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Tumbling Dominoes

Prep Instructions

Part I - Growing Dominoes

For a small surcharge, most major hardware stores can cut purchased wood to the sizes required. Dominoes 1-3 can be made from sheet metal or a piece of medium density fibreboard (MDF) sanded down. Dominoes 4-9 can be made from single pieces of wood or sheets of MDF. Dominoes 10-13 need to be assembled from several pieces of MDF and wood pieces. If acquiring sheet metal proves too difficult, the activity can still be performed by omitting the first three dominoes.

Dimensions for the height, width and thickness of the set of completed dominoes are given in millimeters. However, measurements are also given in inches because these are the standard measures of wood available for purchase at hardware stores. Although the measurements given in inches are not as accurate, they will not alter the activity's success if they are used consistently.

The values below are the measurements for the dominoes that are scaled so that each domino is 1.5 times larger than the previous one, in all dimensions.

Domino	Height (mm)	Width (mm)	Thickness (mm)
1	10	5	1
2	15	7.5	1.5
3	22.5	11.3	2.3
4	33.8	16.9	3.4
5	50.6	25.3	5.1
6	75.9	38	7.6
7	114	57	11
8	171	85	17
9	256	128	26
10	384	192	38
11	577	288	58
12	865	432	87
13	1297	649	130

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The table below provides the dimensions of a set of completed dominoes. In order to reduce the amount of MDF purchased, the dimensions do not match the exact measurements provided above.

	Dimensions (inches)			Dimensions (millimetres)		
Domino	**Height**	**Width**	**Thickness**	**Height**	**Width**	**Thickness**
1	3/8	3/16	1/32	10	5	1
2	5/8	5/16	1/16	16	8	1.5
3	7/8	7/16	3/32	22	11	2
4	1 1/4	11/16	1/8	32	17	3
5	2	1	1/4	51	25	6
6	3	1 1/2	3/8	76	38	10
7	4 1/2	2 1/4	1/2	114	57	13
8	6 3/4	3 3/8	3/4	171	86	19
9	10 1/8	5	1	257	127	25
10	15	7 1/2	1 11/16	381	191	43
11	22 3/4	11 1/2	2 1/2	578	292	64
12	34	17	3 1/2	864	432	89
13	51	24 1/2	4 1/2	1295	622	114

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Dominoes 1 - 3

Dominoes 1 through 3 can be made from sheet metal and cut using a milling machine or a press cutter. Alternatively, a metal saw, or tin snips and a metal file can also be used. Another alternative is to use a very thin piece of MDF and sand it down to the correct size.

The following items will be required for the prep of this activity:

- sheet metal or MDF
- tin snips or metal saw
- milling machine or press cutter (if available)
- metal file

Domino 1

Using a piece of sheet metal or MDF of the appropriate thickness (1/32 in.), or as close to it as possible, cut a 10 x 5 mm (~3/8 in. x 3/16 in) rectangular prism.

Domino 2

Using another piece of sheet metal or MDF of the appropriate thickness (1/16 in.), cut a 16 x 8 mm (~5/8 in. x 5/16 in.) rectangular prism.

Domino 3

Using another piece of sheet metal or MDF of the appropriate thickness (3/32 in.), cut a 22 x 11 mm (~7/8 in. x 7/16 in.) rectangular prism.

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Dominoes 4 - 9

Dominoes 4-9 can be made from a single piece of wood or MDF and cut to the appropriate size using a table saw. The thicknesses listed in the table above are standard measures of wood and are available for purchase at most hardware stores. If not, then use the nearest appropriate thickness available.

The following items will be required for the prep of this activity:

- hardwood
- MDF
- table saw or hand saw
- wood glue

Domino 4

Take a 1/8 in. thick piece of hardwood and cut a 32 x 17 mm (~1 1/4 in. x 11/16 in.) rectangular prism.

Domino 5

Take a 1/4 in. thick piece of MDF and cut a 51 x 25 mm (~2 in. x 1 in.) rectangular prism. Alternatively, to economise: cut two pieces of this size using 1/8 in. thick hardwood and glue them together.

Domino 6

Take a 3/8 in. thick piece of MDF and cut a 76 x 38 mm (~3 in. x 1 1/2 in.) rectangular prism. Alternatively, cut three pieces of this size using 1/8 in. thick hardwood and glue them together.

Domino 7

Take a 1/2 in. thick piece of MDF and cut a 114 x 57 mm (~4 1/2 in. x 2 1/4 in.) rectangular prism.

Domino 8

Take a 3/4 in. thick piece of MDF and cut a 171 x 86 mm (~6 3/4 in. x 3 3/8 in.) rectangular prism. Alternatively, cut two pieces of this size using 1/8 in. thick hardwood and one piece 1/2 in. thick MDF and glue them together.

Domino 9

Take a 1 in. thick piece of MDF and cut a 257 x 127 mm (~10 1/8 in. x 5 in.) rectangular prism.

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Dominoes 10 - 13

Dominoes 10-13 need to be made from several pieces of wood and MDF. These dominoes are made by forming a frame from wood, then covering them with panels of MDF and screwing them in place (**Figure 4**).

The following items will be required for the prep of this activity:

- wood
- MDF
- table saw or hand saw
- wood glue
- wood screws
- drill and bit

Domino 10

Cut two 381 x 191 mm (~15 in. x 7 1/2 in.) rectangular prisms from 1/2 in. MDF. Take the 4 ft. piece of 2 in. x 1 in. wood and cut it into two lengths of 381 mm (~15 in.) and two lengths of 114 mm (~4 1/2 in.). Form a rectangular frame, to the height and width listed in the table, using the pieces of wood. Orient the corners of the pieces of wood to replicate **figure 1**. Use a mixture of wood glue and 1 in. screws to secure the frame together. Finally, glue the MDF sheets onto the frame and screw them at regular intervals to form a complete, hollow domino (**Figure 2 and 4**).

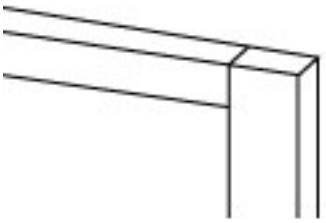

Figure 1

Domino 11

Cut two 578 x 292 mm (~22 3/4 in. x 11 1/2 in.) rectangular prisms from 1/2 in. MDF. Take the 6 ft. piece of 2 in. x 2 in. wood and cut it into two lengths of 578 mm (~22 3/4 in.) and two lengths of 216 mm (~8 1/2 in.). Form a rectangular frame using the pieces of wood, so that it is the same size as the MDF sheet. Use a mixture of wood glue and 1 in. screws to secure the frame together. Finally, glue the MDF sheets onto the frame and screw them at regular intervals to form a complete, hollow domino (**Figure 2 and 4**).

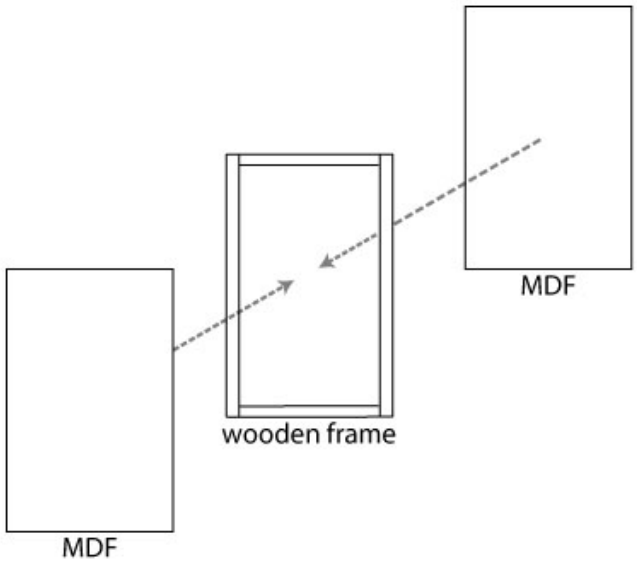

Figure 2

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Domino 12

Cut two 864 x 432 mm (~34 in. x 17 in.) rectangular prisms from 1/2 in. MDF. Take the 10 ft. piece of 3 in. x 2 in. wood and cut it into two lengths of 864 mm (~34 in.) and two lengths of 356 mm (~14 in.). Form a rectangular frame using the pieces of wood, so that it is the same size as the MDF sheet. Orient the corners of the pieces of wood to replicate **figure 3**. Use a mixture of wood glue and 2 in. screws to secure the frame together. Finally, glue the MDF sheets onto the frame and screw them at regular intervals to form a complete, hollow domino (**Figure 2 and 4**).

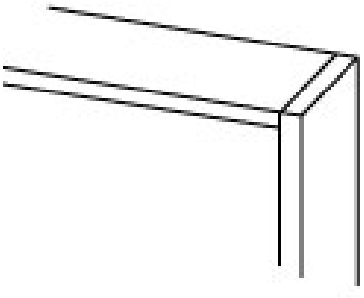

Figure 3

Domino 13

Cut two 1295 x 622 mm (~51 in. x 24 1/2 in.) rectangular prisms from 1 in. MDF. Take the 14 ft. piece of 4 in. x 2 in. wood and cut it into two lengths of 1295 mm (~51 in.) and two lengths of 546 mm (~21 1/2 in.). Form a rectangular frame using the pieces of wood, so that it is the same size as the MDF sheet. Orient the corners of the pieces of wood to replicate **figure 3**. Use a mixture of wood glue and 2 in. screws to secure the frame together. Finally, glue the MDF sheets onto the frame and screw them at regular intervals to form a complete, hollow domino (**Figure 2 and 4**).

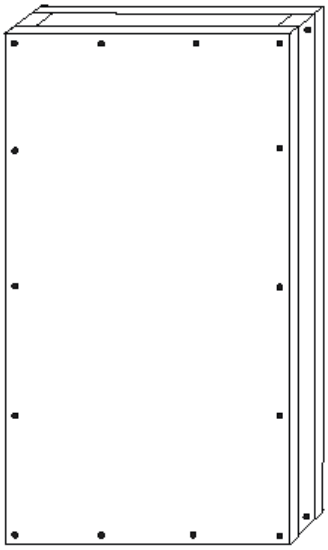

Figure 4

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Post-build

The following items will be required for the prep of this activity:

- complete set of dominoes
- tack cloth
- sandpaper
- acrylic paint
- varnish
- paintbrush

Step 1

Once all the dominoes have been put together, the wooden dominoes must be sanded with 80 grit sandpaper. Most MDF is pre-sanded so the faces do not need to be sanded.

Step 2

Using the tack cloth, wipe down all the dominoes to remove any dust. Once they have all been cleaned, use the acrylic paint to give the dominoes a coat of paint. Wait three hours for the paint to dry before applying a second coat. Once the second coat has dried, apply a final coat of paint.

Step 3

Once the final coat of paint is dry, sand the entire domino lightly using 220 grit sandpaper. Use the tack cloth to wipe the residue away.

Step 4

For the first coat of varnish, the varnish must be thinned by 50% (i.e. one part varnish, one part thinner). Depending on the type of varnish that is purchased, a special solvent might be required. Consult the sales clerk at the hardware store if you are unsure.

Varnishing is best done at a room temperature of 20 to 25 °C. Beginners might find it easier to use a foam brush to apply the varnish, provided they are using oil-based varnishes. The first coat should be applied in the direction of the grain or against it. Subsequent coats must be applied in the direction of the grain. After applying the first coat of varnish, allow the domino to dry overnight.

Step 5

Sand the dominoes with 220 grit sandpaper and clean the dominoes with tack cloth. This is the last time the dominoes should be sanded. Apply two more coats of varnish, allowing at least 6 hours between applications.

Figures 5-7, scaled according to the size of wood, present a possible method for cutting the hardwood and MDF sheets for the various sizes of dominoes.

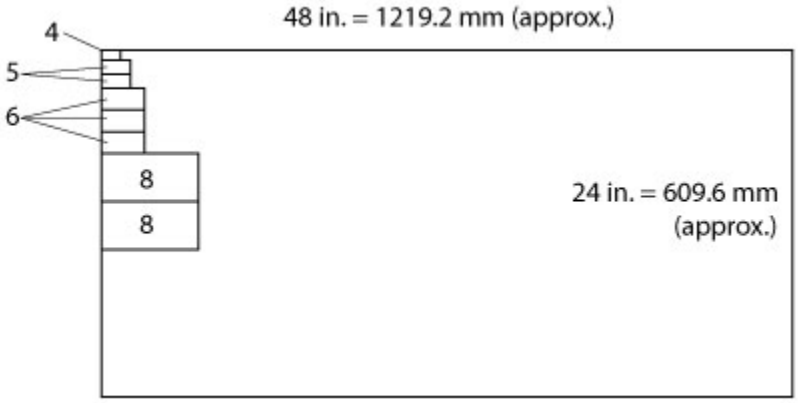

Figure 5

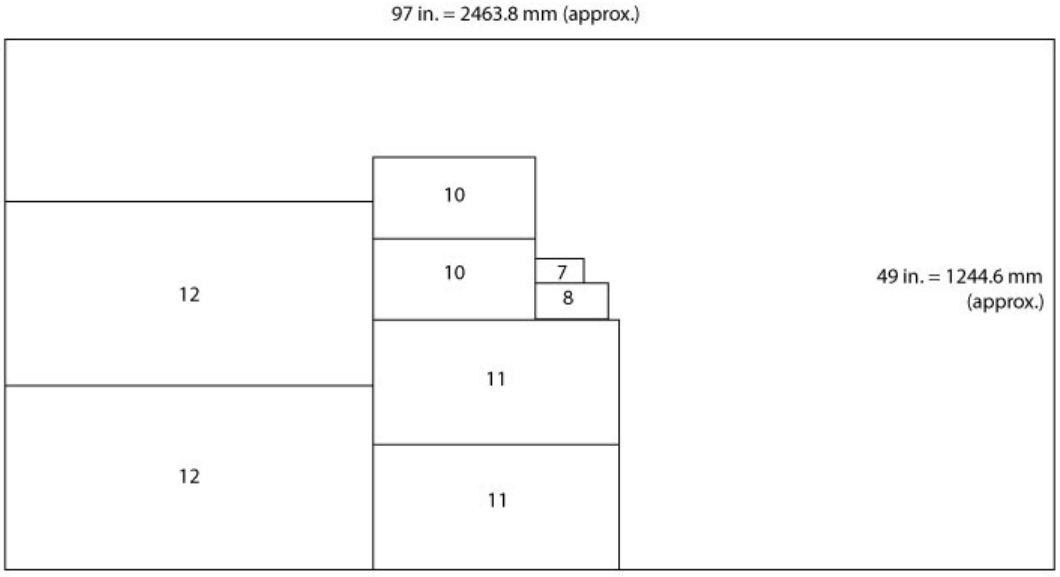

Figure 6

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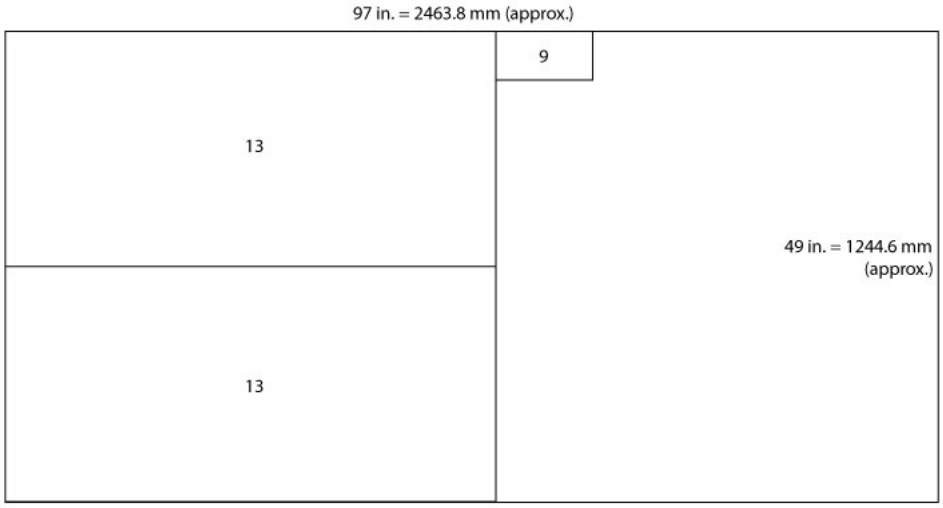

Figure 7

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Climbing Dominoes

The following items will be required for the prep of this activity:

• cereal boxes

Step 1

Find a flight of stairs for the activity. To ensure the stairs are suitable for the activity, do Part II in the *Activity Instructions* prior to students arriving.