Building Pinhole Cameras

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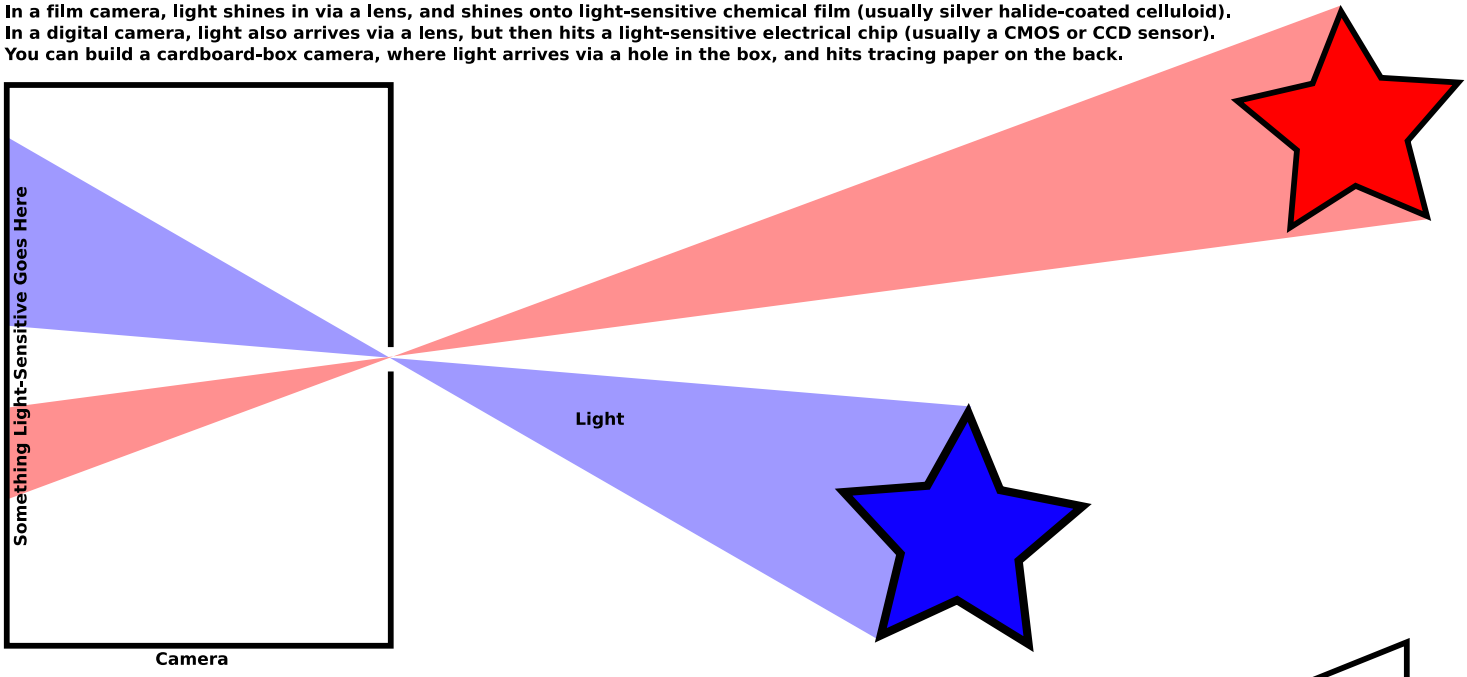
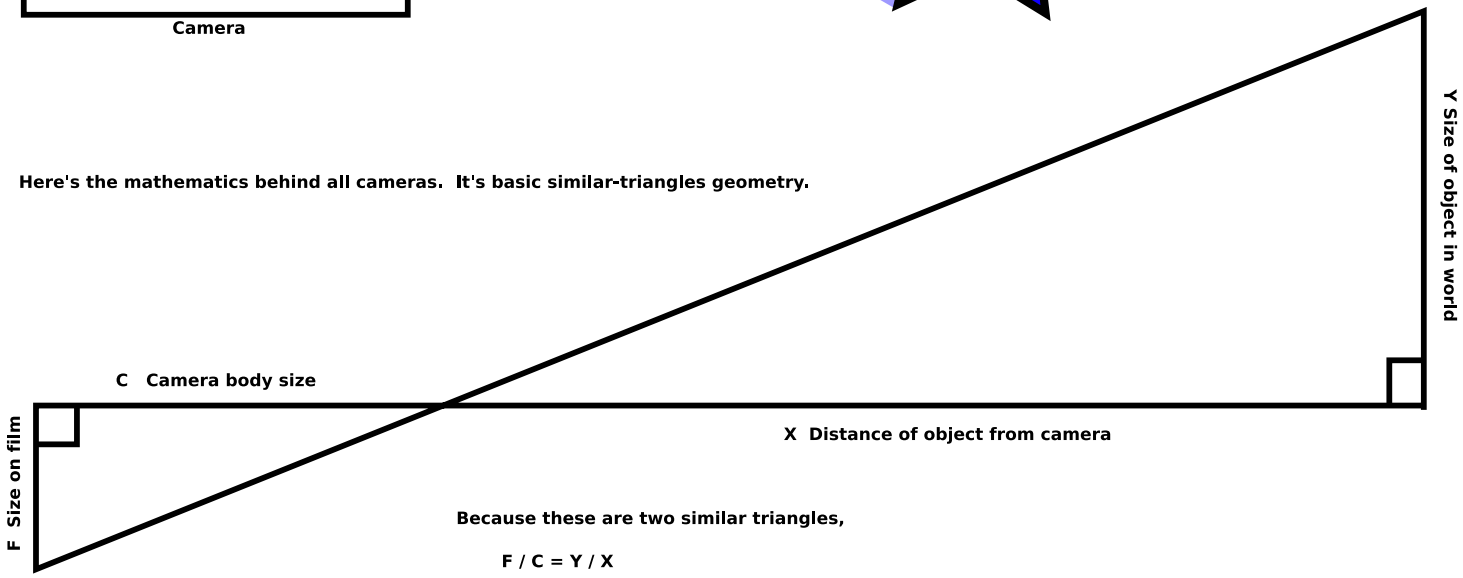
Any camera is, deep down, just a box.
Light shines in through one side of the box, and shines onto something light-sensitive at the back of the box.
In a film camera, light shines in via a lens, and shines onto light-sensitive chemical film (usually silver halide-coated celluloid).
In a digital camera, light also arrives via a lens, but then hits a light-sensitive electrical chip (usually a CMOS or CCD sensor).
You can build a cardboard-box camera, where light arrives via a hole in the box, and hits tracing paper on the back.



Here's the mathematics behind all cameras. It's basic similar-triangles geometry.



Because these are two similar triangles,

$$F / C = Y / X$$

Or, solving for F, the size of an object on film,

$$F = C * Y / X$$

This means:

If C is big (you have a big camera), F is big (objects will occupy more film space)

If Y is big (you're photographing a big object), F is big (big objects look big on the camera) (Duh!)

If X is big (you're far away from the object), F is small (objects look smaller as they get farther away)

Notes: