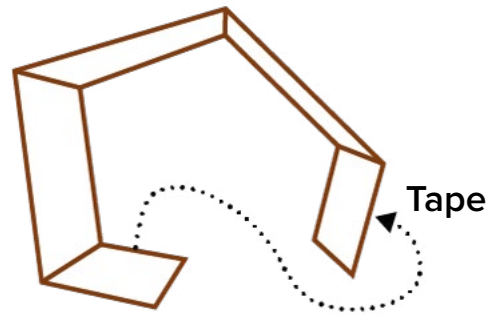# Castle Science
AMAZING ARCHES

Discover the amazing structural properties of arches by building your own and testing it to see how much weight it can hold!

You will need:
- **Arch template**
- **Glue**
- **Sticky tape**
- **Ruler**
- **Pencil**
- **Scissors**
- **Thin cardboard – a cereal box is perfect!**

Tape

1. Print off the arch template and cut out all 7 pieces. If you don't want to print it out, you can use the measurements on the template to draw out your own. Once printed you could colour in your shapes.

2. Use the glue to stick down your paper templates onto the carboard.

3. Cut out the cardboard shapes.

4. Fold the dotted lines of your cardboard shapes to create your arch blocks. Use your ruler to help fold a straight line.

5. Use sticky tape to the stick the sides together to create your arch blocks.

6. Tape your two hollow shapes to a table about 10–15cm apart.

7. Stack your remaining blocks together to create an arch. Your keystone will support all the arch blocks in place without the need for tape!
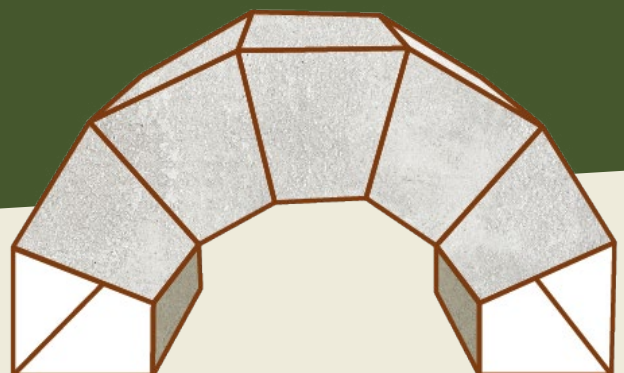
ARCH ANATOMY
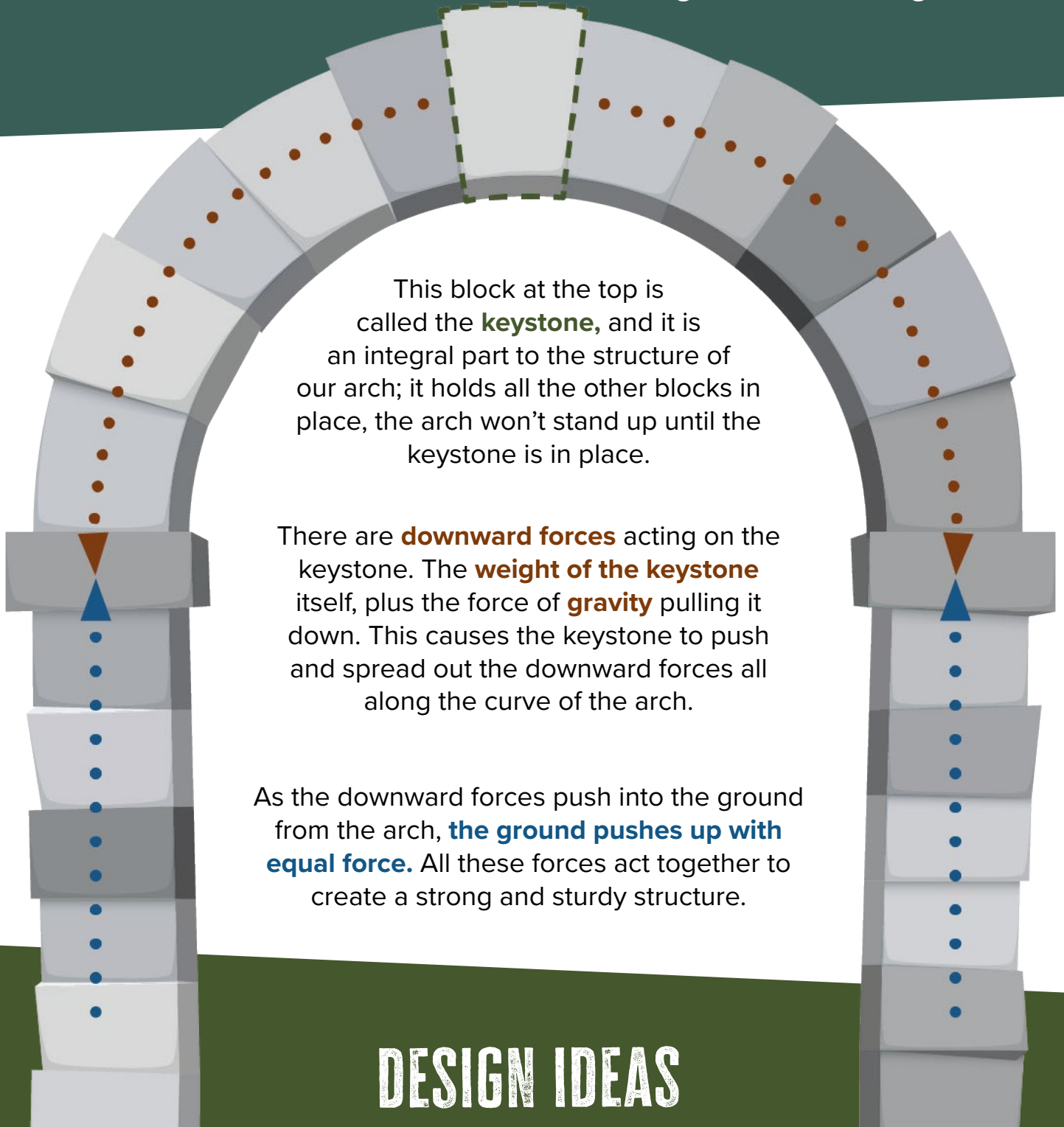
This block at the top is called the **keystone,** and it is an integral part to the structure of our arch; it holds all the other blocks in place, the arch won't stand up until the keystone is in place.

There are **downward forces** acting on the keystone. The **weight of the keystone** itself, plus the force of **gravity** pulling it down. This causes the keystone to push and spread out the downward forces all along the curve of the arch.

As the downward forces push into the ground from the arch, **the ground pushes up with equal force.** All these forces act together to create a strong and sturdy structure.

DESIGN IDEAS

Test how strong your arch is!

Balance objects on top of your arch and see how much weight it can hold.
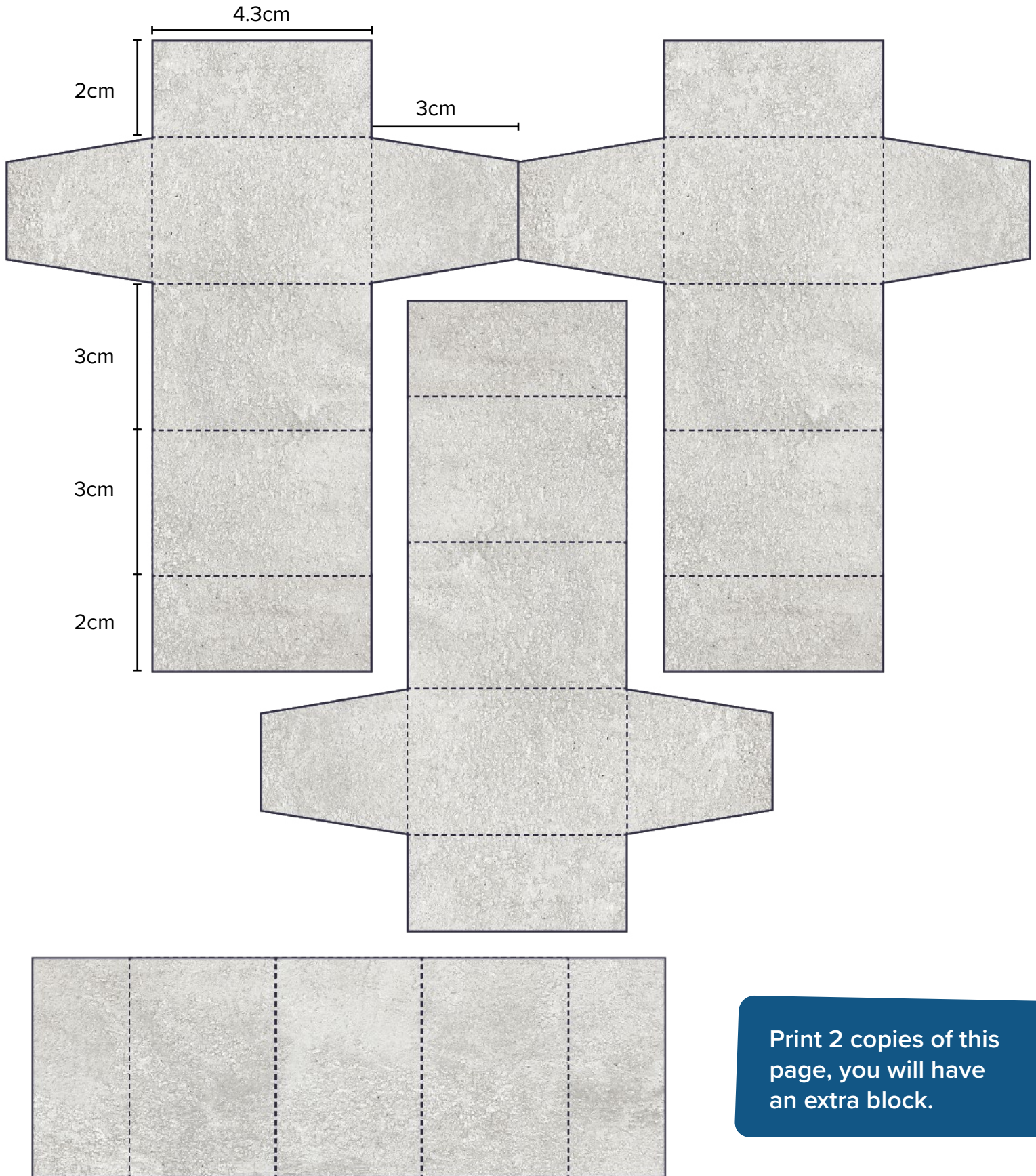
Make your arch bigger!

Could you scale up the measurements to make a bigger arch?

Would it hold more weight?

Make an arch from different materials.

Which material allows it to hold more weight?

ARCH BLOCK TEMPLATES

4.3cm

2cm

3cm

3cm

3cm

2cm

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