

PARTY MASKS

FOR CHILDREN'S CELEBRATIONS

Technical Design Guide

15 Character Masks for SLA 3D Printing

Animals: Wolf, Fox, Rabbit, Bear, Lynx, Frog, Raven, Crow, Squirrel

Fairy Tale Characters: Baba Yaga, Koschei, Snegurochka, Ded Moroz, Leshy, Vodyanoy

Blender Python Script Included

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1. Overview

This technical guide provides detailed specifications for 15 character masks designed for children's parties, school performances, and festive events. Each mask is optimized for SLA (Stereolithography) 3D printing, ensuring high detail, smooth surface finish, and comfortable wear for children aged 4-10 years. The masks feature standardized dimensions, attachment points for elastic straps, and ventilation holes for extended wear.

The collection includes two main categories: realistic animal masks (Wolf, Fox, Rabbit, Bear, Lynx, Frog, Raven, Crow, Squirrel) and Russian fairy tale characters (Baba Yaga, Koschei, Snegurochka, Ded Moroz, Leshy, Vodyanoy). Each design incorporates distinctive features such as ears, horns, beards, or other characteristic elements while maintaining printability and structural integrity.

1.1 Target Age Group

Age Range	Face Width	Face Height	Recommended Mask
4-5 years	120-140 mm	130-145 mm	Scale: 0.85
6-8 years	140-160 mm	145-155 mm	Scale: 0.95
9-10 years	155-170 mm	150-165 mm	Scale: 1.0 (default)

Table 1: Age-Appropriate Sizing Guide

2. Technical Specifications

2.1 Base Mask Dimensions

Parameter	Value (mm)	Notes
Overall Width	180	Fits most children 4-10 years
Overall Height	160	From forehead to chin
Depth (face curve)	45	Comfortable curve for face
Wall Thickness	3.0	Minimum for SLA durability
Eye Hole Width	35	Elliptical opening
Eye Hole Height	25	Allows glasses underneath
Eye Spacing	60	Distance between centers
Strap Slot Width	12	Fits standard elastic
Strap Slot Height	4	Pass-through opening

Table 2: Base Mask Dimensional Specifications

2.2 SLA Printing Requirements

Parameter	Minimum	Recommended
Layer Height	0.025 mm	0.05-0.1 mm
Exposure Time	6-8 sec	8-12 sec (base)
Support Density	40%	50-60%
Print Orientation	45 deg tilt	Face up, 15-30 deg
Hollow Print	Yes	2-3mm walls, 2mm holes

Table 3: SLA Printer Settings

3. Animal Masks

The animal mask collection features nine distinctive designs, each capturing the essential characteristics of the creature while maintaining wearability and printability. All animal masks share a common base form with species-specific modifications to ears, nose, teeth, and facial features.

3.1 Wolf Mask

The Wolf mask features pointed ears, an elongated snout, prominent fangs, and fierce eyebrows. The design emphasizes the predatory nature while remaining child-friendly. Ears are positioned at 20-degree angles with internal supports for durability during active play.

Feature	Specification	Notes
Ear Type	Pointed, 35mm tall	Reinforced base
Nose	Elongated, 15mm	Black coloring recommended
Teeth	Fangs, 12mm	Optional feature
Base Color	Gray (0.45, 0.45, 0.50)	Airbrush or paint

Table 4: Wolf Mask Specifications

3.2 Fox Mask

The Fox mask showcases large triangular ears with pink inner details, a pointed snout with black nose, and distinctive white muzzle markings. The orange-red color scheme makes this mask particularly popular for autumn festivals and forest-themed events.

3.3 Rabbit Mask

The Rabbit mask features characteristic long ears (up to 75mm extended), a small pink nose, prominent front teeth, and rounded cheeks. The design includes internal ear supports to prevent drooping during wear. White or cream base color with pink accents.

3.4 Bear Mask

The Bear mask presents a friendly brown bear face with small rounded ears, a large black nose, and extended muzzle. The robust construction suits active play. Recommended in brown with cream muzzle and black nose detail.

3.5 Lynx Mask

The Lynx mask is distinguished by tufted ears with black tips, distinctive facial ruff (side whiskers), and spotted fur texture on the face surface. The most complex animal mask in the collection, featuring multiple small detail elements.

3.6 Frog Mask

The Frog mask features bulging eyes positioned above the face plane, a wide mouth, and textured skin with small warts. Bright green base color with yellow accents. Eye openings are positioned to allow clear downward vision.

3.7 Raven and Crow Masks

The Raven mask (black) features a curved beak and head feather tufts. The Crow mask (gray-brown) has a shorter beak and simpler feather arrangement. Both include textured feather patterns on the face surface for painting guidance.

3.8 Squirrel Mask

The Squirrel mask displays large pointed ears with tufts, fluffy white cheeks, and a small black nose. The design captures the curious, energetic expression characteristic of squirrels. Orange-brown base with white cheek accents.

4. Fairy Tale Character Masks

Russian fairy tale characters form a unique category of masks designed for traditional celebrations, school performances, and New Year festivities. These designs incorporate distinctive elements like horns, beards, crowns, and magical accessories.

4.1 Baba Yaga Mask

Feature	Specification	Notes
Hair	Wild, disheveled	5 spike elements
Nose	Hooked, 50mm long	Distinctive feature
Warts	2-3 small bumps	On nose and cheek
Eyebrows	Bushy, angled down	Fierce expression
Base Color	Dark beige/olive	Weathered appearance

Table 5: Baba Yaga Mask Specifications

4.2 Koschei the Deathless Mask

The Koschei mask represents the skeletal villain from Russian folklore. Features include short horns, a thin goatee beard, angular mustache, and hollow cheekbones. The pale green-gray base color emphasizes the undead appearance. Suitable for older children (8+).

4.3 Snegurochka (Snow Maiden) Mask

The Snegurochka mask portrays the granddaughter of Ded Moroz with delicate feminine features. Includes braided hair elements on the sides and a small crown or kokoshnik headdress element. Pale blue-white base with silver or pearl accents.

4.4 Ded Moroz (Grandfather Frost) Mask

Feature	Specification	Notes
Beard	Full, white, 60mm	Textured surface
Mustache	Thick, white	Curled tips
Eyebrows	Bushy, white	Matching beard
Hat	Pointed, red	Optional 3D element
Cheeks	Rosy pink circles	Jolly expression
Base Color	Red with white trim	Traditional colors

Table 6: Ded Moroz Mask Specifications

4.5 Leshy (Forest Spirit) Mask

The Leshy mask embodies the forest guardian with branching antler-like horns, wild leaf-textured hair, a mossy beard, and green-brown coloring. Horns are designed with support-friendly geometry. The most complex fairy tale mask with multiple organic elements.

4.6 Vodyanoy (Water Spirit) Mask

The Vodyanoy mask represents the water dwelling spirit with gills on cheeks, bulging frog-like eyes, a flat hat element, and flowing hair/beard suggesting water movement. Green-blue swamp color scheme with darker accents.

5. Printing Guidelines

5.1 Material Recommendations

Material Type	Properties	Best For
Standard Resin	Good detail, brittle	Display masks
Tough Resin	Impact resistant	Active play

Skin-Safe Resin	Biocompatible	Extended wear
Water-Washable	Easy cleanup	Beginners

Table 7: Resin Material Selection Guide

5.2 Print Orientation

Optimal print orientation minimizes support marks on visible surfaces. Position the mask face-up at a 15-30 degree angle from horizontal. This orientation reduces the need for supports on facial features while maintaining good layer adhesion. Add drainage holes at the bottom edge when printing hollow.

5.3 Support Strategy

Use medium-density supports (50-60%) with heavy supports under protruding elements like ears and horns. Light supports suffice for the main face surface. Critical areas (eyes, nose, mouth) should have minimal supports to preserve detail. Post-cure supports before removal to prevent surface damage.

6. Post-Processing

6.1 Surface Finishing Steps

1. Remove supports while resin is still slightly flexible (before final cure)
2. Rinse in IPA (99%) for 10-15 minutes
3. Cure under UV light for 5-10 minutes (check manufacturer guidelines)
4. Sand support marks with 400-600 grit sandpaper
5. Apply primer spray for better paint adhesion
6. Paint with acrylic paints (recommended for child-safe finish)
7. Apply clear coat sealer for durability
8. Attach elastic strap through side slots

6.2 Painting Recommendations

Paint Type	Application	Safety
Acrylic	Brush or airbrush	Water-based, safe for children
Enamel	Brush application	Requires ventilation, durable
Spray Paint	Base coat only	Use outdoors, wear mask

Table 8: Paint Selection Guide

7. Using the Blender Script

7.1 Running the Script

1. Open Blender (version 3.0 or later)
2. Navigate to Scripting workspace (top menu bar)
3. Click 'New' to create a new text block
4. Copy the entire 'party_masks_blender.py' script
5. Paste into the text editor
6. Press 'Run Script' (Alt+P) or click the play button
7. All 15 masks will appear in the viewport

7.2 Exporting for Printing

After generating the models, export individual masks in STL format for your slicer software. Select the desired mask, then use File > Export > Stl (.stl). Set the scale factor to 1000 (meters to millimeters) for correct sizing in most slicer applications.

7.3 Customization Options

The script includes adjustable parameters at the top of the file. Key values that can be modified include overall mask dimensions, eye hole sizes, and strap slot dimensions. When modifying, maintain proportional relationships to preserve the character's distinctive appearance.