silhouettes as long as your items still support the hero's identification. For more details, please see our updated Character Art Guide.
- Refer to the Asset Creation guidelines on the Dota 2 Item Workshop Guidelines Homepage for general information about authoring models and textures.

WEARABLE ITEM TESTING AND SUBMISSION

- Refer to the Submitting Items page for important general information about testing and submitting items.
- There will be specific instructions within the tool or in the hero's resource page if there are special requirements for authoring, testing, or submitting a hero item, such as a Nightstalker day/night item or a weapon for Leshrac.
- You'll need to submit each hero item separately and save a separate workshop session for each one.
- Once you have taken each of the items in your set as far as the model compile in the workshop tool, you can preview your hero wearing all the items you created by using "Select Wearables" on the Preview Models page. All of your items must be compiled in the workshop tool first in order to generate the vmdls needed for previewing and in-game testing.
- Your "Select Wearables" choices will be stored when you save your workshop session file. You can clear out your custom item selection by choosing "Reset to Default" in the "Select Wearables" pane.
- You'll be able to put a full set of hero items into a collection after they're submitted to the workshop.

- If you have technical problems testing or submitting your hero items, please see our Item Troubleshooting page

SPECIAL WEARABLE ITEM CONSIDERATIONS

- Certain heroes have opportunities for item textures to display different colors or motion effects. For more information, see Authoring Arcana, Ability and Ambient Textures.
- We may request low-violence versions of some items. Some heroes have low-violence base models that need to be considered when creating items. For more information, see Low Violence Items.
- Some hero weapons require an effects model that allows Valve's default weapon effects (flames, glows, etc) to follow the custom shape of your weapon. For more information, see Item Effects Models.
- Some thrown weapons like Pudge's hook, Enchantress' spear, and Huskar's spear have the option for a weapon swap that allows the custom model to fly through the air during an attack or ability. This swap is enabled by a Valve particle effect that requires these weapons to be authored at the origin and have the same orientation and size as the hero's default weapon in order to display properly in game. Please refer to the hero reference files available through the Hero Resource page.

Dota 2 Item Workshop Guidelines Homepage

Steam Support :: Dota 2 Workshop

Is there a main resource web page for the Dota 2 Item Workshop?

> Yes. The Dota 2 Item Workshop Guidelines Homepage is the starting place for item workshop resources.

Do I need a special Steam account to submit items to the Dota Workshop?

> You need to follow certain procedures to set up a Steam account and submit bank and tax information before you can add items to the Dota Workshop. Please see Account Preparation for Workshop Submissions for details.

What are the steps to making and submitting a Dota 2 Workshop item?

- Concept: Come up with an idea.
- Reference: Go to the <u>Hero Requirements</u> page to find model and texture budgets and reference files for hero items.
- Author your items. See links on the <u>Workshop Guidelines</u> home page and the <u>Tutorial</u> and <u>Software</u> links on this page for more information about the following creation processes:
  - Model: Using a 3D modeling program, create the model for the item, weighting the mesh to a Valve reference file where applicable.
  - UVs: Unwrap the 3D model so you can texture map it.
  - Texture: Using your UVs as a guide, paint the surface of your item.
  - Shaders: Adjust the properties of your materials.
  - Animation: Needed for NPCs such as couriers that have a custom skeleton.
- <u>Install the Dota 2 Item Workshop tools</u>
- <u>Test and submit your items</u>
  - Use the Dota 2 Item Workshop Item Tools to compile and test your items in game.
  - Upload your items to Steam's Dota 2 Item Workshop and spread the word to the Dota community.

How does the item publishing process work?

- After you submit your item to Steam's Dota 2 Item Workshop, the Dota community will see it displayed as a new submission and will provide feedback and votes for your item.
- Interesting items are selected by Valve's Dota Economy team for review based on quality, creative and technical fit with Dota and community reaction.
- Valve artists and the economy team review items in game, looking at technical and artistic execution, gameplay readability, and comparing them to other custom and default items.
- If there's interest in shipping your items we may request that you make revisions.
- If the revisions are approved, we prepare the items for our pipeline and integrate them into pre-shipping builds of Dota 2.
- We test your items in game through internal playtests.
- We release the items on the Dota 2 store and share the revenue from the store sales with you.

How do I submit a Dota Team or Player Branded item, a Dota League ticket, or a Dota Game Mod?

- <u>Team, Player, and Caster Branded Items</u>
- <u>Dota 2 League Tickets</u> - read the League instructions first, then submit tickets as <u>Contract Only</u> through the Item Workshop tool.
- <u>Dota 2 Game Mods</u>

What are some guidelines for matching the Dota 2 art style?

Please be aware that "matching the Dota 2 art style" does not mean strictly following the coloring and silhouettes of Dota 2's default hero items. Dota 2's art style follows very important general design concepts that apply to the readability and quality execution of all items, including inventive items that thoughtfully differ from the defaults and add to the appeal of our game. These principles are covered in the Character Art Guide and other Asset Creation Guidelines that have been updated and expanded for Source 2.

What should always be avoided when creating items for Dota 2?

- Obscenity: We will automatically reject any obscene items.
- Copyright infringement: Even if you made a model yourself, if you used an existing likeness without the owner's permission, it's copyright infringement. Unauthorized images, audio or models from other commercial properties, from other people's Steam workshop submissions, from artist's galleries on the Internet or from any other sources covered by copyright cannot be used in Dota 2.

Where can I find good tutorials to learn 3D modeling?

- There are a lot of digital art communities online with great information:
    - http://www.polycount.com/forum
    - http://forums.cgsociety.org
    - http://www.zbrushcentral.com
    - http://3d-coat.com/forum
    - http://www.cgfeedback.com/cgfeedback
    - http://blenderartists.org
- Search for 'speed modeling' or tutorials using your specific modeling or animation software on YouTube.
- Several Dota workshop artists have created item authoring guides on the Steam Community. If you're impressed by the items of a workshop artist, click on the artist's link under "Created By" on the item's workshop web page. This will take you to the Steam Community page for the artist. They'll have listings in the column on the right under "Guides" if they have created community guides. See if they have created any guides for authoring items. Some instructions and images may refer to Source 1 procedures but they could still be very helpful.
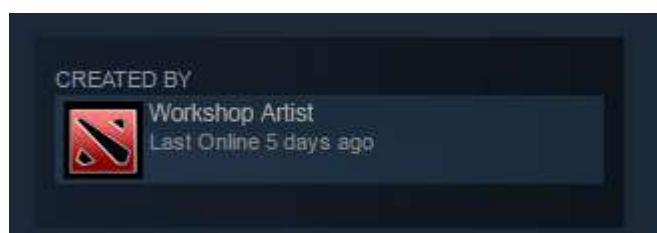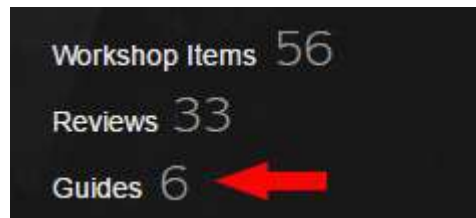
- Look at our list of <u>Service Providers</u> to find toolmakers, organizations and users who provide tutorials and other assistance to workshop artists. If any of these service providers have been helpful enough that you'd like to show your appreciation, when you submit your item to the workshop you'll have the option to give them a percentage of Valve's revenue if the item is sold on the Dota store.
- Go to <u>Steam Community Dota Guides</u> and use the "Filter" drop-down list to find guides tagged with "Workshop", "Weapons", "Modding or Configuration" or "Characters".
- Visit the <u>Valve Developer Community Modeling Category</u> - most of this information is only applicable to Source 1 or other games, but it still covers general modeling concepts that are helpful.

What software should I use to make my item?

Bear in mind that our workshop tools no longer support the .SMD model file format, so models will have to be submitted as .FBX or .DMX files.

I would like to create a custom courier. Do I have to animate it or will Valve take care of that?

- You will need to provide fully animated walking and flying versions of your courier for a successful submission.
- There are special animation requirements for NPCs (Non-Player Characters). Please see the specific guidelines for <u>Couriers</u>, <u>Wards</u> and <u>Ability Model</u> creatures (Summoned Units and Ultimates) as well as the <u>NPC Animations Guide.</u>

Do I need to use special tools to submit Workshop items?

Yes. Please review <u>Installing and Launching the Dota 2 Workshop Item Tools</u>.

Do all heroes in Dota 2 have the same types of items?

Due to the diversity of heroes in Dota 2, each hero has a unique set of items. Hero-specific requirements, budgets, and reference models can be found through the <u>Technical Requirements/Hero Resource</u> page.

Where can I get the original content for the existing characters so I can build my item in context?

- The source geometry and texture files for Dota heroes are available through the Hero Resource page.
- We prefer that you work with Valve's reference models rather than decompiled game models which may have incorrect poses or scaling.

Will you be adding more heroes to the Dota 2 Item Workshop?

Adding new heroes to the workshop and updating existing hero reference files will be a gradual, ongoing process. New and updated workshop heroes will be noted on the Hero Resource page.

Can people at Valve give me feedback on my ideas or concept drawings?

The Dota 2 Workshop exists to allow the community to give feedback and have influence over what we ship. If you need feedback, please post your concepts or items publicly on the Workshop to allow the Dota 2 community to comment and vote on your ideas. We usually only give feedback if, after review by our artists and economy team, we decide we would like to consider your completed items for shipping but need to see some revisions.

I submitted an item to the Workshop. When will I hear whether it has been accepted or not?

Due to the volume of items we are unable to respond to every workshop submission. If, after review, we decide we'd like to consider an item for shipping but would like to see some revisions, we will contact you to request revisions through the private developer comments on the Dota 2 Workshop. If we communicate with you or ask for revisions, that is still no guarantee that an item will actually ship. We may keep some items or sets in mind for a long time before we find a good place for them.

I am having technical problems preparing my items or using the Dota Workshop Item Tools. Can someone help me?

- Look at our Item Troubleshooting page to see if the issue is mentioned there.
- A good resource for assistance with tool or item creation problems is the Dota 2 Workshop Item Tools Forum. Members of the community may be able to help you resolve problems. Valve developers also check this forum to become aware of workshop tool issues we need to address.

Can I change the revenue shares on my workshop item?

Once an item is finalized on the workshop, you cannot change the revenue shares on that submission. If the item has not shipped, you can create a new workshop submission with the preferred revenue shares. Notify Valve of this change through the private developer comments on the old and new submissions and put a link to the new submission in the developer comments for the old item. If this item is part of a collection, you should remove the old item from the collection and replace it with the new one. Once the item ships we cannot change revenue shares.

Dota 2 Item Workshop Guidelines Homepage

Steam Support :: Dota 2 Workshop

Below are some technical problems artists have encountered while authoring or submitting items.

- I'm getting a compile error that says my model is 516 triangles and is not weighted to bones, but this does not apply to my model.
- I imported a Valve FBX reference file into my modeling software but some joints have the incorrect orientation
- My model mesh has broken skinning, is the wrong scale, or is completely detached from the skeleton when I preview it in the workshop tool.
- My submission has failed to complete
- My item submission shows an "Invalid Zip File" error.

- I looked for my item on the workshop but the link goes to a page that says "That item does not exist. It may have been removed by the author".

- If you're looking for help with Dota 2 League tickets, please go here.
- If you're looking for help with Dota 2 Custom Games, please go here.

ITEM WORKSHOP FEEDBACK AND BUG REPORTS

- If the problems you're encountering are not addressed here or you have feedback concerning our item workshop tools or hero reference files, please report this on the Dota Item Workshop Dev Forum.
- For bugs, provide as much detail as you can:

1. The software package and format of the files you're working with
2. What hero or items you're working with
3. What plugins you're using to export model and animation files
4. Any error messages you see
5. Screen shots of problems with models or textures (including views of joints or wireframes if necessary)
6. Steps we can follow to reproduce bugs

We appreciate your help!

I'm getting a compile error that says my model is 516 triangles and is not weighted to bones, but this does not apply to my model.

If you get a model compile error saying your item is 516 triangles, the tool may actually be reading the 516 triangles of our "ERROR" model, which does not have any bones. Reading the 'ERROR' model actually means something else is failing earlier in the compile, possibly a texture. We've made adjustments to eliminate most causes of the misleading triangle message but it may occasionally still occur.
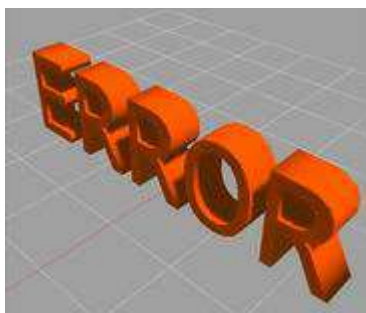
- Look at the Import Log for your item to get information about what is failing in your item's compile. When debugging it helps to also have your console open before you try to submit an item so you can see any additional errors that may be useful.

- If the console information doesn't make the problem clear, you can post the output from the console to the Dota Dev Item Workshop Forum. Valve devs or community members may be able to help you resolve the problem after having more information.

I imported a Valve FBX reference file into my modeling software but some joints have the incorrect orientation.

We are aware that some third party software has problems importing the FBX format we are now using for workshop reference files. We have transitioned to using the FBX format for better functionality within our pipeline and better compatibility with most commercial modeling and animation software. We found Autodesk's FBX SDK very helpful when we were transitioning our tools to FBX and we highly recommend this resource (which includes a Python SDK) to other modeling software developers.

My model mesh has broken skinning, is the wrong scale, or is completely detached from the skeleton when I preview it in the workshop tool.

- Valve reference file. Are you weighting meshes to a current Valve reference file? Old Valve model files, files from other sources or decompiled game files may contain incorrect scaling or inaccurate joint positions. You can download Valve's latest model files from the Hero Resource page.

- Import and Export with Scale Factor set to 1.0. Our workshop tools don't use a set unit of measurement. However, when you import our workshop reference files or export your item files, it is important to ensure that your importer and exporter do not apply a scale factor other than 1.0. The scale factor can be viewed in your software's import and export settings. You should confirm the correct scale settings before importing any Valve workshop file.

- Bone renaming. If you see a compile error saying bones have not been found, check to see if your reference file import or authoring process, such as adding a rig, caused the bones of our default skeleton to become renamed.

- Include the root bone. Export your mesh file with the root bone included. Some exporters may decide to ignore the root if it is not part of the skinning, to avoid that you can add the root bone to the skin with 0 influence.

- Altered joint positions. Did you reposition the joints of Valve's default hero skeleton before authoring your item? Community hero wearable items, including mounts, must work with Valve's default hero joint positions and animations.

- Mesh shape is incompatible with animated joints. Is your mesh drastically different from the default hero skeleton in an area that has many highly active joints, such as wings? If your mesh distorts too much during animations you may have to revise the mesh to more closely follow the skeleton.

- Valve cloth. If you are authoring something that uses Valve's cloth, such as Zeus' scarf or Crystal Maiden's cape, study the skinning on Valve's hero reference file and copy it if necessary. Source 2 cloth requires very careful weighting.

- Static model export pose. Have you accidentally exported your model on an action pose or a range of animation? You'll need to export your model as a single, static frame of the skeleton's bind pose. If your item is skinned to a Valve skeleton, the joints must match the scale, positions and rotations of Valve's bind pose.

- 4 Vertex skinning limit. Our game is only able to support the skinning of 4 vertices per joint. Skinning on additional vertices will be deleted.

- Mesh triangulation. Did you triangulate your mesh? If you don't do this, our workshop tool will triangulate the mesh, which may cause changes from the deformation you authored.

- Duplicate bone names. If you are creating a custom skeleton for a ward, courier or ability model, avoid having duplicate bone names. These can cause model distortions in Source 2.

- Custom skeleton checkbox. If you are submitting an ability model with a custom skeleton and custom animations, be sure to mark the 'Model Uses a Custom Skeleton' checkbox to ensure that Valve's default animations for that item type are not accidentally applied to your skeleton.
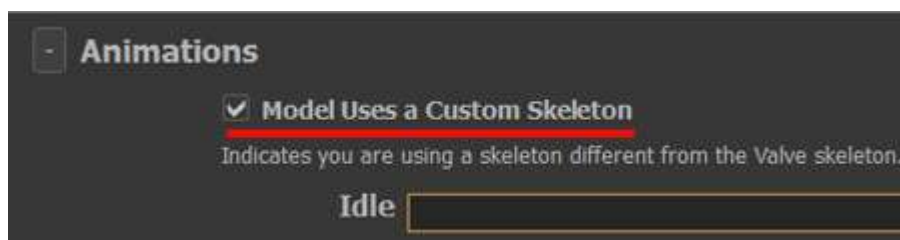
- FBX or DMX exports. If you are seeing issues with models that have been exported as FBX files and have followed all of the above requirements, try exporting files as DMX if you have that option.

- More model guidelines - Please see our Model Requirements page and the guidelines for specific item types.

My item submission has failed to complete.

- If you were testing a work-in-progress item with a mesh that's over our triangle limit you will need to adjust it to be within the item's budget before you can submit it to the workshop.
- You need to make sure you are not using a "Limited" account to make a submission. To combat fraud, we require that Steam accounts need to have purchased at least $5 USD on the Steam store before they have certain privileges, including being able to submit items to the Workshop. You can find out more on the Limited User Accounts FAQ.

My item submission shows an "Invalid Zip File" error.
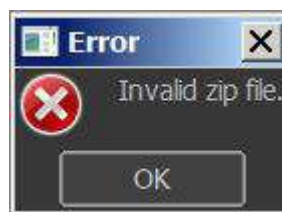
You will get an "Invalid Zip file" error if you try to add additional files to your workshop submission .zip file beyond those generated by the workshop tool. Files for supported item types should be submitted under the appropriate category. If there is no category for the item you wish to submit that means our workshop item tool is unable to accept it at this time.

I looked for my item on the workshop but the link goes to a page that says "That item does not exist. It may have been removed by the author".

- Make sure you are logged into the workshop.
- If you are trying to view a submission that you have marked hidden, be sure that you are trying to view it through the same account you used to submit it.
- If you are trying to view an item submitted by a friend that has its visibility set to "Friends Only" you will need to view it through the account they use to friend you.
- Make sure that the revenue shares have been finalized for the item. After all parties have agreed to the revenue shares, the entity making the submission has to finalize these shares.

Dota 2 Item Workshop Guidelines Homepage

Steam Support :: Dota 2 Workshop

This guide describes a method for quickly creating a consistent color texture from a high resolution sculpted source and applying it to the low resolution in-game asset.

- <u>DEFINING COLOR</u>
- <u>AMBIENT OCCLUSION</u>
- <u>POINT LIGHT MAP</u>
- <u>COLOR MAP</u>
- <u>GRAPHIC PATTERNS</u>
- <u>FINAL ADJUSTMENTS</u>

DEFINING COLOR

- Dota 2's in-game lighting is quite subtle and as a result we tend to lose a lot of the sculptural detail in the character's normal maps.
- We offset this by baking - or painting - the light into the color texture.

AMBIENT OCCLUSION

Start with the predominant color of the character

Bake an ambient occlusion map (AO Map) of the model.

Multiply the ambient occlusion layer on top of the base color at an 80% opacity.

POINT LIGHT MAP

- Place a couple of simple white point lights in your scene and render out a light map.
- You don't want ambient occlusion in this light pass, just pure point light information, preferably with a material that captures specular highlights.
- Turn off projected shadows. Typically, multiple point light maps are baked with lights in various positions then blended in Photoshop into one map for more precise control.
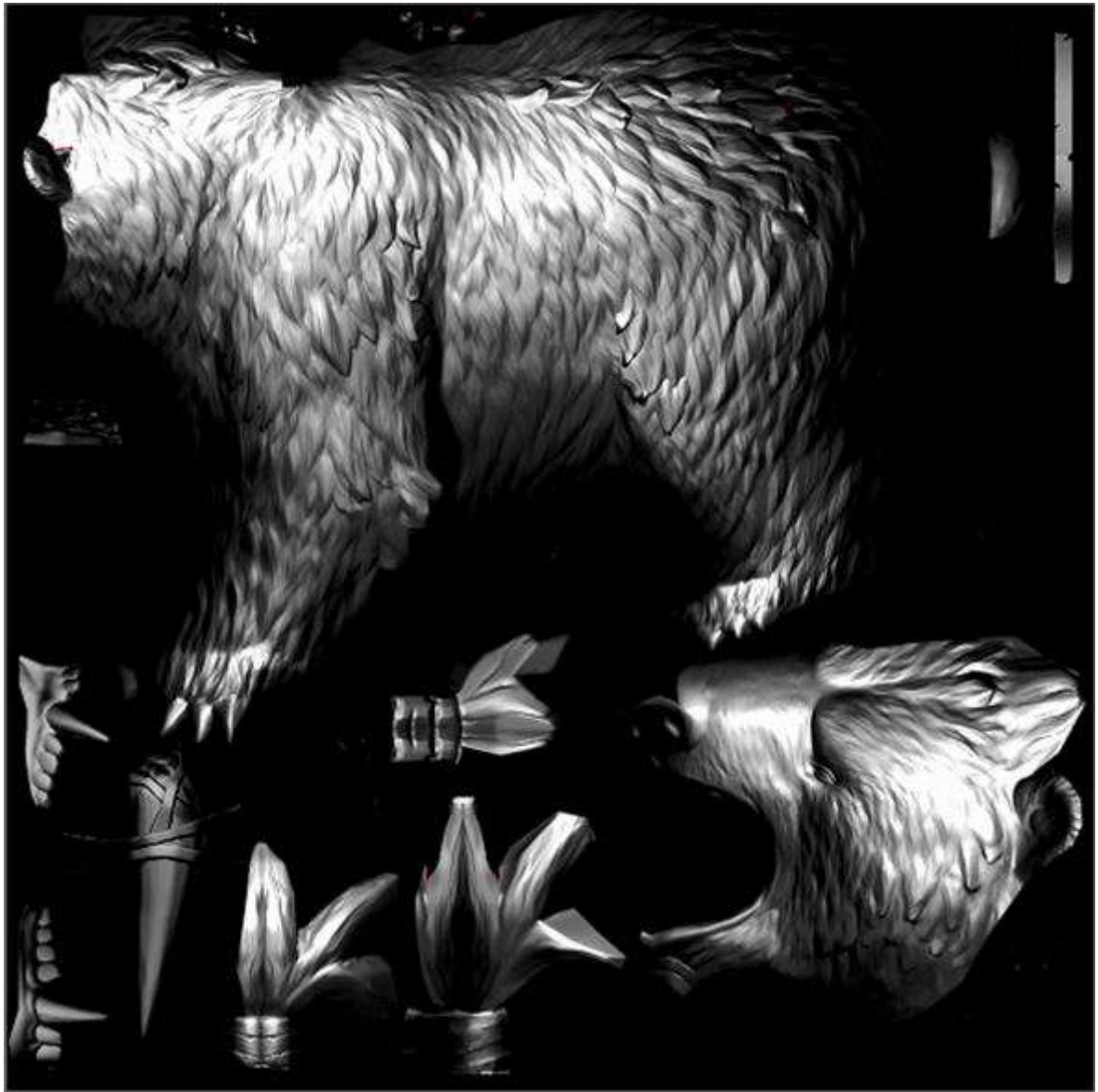
- The point light map captures more sculptural information than is possible with a pure AO map.
- We bake this map separately from the AO as we want to control the two elements differently.
- The point lightmap also gives you a good starting point to introduce your top-to-bottom, light-to-dark gradient.

- Clamp the shadows so they don't darken the base map unnecessarily.
- A 90 90 90 (RGB) screen layer at 85% opacity on top of the point light map is a good place to start.
- You can group these two layers together to make them easier to blend onto the base map.

- The point light group is layered above the AO map.
- Set the point light group's blending mode to 100% soft light.
- This constitutes the 'underpainting' of the texture. Because we have a strong sculptural base to the texture we don't need to paint too much in the way of lighting and shadow information.

COLOR MAP

The majority of the painting is done in the color layers.

The color group is blended on top of other layers in overlay mode at 80% opacity.

- Dota 2 has a very bright and intense palette with lots of saturated colors. Layers with certain blend modes can blow out the palette into unusual colors, so it's worth clamping shadows and highlights to avoid excessive contrast. How aggressively you do this is best determined on a per character basis.
- For this character the color layer group was duplicated and given a blending mode of lighten at 30% opacity.

The color layer group was duplicated again and given a blending mode of darken at 50% opacity. This allows the shadows and highlights to be controlled independently.

GRAPHIC PATTERNS

- Most of Dota's characters have large crisp graphic patterns to aid legibility.
- These patterns can be blocked in loosely on the initial rough texture then later enhanced by a masked color layer.
- A layer mask is created using the lasso tool.
- Then color is painted on to sharpen edges and make colors more consistent.
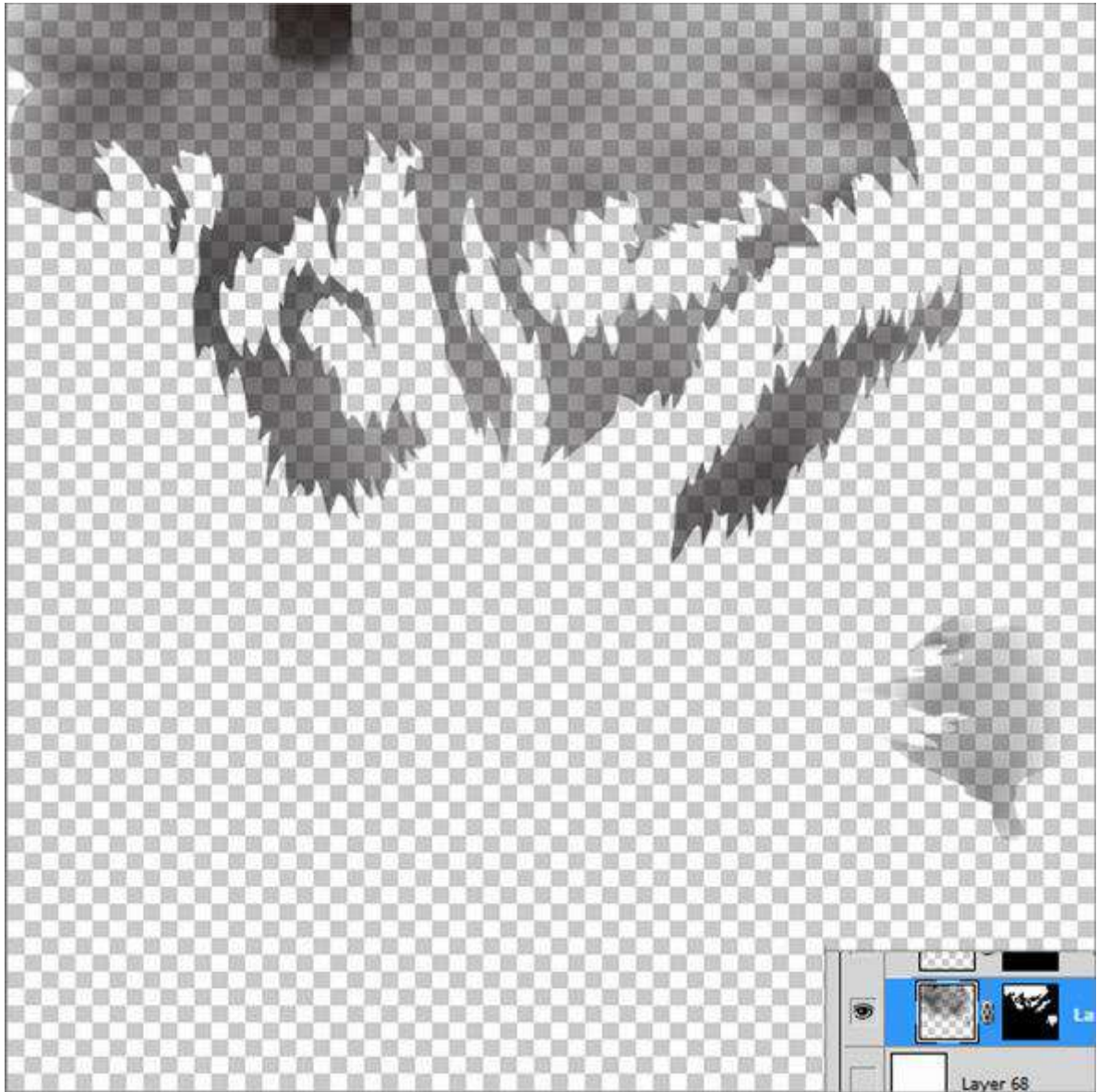
Color is loosely painted inside the layer mask to preserve a sharp edge to the design. The blending mode is set to normal at 80% opacity.
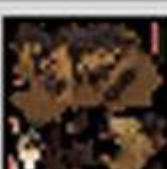
FINAL ADJUSTMENTS

Make final adjustments to details like the eye highlights, improve the value gradient overall, and adjust the saturation.

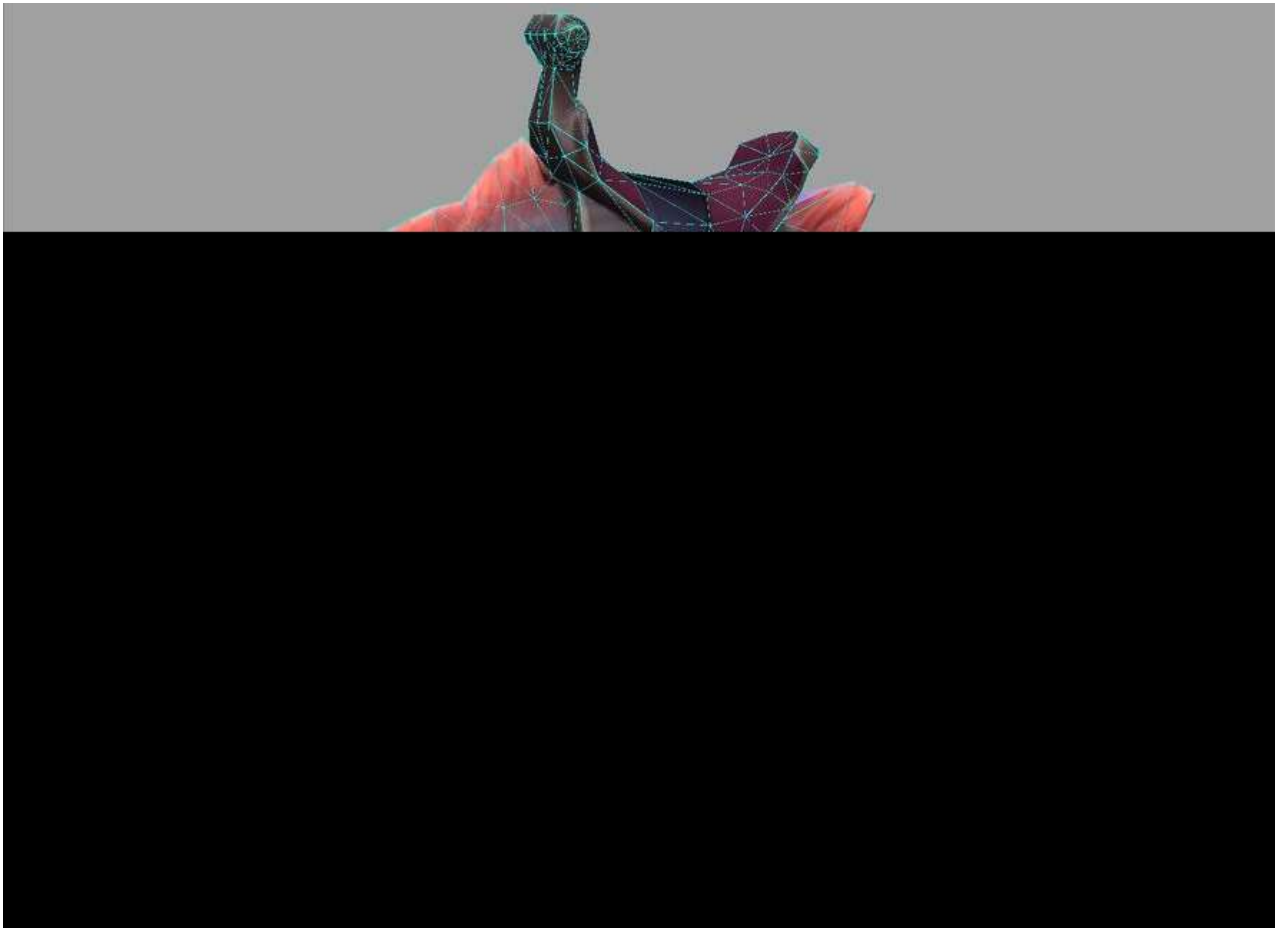This color texture is now perfectly synched to all of the details in the normal map.

final adjusments

graphicPattern

color-darken

color-lighten

color-Overlay

PointLight-softlight

R90 G90 B90-Screen

pointLightMap

AO-Multiply

baseColor

Dota 2 Item Workshop Guidelines Homepage

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- [DIMENSIONS](#)
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- [BASE MODEL INTERACTION](#)
- [INTERACTION WITH OTHER HERO WEARABLE ITEMS](#)
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DOTA 2 WORKSHOP MODEL TYPES

This page is applies to all Dota workshop model types. You can find additional item-specific model requirements on these pages:

- [Hero Wearables](#)
- [Ability Models](#)
- [Couriers](#)
- [Sentry/Observer Wards](#)

BUDGETS

- Due to unique design of every hero, each one has different geometry and texture budgets for his or her items.
- Model budgets always refer to triangles, not polygons.
- Be sure to check the individual hero pages accessible from the [Hero Resource page](#) for specific information on item budgets.
- Wards, couriers, and ability models can have no more than 60 bones. Undying's Flesh Golem, which has to use Valve's default skeleton, has an exception to use 62 bones.
- Most hero wearables can use no more than 60 bones from the hero's default skeleton. The exception is Winter Wyvern's back slot because the hero has a large number of bones and this item covers most of the body.

MODEL FILE FORMATS

- We no longer support .SMD files for workshop submissions. Model and animation files submitted through the workshop tool will need to be either .FBX or .DMX.
- Some third party modeling software has issues importing our reference FBX files, which may display with incorrect joint rotations. Until the developers of these packages are able to update their FBX plugins you may need to try using other software to author your items.

LOD (LEVEL OF DETAIL) GEOMETRY

- Each item can have two models with different levels of detail.
- The optional, higher resolution LOD0 model is used in the portrait, loadout and in-game close up showcase views.
- The required lower resolution LOD1 model is used for normal top-down in-game viewing.
- When testing your item in the workshop tool, you can switch between LOD0 and LOD1.
- LOD0 can sometimes be twice as detailed as LOD1, depending on the hero, item, and overall budget.
- Some Valve artists create LOD0 first, then create LOD1 from this by optimizing and removing small details. Other Valve artists author LOD1 first, then build on this to add details for the LOD0 version.
- If LOD0 geometry is not provided, the LOD1 geometry will be used for all situations including close-up views.

DIMENSIONS

- If you decide to make items of very different dimensions from the hero's default items, bear in mind that the hero's selection area will not grow or shrink to fit custom items.
- We're open to looking at item designs that push the boundaries but be aware that extreme deviation from the default item size or silhouette may cause problems identifying the hero in-game. If you decide to try a profoundly different silhouette for some items, you may need to bring colors or other items closer to what's recognizable for the hero to compensate for this. Our Character Art guide has more information about achieving this balance.
- Be careful if your mesh drastically differs from the default hero skeleton in an area that has highly active joints, such as wings. If your mesh distorts too much during animations you may have to revise the mesh to more closely follow the skeleton.

POLYGONS
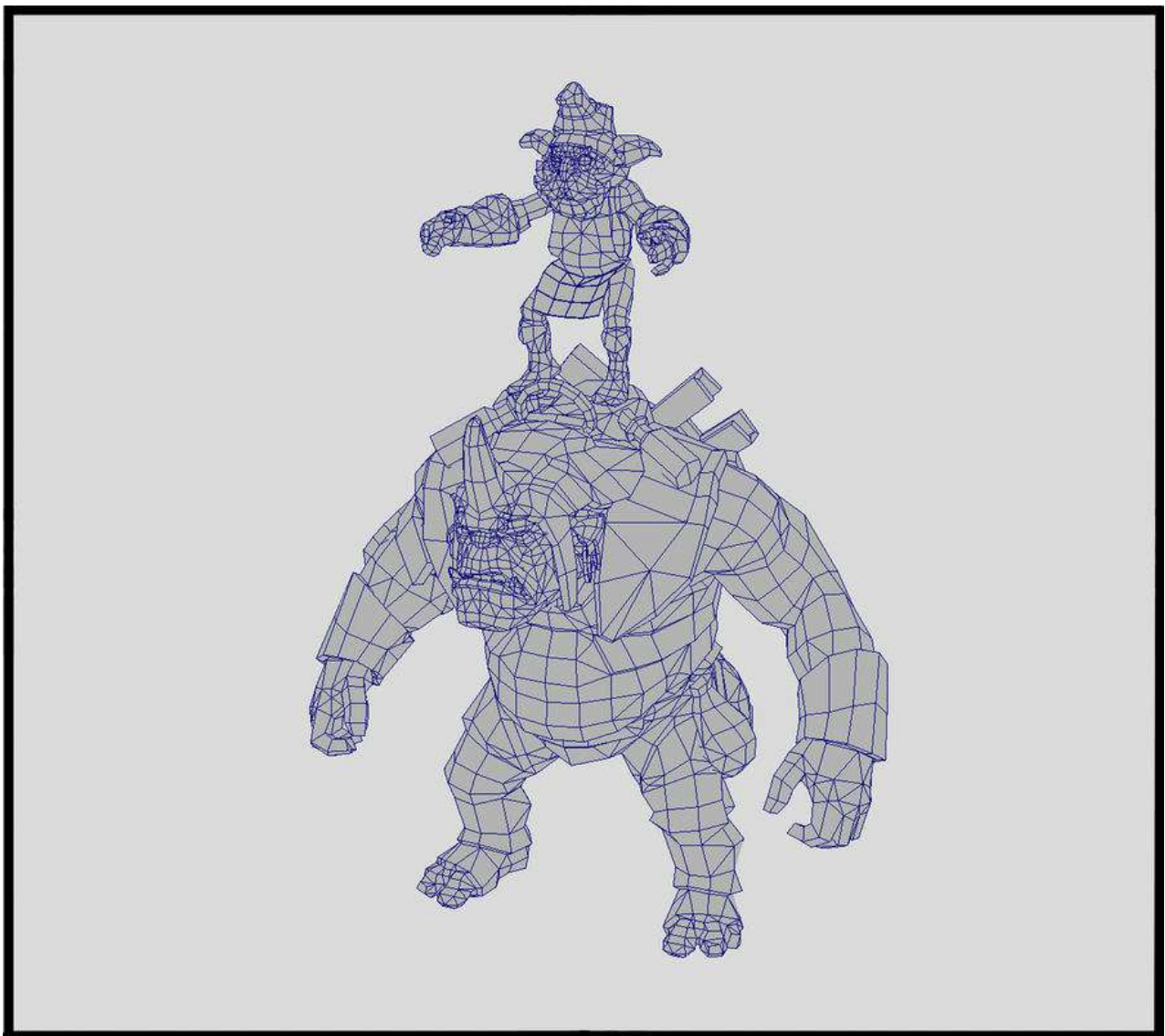
- Like textures, geometry typically has a gradient, with the lowest amount of polygons being used around the feet/lower torso and highest density around the head and upper torso.

- Make every triangle count. A polygon should either be contributing to the silhouette and/or helping deformations.
- In situations where the texture resolution doesn't support clean edges on prominent areas of an item, for example, the edge of a mane or saddle on a mount, you may want to create these edges with geometry instead of with the texture. It helps to consider needs like this that are affected by your item budget early in your concept phase.
- Polygons are also added in cases where the normal map isn't projecting properly due to lack of geometry.
- Avoid creating long triangles as they tend to cause shading errors, especially during animations.
- It is helpful if you triangulate your model before submission to confirm that the final mesh is what you intend. If you don't, our tools will triangulate the mesh but the results may look different from what you authored.

BASE MODEL INTERACTION

- Most hero items are created on top of the geometry of the bare hero. For example, the geometry of a hero's forearms is not removed; his or her bracers sit on top of it.
- Only if a body part is designated as an item slot - such as Pudge and Tusk's left arm or Faceless Void's head - can it be totally replaced by a custom item.

INTERACTION WITH OTHER HERO WEARABLE ITEMS

- Use "Select Wearables" in the Preview Model window of the item workshop tool to test how your hero wearable items interact with each other and with the hero's existing items during idle, loadout, portrait, and other important animations. You can save your wearable selections in the workshop session for the main item.
- Since people are likely to equip Arcana or Immortal items if they have them, it's important to test your items in conjunction with these models. You won't see the texture or particle effects for these items when in item workshop demo mode but you will see how the models work together.
- Extreme intersections not noticeable in the top down game view may be distracting in portrait or loadout views.

MESH WEIGHTING

- Check the weighting of your item geometry with various hero animations rather than just the bind pose:
    - Animations with extreme poses, such as attacks or casts
    - Animations seen in close-up, such as portraits and loadouts
    - Frequently displayed animations, such as idles and runs
- Look for extremely distorted mesh, disconnected edges, or stray vertices accidentally weighted to the wrong joints.
- Check LOD0 and LOD1 mesh weighting in loadout and in game

- You may need to add more faces or do more refined weighting to areas that are subjected to extreme movements or that are seen prominently in portraits or loadouts.
- The Hero Resource page for each hero will indicate the specific bones that weapons need to be weighted to.
- Weighting to Valve's Source 2 cloth bones has to be done very carefully. Try copying the weighting from Valve's reference model to your model to ensure the best cloth behavior.

DECOMPILED MODELS

- Please don't model your items to fit decompiled hero models. Game compile processes may add scaling or poses to these models that are not representative of the geometry that custom items need to fit.
- We will be updating existing workshop reference files and adding files for new workshop heroes on a gradual, ongoing basis. If we haven't yet updated the reference files for the hero you're working on, our Source 1 reference files are still usable for item creation.

BLEND SHAPES

- The Dota Item Workshop does not support submission of blend shapes, also known as flex or morphs, within models.
- If you submit an item that needs facial blend shapes, Valve artists will create these so the meshes will move when the hero speaks.

EDGES AND VERTICES

- Our game is only able to support the skinning of 4 vertices per joint. Skinning to additional vertices will be removed or will cause a failure when community items go through our workshop compiler.
- Hard edges and smoothing groups are OK to use, but are best kept to a minimum, as they break up the vertices and add to an item's vertex count.

SKELETON

- Your item's geometry should be skin-weighted to the default hero skeleton in the model file provided by Valve. You can download these reference files on the individual hero pages accessible from the Hero Resource page .
- We are unable to ship hero items, including mounts, that require the joints of the hero or mount to be positioned differently from the default skeleton.
- All hero items need to work with the default hero animations. This is how they will be evaluated by Valve.
- External artists are not able to add bones to community items for heroes.
- If you move the joints in your item's model file to test mesh deformations, be sure to export your item from a single frame where the joints are in the hero's bind pose.

- When creating new skeletons for custom wards, couriers, or ability models, please avoid duplicate bone names or spaces in bone names. These can cause unwanted model deformations or compile failures in Source 2.
- If you add nodes to your custom skeleton that have keys on them, even if they have no animation, the nodes may be converted to bones by the workshop tool and could fail your submission if the item goes over the 60 bone limit.
- When using Valve's skeleton for an item, if you see a 'missing bones' error when compiling your model in the workshop tool or the mesh is totally disconnected from the skeleton, see if the joint names had gotten accidentally renamed during import or if you added a rig.
- If you are submitting an ability model with a custom skeleton and custom animations, be sure to mark the 'Model Uses a Custom Skeleton' checkbox to ensure that Valve's default animations for that item type are not accidentally applied to your skeleton.
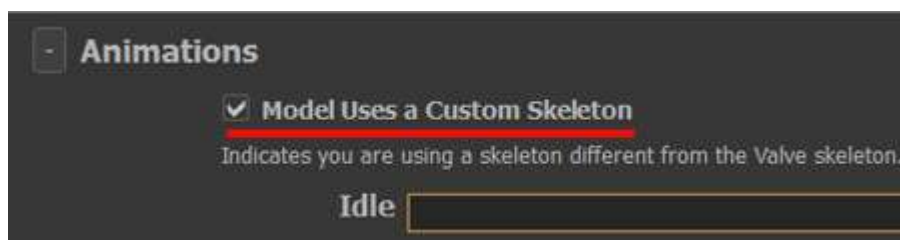
BACKFACES

- Please note that Dota 2 does not support double-sided materials; you will need to create additional geometry if a backface is needed.
- Bear in mind that missing backfaces of geometry that are not noticeable in top down game view may be obviously missing in portrait, loadout, or showcase views, so you may want to provide these faces for your LOD 0 models.
- Missing backfaces for undersides of capes, scarves, and wings are particularly noticeable in the loadout.

HITBOXES AND ATTACHMENTS

- External artists do not need to create hitboxes for couriers, wards or ability models. These will be created by Valve.
- Where necessary, attachments are designated and edited within the item workshop tool. More details are on the Item Submission page.

ITEM TROUBLESHOOTING

If you have problems compiling, testing or submitting your model, see our Item Troubleshooting checklist.

ART AND UV GUIDELINE LINKS

- For design-related model guidelines, please see the Character Art Guide
- For guidelines about model UVs, please see Item UV Mapping

MODELING TUTORIAL AND SOFTWARE LINKS

Dota 2 Item Workshop Guidelines Homepage

Steam Support :: Dota 2 Workshop

- [OVERVIEW](#)
- [SOURCE 1 TEXTURE AND SHADER MASK CONVERSION](#)
- [TEXTURE BUDGETS AND RESOLUTION](#)

OVERVIEW

- The hero shader in Dota 2 is extremely powerful, capable of many high-end material properties. Every hero, item, courier, and creep makes use of the shader. Each texture works in conjunction with all the others.
- All shader settings for all of a hero's items will be derived from the base hero material. The game automatically creates a single model and texture out of the hero and its currently equipped items, assigning a single shader to everything. We do not support custom item shaders that differ from the default item shader. For example, an additive shader on a solid hero isn't supported, but the hero material is very powerful and supports a range of effects, so there is almost always a way to achieve the desired effect.

- We do not support double-sided materials; you will need to create geometry where a backside is needed.
- Some masks, like the Metalness Mask, Detail Mask, and Diffuse Mask, are only used on certain heroes or items.

Ogre Magi textures and shader masks:

Base Model, Color, Normal, Self Illumination, Specular, Rimlight, Base Tint, and Specular Exponent
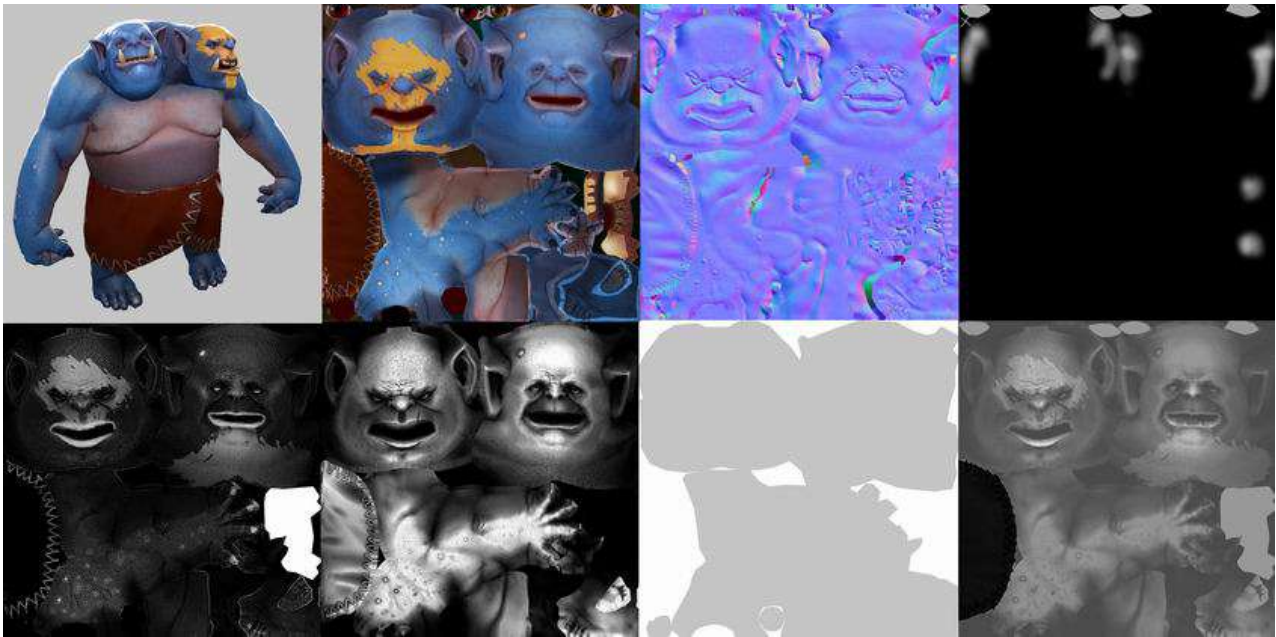
Ogre Magi Weapon textures and shader masks:

Model, Color, Normal, Metalness, Self Illumination, Specular, Rimlight, Base Tint, and Specular Exponent
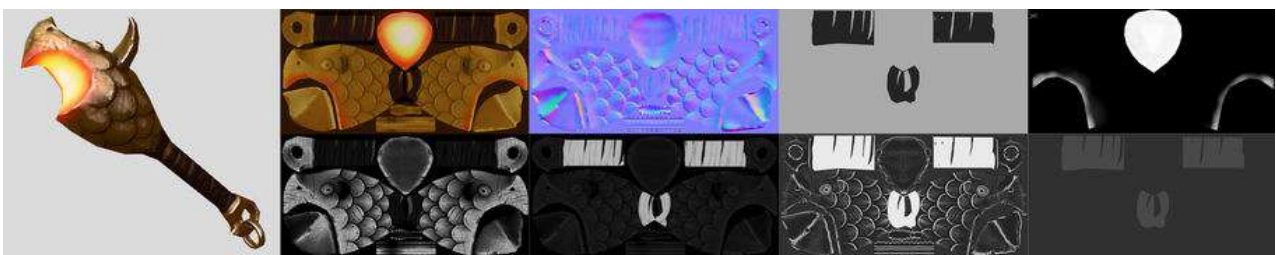
SOURCE 1 TEXTURE AND SHADER MASK CONVERSION

- Source 2 - Transparency and masks are now their own individual files, normal green channel is down.
- Source 1 - Transparency was included in color maps, the normal green channel was up and multiple shader masks were contained within mask 1 and mask 2 files.
- Our workshop tools can convert Source 1 textures into the Source 2 files but for accuracy of new submissions you should author the separate textures needed for Source 2.

SOURCE 2 TEXTURES AND SHADER MASKS

Color Map

- When creating your color map, be very aware of how the values, color palettes, gradients, and texture details of your items affect hero readability in game.
- For guidelines about color map authoring, please see our Character Art Guide.
- The color map can be 24 or 32 bit.

Color Maps for Ogre Magi, Disruptor, and Razor

We will soon be adding a control to the workshop demo mode that will allow you to see your items with desaturated colors in order to assess the readability of color map values. You can also use the console command r_hero_debug_render_mode 5 to enable desaturated display.

Transparency

- Transparency determines where the texture is opaque.
- White is opaque, black is invisible. Transparency can only be fully opaque or fully invisible, there is no greyscale.
- Transparency is now enabled for all Dota heroes.
- Transparency is now a separate texture file in Source 2 but you can leave the transparent file input blank in the submission tool if your item doesn't need this.

The mesh, Color Map, Transparency, and game model for Abaddon's default cape
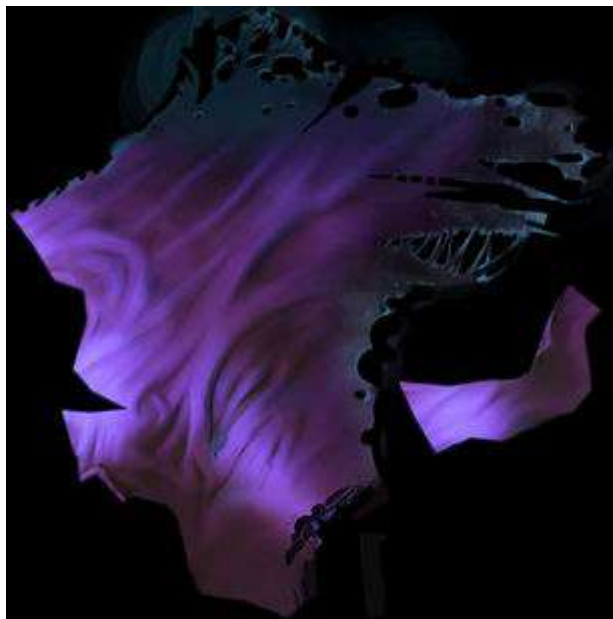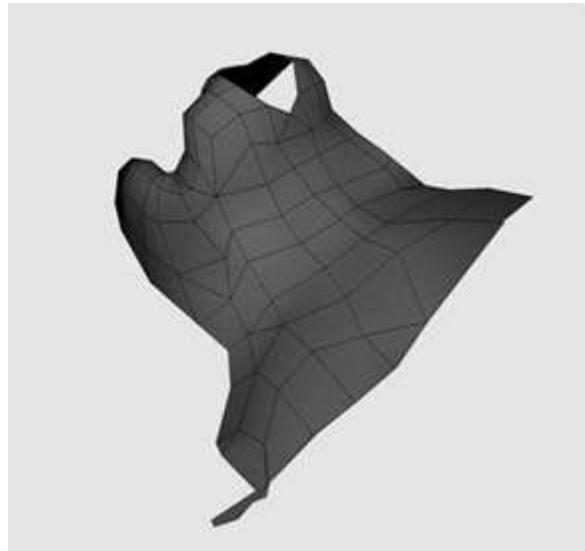
Normal Map

- The normal map gives the illusion of the lighting of raised and indented surfaces on a smooth mesh.
- The normal map should be 24-bit. In Source 2, red channel is left; green is down; blue is up. If you aren't creating a custom normal map, use a flat normal color (128,128,255).
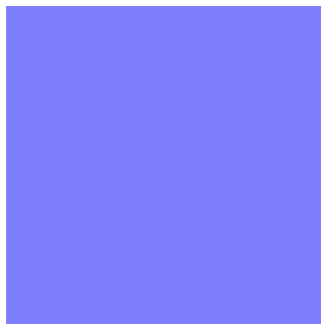
- NOTE - the normal green channel was up in Source 1, it has been inverted to be down for Source 2.
- Normal maps work best in combination with high specular and other masks.
- You can find resources and tutorials about making normal maps through community links on our Dota Workshop Submission Guidelines Homepage

The Normal Map and Specular Mask for Ogre Magi's default weapon
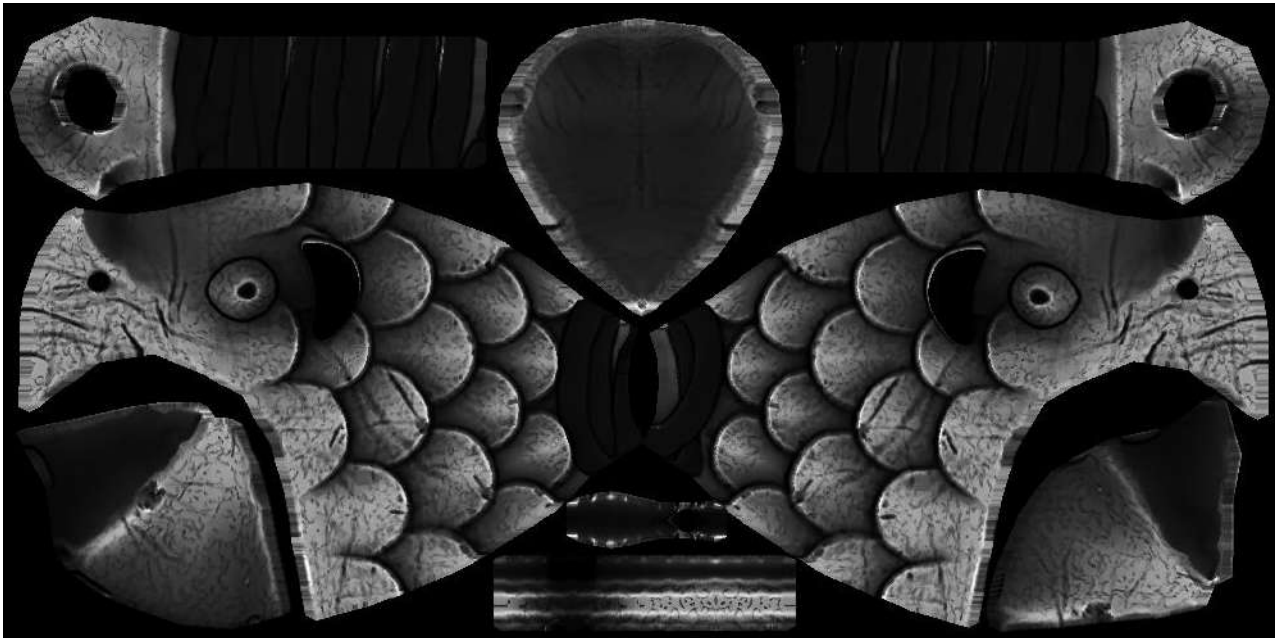
The model mesh without Normal Map, with Normal Map, and with all final textures including Specular and Metalness

Detail Mask

- NOTE - a Detail Mask will only work on a custom item if the hero's default material has this enabled. It must use the hero's default detail map.
- The Detail Mask determines where a detail map scrolling texture or added color will display on an item's surface. For more specifics about how to author textures for these situations, please see Authoring Items for Arcana, Ability, and Ambient Textures.
- Most of the heroes and their items do not use the Detail Mask features at all. If a hero uses a Detail Mask on its body or default items, you could experiment with authoring a Detail Mask for part of your custom item, but be careful not to over use this.
- The default values are black. Lighter values will make the detail map appear.
- The material for the hero's default item controls the blending mode for the detail map. In the example below, the default material for Razor is using an additive blend mode.

The Color Map, Detail Mask, and Detail Map of electrical arcs used on Razor's body.
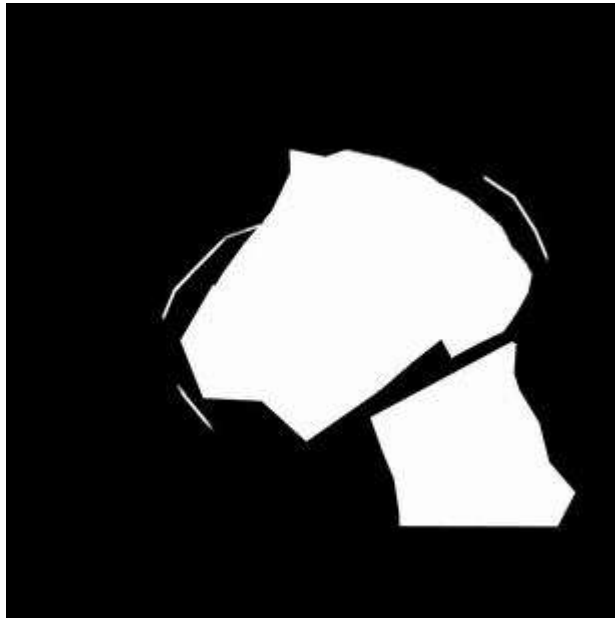
Razor's arm without the Detail Mask

Razor's arm with the Detail Mask

Metalness Mask

- The Metalness Mask reduces and darkens the color and rimlight in order to simulate a real-world metallic look. It works in combination with the Base Tint mask, which returns the color through specular highlights. This mask is used in combination with other masks that help the surface appear more metallic. Typically this means bright, broad highlights that are tinted by the base color.
- In the examples below with Ogre Magi's weapon and Nyx's helmet you'll see:

1. Color, Normal, and Specular
2. Metalness added
3. All maps combined, including Metalness, Base Tint, Exponent, and Rimlight
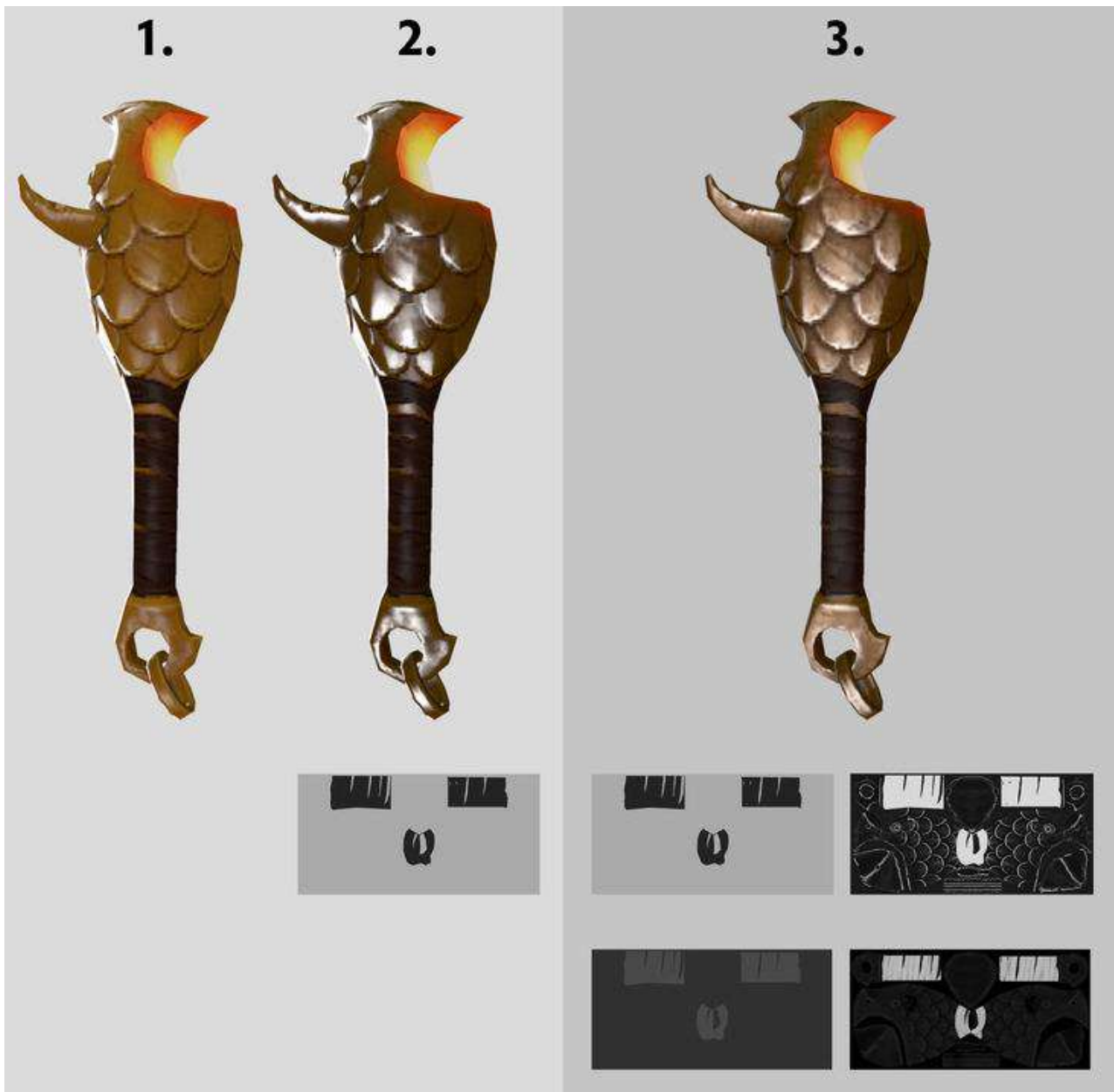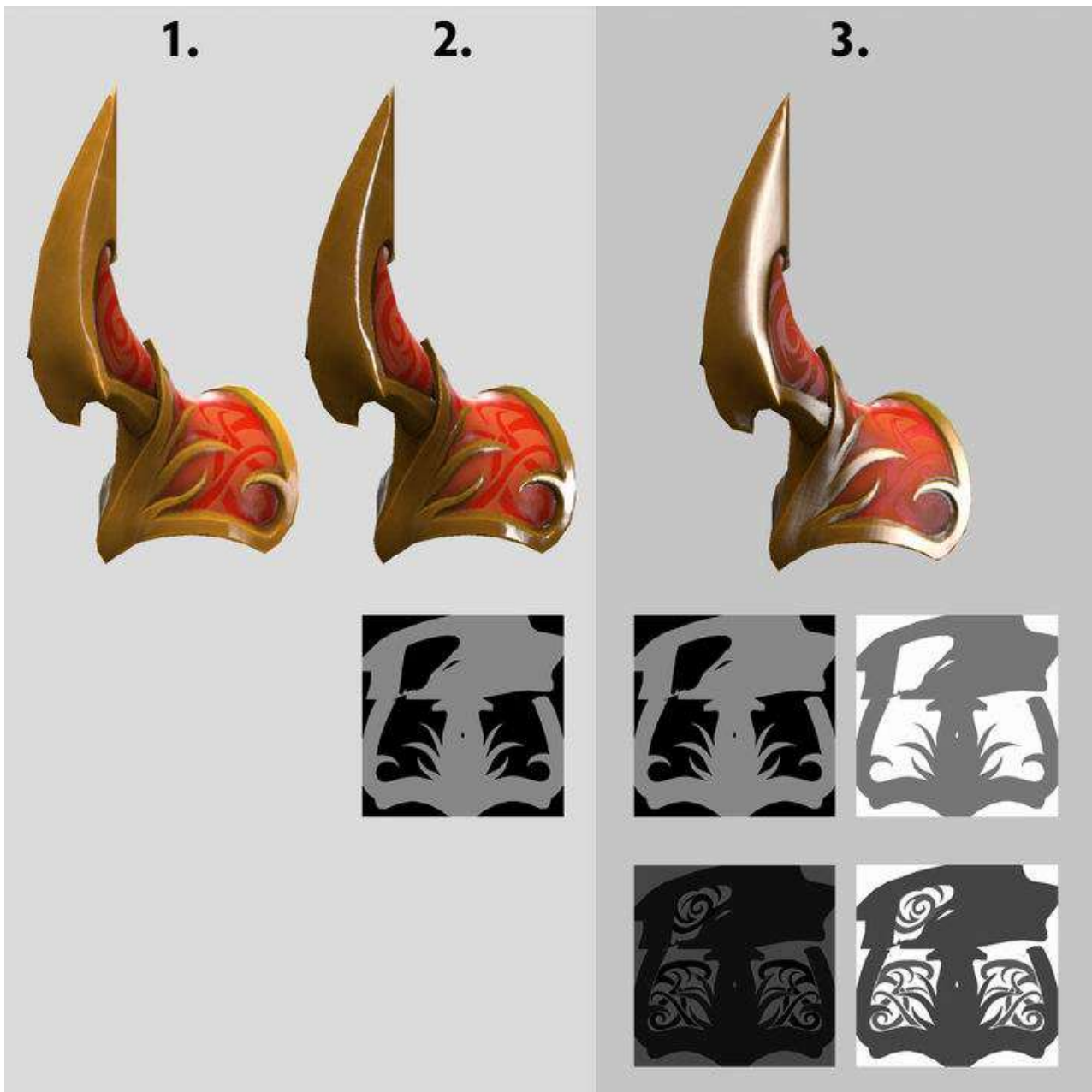
Self Illumination Mask

- Self Illumination determines where the surface is self-illuminated independent of environment lighting.
- This mask can make the pixels of the surface full-bright with the coloring from the color texture.

Self Illumination is used to create glowing areas, such as the mouth of Ogre Magi's weapon
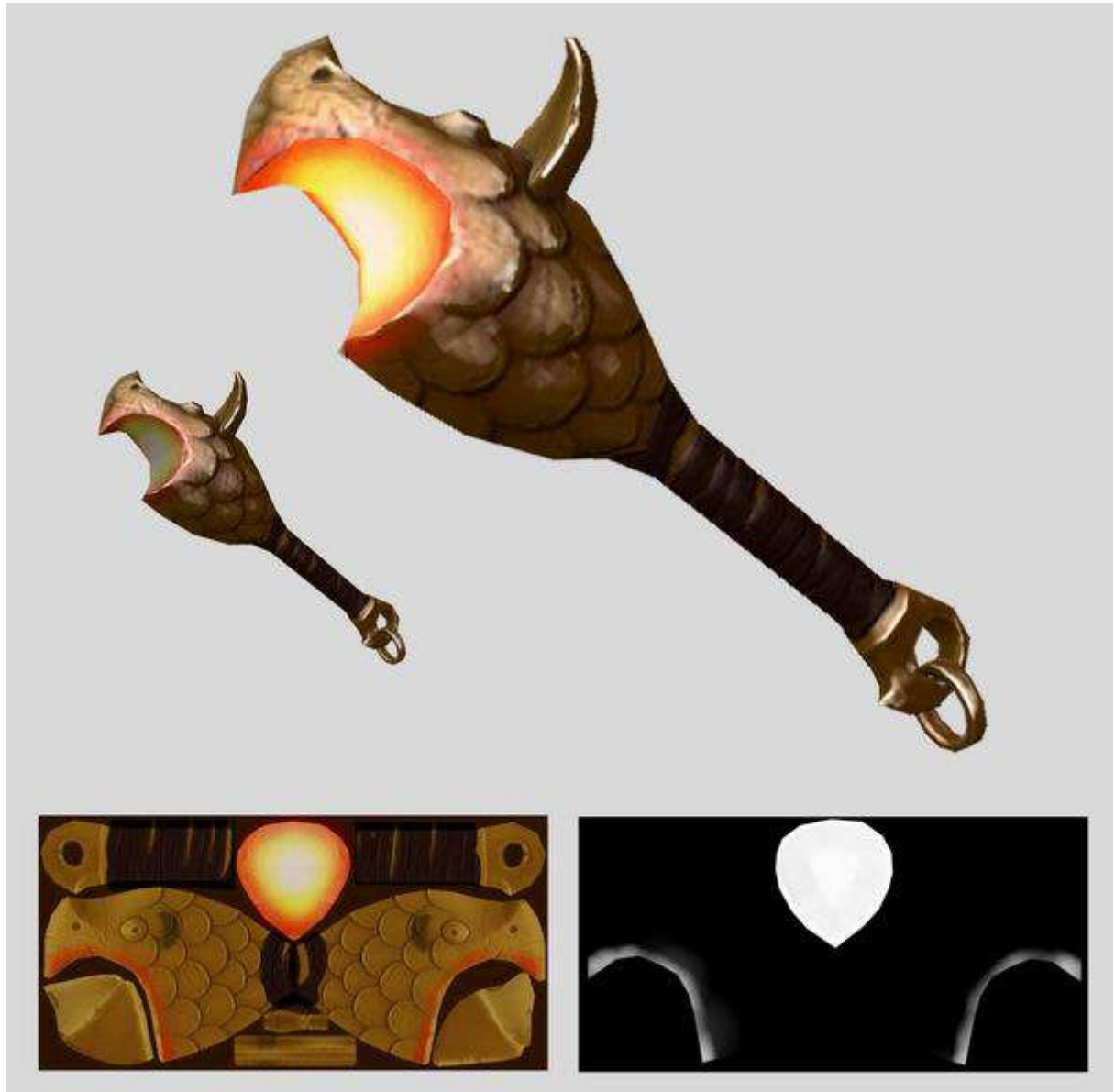
A more subtle mask is used for the glow within Earth Spirit's arms.

- The default values are black. Lighter values will make a surface ignore lighting and just show color texture. Self illuminated areas in-game will also have a bloom (or glow) effect to them.
- It is best to be selective when using self-illumination so that you concentrate focus on the most important areas of an item or hero.

Specular Mask

- The Specular Mask determines the brightness of the highlights, multiplied by specular intensity from the material.
- An Ambient Occlusion map is a good base for this map. Instructions about making an ambient occlusion map can be found in our Color Texture Light Baking guide.
- This mask works in tandem with the Specular Exponent mask.
- Specular intensity values from the mask are multiplied by the specular scale value from the material. Custom items will use the value in the material for the default item. In most cases specular scale is a number higher than 1, which results in exaggerated highlights.

No Specular

Full Specular

Authored Specular

Rimlight

- Rimlight is the highlighting on the edges around a model to give it depth and help it stand out from the environment. It's also known as fresnel intensity or rimlight intensity.
- Rimlight intensity values from the mask are multiplied by the rimlight scale value from the material. Custom items will use the value in the material for the default item. In most cases, rimlight scale is a number higher than 1, which results in an exaggerated rimlight.

No Rimlight

With Authored Rimlight
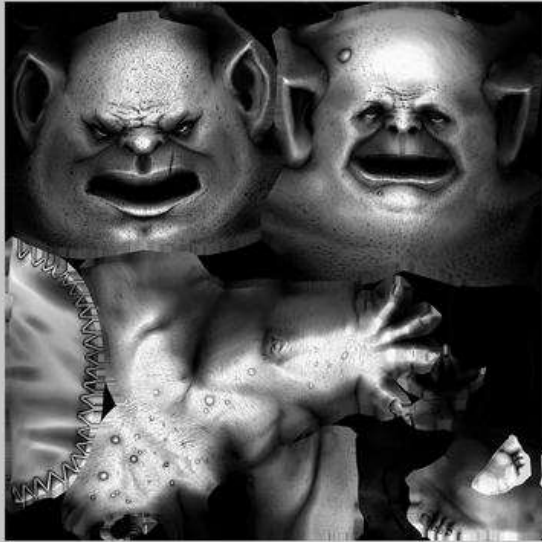
- Dark values can be used for metals and lighter values for skin, leather, and wood. This may not be the case for all items.
- There are darker values in the crevices, which can be achieved by creating an Ambient Occlusion map.

Ogre Magi's weapon rimlight mask is light for leather and dark for metal
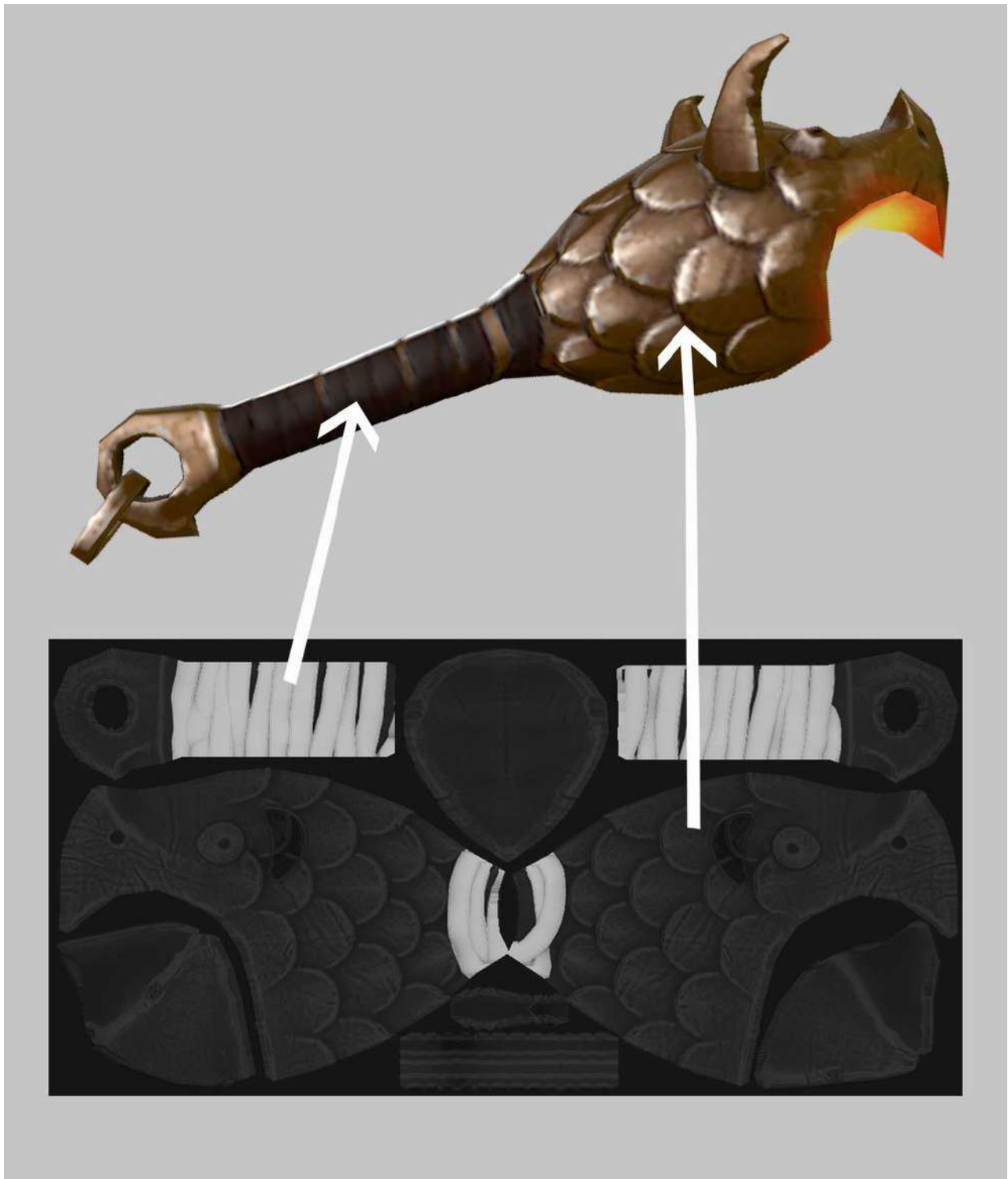
Base Tint Mask

- The base tint mask determines how much color the specular highlights get from the color texture. It is useful for colored metals (such as gold), or to simulate light penetrating a surface and being reflected back with color, making the surface appear fleshy.
- This mask was known as Tint Spec by Color in Source 1.
- Dark values in this channel will color specular highlights by diffuse color from the item's color texture.
- Light values will keep specular highlights the color of the light affecting the surface.

Ogre Magi's bracer and Disruptor's base model without and with a Base Tint Mask
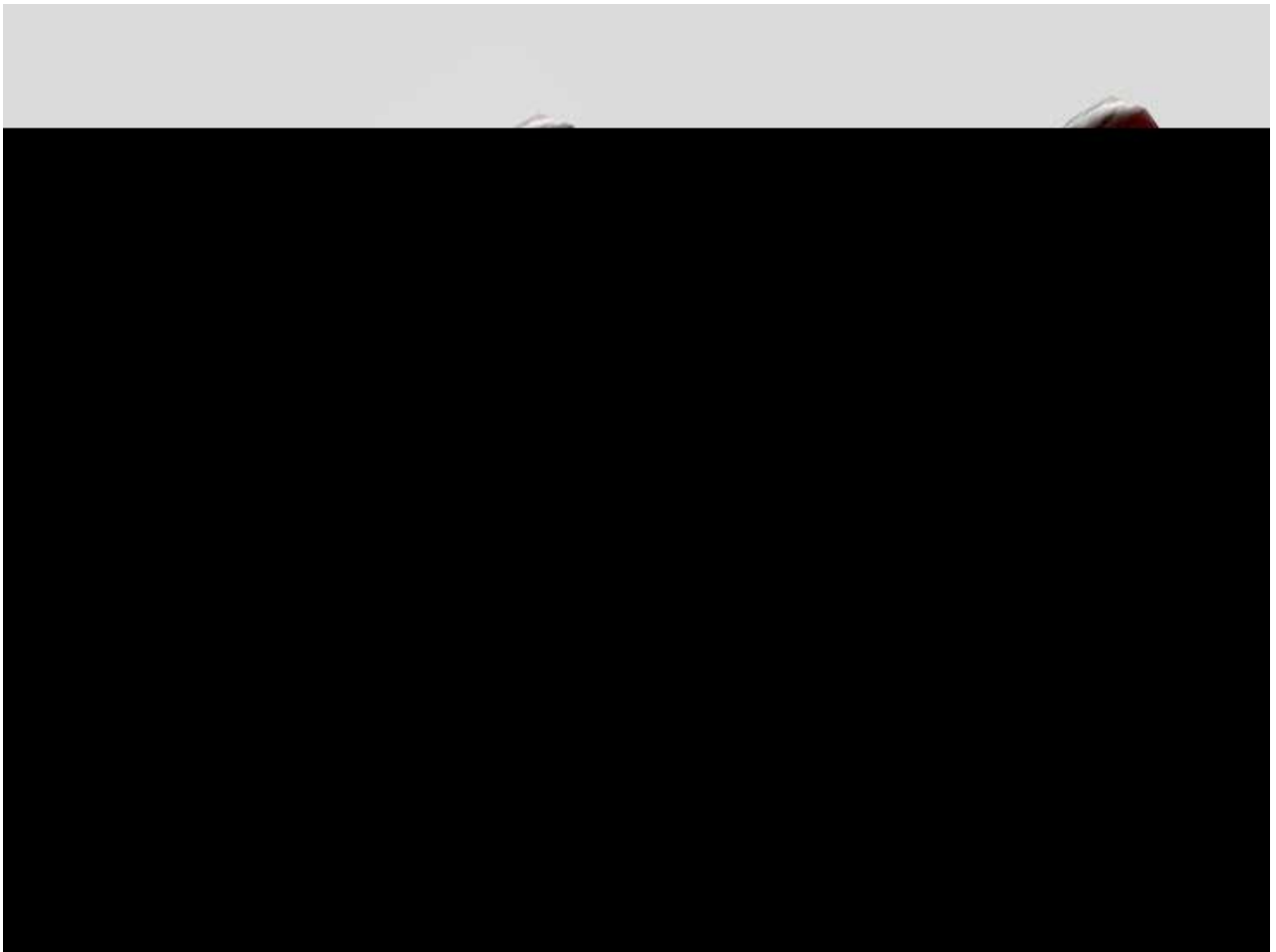
Specular Exponent

- Specular exponent values determine the size of the specular highlight on a surface.
- Dark values will give the impression of a rough surface.
- Light values will give the impression of a polished surface.
- Specular masks and specular exponents work together to create different surface types. Examples include:
    - Metal - high specular, medium exponent
    - Leather - medium specular, high exponent
    - Wood - low specular, very low exponent
- Values in this mask act as a scale for the specular exponent value from the material. If the entire channel is white, then the entire surface will inherit specular exponent values from the material.

Specular Highlight
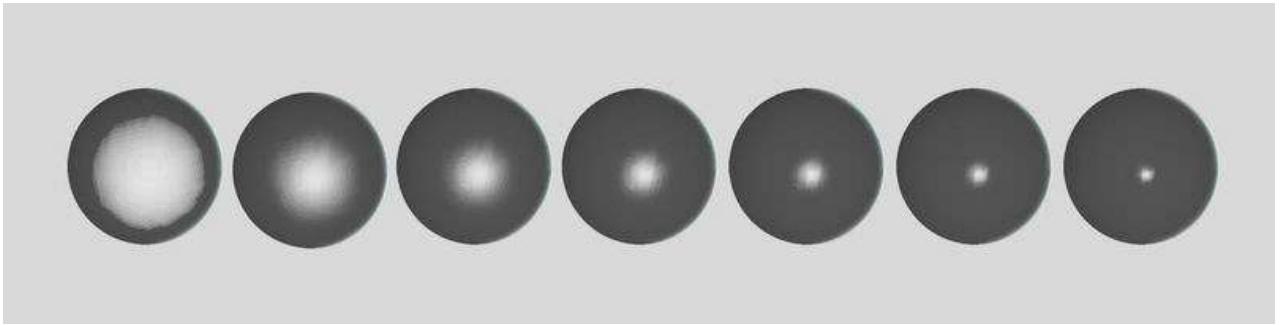
Matching Specular Exponent Values
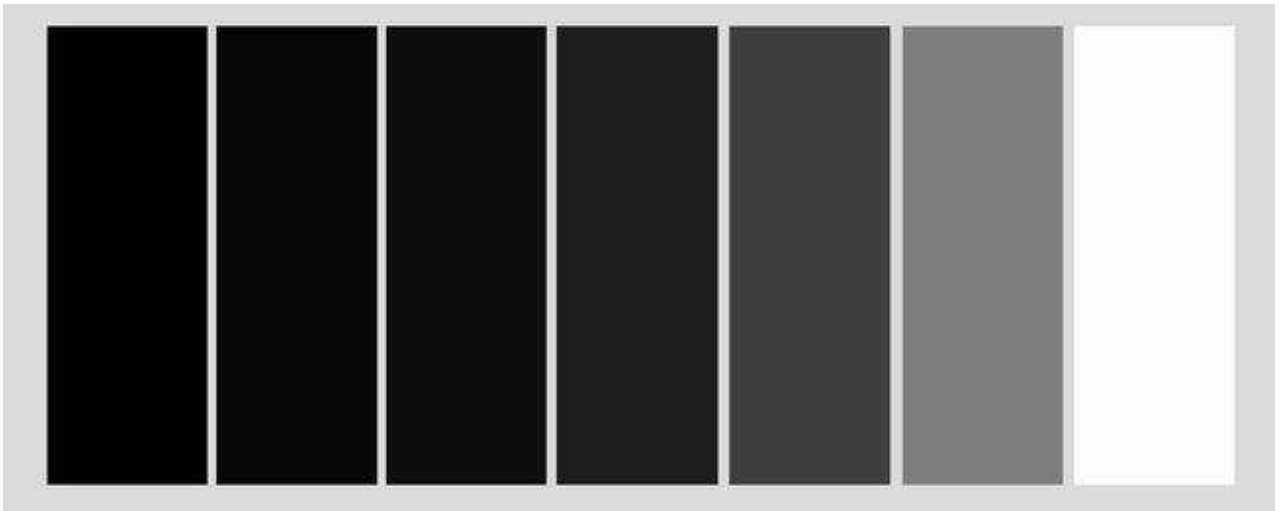
Full Specular Exponent

Authored Specular Exponent

Diffuse Mask (rarely used)

- NOTE: Diffuse Mask is only enabled for a few early Dota heroes such as Puck, Juggernaut and Nyx.
- Diffuse masks are mostly obsolete and most items won't need this.
- The Diffuse Mask can apply a color transformation, like a hue shift or a contrast adjustment to the original color. This color transformation is encoded into a 3D texture called a colorwarp. This effect is then applied using a fresnel term, meaning it only appears around the edges of the character.

Puck without (left) and with (right) a Custom Fresnel Color Warp applied to different extents by a light body diffuse mask (upper) and dark wings diffuse mask (lower)
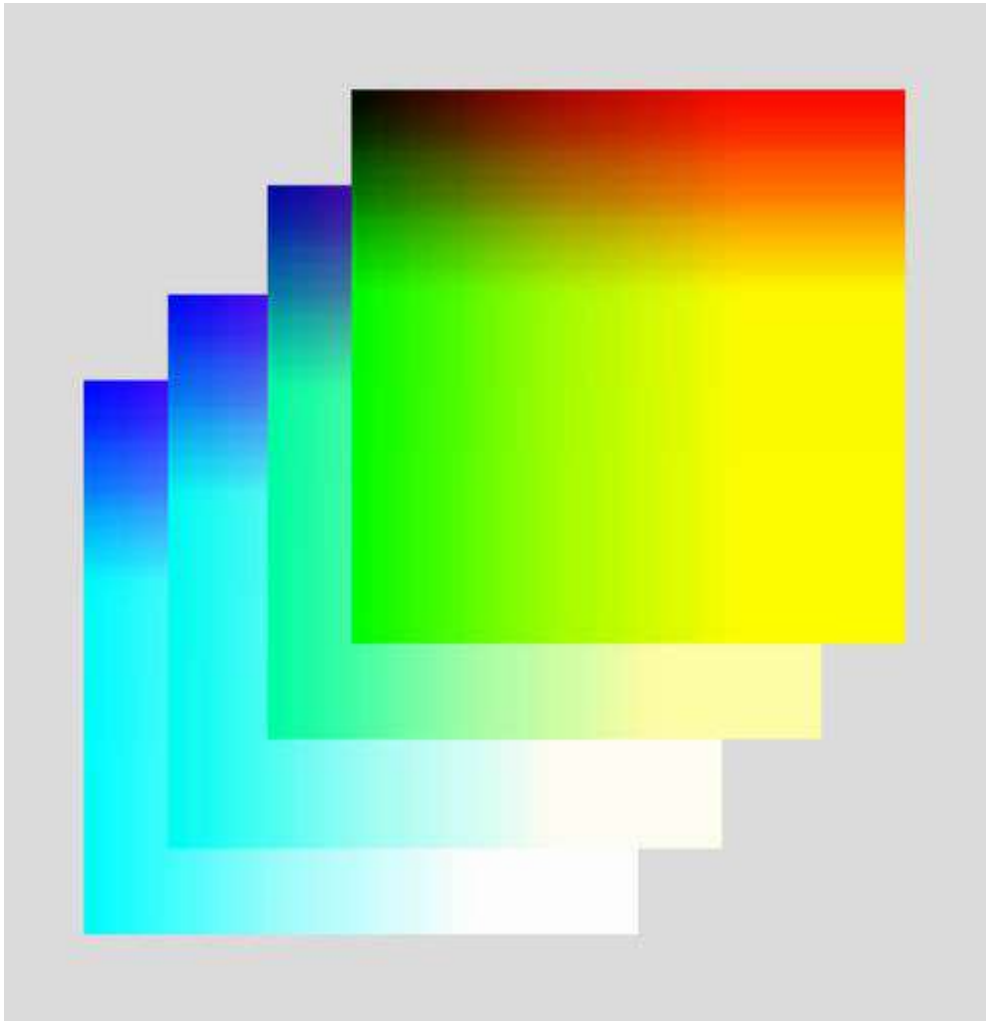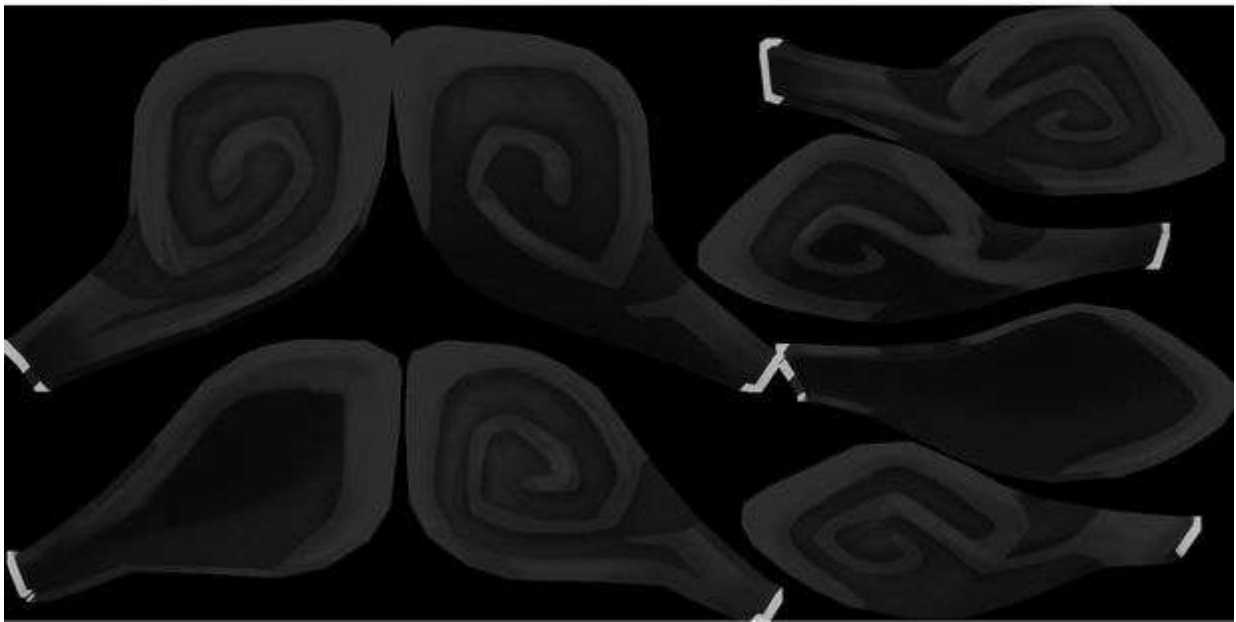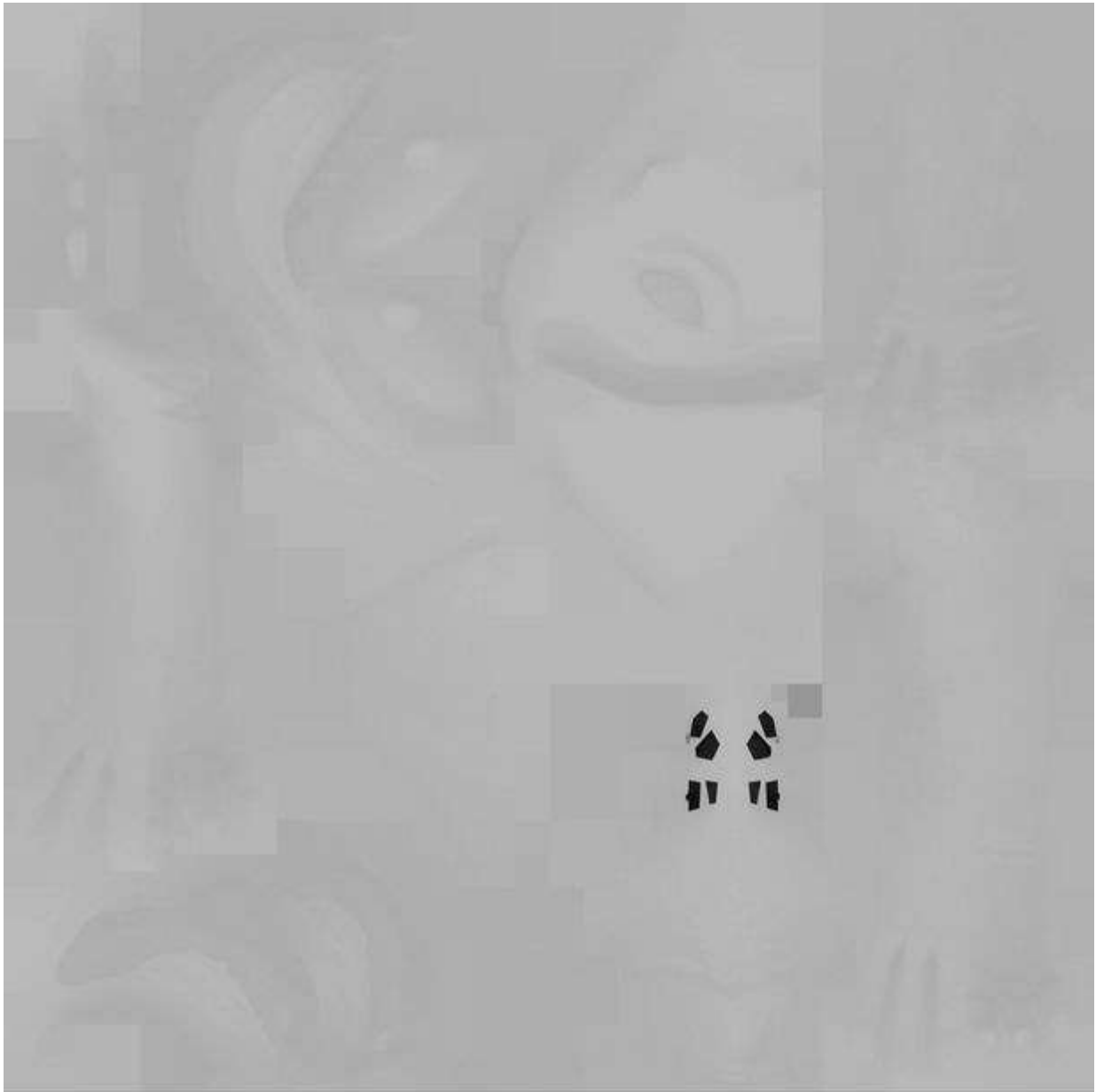
TEXTURE BUDGETS AND RESOLUTION

- Due to the unique design of every hero, they each have different texture budgets for their items. Be sure to check the individual hero texture budgets through the Hero Resource page.
- All textures for an item must have the same proportions as the budget for that slot on the hero's page, otherwise the submission will fail.
- Textures will need a resolution equal to or higher than the item resolution specified on hero's page. If they don't, the submission tool will scale them up or down which might result in reduced quality.
- Valve artists author source textures up to 4 times larger than the in-game size for painting and promotional purposes. For example, a typical weapon could have a texture resolution of 256x256 pixels in game but source art could be 1024x1024.

Dota 2 Item Workshop Guidelines Homepage

Steam Support :: Dota 2 Workshop

Follow the steps in the sections below to submit in-game items for the Dota Workshop:

- PREPARATIONS BEFORE SUBMITTING ITEMS
- LAUNCH ITEM TOOLS
- CREATE NEW ITEM
- SELECT ITEM TYPE
- SELECT INPUTS
- INPUT ATTACHMENTS
- COMPILE YOUR ITEM
- PREVIEW MODEL
- EDIT ATTACHMENTS
- PREVIEW IN GAME

- EDIT PORTRAIT
- MAKE REVISIONS
- SUBMIT YOUR ITEM TO THE STEAM WORKSHOP
- ITEM COLLECTIONS
- UPDATING WORKSHOP SUBMISSIONS
- ITEM TROUBLESHOOTING

- If you need information about submitting Dota game mods, please see Addon Overview
- If you need information about submitting Dota League tickets, please see Dota League Tickets

PREPARATIONS BEFORE SUBMITTING ITEMS

- Prepare a Steam account for submitting items to the Dota Item Workshop and install Dota Workshop tools
- Make sure your items conform to the texture and triangle budgets and other technical requirements described in the Hero Reference pages and Asset Creation Guidelines.

LAUNCH ITEM TOOLS

Launch Dota 2 in Steam and click the button that says "Launch Dota 2 - Tools"
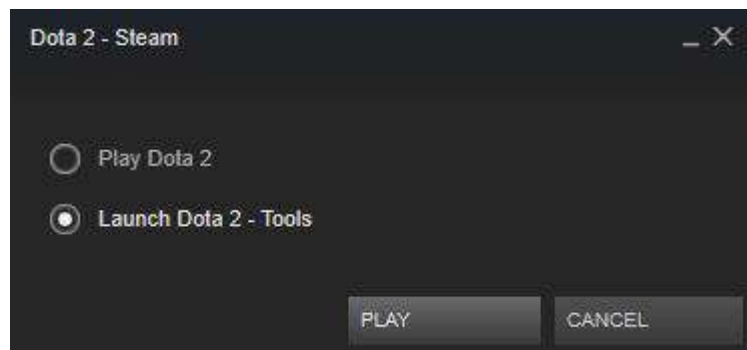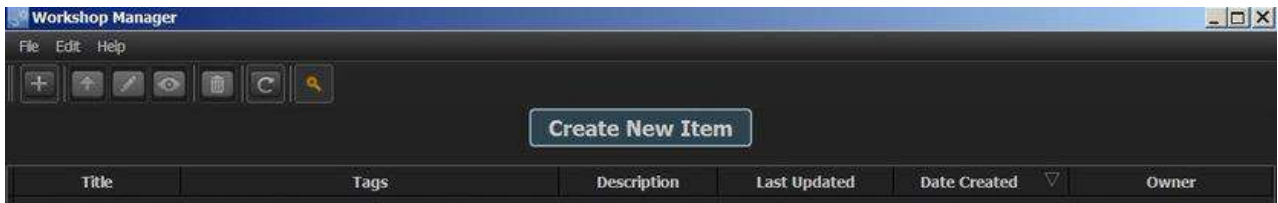

In Workshop Tools, click "Launch Item Tools."
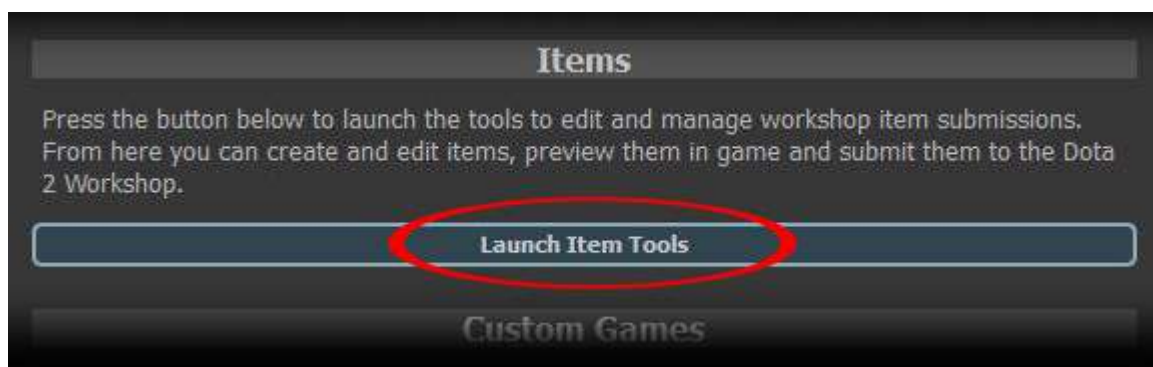
Item tools are in the upper section of the Launch window. The lower section pertains to Game Mod tools.
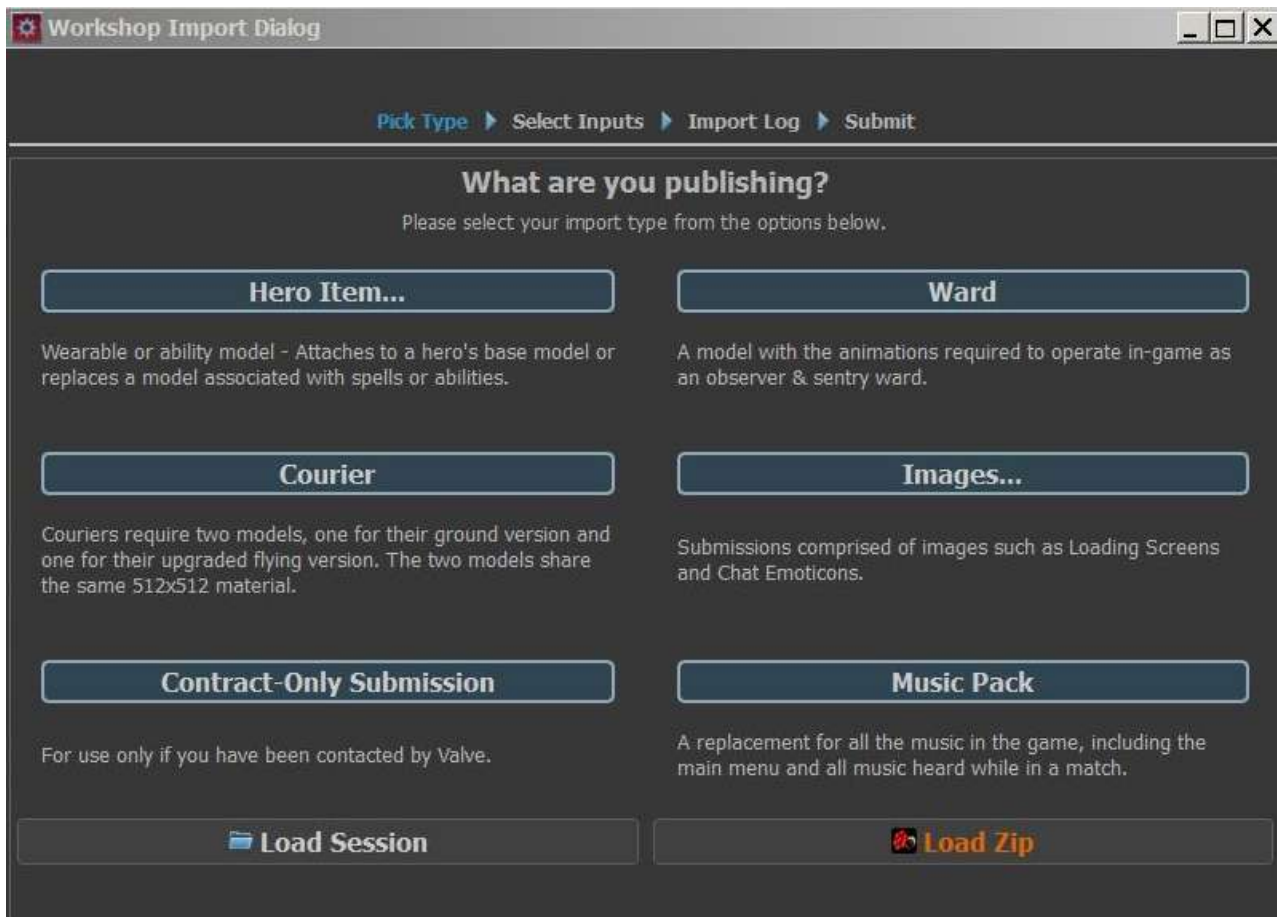
CREATE NEW ITEM

In the next window, click "Create New Item"

SELECT ITEM TYPE

In the "What are you publishing?" page, select the item type you wish to submit.
- "Hero Item..." will contain drop-down lists where you can choose a hero and an item slot (including ability models)
- "Images..." will contain a drop down list where you can choose Loading Screen, Team Logo, Emoticons, or Cursor Pack.

- "Contract Only" is used if Valve has contacted you or if you are submitting a League ticket. It is not used for submitting items.

Workshop Import Dialog

Pick Type ▸ Select Inputs ▸ Import Log ▸ Submit

What are you publishing?

Please select your import type from the options below.

Hero Item...

Wearable or ability model – Attaches to a hero's base model or replaces a model associated with spells or abilities.

Ward

A model with the animations required to operate in-game as an observer & sentry ward.

Courier

Couriers require two models, one for their ground version and one for their upgraded flying version. The two models share the same 512x512 material.

Images...

Submissions comprised of images such as Loading Screens and Chat Emoticons.

Contract-Only Submission

For use only if you have been contacted by Valve.

Music Pack

A replacement for all the music in the game, including the main menu and all music heard while in a match.

📂 Load Session

🔒 Load Zip

SELECT INPUTS

- Inputs will vary according to the item type.
- To fill most of these fields you'll browse to your model, texture, animation, image, or music files.

INPUT ATTACHMENTS

- Details about typical creature attachments can be found on the <u>Ability Model</u> and <u>Courier</u> pages.
- Other attachment needs will vary per item and will be described in the workshop tool.
- Ability models that can use Valve's default skeleton will have the default attach bone names automatically filled in.
- Some hero wearables that use default Valve particles, such as bow weapons, may have the joint bones automatically filled in since these will use the default skeleton.
- For custom skeletons you'll need to type in the exact names of attach bones (typically the head, hands and root for creatures), so make a note of these before starting your submission.

- You will have the chance to reposition these attaches in the preview window after you compile your item.
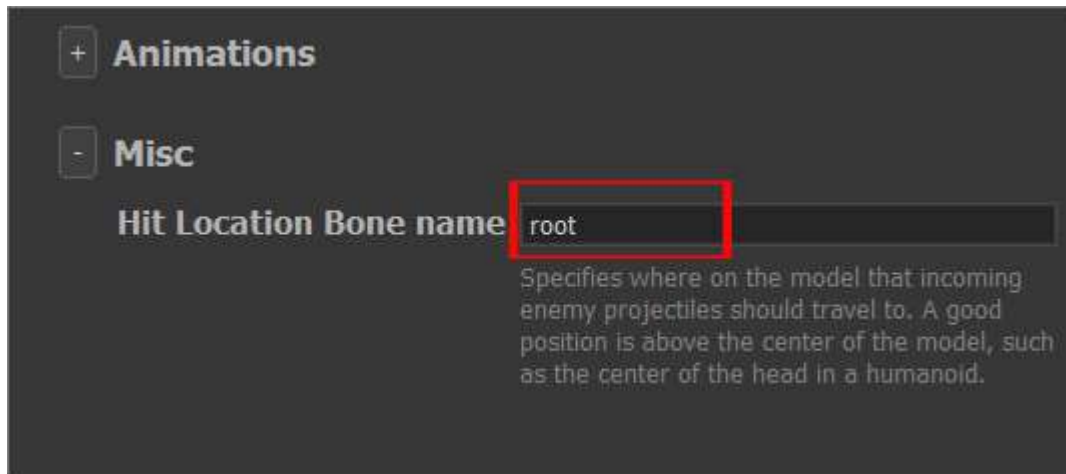
SAVE YOUR SESSION

It's highly recommended that you save your workshop session by clicking the button in the upper left after filling in the inputs to avoid having to add this information again if you have to revise or restart your submission.
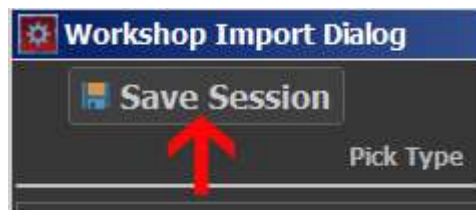
COMPILE YOUR ITEM

After saving the session, click "Next" in the lower right to compile the item.

IMPORT LOG

- This log text shows the compile processes and results for your model.

- If you encounter problems with your model compile, look at the Import Log to find errors. Sometimes a model compile error occurs because of a texture problem.


Click "Next" after a successful compile.

PREVIEW MODEL

- You'll see your compiled model in the tool's model viewer.
- Ensure that NPCs are oriented facing forward and upright for the bind pose because incorrect orientation can affect hitbox placement.
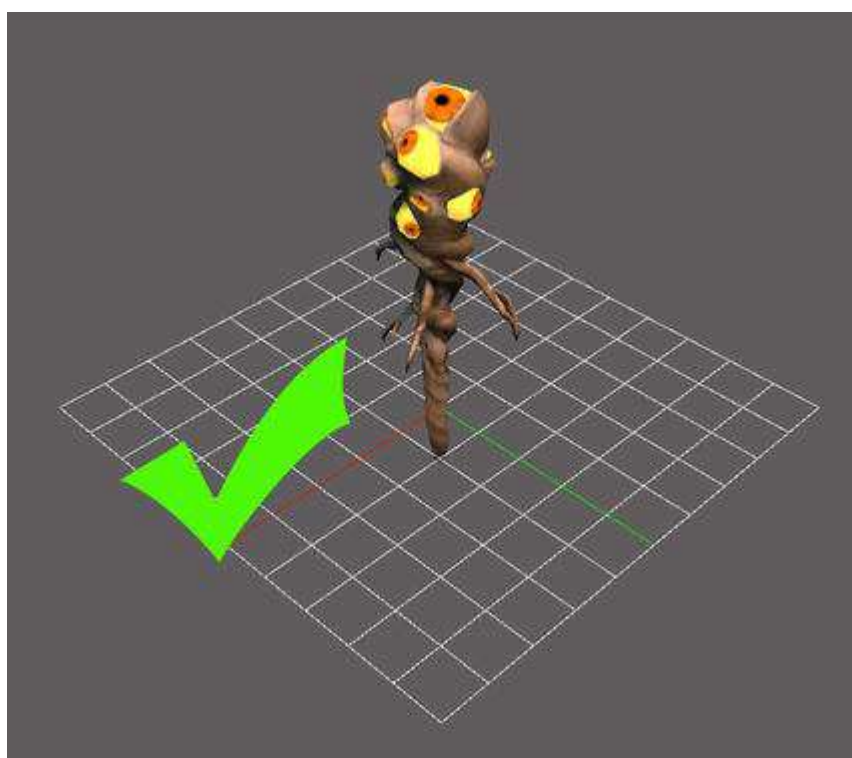
Ensure that models for some hero items that become projectiles during abilities, such as thrown weapons for Pudge, Huskar and Enchantress, match the bind pose orientation of the hero's default weapon.
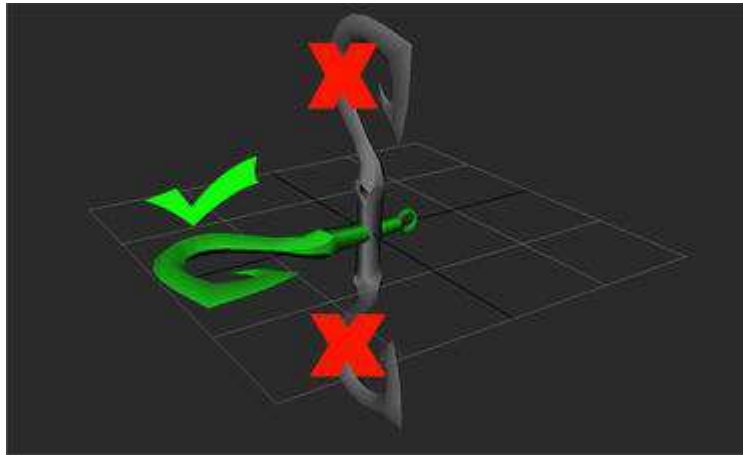
PREVIEW SETTINGS

1. You can click the gear icon to hide the model viewer's grid or change the background colors if you wish to use this pane for image captures.
2. To see your items reacting to different animations, select these from the animation sequence drop down list.
3. Select "Show Low-Res Model" to test the LOD 1 mesh as well as the LOD 0 mesh against important animations.
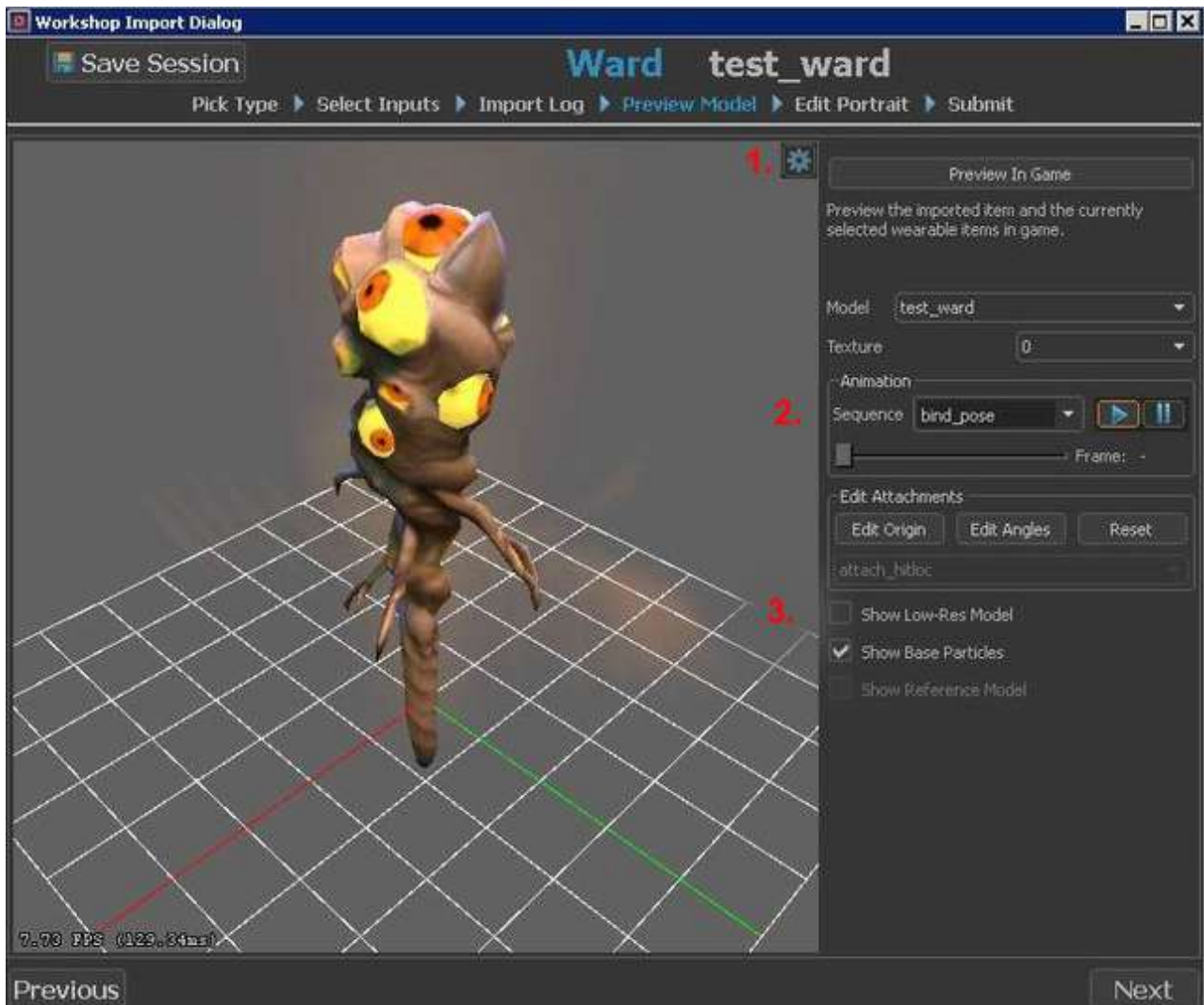
EDIT ATTACHMENTS

To edit the position and orientation of attachments:
1. Click "Edit Origin" or "Edit Angles".
2. This will activate the attach dropdown list you can use to select which attachment you will be editing.
3. Use the controls in the viewport to move or rotate your attachment.
4. Save your session again to preserve these settings.
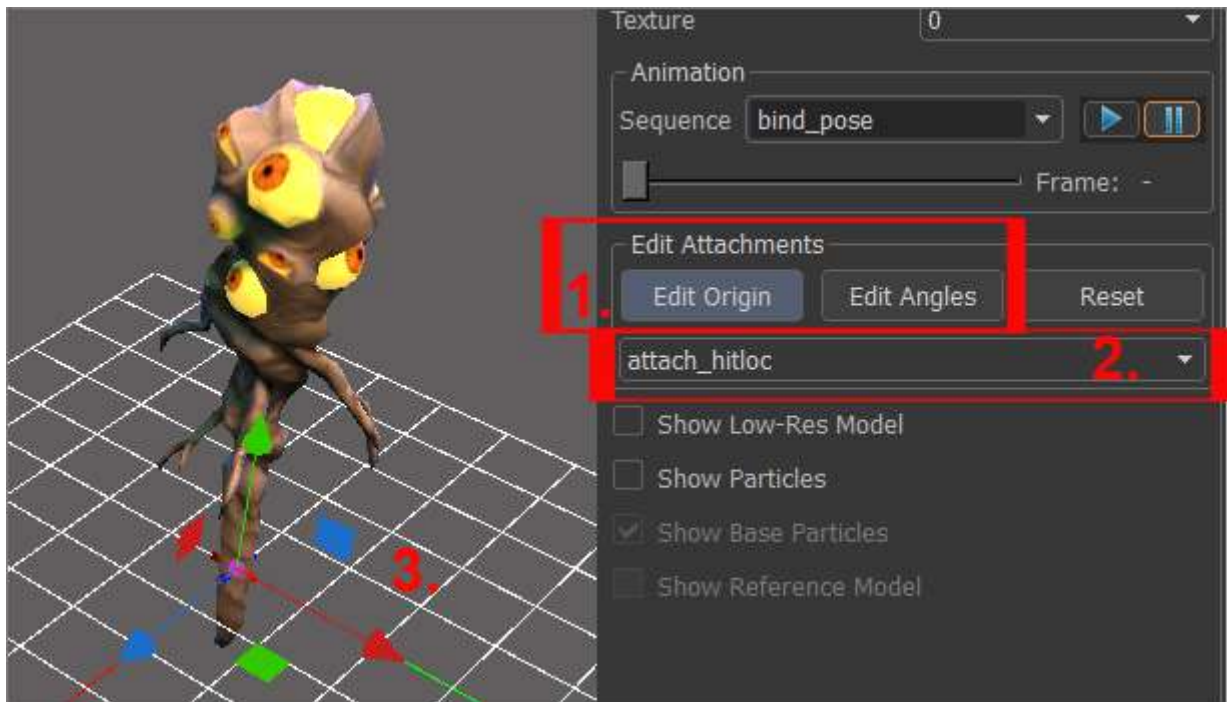
MODEL TROUBLESHOOTING

If your model's mesh is disconnected or the weighting is distorted, please see this section of our Item Troubleshooting page.

PREVIEW IN GAME

- Some items have special requirements for testing. These may be noted in the submission tool, on the resource page for that hero or in the web guidelines for that item type.
- The workshop tool will allow you to test in-progress items that are initially overbudget or that are missing textures. This will help you easily see items in game early in the creation process in order to discover model or size problems when it's easier to make changes. You will need to adjust the model and textures to be within the item budget requirements before you can do the final submission to the workshop.
- There are now options to use the Demo Mode buttons for Refresh, Level Up and more in the workshop tool when testing items in game along with these workshop-specific options:
    "Toggle Day/Night" - useful for testing items in different lighting. You can also type dota_daynightcycle_toggle in the game console.

"Hero Display Mode" - this will cycle the test models through a variety of render display modes. This render display will carry through to the tool's model preview window. "Desaturated" is particularly valuable for assessing texture values in game. You can also display desaturated textures by typing r_hero_debug_render_mode 5 in the game console.

- Remember - your item's appearance from above in game view is just as important as its closeup appearance in loadout.
- Click "Next" when done testing.

EDIT PORTRAIT

- If you are submitting a courier, ward, or hero ability model, you will need to create a portrait for it.
- These item types should start with the default item's portrait as a template. You can either keep this or create a custom portrait.
- If there are portrait animations, select the "ACT_DOTA_CAPTURE" animation activity to ensure correct framing.
- If your courier, ward or ability model uses its in-game idle for its portrait but is moving too much to stay in the frame, you may need to create a custom portrait animation with reduced movement.
- Hero mounts are considered part of the hero and don't have their own portrait.
- Save your session again after creating a portrait - this will retain the portrait settings for future revisions.
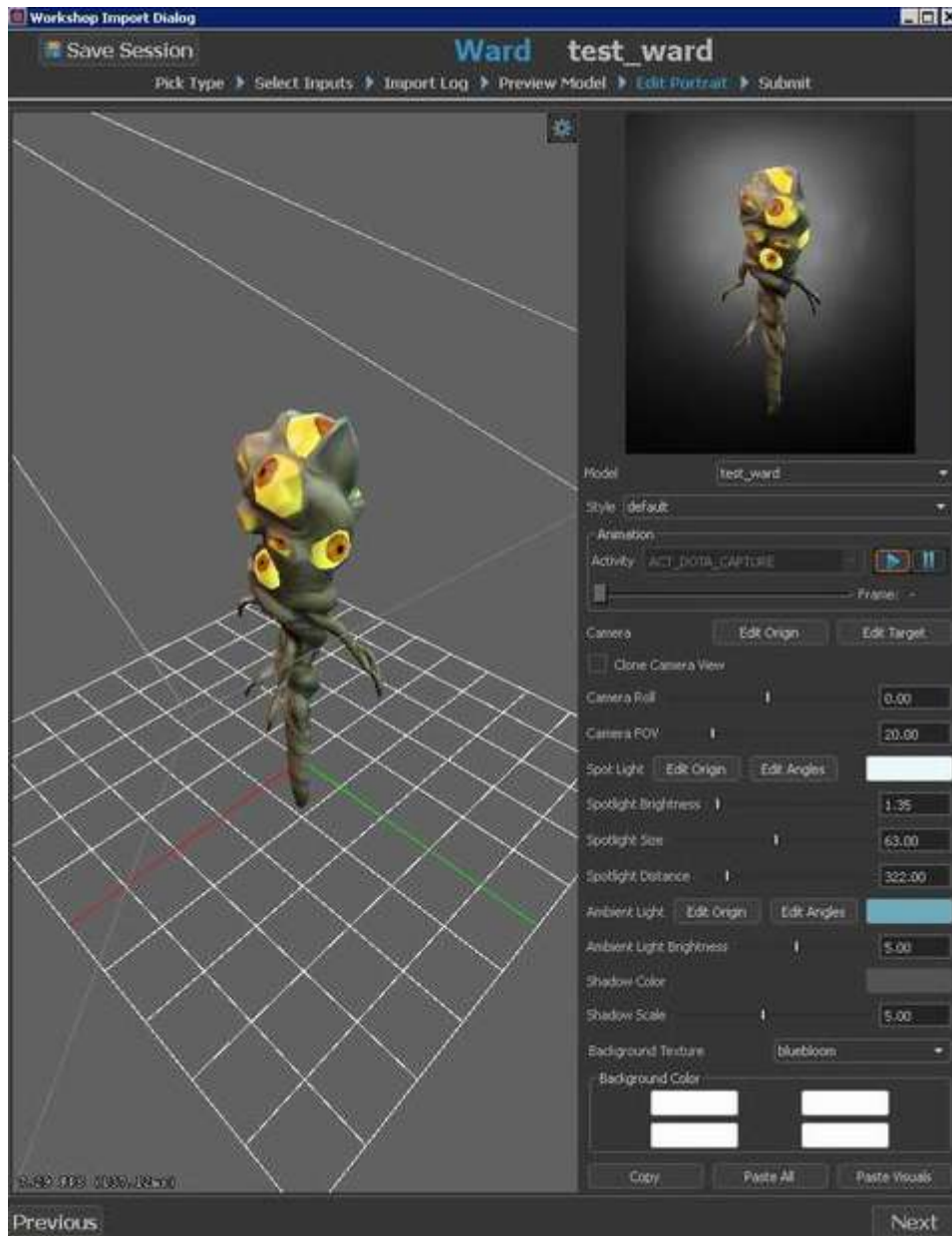
MAKE REVISIONS

- You don't have to submit your first pass of an item to the workshop. You can take it as far as compiling the model in the tool and previewing it in game, then save your session, and exit the tool to do more work before making your final submission.
- To reload an existing session for an item you haven't submitted yet, return to the first page, click "Create New Item" and then, on the following page, click "Load Session" in the lower left.

SUBMIT YOUR ITEM TO THE STEAM WORKSHOP

- Once you are done previewing and revising your item, continue clicking "Next" to take the item through to the final workshop submission.
- Once the item is submitted to the Steam workshop, finalize the revenue shares.
- Save your final workshop session.

- If you have problems submitting your item, see our Item Troubleshooting page.

ITEM COLLECTIONS

You can put all items for a hero's item set or other combinations of items (such as a courier and loading screen) into a collection on the workshop by going to the Browsing: Collections part of the Steam Dota Workshop, clicking "Create Collection", choosing the correct collection type and following the instructions.
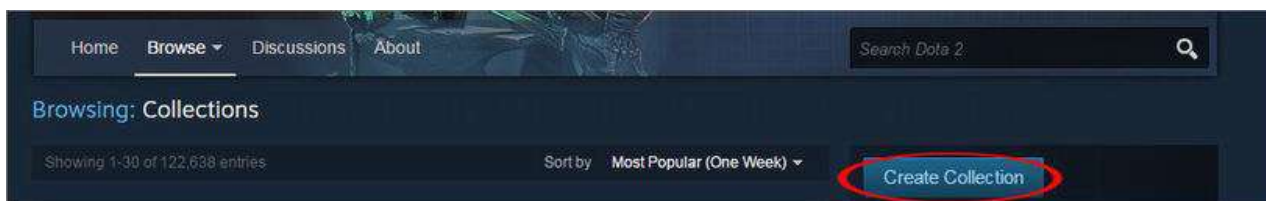
NOTE: By default the middle collection type option is selected. For most Dota collections, you will need to select the top option, "Items that are a set". If you don't select this option, your collection may not display in some of the workshop searches our economy team uses and community votes may not be applied to the items within your collection.
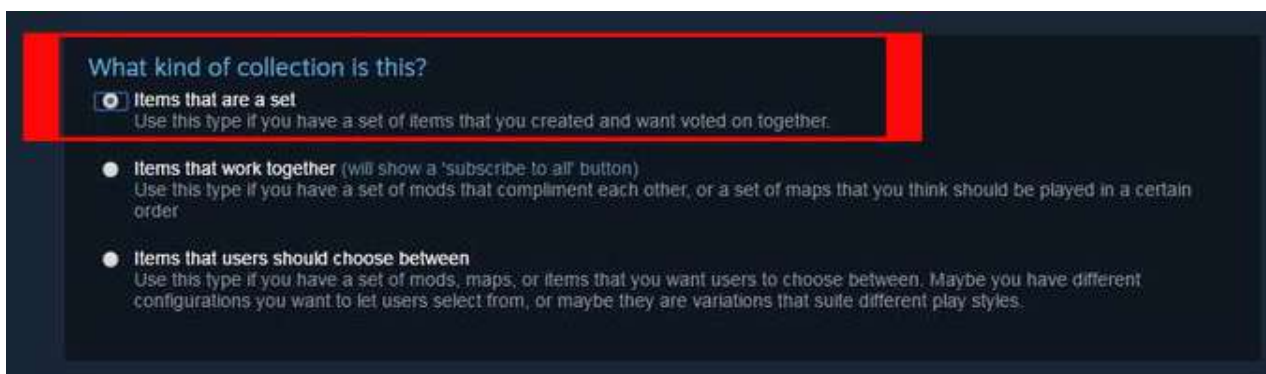
UPDATING WORKSHOP SUBMISSIONS

- If you need to update your item once it has been submitted to the workshop, you can select it from your list of submitted items in the tool's Workshop Manager and use the "Edit" menu to edit or re-upload your item.
- Unless you need to change payment shares or are submitting alternate versions of your submissions, it's best to keep updating the same workshop submission rather than doing a new submission every time there's a revision. This is less confusing for the community members who are viewing and voting for the items and for the Valve developers who are tracking submissions.
- If you need to change the payment shares of an item, you will need to do a new, separate workshop submission.
- If you would like to show your appreciation of a pre-approved Dota Workshop Service Provider, you have the option to give them a percentage of Valve's revenue if the items are sold on the Dota store.

Related FAQs

Steam Support :: Dota 2 Workshop

UV Mapping is the process of unwrapping the surface of a 3D model to create a 2D image onto which the model's texture can be painted.

- To achieve better texture details you can overlap UVs on symmetrical or repeating parts of the model but do not weld them through. Internally we offset overlapping UVs +1 in U direction.
- Texture seams are better kept to a minimum as they break up the vertices and add to an item's vertex count.
- In general, you can push an item's UVs to the texture borders closer than usual because hero's and item's textures are all added together in-engine.
- Mirror UVs as much as possible. Reserve asymmetry for areas that are most prominent in the portrait and game cameras. In the example above with Brewmaster, all solid colored areas have been overlapped.
- On Dota heroes, face UVs occupy at least 25% of the body's UVs so that the portraits have sufficient detail. Bear this in mind when creating UVs for replacement head items or for the heads of NPCs and hero mounts that will be seen prominently in portraits or in the loadout.
- Most of the mounts ridden by Dota heroes have somewhat solid body coloring instead of skin covered with sharply defined details like stripes or spots. This gives our artists the option to use smaller UV space for the simpler body areas and use larger UV space for more important details on the mounts' heads, armor, tails, and fur or feather accents.

- All swappable costume items should be UV'd in their own unique 0 to 1 space (creating a unique texture).
- Like textures, UVs also typically have a density gradient with the lowest amount of UV space towards the feet/lower torso and largest UV space toward the head and upper torso. Portrait and game camera should inform these decisions.
- Eyes with a lot of detail should be a separate, larger UV island.
- Waste as little space as possible when laying out UV islands without packing it too tight. Always leave approximately 5-10 pixels (on a 2k source texture) between each shell and the edges of the 0 to 1 space. On some hardware, smaller versions of the textures will be loaded, and this can cause bleeding artifacts if the islands are packed too tightly.
- Grouping UV islands that will be colored similarly helps retain color separations when smaller versions of the textures are loaded.

Dota 2 Item Workshop Guidelines Homepage

Steam Support :: Dota 2 Workshop

WARD CONCEPT CONSIDERATIONS

- Observer and sentry wards need an 'eyeball' element that is very prominent and can be seen clearly from above in game view.
- For gameplay clarity, the eyeballs should have strong yellowish or bluish coloring.
- If the ward has a face or prominent features, make sure these can be clearly seen from above in game view.
- Our artists review wards by how they look in game, so please put as much effort into the in-game view as you do for their appearance in the loadout.

- For more information about general item design concepts, please see our Character Art Guide.
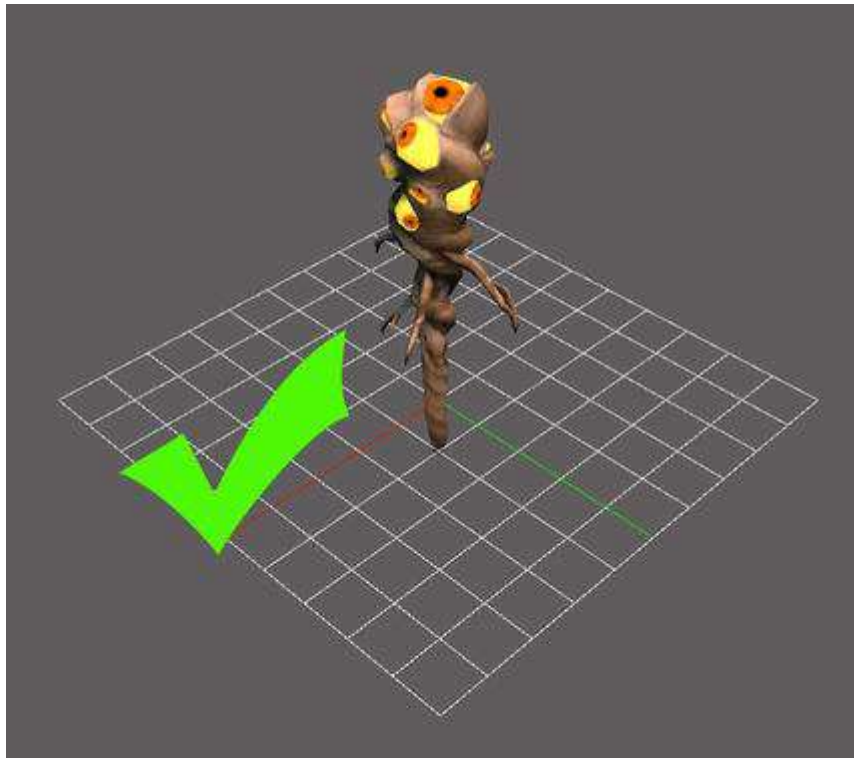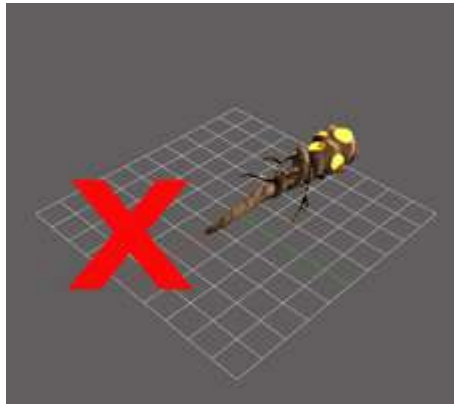
WARD MODEL REQUIREMENTS

- Wards share the same model for the sentry and observer versions.
- There is a limit of 60 bones for the model.
- Both models can have two LOD (level of detail) meshes
- LoD0 is higher resolution. It is optional, is displayed in the portrait, loadout and closeup showcase views and is limited to 2000 triangles.
- LoD1 is lower resolution. It is required, is used in-game and is limited to 1500 triangles.
- Please note that our budgets refer to triangles, not polygons.
- It is helpful if you tessellate your model into triangles before submission to confirm that the final mesh is what you intend. Otherwise our tools will triangulate the mesh but may have different results from what you'll see using your software.
- Our game is only able to support the skinning of 4 vertices per joint. Skinning to additional vertices will be removed or will cause a failure when community items go through our workshop compiler.
- Please make sure the bind pose for your ward model is oriented upright and facing forward. This orientation determines the placement of the hitboxes.

- For general information about workshop models, go to <u>Workshop Item Model Requirements</u>
- We no longer accept .smd files for workshop models. Please provide .dmx or .fbx files.

WARD MATERIALS

- Wards require two separate skin textures, one for the observer ward which has prominent areas of yellow coloring, and another for the sentry ward, which has prominent areas of blue coloring.
- The final material size for each texture is 256x256
- For general information about workshop item textures and masks, go to <u>Workshop Item Shader Masks</u>

WARD ANIMATION REQUIREMENTS

- Wards need spawn, idle, and death animations.
- They have an option for portrait and rare animations.
- A run animation is not needed for wards since they are rooted in one place.

- It may help to orient the animation of the eye, head, or primary features to face slightly upwards so that they read better from above in game view.
- If you have separate portrait animations, these can be adjusted to have the head at a normal angle.
- For general information about NPC animations, go to <u>Workshop NPC Animations</u>.

HITBOXES

- Hitboxes creation by community artists is not currently supported for the Source 2 Dota Workshop. Hitboxes are created by Valve artists once a ward is accepted for the game.
- Temporary generic hitboxes are created by the workshop tool when you test your ward in demo mode so that it can be selectable. These are not the final hitboxes.

ATTACHMENT POINTS

- Hit location attachments are needed for wards.
- The hit location specifies where attack projectiles will travel to.
- In the workshop submission tool you will need to enter the name of the bone that the attach_hitloc will bind to and, if necessary, adjust the attach position to be near the eye or above the center of the ward so that projectiles will stay well above the ground.
- Detailed instructions about designating and editing attaches in the workshop tool can be found on the <u>Submitting Items</u> page.

WARD PORTRAIT

- The portrait options in the submission tool start with the same framing, lighting, and background as the default ward but you can customize these settings.
- If you have prepared a separate portrait animation with a different eye/head orientation, be sure to choose this animation from the drop-down list before framing your portrait.

SUBMITTING WARDS

- Refer to the Submitting Items page for important general information about testing and submitting items.
- It is no longer necessary to maintain our file structure when preparing your item files. The workshop tool will place your files where they need to go.

ITEM TROUBLESHOOTING

If you have problems testing or submitting your ward, see our Item Troubleshooting page.

WARD REFERENCE DOWNLOAD

Download the Ward Model (675k)

- These instructions pertain to Observer/Sentry wards that can be used and shared by all Dota heroes.
- See the Hero Ability Models webpage if you need information about the ability wards used by specific Dota heroes.

Dota 2 Item Workshop Guidelines Homepage