Design and build a flatpack toy

Use one of your favourite character designs to create a flatpack toy you can give to friends and clients...

Despite the fact that vinyl toys have been exceedingly popular for the last five years, they remain an elusive industry for most illustrators and designers to break into. Waiting around for Kidrobot or Toy2R to knock on your door isn’t going to remedy the situation, so it’s time you took matters into your own hands.

This tutorial demonstrates how you can take a sketched character design and turn it into a toy that can be built and given out for as long as you can afford the paper. All you need is a copy of Adobe Illustrator, some drawings skills, an ink-jet printer, some double-sided tape, and a scalpel.

We start with a basic character design and alter the shape to better suit the needs of the medium. No one likes making a lot of folds, and only die-hards enjoy spending more than ten minutes on arts-and-crafts projects, so keeping your shape as simple as possible is key. You need to decide which features of your character should be accentuated, and base your toy around them.

Next, we show you how to take that basic shape and turn it into a flattened template. You then apply final art to your template and spruce it up with shading and extra bits of character to give it a more three-dimensional feel.

At that point, it’s just a matter of making the template dummy-proof by adding dotted lines to the designated folds, tabs to the right areas, and instructions to key areas of the canvas which might otherwise cause confusion. The only thing left is to print it out, put it together, and show it off to all your mates.

Expertise provided by Ben Pieratt. Ben is a partner at Fwis Design, which has offices in Denver, Colorado, and Portland, Oregon. See more of the company’s creations at www.fwis.com.

You’ll find a PDF of the flatpack toy designed in this tutorial on the Computer Arts Projects disc 82 in the DiscContent\Tutorials\Tutorial Files\Flatpack toy folder. Print it out, fold it up, and then create a toy of your own with the help of the following tutorial.
**Part 1: Coming up with a character**

Create a character, or use an existing one, to get your toy design under way...

**Keep it simple**

Remember, simplicity is key — if there are too many folds, your audience will get frustrated. You need to break your character down to the bare-bone essentials to keep your template painless.

1. You need to have a character design in mind to get you started, so spend a couple minutes, or hours, comping together something memorable. Alternatively you can use a character that you've already been using.

2. Here, we've sketched out an escaped prison inmate. Paper models need to be kept simple so that they're easy to build. What this means is that, just like doing a caricature, you need to determine the most prominent features of your figure.

3. Now you need to turn your sketch into a three-dimensional shape. Start drawing boxes and flat shapes together to show how your character will look. We're going to emphasise the character's arms and face.

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**Part 2: Flattening your figure**

Work out how to turn your 3D character into a flat shape...

**Perfect perspective**

The easiest way to get your measurements perfect is to simply copy and paste the corresponding elements in question. So if you're not sure about how tall your head should be, just grab the arm, rotate it 90 degrees, and place it next to the head for reference.

1. Once you've decided on a shape, you'll need to figure out how that shape will lay flat. This is the hardest part of the process. It helps to think of everything in terms of a flattened box. So go into Illustrator and create a new standard-paper sized, landscape document.

2. Now you need to make a simple box diagram like this one in a new layer named OUTLINE. Use the Rectangle tool to create a perfect square by holding down Shift+Option while dragging. Then duplicate it six times by holding down Option while dragging the original box.

3. This character won't need a bottom to it because it's going to sit flat on the surface. If this is also the case for your character, get rid of the bottom by deleting the bottom square.

4. You can put placeholder text and images in the corresponding squares to help you keep track of what's what. Here, we put a face on the front panel, and text on the other sides.

5. You'll want to alter the size of the squares to better reflect the shape of your character. Here, we make his torso wider, his whole body taller, and his sides a bit more shallow.

6. Make sure that opposite sides correspond in height and width. This means that the width of your sides needs to be the same as the height of the top square.
At this point you’ll want to illustrate the various elements of your character and apply them to their corresponding spots on the template. It helps to keep your template unaltered at first, so create a new layer underneath called ARTWORK, and lock the OUTLINE layer.

The long arms will make the character too front-heavy and it’ll topple forward. So we’re going to make the character sit back on his haunches a little to balance it out. We do this by first shortening his back.

Now you need to drag the innermost points of each side so that they align with the bottom edge of the back, and the bottom edge of the front. The easiest way to do this is to select both points at the same time with your secondary selection tool, and drag them upwards. This ensures that the two points line up on either side.

We want our character to have simple legs, so we cut out a triangle from the front and back. Abstracting the legs in this way enables you to keep the cuts simple, and the emphasis on the more important aspects of the illustration.

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The next step is to scan in the sketches of the character you want to use, and then import them into Illustrator.

We trace the robber’s face outside the artboard, make some changes to it, and then place it on the corresponding area of the template.

If you put arms on either side of his head, they will stick straight out when the top is folded down. These arms may look way too long, but you need to bear in mind that once the template has been folded together, the only parts of the arms that’s going to stick out are the areas that extend past the front of the torso.

An area equal to the width of the arms should be removed from the sides of the box, so that the arms won’t overlap other paper.

You don’t want the insides of the arms to be blank paper, so add a duplicate arm to each side that can be folded underneath.
**Part 3: Illustrative elements**

With all the preparation done, you can start adding colour...

1. Here, we draw the hands and guns using the Pen tool. These are placed on the template.
2. Once we've illustrated the front and back of the hand, we use the Reflect tool to replicate it on the other side.
3. Apply a striped shirt, colour the top of his head to match the robber's bandana, and illustrate the back of the bandana on the back of his head.
4. Add his trousers by placing a black bar across his lower torso, ensuring you align them with the angle of the two sides. Add small sleeves to his arms by creating a long grey rectangle with smaller white triangles on top of it. Keep their spacing uniform by using the Horizontal Distribution alignment options in the Distribute Objects palette.
5. Add shading to the left side of his body using black rectangles set to Multiply and their Transparency set to 40 per cent. Make the insides of his guns a little darker, to give the character a better sense of lighting when printed.
6. It's a good idea to apply small details to give the character an added sense of individuality. Here, we give him a couple of tattoos, some arm hair and some pockmarks on his nose. We also add some shading to his arms.

**Part 4: Building instructions**

Set up guides and instructions to help people put your character together...

1. Create a new layer called TABS, and place isosceles trapezoids on either side of his back, the top of his head, and the side of his torso. Make them a colour which complements your illustration.
2. Now you need to create the score lines. Unlock your OUTLINE layer and edit the paths so that none of its lines are overlapping.
3. Place a dashed line on each line that needs to be folded. Make sure you change the colours of the line so that you can see it on varying background colours. The best way to do this is to make the path a 2pt/3pt dashed line, and then break the path up with the Scissor tool at the points where a colour change is needed.
Building instructions continued...

4. Add thick black outlines to all your curved lines. This will make it easier for you to cut around these areas without showing the white of the paper.

5. Help guide your builder with notes placed around the template in a new layer called NOTES. For instance, ‘Cut along the top of his head’ would be helpful, and you also need to include a ‘Score on dotted lines’ notice.

6. Apply your logo or URL, or any other decorations you think might be applicable, to the white space around the template.

Part 5: Printing and assembling
Print out your paper model and make sure it works before giving it to others...

Scoring techniques
It’s usually best to work with an old blade when cutting and scoring the paper. A blade that’s too sharp will make it hard to not cut your scores too deep, which will leave your folds weak and easily broken.

1. With all the planning and designing done, print out your template on some thick matte paper. It’s time to see if it works! Experiment with the spacing until you get the desired result.

2. Cut along the outside of the shape using a scalpel. You’ll see now why those thick black outlines around the curves are handy.

3. Score all your dotted lines by running your scalpel blade gently along them.

4. Bend all your scores to make sure that you’ve got them all. This will also make taping the shape together easier.

5. Stick a piece of double-sided tape on the underside of the arms, and stick the two halves together.

6. Using double-sided tape, bring your tabs together and build your character. Try to tape the tabs together in a linear fashion. If you jump around from side to side, you’ll probably end up unable to gain access to a tab because you’ve already sealed that side with another tab.