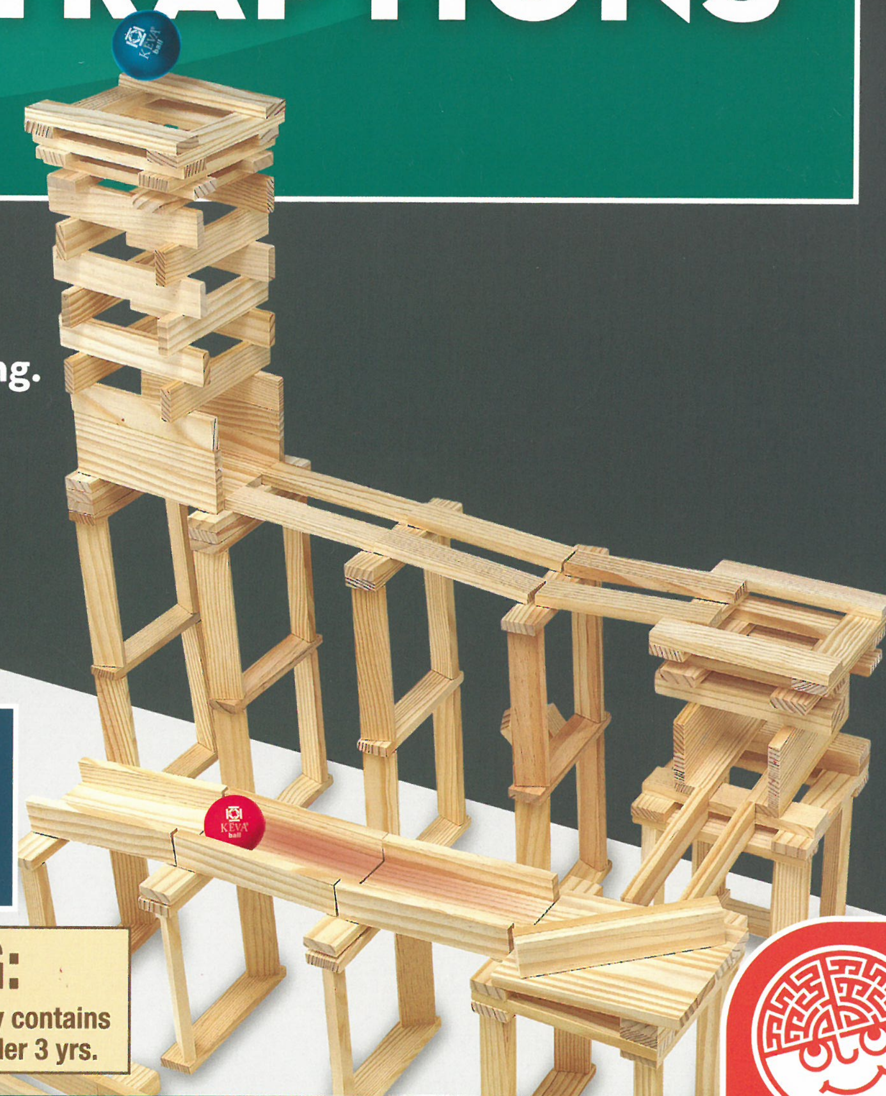
KĒVA®

CONTRAPTIONS™

7+
Years



No Glue.
No Connectors.
Just Simple Stacking.

GUIDE BOOK

⚠ **WARNING:**
CHOKING HAZARD—Toy contains small balls. Not for children under 3 yrs.

From SIMPLE SLOPES to WILD RUNS

MindWare®

Contraptions

Tips

Trial and Error
Make frequent trials as you build to see if the ball will do what you expect it to do.

Easy Does It
Gentle slopes and slower speeds make it easier to control the ball movements.

Moveable Structures
Build towers on square bases so their position can be easily adjusted.

Like Sandcastles
Remember that Contraptions are temporary. They will eventually fall out of alignment. The goal is to successfully get the ball through the Contraption one or more times.

Design Your Own
Use your imagination to expand the basic concepts illustrated in this booklet.

Table It
Build on a table to gain more height. Try making the KEVA ball move from the table to the floor.

The Angle Advantage
Upright planks are much more stable if they are angled rather than parallel.

Proof
Take photos or videos to help remember your accomplishments.

Inventing

As children build Contraptions they learn the art of inventing. Inventing is all about problem solving. Whether inventing a new gizmo for a household chore or inventing a lightbulb, it always starts with a problem and creative thought to solve the problem or find a better way.

Building Contraptions creates one problem after another… yes, problems are good.

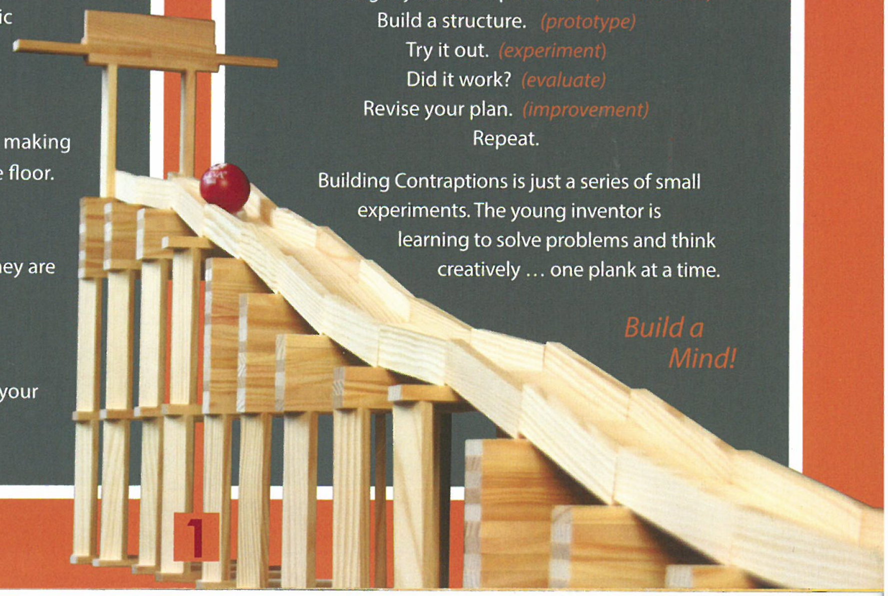
Problem: *The ball won't move.*
Solution: Place the ball on a sloped plank.
Problem: *The ball falls off the side of the plank.*
Solution: Add sides to the plank (create a chute).

Contraptions invite the builder to work through the invention process to create interesting new structures:

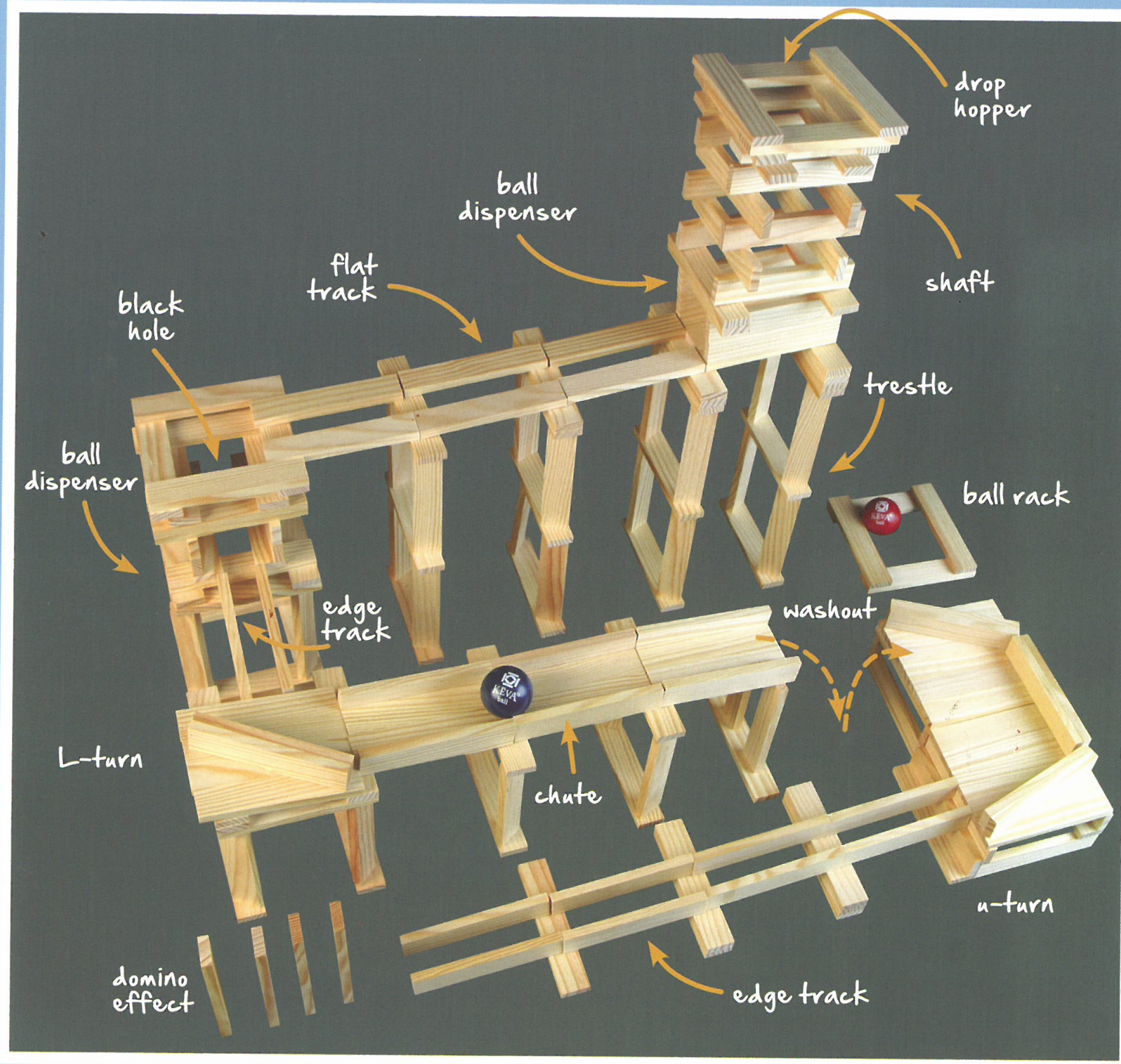
What do you want the ball to do? *(problem)*
How might you accomplish this? *(creative idea)*
Build a structure. *(prototype)*
Try it out. *(experiment)*
Did it work? *(evaluate)*
Revise your plan. *(improvement)*
Repeat.

Building Contraptions is just a series of small experiments. The young inventor is learning to solve problems and think creatively … one plank at a time.

Build a Mind!



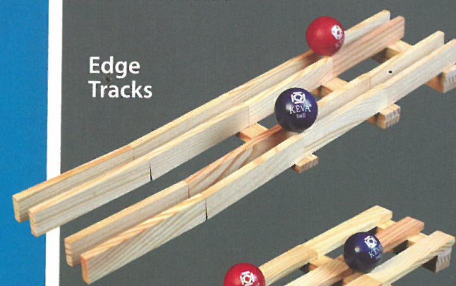
Contraptions in Action



Tracks Chutes Trestles

Tracks create the most precise ball control. *Edge tracks* can form curves and zig zags. *Flat tracks* are more stable.

Edge Tracks



Flat Tracks

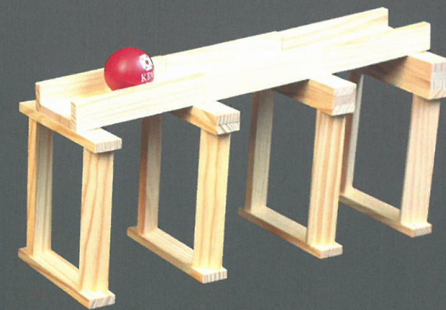
Zig Zag Tracks

If you make the *track* wider, the ball goes slower.

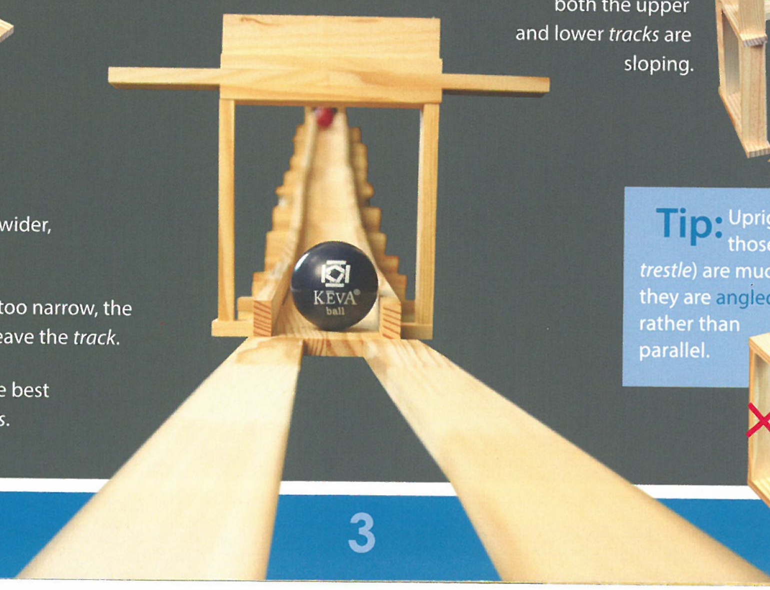
If you make the *track* too narrow, the ball is more likely to leave the *track*.

Experiment to find the best spacing for your *tracks*.

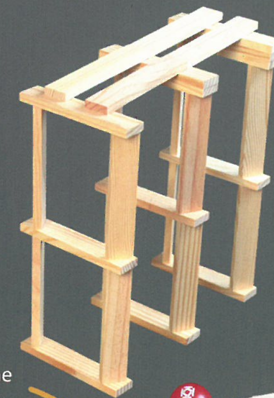
The *chute* is a basic way to move the ball. Add stability with double plank side rails.



The ball is about to move from a *chute* to a *flat track*.

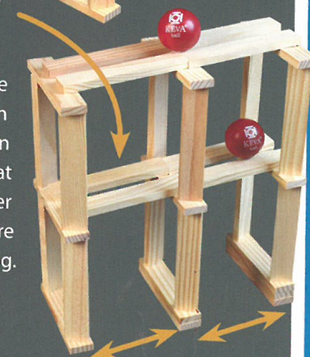


A *flat track* elevated on *trestles*.

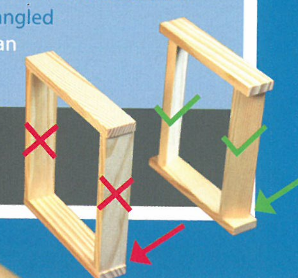


Add another *track* in the middle of the *trestle*.

Notice that the slope change in height is done on the bottom so that both the upper and lower *tracks* are sloping.



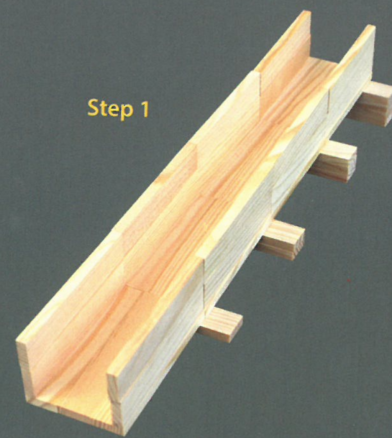
Tip: Upright planks (like those used on a *trestle*) are much more stable if they are angled rather than parallel.



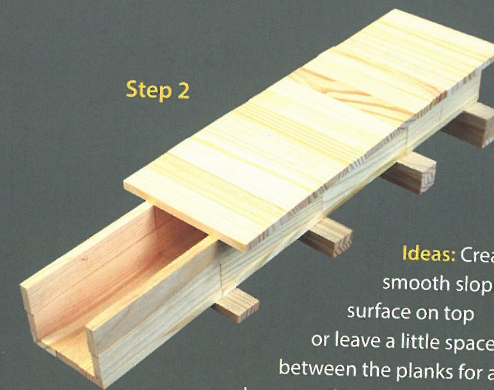
Trough

A *trough* has sides high enough that the KEVA ball can travel under any planks laid across the top — creating *tunnels* or double decker effects.

Step 1



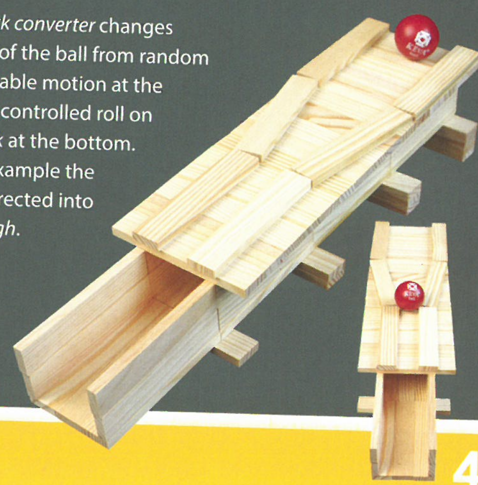
Step 2



Ideas: Create a smooth sloping surface on top or leave a little space between the planks for a bumpy railroad *track*.

Track Converter

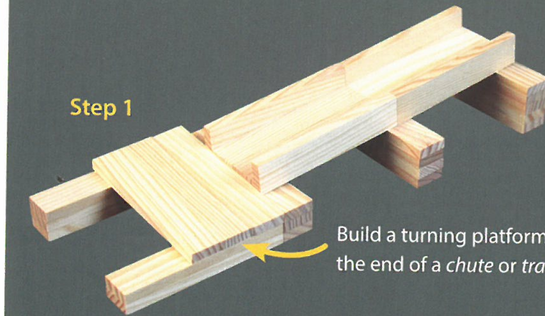
The *track converter* changes motion of the ball from random and variable motion at the top to a controlled roll on the *track* at the bottom. In this example the ball is directed into the *trough*.



Tip: Use a couple of planks to easily straighten irregular edges.

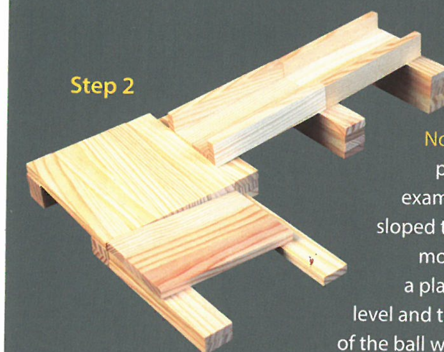
U-Turn

Step 1



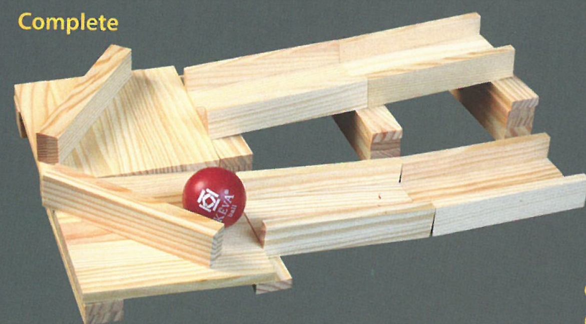
Build a turning platform at the end of a *chute* or *track*.

Step 2

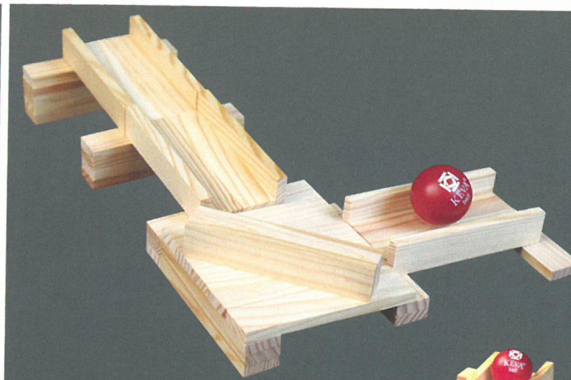


Note: The turning platforms in this example are slightly sloped to keep the ball moving. However, a platform could be level and the momentum of the ball will usually carry it through the turn.

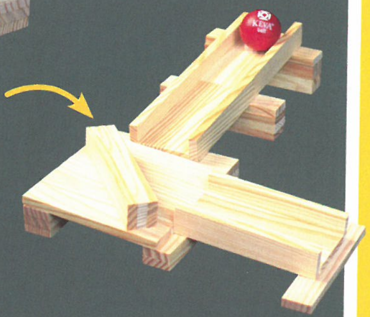
Complete



L-Turn



Bumper



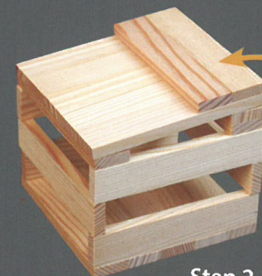
Adjust the angled bumpers until the ball makes the proper turns. Use three or more planks to make the bumper more stable.

Complete (top view)

Bounce Plate

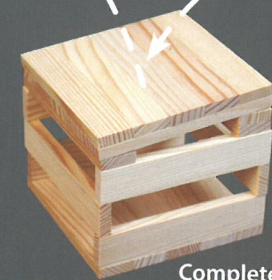
Bounce plates are fun because they make the KEVA ball look like it has a mind of its own. The ball appears to leap to a small platform and then "hop" to its new destination.

Step 1



Step 2

Tip: A two layer top creates a higher, more consistent bounce.



Complete

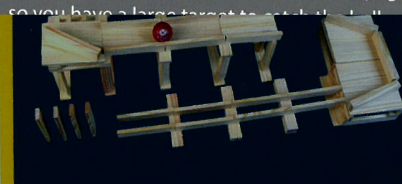
Build the *bounce plate* on a flat square base so you can easily move the entire structure. Do trial runs to help position the tower so the ball hits the top plate.

Variation: The plate can be level or sloped. Level creates a higher bounce. Sloped creates more distance.

Taller towers create even more surprise when the ball bounces off the plate.

Roll, Bounce, Catch

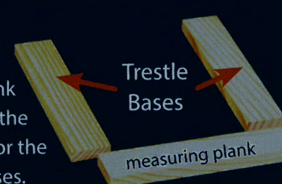
Usually a *bounce plate* is followed by a *funnel* (page 9),



Build a *ball dispenser.*

Step 1

Use a plank to gauge the spacing for the *trestle* bases.

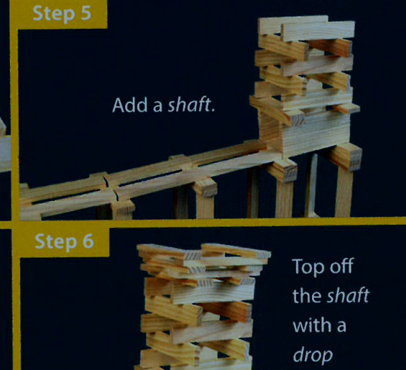


Step 2

Angle the upright planks for maximum stability. Parallel

Step 5

Add a *shaft*.



Step 6

Top off the *shaft* with a *drop*

Step 10

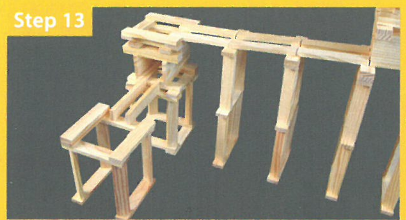
The top planks create a level base.

Step 11

Add the *black hole* to suck in

... a few more steps

Step 13



Step 14

Make a sloped platform for the *L-turn.*

Step 15

Step 16

Do trial runs as you build. The ball should fall from the *chute* built in Step 16, bounce off the table and land on the platform created in step 17. Adjust the platform position as needed.

Step 17

Build the platform at a height so the ball will land on it after bouncing off the table.

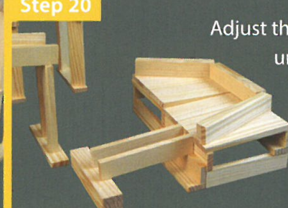
Step 18

Add the second platform of the *U-turn.*

Step 19

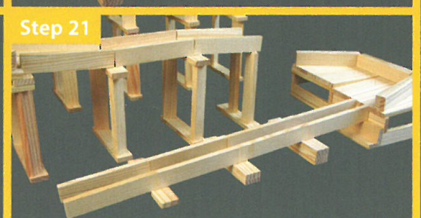
The first platform is level. The second is sloped.

Step 20



Adjust the bumpers until the ball makes the *U-turn.*

Step 21

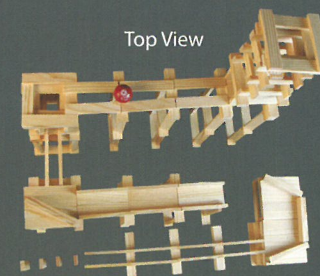


Step 22

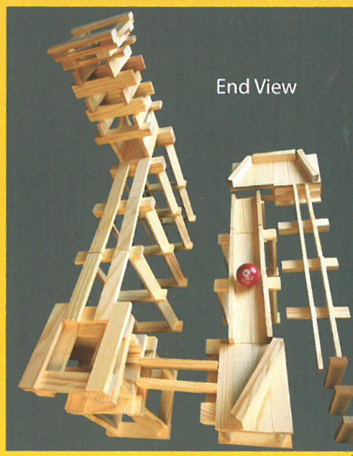
A *domino effect* adds a bit of flare to your finish.

REMEMBER
This Contraption layout is just an example to get you started. The real fun is designing your own.

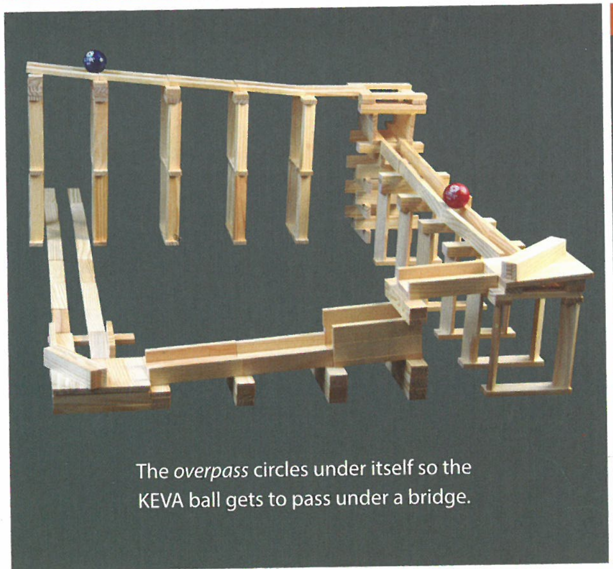
Top View



End View



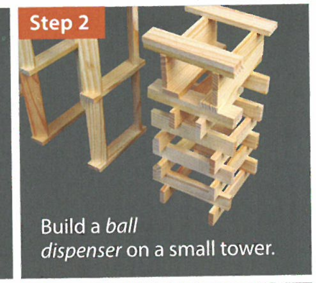
The Overpass Configuration



The *overpass* circles under itself so the KEVA ball gets to pass under a bridge.

Step 1

Build a *track* on *trestles.*

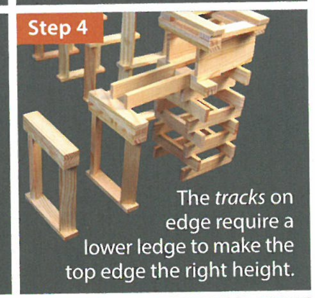


Step 2

Build a *ball dispenser* on a small tower.

Step 3

Add a small *drop hopper* and connect the *track* to the *hopper*.



Step 4

The *tracks* on edge require a lower ledge to make the top edge the right height.

Step 5

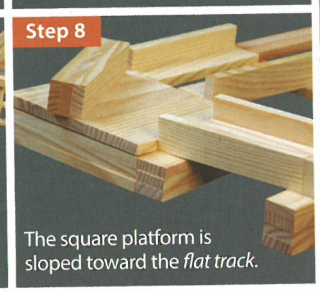
Make a sloping platform for the *L-turn.*

Step 6

Add a single *chute* section and *trough* as an exit from the *L-turn.*

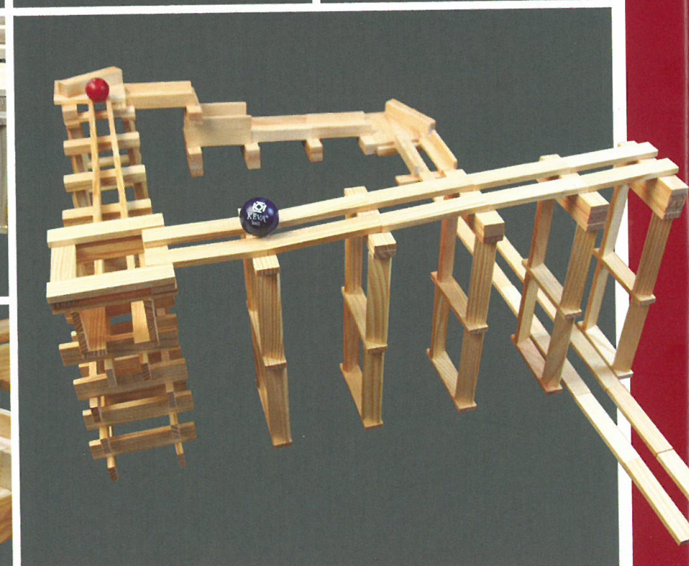
Step 7

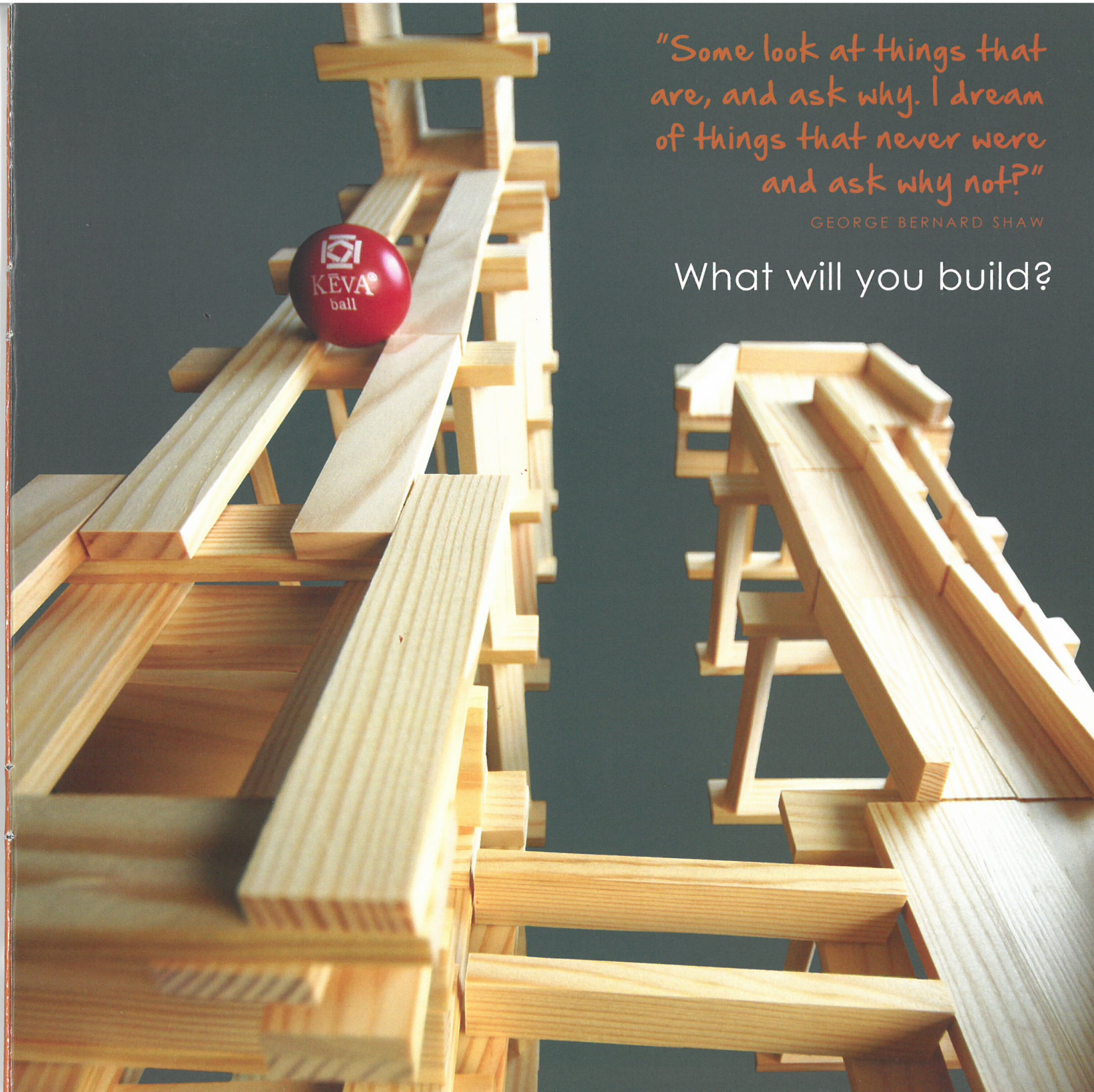
The higher walls (2 planks) keep the ball from bouncing out of the *chute.*

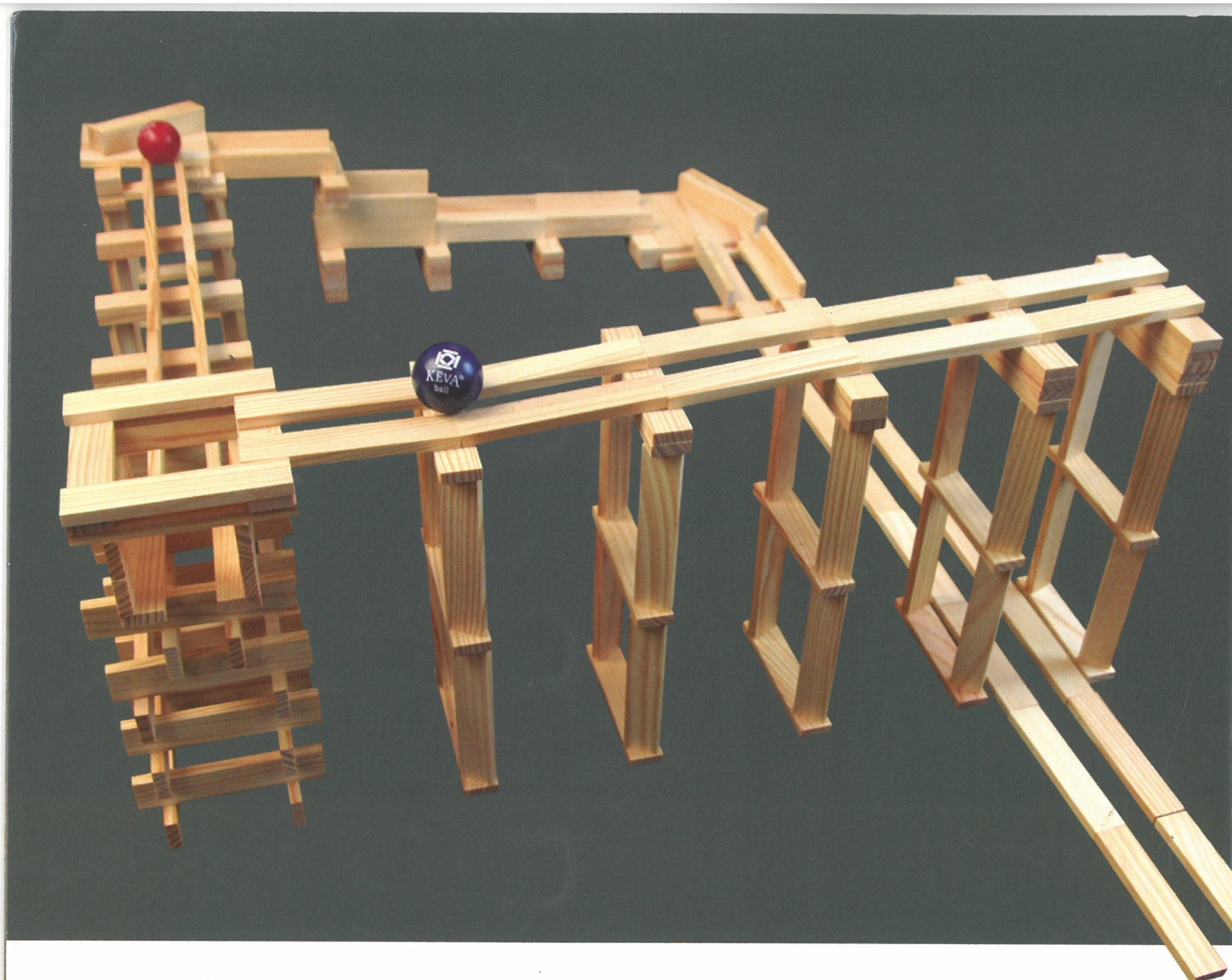


Step 8

The square platform is sloped toward the *flat track.*




"Some look at things that are, and ask why. I dream of things that never were and ask why not?"
GEORGE BERNARD SHAW
What will you build?
KEVA® ball



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CE

Keep all relevant
information.