

Graphic Duplicator

While we are duplicating graphics with our graphic duplicator, we can be reminded that reflecting upon a time that makes us smile and finding a sense of gratitude can help when we're struggling to be positive.

“Reflect and Smile”

You need:

- A piece of glass/Perspex/plastic - glass from an old 5'x7' photo frame is perfect
- Card - 6cmx6cm
- Scissors
- Tape - electrical tape if you've got it
- Pencil
- Ruler
- Pens, paper, and an image you want to duplicate

Method:

1. Take the piece of glass and with the tape, tape along the edges. This helps prevent any cuts on any sharp edges AND it looks good.
2. Take the 6cmx6cm piece of card and cut it in half on the diagonal, so you end up with two triangle pieces. These will become the stands for the glass/graphic duplicator.
3. Rule a line straight down the middle of each of the triangle pieces of card. This is a reference point when attaching the card (stand) to the glass.
4. Cut four lengths of tape, no longer than the line drawn on the 'stands'.
5. Take the glass and with the long edge as the bottom, lay the short edge along the centre line drawn on one of the 'stands'. The bottom corner of the glass should be at the centre of the base of the triangle 'stand'.
6. Using one of the lengths of tape, tape along the edge of the glass onto the 'stand', using your finger to make sure the tape is tightly stuck down on both the glass and the 'stand'.
7. Turn the glass over (like a page in a book) while the 'stand' stays flat. Now repeat step six, for this side.
8. Repeat steps six and seven for the other end of the glass. Your graphic duplicator (GD) is now ready for you to use.
9. Stand your GD across a piece of paper. Place a graphic (image) you would like to draw on one side (if you're right handed put it on the left side, and vice versa if you're left handed).
10. If you look through the glass from the same side as the graphic, it will appear as though the graphic is also on the paper on the other side, though faintly. You can now copy the graphic by tracing.

What's happening?

We can see things because they reflect light into our eyes. With our graphic duplicator, light is shining on the graphic which reflects onto the glass, which reflects to our eyes. Because the glass is transparent (see through) we can see the paper on the other side, with the graphic on the glass appearing as though it's also on the paper.

GRATITUDE - HOW TO BE GRATEFUL

VALUE TOPIC: Gratitude - The feeling or quality of showing appreciation for what you have

CATCH PHRASE: Reflect and smile -
Hurihia tōu aroaro ki te rā (Turn your face towards the sun)

TOPIC SUMMARY

Problem: I'm struggling to be positive. When we find it hard to be positive, we can reflect upon a time that makes us smile and find a sense of gratitude.

STEMHYPE Instructions - Graphic Duplicator

This is an opportunity for students to use science, technology, engineering, or maths to either solve a problem which relates to the Value Topic or create something that illustrates the Value Topic.

While our Graphic Duplicator uses light and reflection to help us draw we are reminded of times when we can struggle to be positive and the value in Gratitude while remembering to, 'Reflect and Smile'.

The images we see are made up of light reflected from the objects we look at. This light enters the eye through the cornea, which acts like a window at the front of the eye. When light hits the retina (a light-sensitive layer of tissue at the back of the eye), special cells called photoreceptors turn the light into electrical signals. These electrical signals travel from the retina through the optic nerve to the brain. Then the brain turns the signals into the images you see.

Each student could make their own *Graphic Duplicator*, or you might select a group of students to make one and model to the rest of the class. However you decide to make it, the *Graphic Duplicator* is an item which helps to remind students of the value in Gratitude.

SPECIFIC LEARNING OUTCOME	RESOURCE	LESSON SUGGESTION
9. We are learning to use light and reflection to duplicate graphics. We are making a graphic duplicator to remind us of the value in Gratitude.	- 'STEMHYPE Instructions' - Voice Modifier	It will help if you have watched the <i>STEMHYPE</i> which shows how to make the Graphic Duplicator. Provide students with the materials needed, or have them collect them and bring them from home. Either follow the <i>STEMHYPE POP</i> and pause whenever needed, allowing time for students to get up to the same point in the process of making theirs. Or follow the step by step instructions as outlined in this resource.