Making Great Diagnostic Photos (On A Budget)

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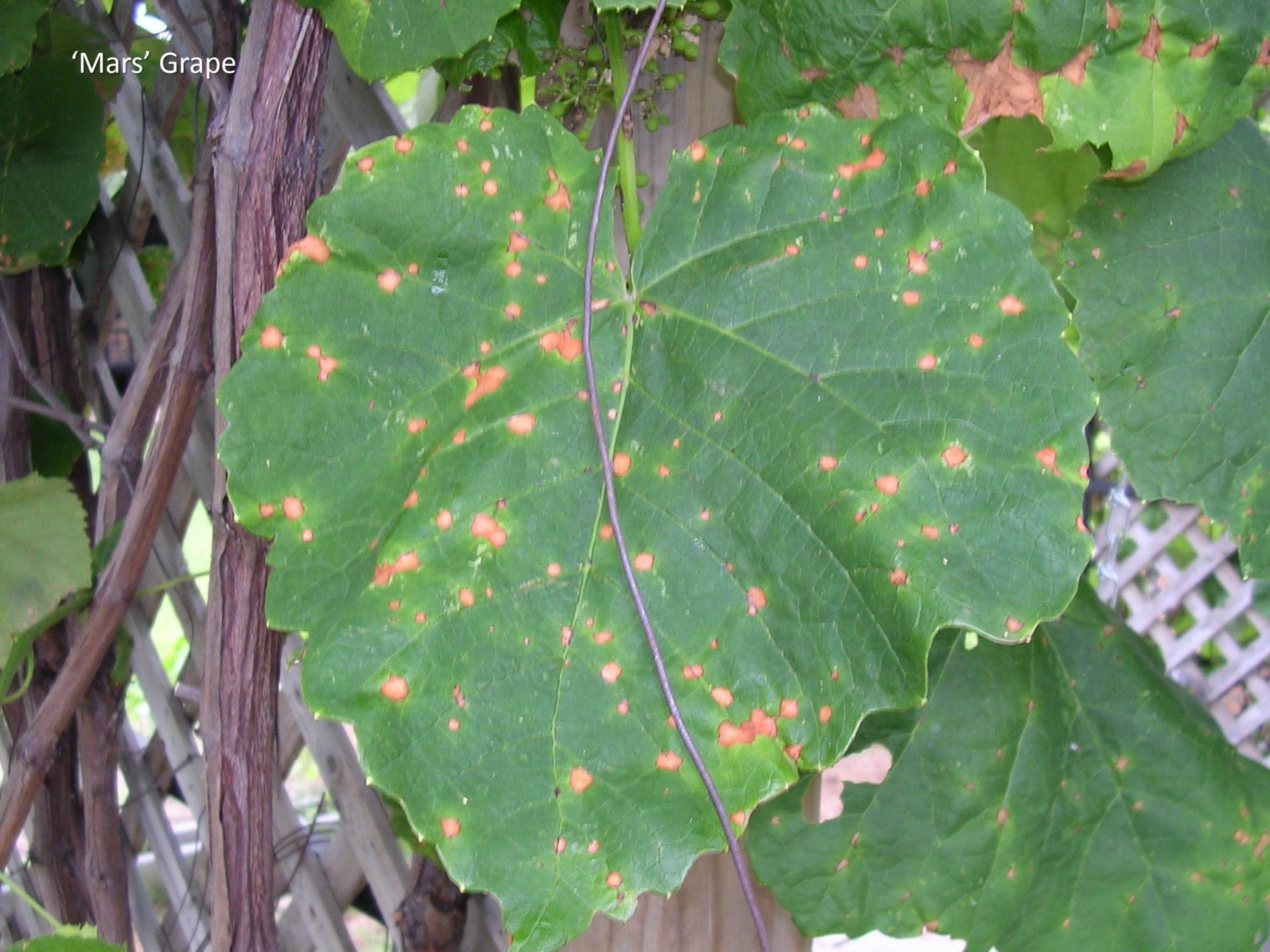
County Director / Farm Advisor

UCCE Inyo and Mono Counties

Can you
I.D. this
for me??
Thx!

Nikon
COOLPIX
3100
ZOOM NIKKOR
5.8-17.4mm 1:2.8-4.9
3 Megapixels!

N Deficiency in Corn


‘Mars’ Grape

Photography is more about good lighting, interesting subjects, and composition.

Cool gear just expands your options or makes it easier to get the shot.

Canon
CANON
LENS
CANON MACRO LENS

Dustin's Diagnostic Cameras

What We'll Learn

- What Makes a Good Diagnostic Shot
- Digital Camera Physics
- Getting the Shot
  - Close Focusing
  - Reflectors
- Activities
- Show and Tell

What Makes a Good Diagnostic Shot?

Azalea Leaf Gall

Characteristics

1. Sharp subject
2. Right things photographed
3. Enough light

And sometimes:

4. Context

forestryimages.org
5405285

Thrips damage, willow oak
Nikon Coolpix E3100

What does this tell me?
It shows there is a dead pine.

Beetle.

Ugly leaves on grape.
Canon PowerShot S100,
No flash, sun behind me

Leafhoppers on grape.
Canon PowerShot S100,
No flash, added light.

With flash

Moved to stump
in full sun.

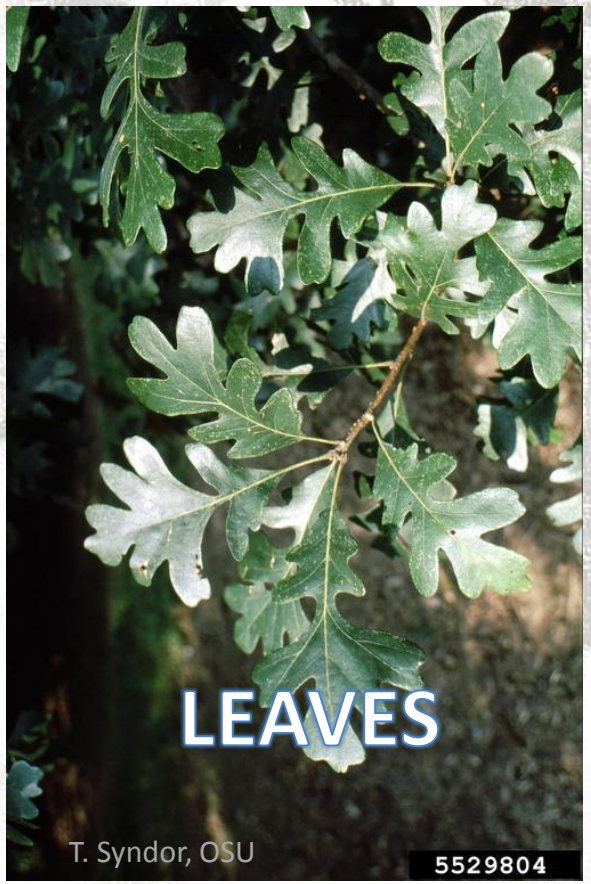
Full sun, up close,
cropped to enlarge.

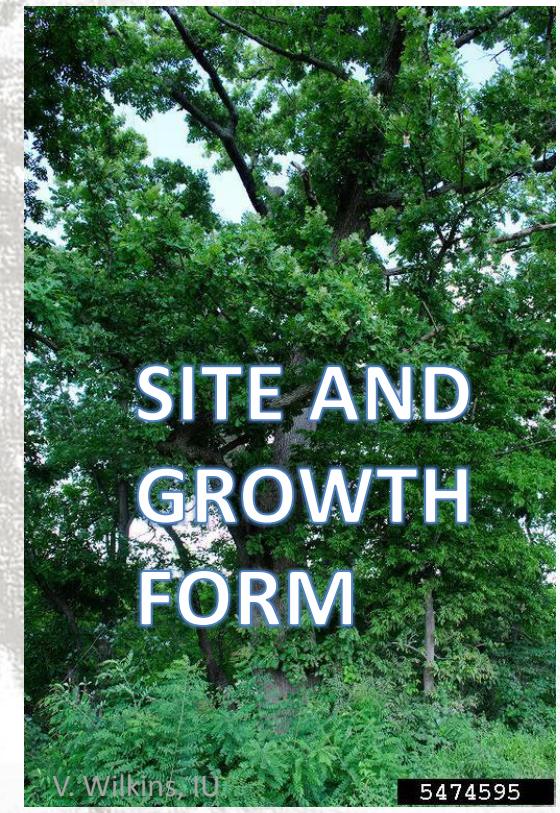
Plant ID Shots

Bur Oak
Q. macrocarpa

bugwood.org

Plant ID Shots





Bur Oak
Q. macrocarpa

bugwood.org

Canon S100

Kodak EasyShare C1530

TO: Farm Advisor
FROM: PersonZ@gmail.com

Can you tell me what these insects are? I found them in my garden in Bishop.

They are in thick groups at the base of my narrow-leaf milkweed. Will they kill it?

Thanks!

Mr. Sick Plant Dude

What to Send

PEST ID

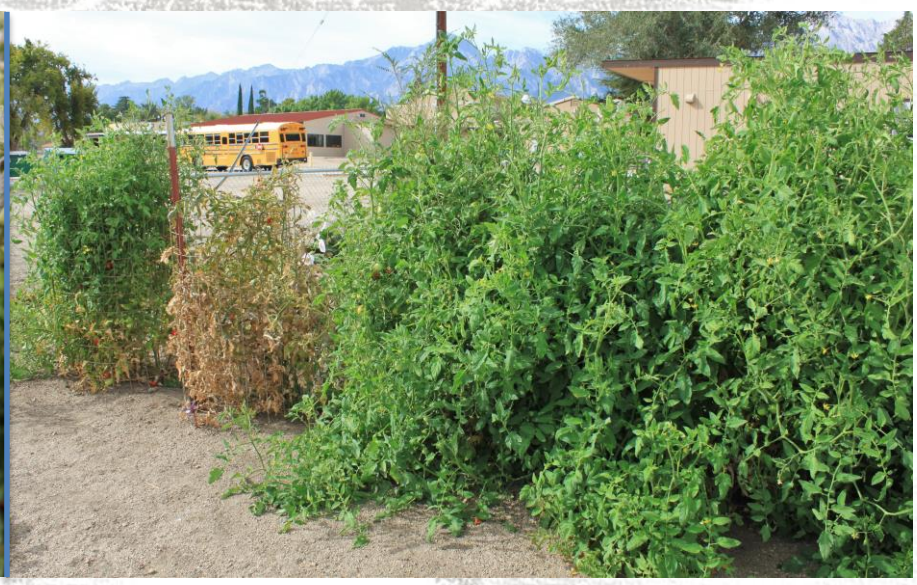
- Clear subject
- Close up of pest
- Margin of disease
- Overall pattern of damage
- Host plant ID

PLANT ID

- Flowers
- Leaves (tell leaf attachment in text)
- Overall plant
- Where it's growing

Close Up and Pattern

On tomatoes in Independence, CA.
Scattered plants.

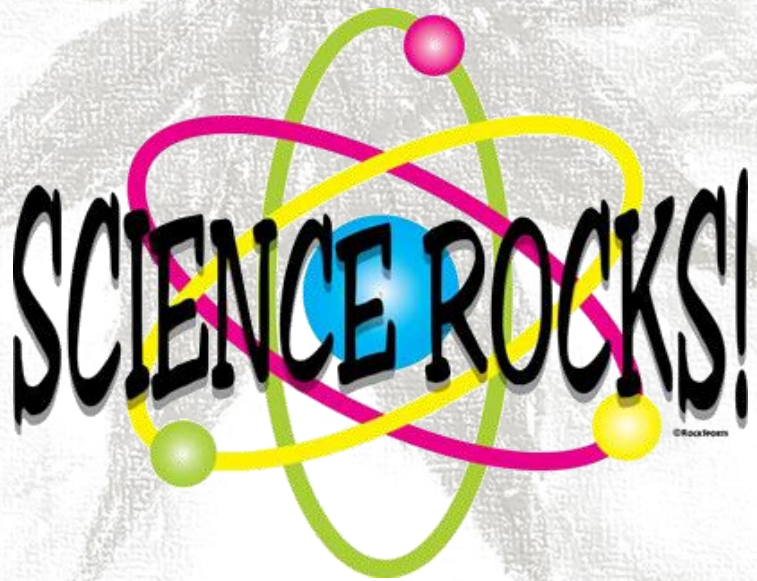


Leyland Cypress

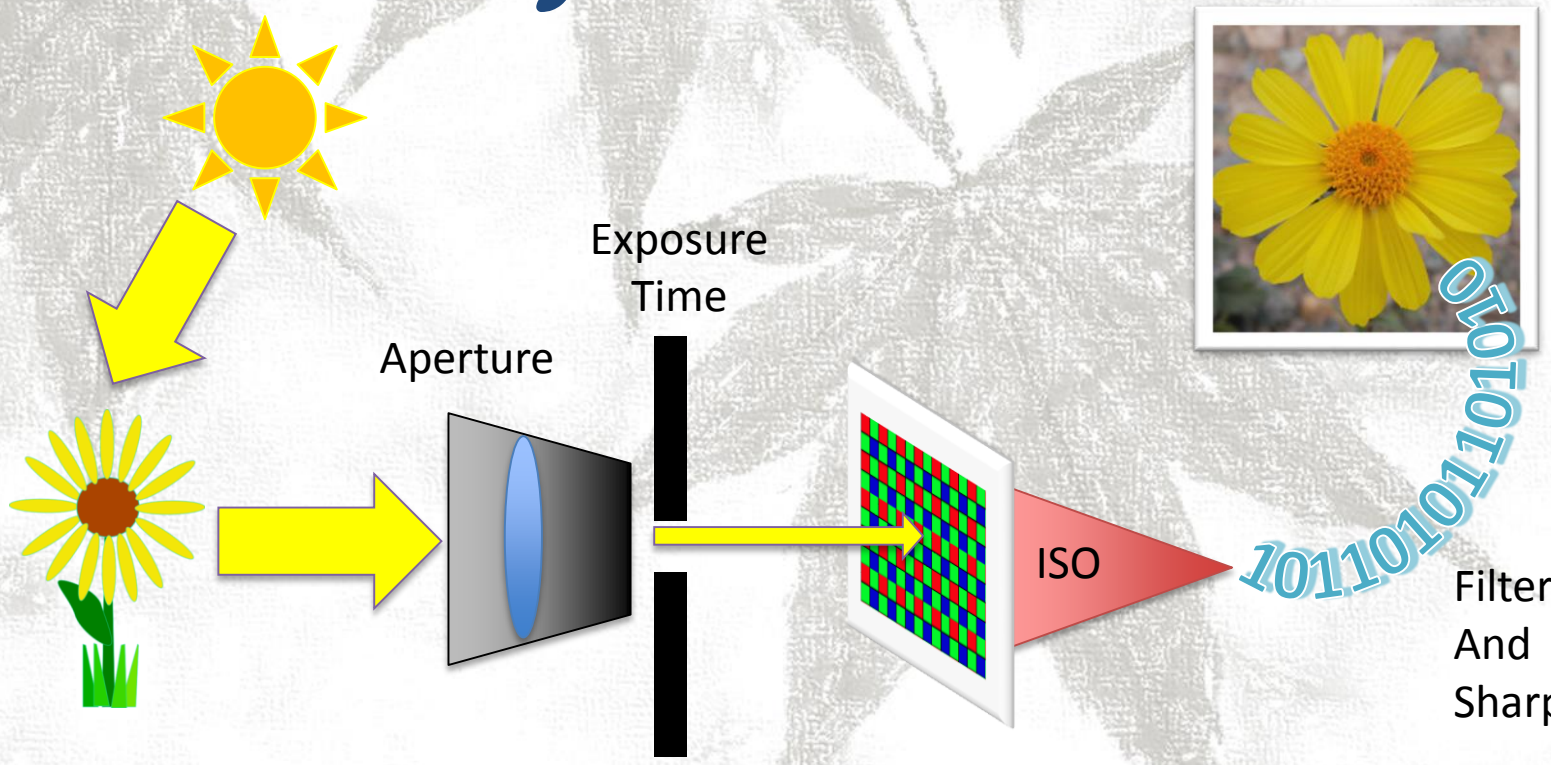
Pest Success:

1. CLEAR, FOCUSED SUBJECT
2. WHERE THE PROBLEM IS HAPPENING **NOW**
3. PATTERN OF DAMAGE

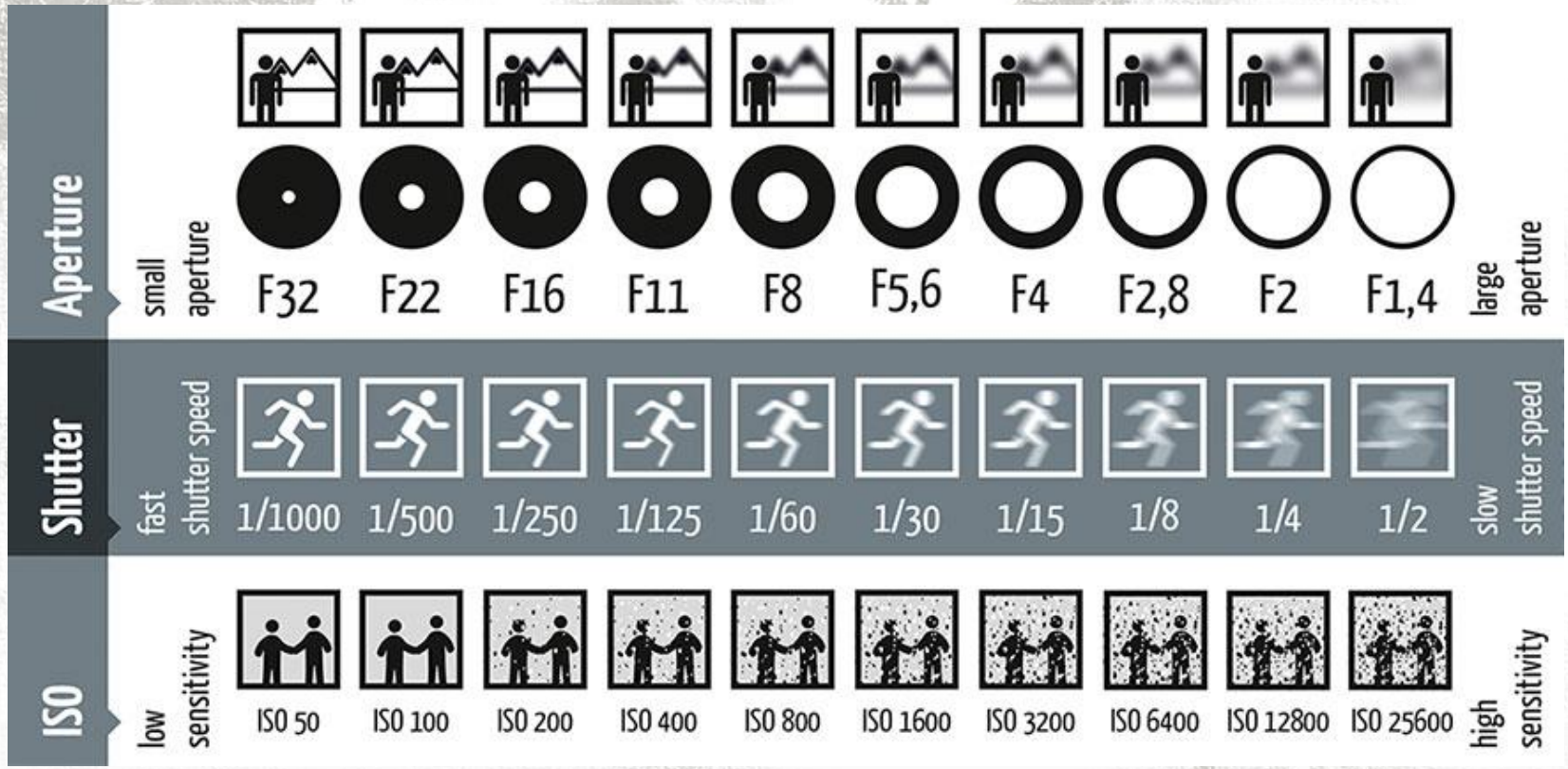
CAMERA PHYSICS FOR DUMMIES



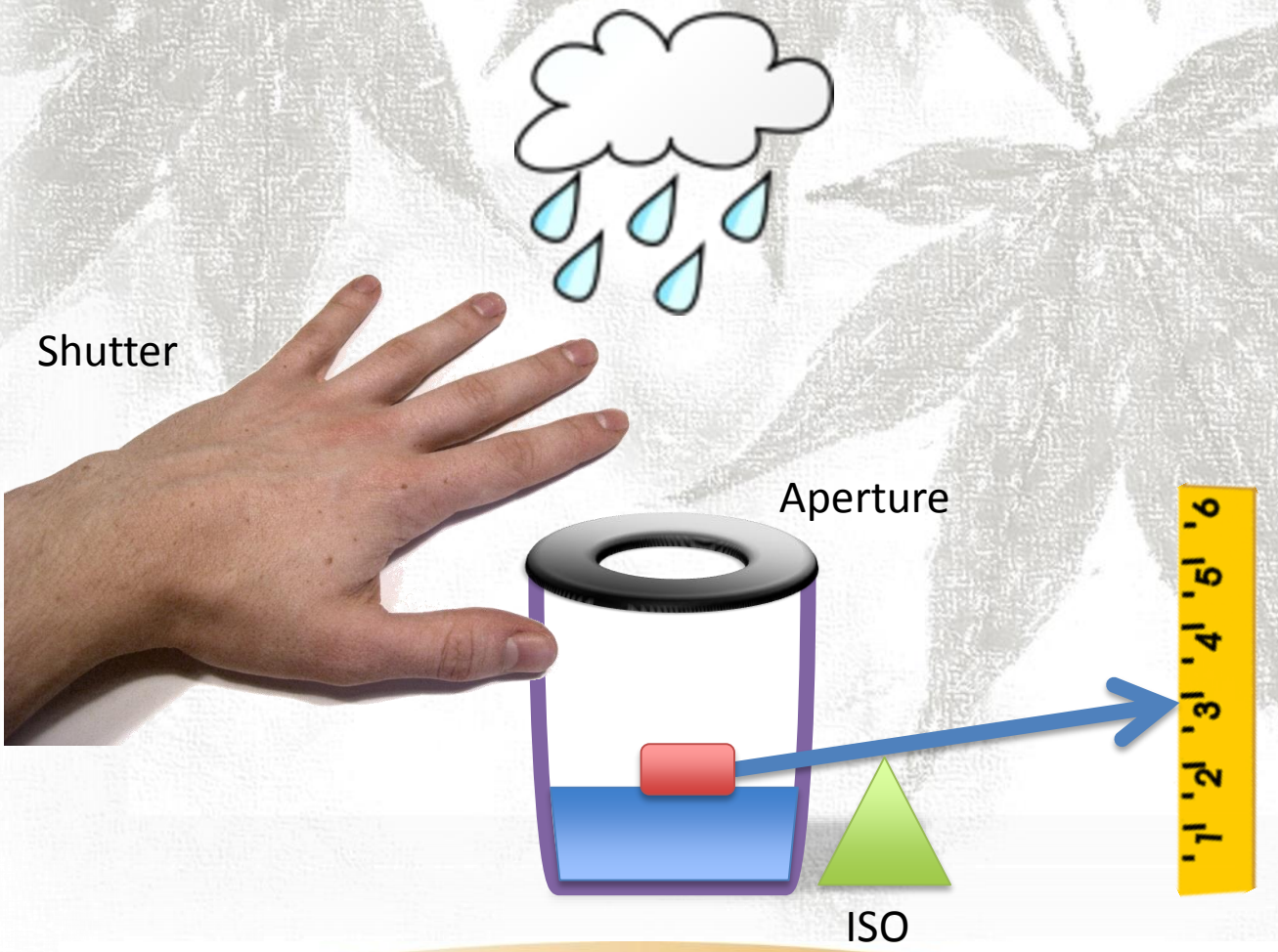
How a Digital Camera Works



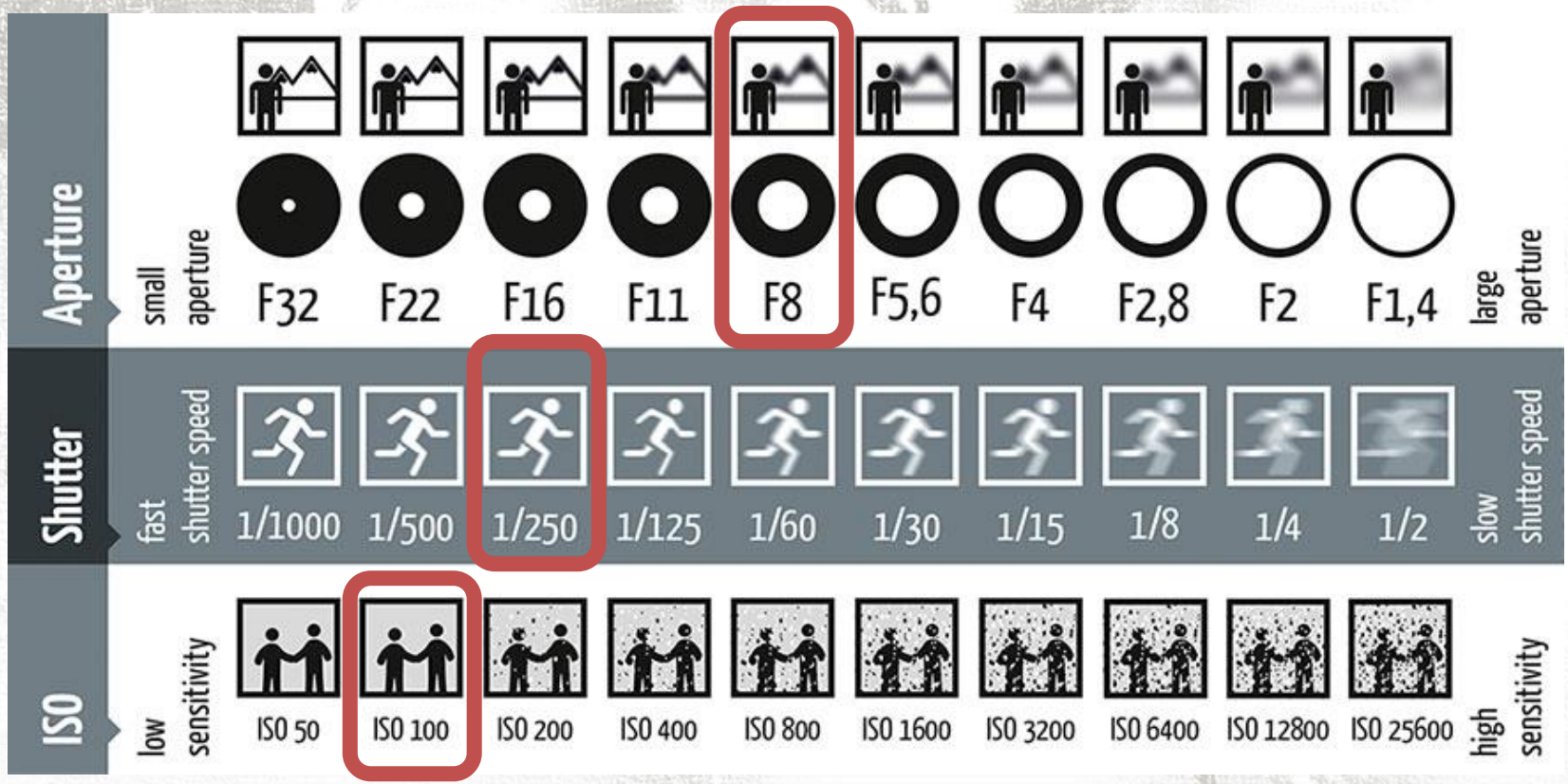
Exposure Triangle



A Fancy Rain Guage



Mid-Day Landscapes

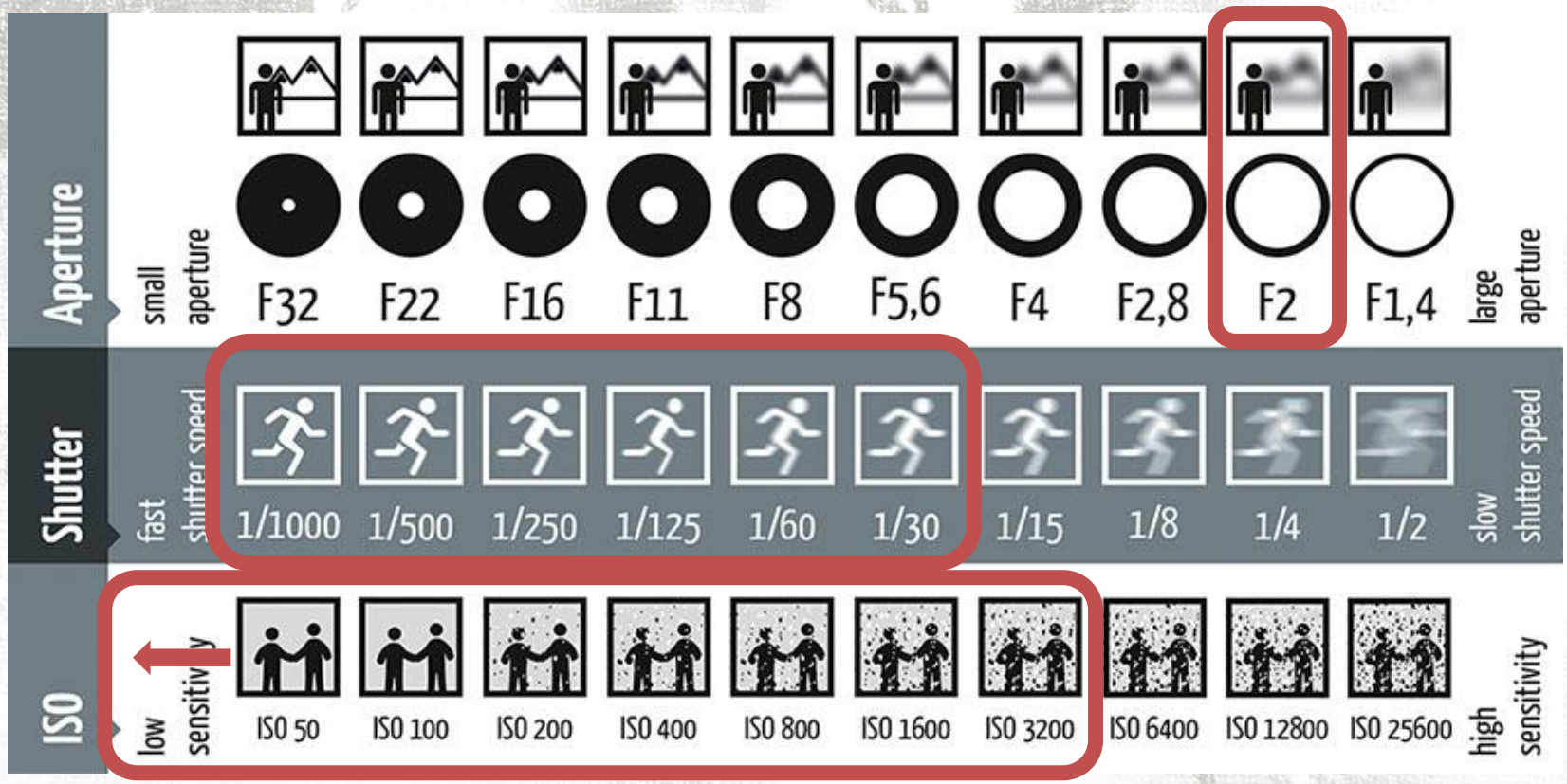


f/8 1/250 ISO100

Penstemon heterodoxus
FujiFilm X30
f/4.5 1/800 ISO 200

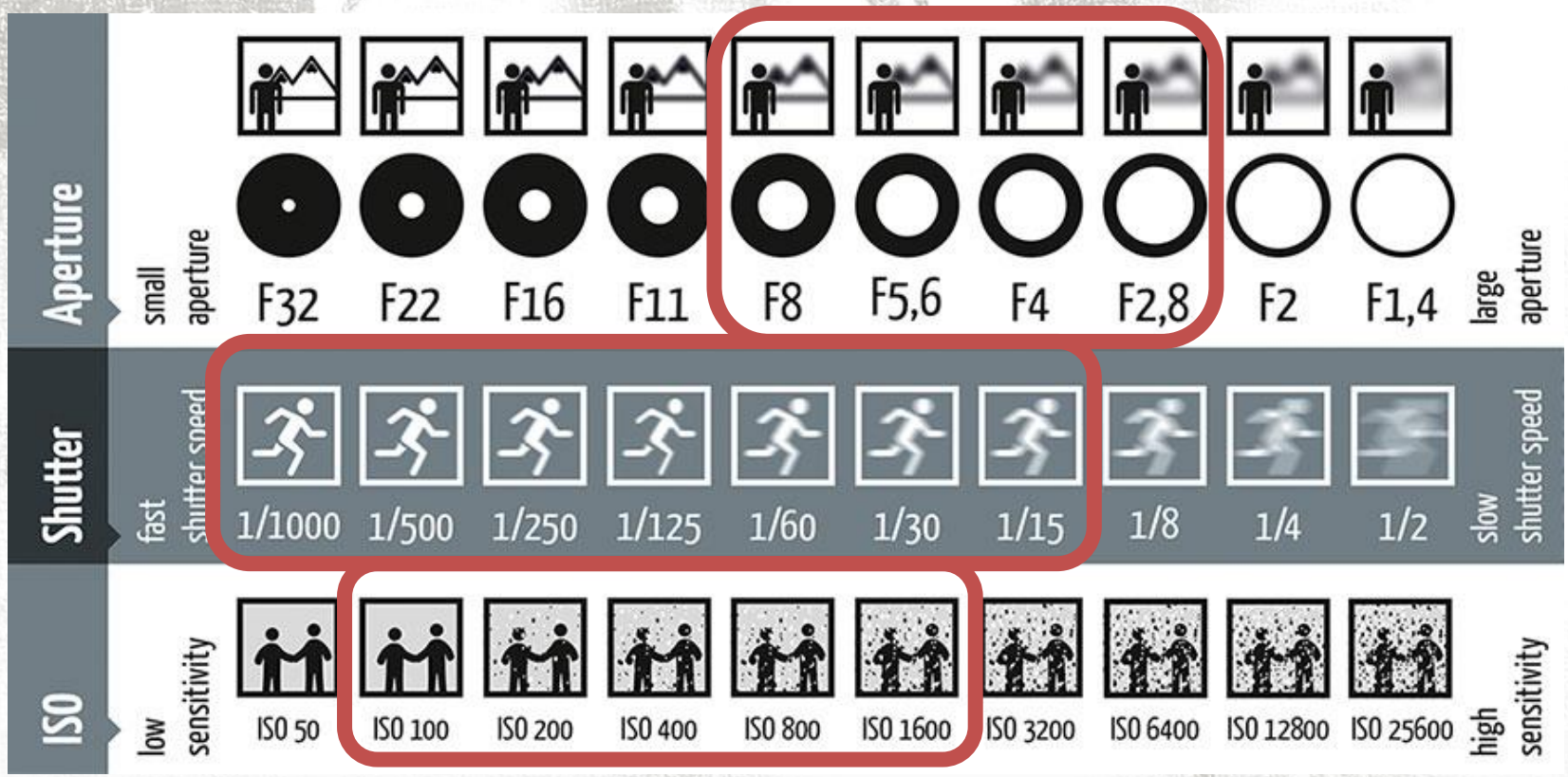
Airport Road Silo
Pentax K3-ii
f/11 1/100 ISO 1600
In Focus

Smartphone Exposure Triangle



Usually what you get.

Cheap Point-and-Shoot Exposure Triangle

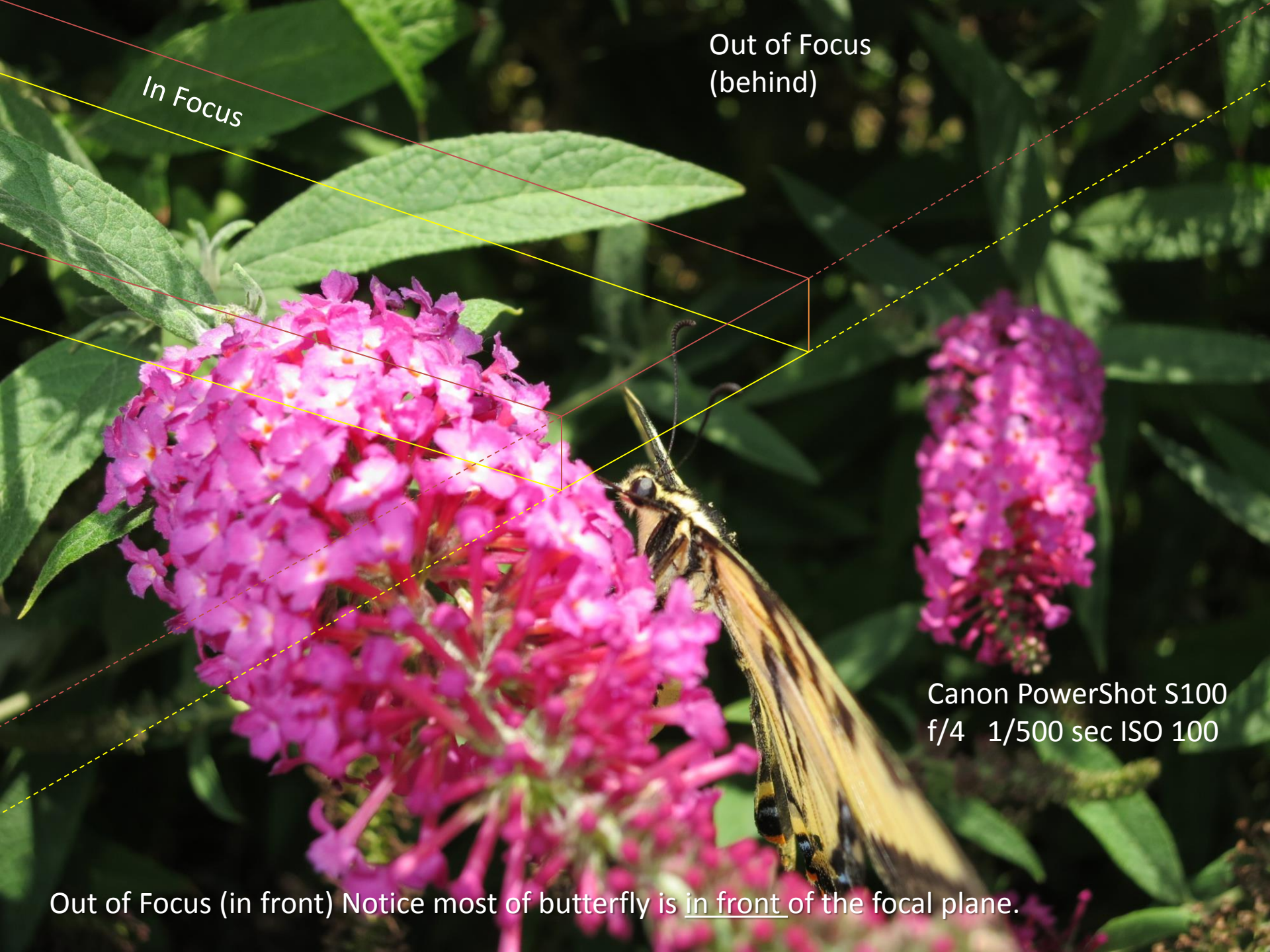


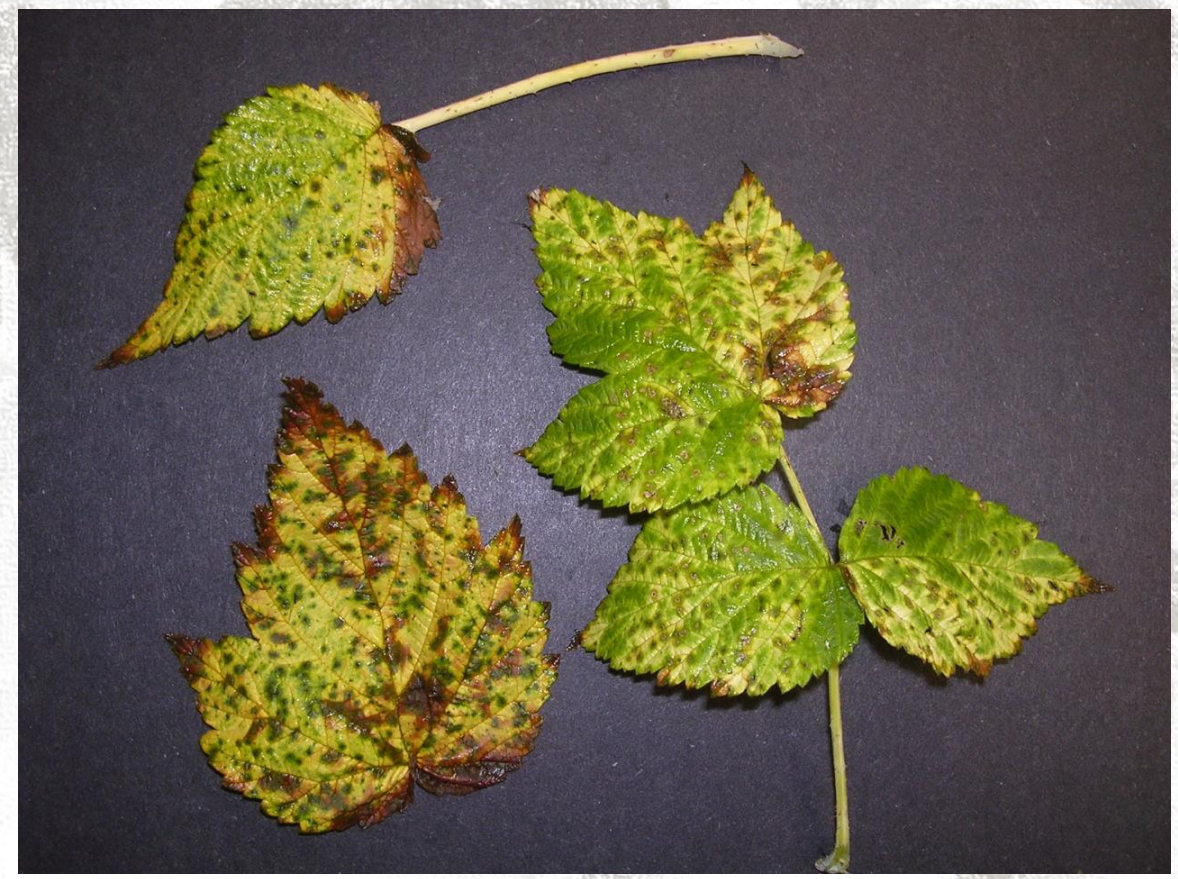
Close Focus Rule:

The closer you are to your subject, the narrower the in-focus are becomes.

Corollary:

As you near your subject, you will need a small aperture to maintain depth of focus.


In Focus
Out of Focus
(behind)
Canon PowerShot S100
f/4 1/500 sec ISO 100
Out of Focus (in front) Notice most of butterfly is in front of the focal plane.



The Challenge

How to get clear pictures within the camera's exposure limits.

Limitations

- Wide apertures (Shallow depth of focus)
- Slow ISO (40 to 200) → slow shutter
- Difficult to manually control
- Need to be close
- Handheld camera
- Moving subjects?

So why do I use a tiny camera?

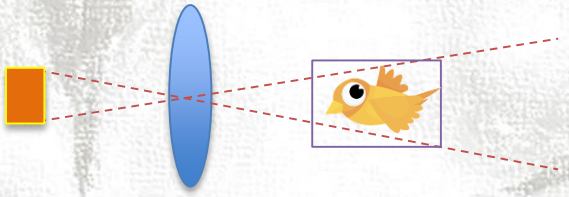
Benefits

1. Easy to bring
2. Small sensor
3. Simple to operate
4. Good enough results

One more over-simplified physics thing:

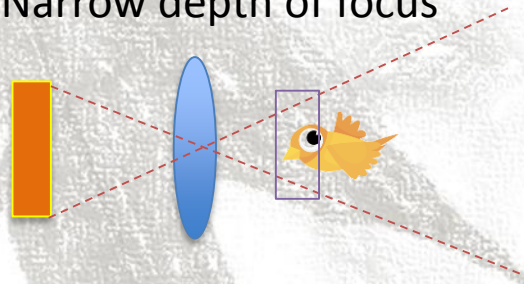
SMALL SENSOR

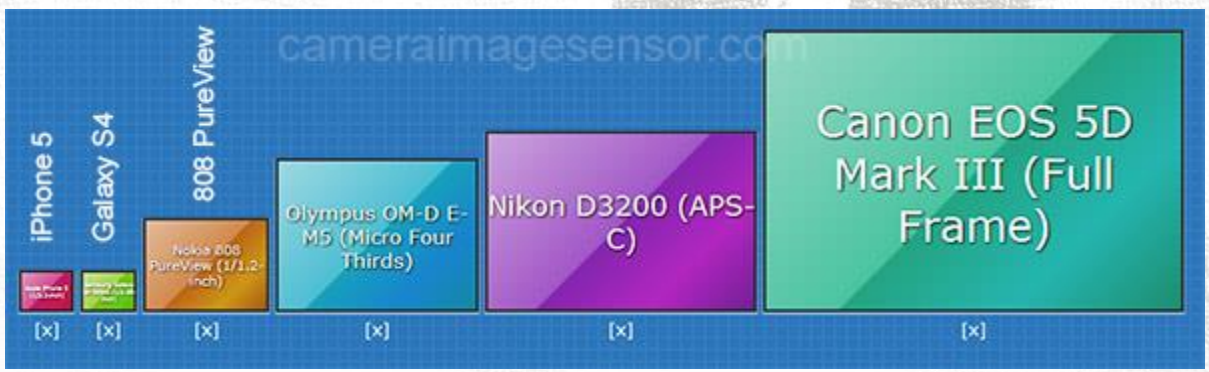
Wide depth of focus



LARGE SENSOR

Narrow depth of focus





Let's Talk About Cameras

Limitations

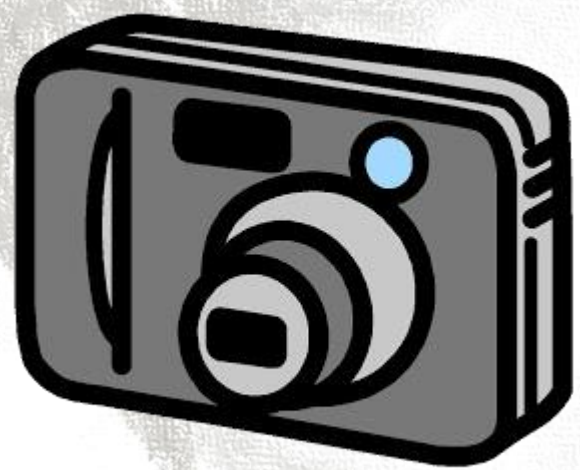
- Wide apertures (Shallow depth of focus)
- Slow ISO (40 to 200) → slow shutter
- Difficult to manually control (smartphones)
- Need to be close
- Handheld camera
- Moving subjects?

GETTING THE SHOT

Tricks to make smartphone and point-and-shoot pictures turn out good!

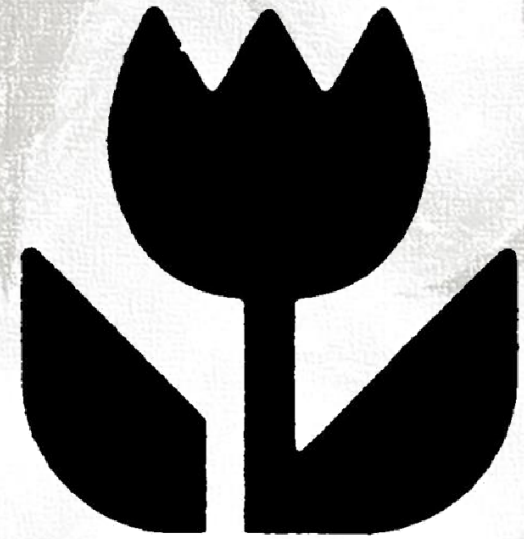
Getting the Shot

1. Sharp images
2. Correct exposure
3. Getting enough light



Missed Focus

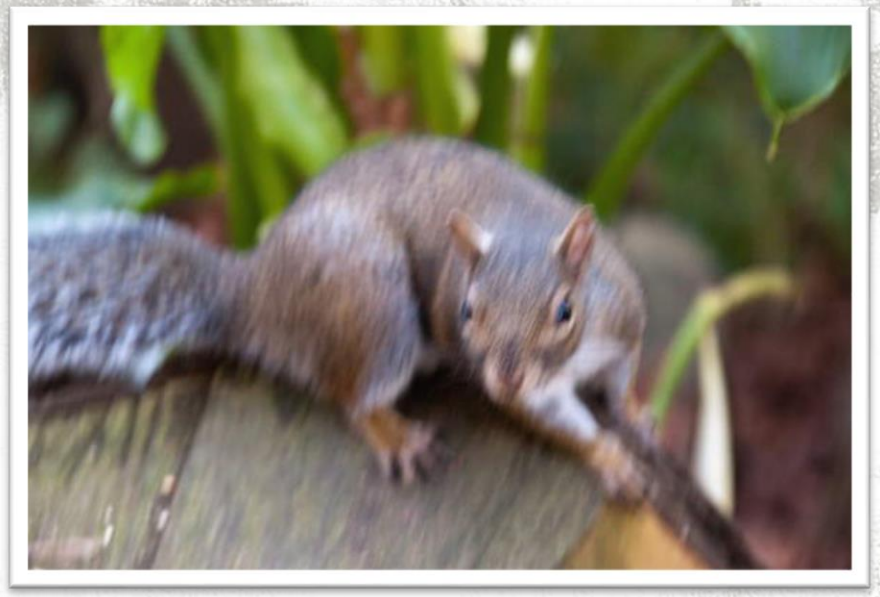
"Macro" Mode



- Allows closer focusing
- Focus on center of frame
- Zoom out to get closer

2 More Sources of Blurriness

CAMERA SHAKE



"Everything is blurry!"

MOVING SUBJECT

"The subject is blurry!"

Camera Shake

- Keep speed above 1/100
  - More light
  - More ISO
  - Sports Scene
- Hold still
  - Brace the camera

Moving Subject

- Faster shutter speed. > 1/500
- Flash if subject is close
- Shaking subject? Take lots of pics

f/8 8 sec
ISO 100

f/5/6 1/500 sec
ISO 100

Eliminating Camera Shake and Freezing a Moving Subject

Green-Tailed Towhee
f/5.6, 1/800 sec, ISO 200
I.S. On
Elbows in, used viewfinder, legs apart

Camera Holding Practice

Forced Flash Practice

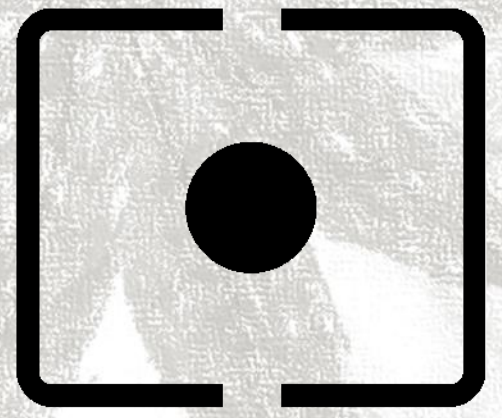
Exposure

Auto Metering Modes

On Smartphones and Point-and-Shoots

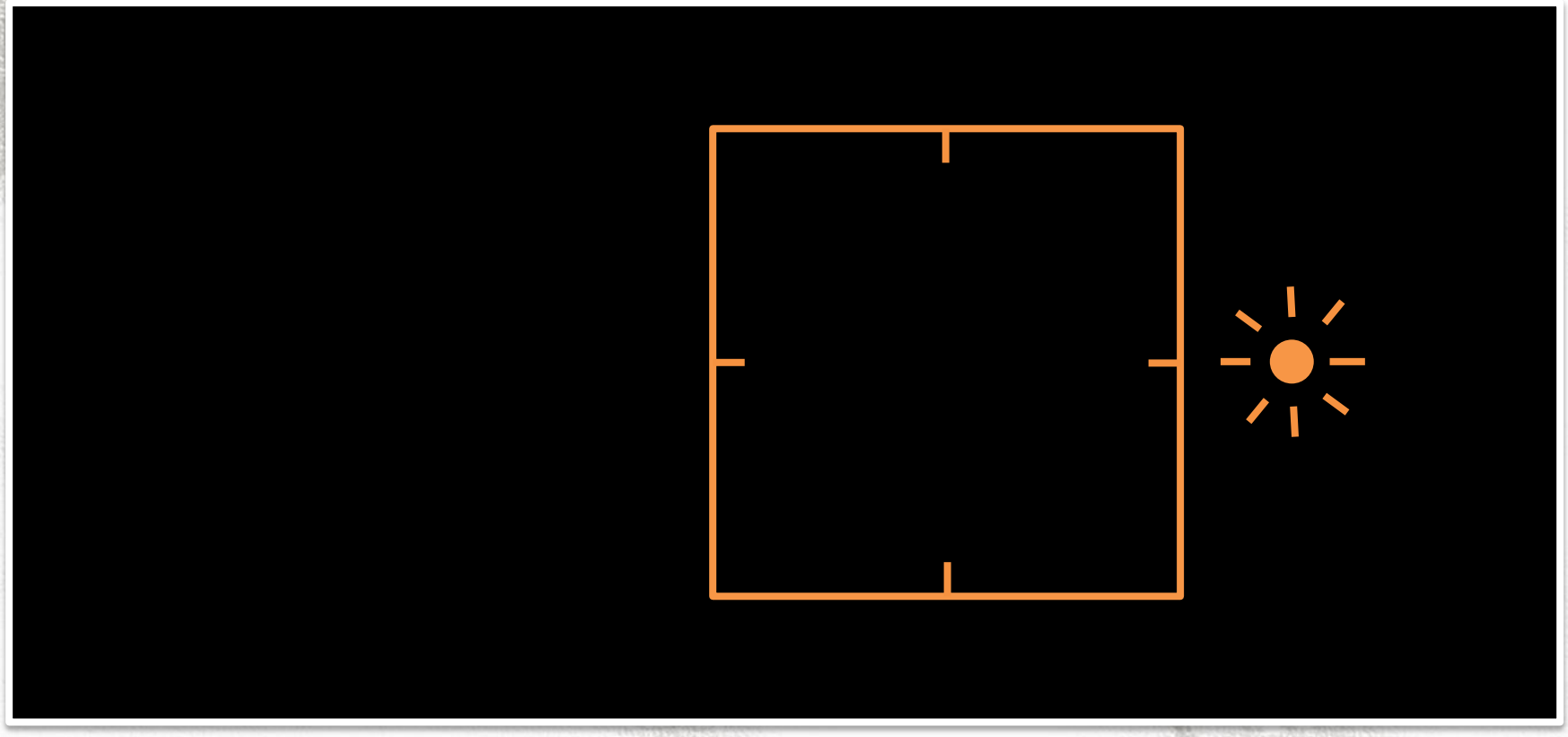
"Magic"- It just works!

Spot



- Smartphone: tap spot
- Camera: Usually menu setting & in center of frame

This is what spot metering looks like on smartphones



The Background Paper Trick

iPhone 5s
1/30, ISO 80
No flash
Auto metering

20 lbs
COPY & LASER PAPER
Superb Opacity
High White
High Performance
Office Paper
20 lbs (75gsm)
Letter
8.5 × 11"
10 × 500 sheets
Window

WHITE

GRAY

SKY BLUE

POPCORN PRACTICE!

With Flash

With Reflector

With Flash

Notice the Improved Lighting

With Reflector

With Reflector

Let's Build a Reflector!

When to Use Reflector

- Bright behind subject
- Back lighting
- Dark area in a bright place
- Indoors on faces when doing video

When to Use Flash

- Bright behind subject
- Low light area
- Shade
- Moving subject, windy
- Try it with insects

- Phone flashes are really weak!

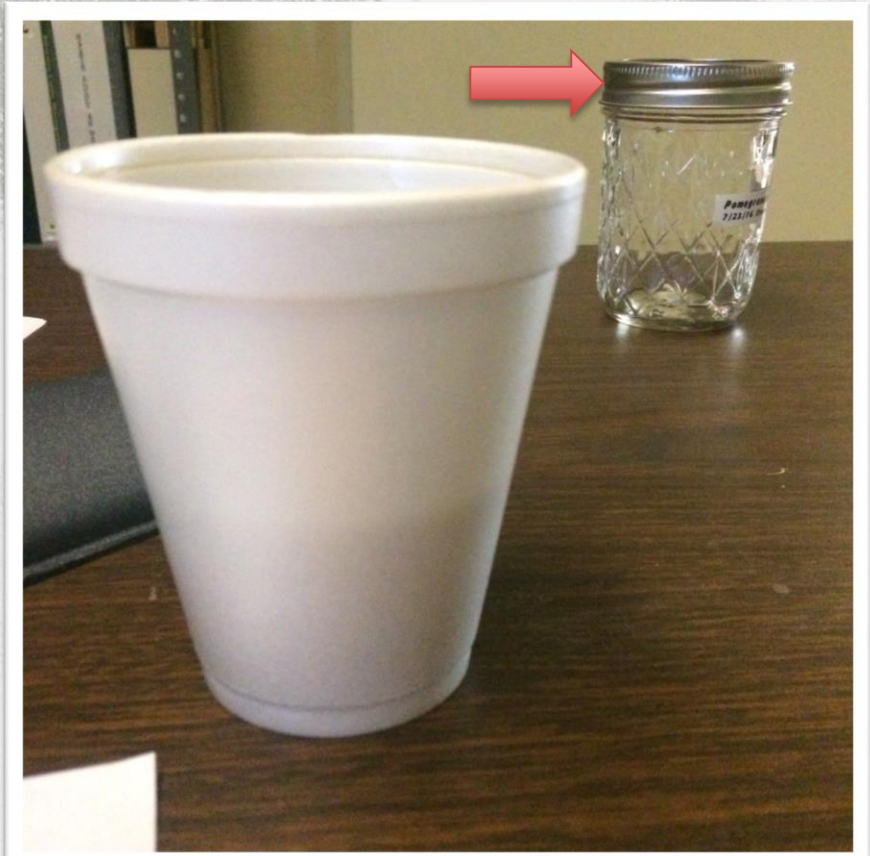
Works on people, too!
Fujifilm X30
2, 1/30, ISO 1600

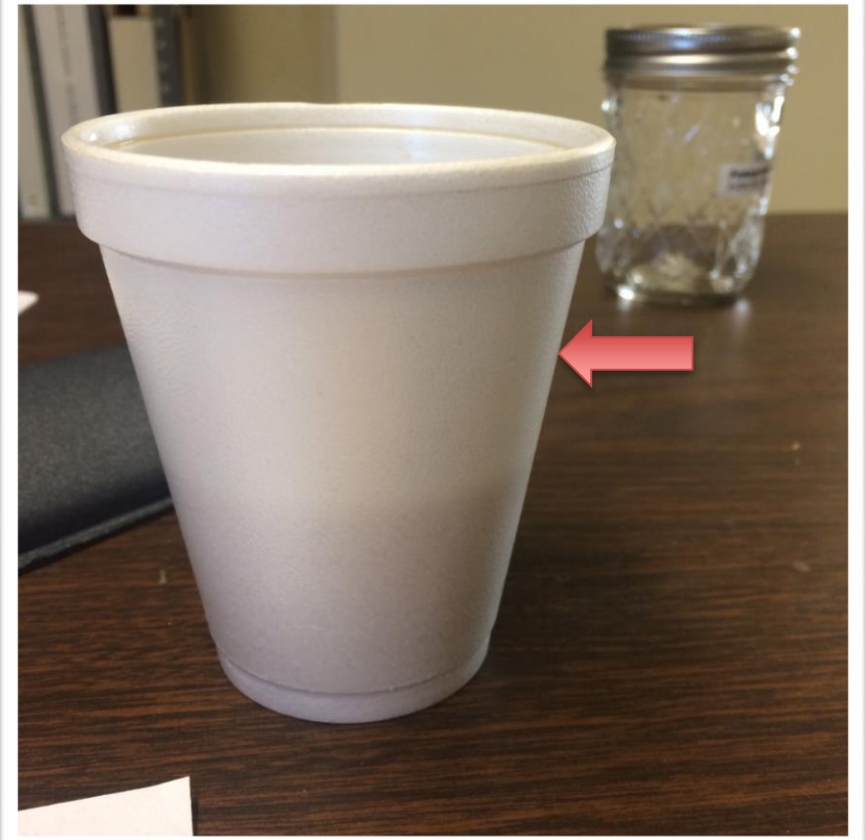
iPhone vs Camera Flash

Settings: ??? (Instagram)

f/11 1/180 ISO 400 + Flash

CHECK FOCUS!





Let's take some diagnostic pictures!

Use an iPhone? Try This App!

Microsoft Pix Camera

View More by This Developer

By Microsoft Corporation

Open iTunes to buy and download apps.

View in iTunes

This app is designed for both iPhone and iPad

Free

Category: Photo & Video
Updated: Jun 29, 2017
Version: 1.0.40
Size: 92.2 MB
Languages: English, Dutch, French, German, Hindi, Japanese, Korean, Portuguese, Russian, Simplified Chinese, Spanish, Swedish, Thai, Traditional Chinese, Vietnamese
Seller: Microsoft Corporation

Description

Microsoft Pix named one of the 50 Best Apps of the Year – Time Magazine

"Microsoft might have just made the best and easiest camera app for the iPhone and iPad." – Napier Lopez, The Next

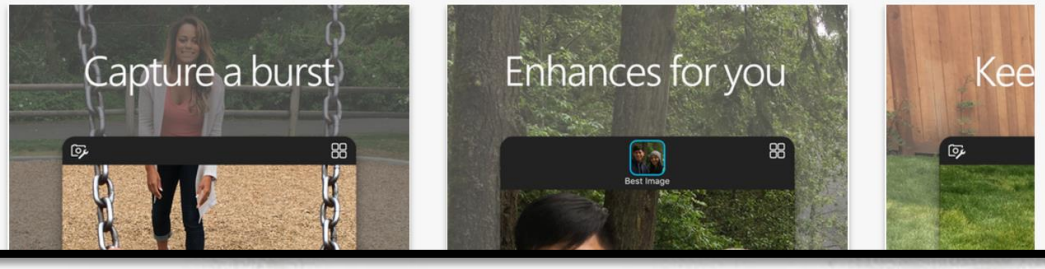
Microsoft Corporation Web Site ▸ Microsoft Pix Camera Support ▸ Application License Agreement ▸ ...More

What's New in Version 1.0.40

* NEW FEATURE: A new Pix Style will be added each week!
* NEW LANGUAGES: Dutch, Hindi, Swedish, Thai, Traditional Chinese, and Vietnamese
* IMPROVED: Stability and performance upgrades

Screenshots

iPhone | iPad



A Good Diagnosis Needs

- Clear images
- Enough light to see
- Context
- Show the affected part
- Identify the plant
  - (or send pix so we can do that for you)