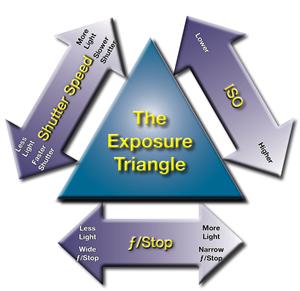
*For every action there is an equal and opposite reaction —*Newton's Third Law

Reciprocity & Exposure Equivalence

Reciprocal exposures are the **same**



Use**The Exposure Triangle**to keep the exposure the same

* ISO
* Shutter Speed
* ƒ/Stop

Together these make up the **exposure value** (EV) for a given setting.

Change one of these and you will need to change at least one of the others or both to keep the exposure the same.

**Links**

<http://www.exposureguide.com/exposure.htm>

<http://www.cambridgeincolour.com/tutorials/camera-exposure.htm>

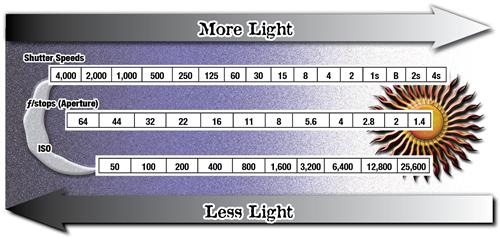
<http://digital-photography-school.com/learning-exposure-in-digital-photography>

**Exposure Charts**

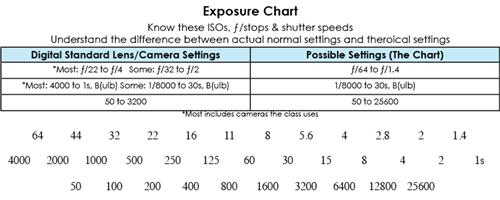
Downloadable chart to use when working problems

[Exposure Calulation Work Charts](http://www.nclack.k12.or.us/cms/lib6/OR01000992/Centricity/Domain/516/Exposure%20Calulation%20Work%20Charts.pdf)

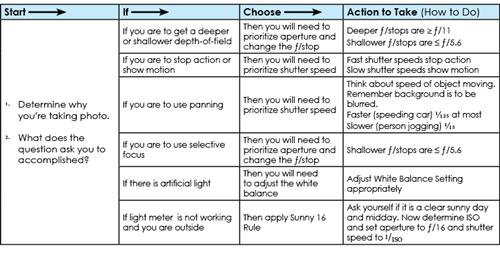
Use the following chart to aid in finding the correct reciprocity (equivalent or same) exposure



 Exposure Chart with Explanation



Steps in determining exposure calculations



**Example Problems**

General adjustments with example settings

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Initial**  **Light Meter**  **Reading** | **Adjust to**  **Stop Action** | **Adjust to**  **Show Movement** | **Adjust to Increase**  **Depth-of-Field**  **(Deep)** | **Adjust to Decrease**  **Depth-of-Field**  **(Shallow)** |
| **ISO**  **400** | Only increase if not enough light to increase SS | Only decrease if too much light to decrease SS enough | Only increase if not enough light to increase ƒ/stop | Only decrease if too much light to decrease ƒ/stop |
| **SS**  **1/250** | Raise Shutter Speed  (faster time)    by subtracting light  – 3 stops  SS 1/2,000 | Lower Shutter Speed  (slower time)    by adding light  + 3 stops  SS 1/30 | Adjust SS back to to ±0      by decreasing SS  adding light  + 3 stops  SS 1/30 | Adjust SS back to to ±0      by increasing SS  subtracting light  – 3 stops  SS 1/2,000 |
| **ƒ/8** | Adjust ƒ/stop back to to ±0    adding light  + 3 stops  ƒ/2.8 | Adjust ƒ/stop back to to ±    subtracting light  – 3 stops  ƒ/22  0 | Increase ƒ/stop  (make aperture small)    subtracting light  – 3 stops  ƒ/22 | Decrease ƒ/stop  (make aperture large)    adding light  + 3 stops  ƒ/2.8 |

Story Problems

**1.**Meter Reading ISO 400 1/500 @ ƒ/5.6

**You're photographing a baseball game and you want to stop the movement of the baseball and bat.**

Best shutter speed is a fast one like 1/1,000 what is the new ƒ/stop?

Using the chart (or your memory) find the difference in stops from 1/500 and 1/1,000, it's –1 stop.

Calculate new ƒ/stop, ƒ/5.6 +1 stops new stop would be ƒ/4

New reciprocal exposure is ISO 400 1/1,000 @ ƒ/4

2**.**Meter Reading ISO 800 1/60 @ ƒ/4

**You're photographing a landscape and you want to show your friend in the foreground, the trees behind them and the mountain behind all in focus. You want a deep depth-of-field.**

Best ƒ/stop is a high one like ƒ/16 what is the new shutter speed?

Using the chart (or your memory) find the difference in stops from ƒ/4 to ƒ/16, it's –4 stop.

Calculate new shutter speed, 1/60 +4 stops (let in more light) new shutter speed would be 1/4

New reciprocal exposure is ISO 400 1/4 @ ƒ/16

**But there is a problem**

Shutter speed to slow to capture your friend standing there. So you need to change the ISO higher so the shutter speed will stop your friend standing.

New ISO 400 +4 stops = ISO 6400

New reciprocal exposure is ISO 6400 1/60 @ ƒ/16