ADAMBOTS
Team 245

Basic Camera Training

Canon

SX510 HS

WiFi

CANON ZOOM LENS 30X IS

12.1

4.3-
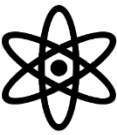
Taking Pictures at Robotics Events

- **Photographing robotic competition events is a difficult task**
  - **Lighting is often dark and is not uniform**
  - **Robots are a "Moving target"**
  - **People are often not standing still**
  - **Often cannot get that close to where the action is**
- **Using camera in Full "Auto" mode will not always get the best shots for competitions**
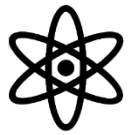
ADAMBOTS
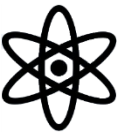Team 245

Different Type of Shots
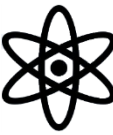
- ✵ **Group shots after winning awards**

- ✵ **Candid shots in the pits, stands, or build room**

- ✵ **Shots of robot on the field**

- ✵ **Shots of drive team on the field**
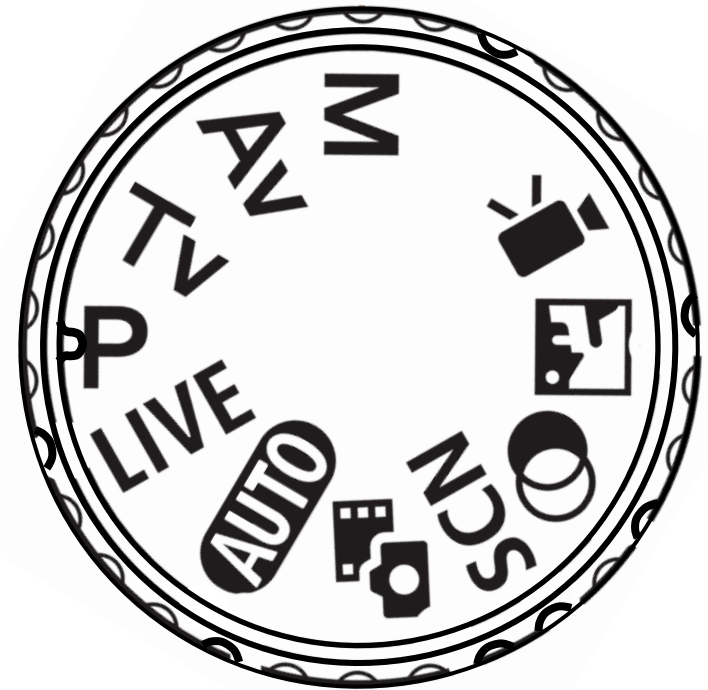
- ✵ **Shots of team members dancing**

- ✵ **Each type of shot requires different camera settings to get the best results**

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Basic Settings
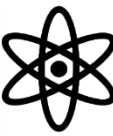
- **Best to use camera in the P Mode when taking candid people shots**

- **Best to use camera in the Av mode when taking shots of the robot in action on the field**

- **Select the mode using the dial on the top right side of the camera**

Set the ISO Speed

- **It is usually dark at the competitions so should use a higher ISO Speed setting**

- **Use 1600 or 3200 when taking pictures of the robot in action on the field**

- **Use 400 or 800 when taking group or candid shots**

Still Images

Changing the ISO Speed

- Press the <▲> button, choose an option (either press the <▲><▼> buttons or turn the <◎> dial), and then press the <(FUNC/SET)> button.
- The option you configured is now displayed.

ISO AUTO		Automatically adjusts the ISO speed to suit the shooting mode and conditions.
ISO 80 ISO 100 ISO 200	Low	For shooting outdoors in fair weather.
ISO 400 ISO 800	↕	For shooting in cloudy conditions, or at twilight.
ISO 1600 ISO 3200	High	For shooting night scenes, or in dark rooms.

- To view the automatically set ISO speed when the camera is set to [ISO AUTO], press the shutter button halfway.
- Although choosing a lower ISO speed may reduce image graininess, there may be a greater risk of subject blurriness in some shooting conditions.
- Choosing a higher ISO speed will increase shutter speed, which may reduce subject blurriness and increase the flash range. However, shots may look grainy.
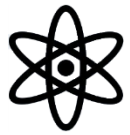
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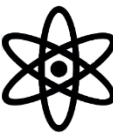
ISO Speed

- **Higher ISO speeds will use a faster shutter speed that will help prevent blurred shots**
    - **Different than out of focus shots**
- **Higher ISO speeds unfortunately result in a Grainy image that detracts somewhat from image quality**
- **Select an ISO speed for candid or group shots that give you a shutter speed higher than 1/60th**
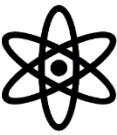- **Select an ISO speed for shots of the robot in action that give a shutter speed higher than 1/150th or 1/200th**

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Impact of the Zoom on Shutter Speed
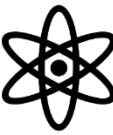
- **It is much harder to hold the camera still when the lens is at higher zoom positions**

- **Photos with maximum Zoom position should use a higher shutter speed to get a sharp, clear image**

- **Wider angle, smaller zoom shots can use a slower shutter speed**

  - **Generally, don't use a shutter speed lower than 1/60th of a second**

 - **Much more difficult to hold the camera still for speeds slower than this**

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Holding the Camera Still

- **Tips on holding the camera still when shooting with shutter speeds slower than 1/60th or with higher lens Zoom values**

    - **Release the shutter while doing a slow exhale after taking a big breath**

    - **Lean against a wall or other stable object**

    - **Hold your arms with your elbows locked against your body**

    - **Prop your elbows on your knees while in a sitting position**

    - **Prop your elbows on chair backs or other convenient stable objects**

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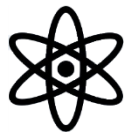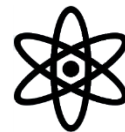
White Balance

- Pictures have a different color tone based on the type of lighting in the subject

- Use the White Balance settings to choose the option that gives the most natural looking result

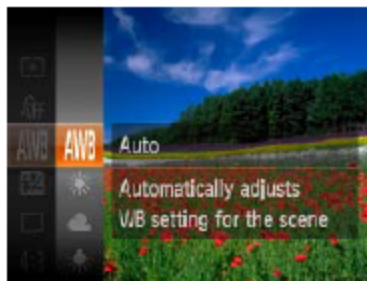- Look at the image display on the camera to choose which is best

- Can also use AUTO setting

Still Images   Movies

Adjusting White Balance

By adjusting white balance (WB), you can make image colors look more natural for the scene you are shooting.

AWB Auto
Automatically adjusts
WB setting for the scene

- Press the <(FUNC SET)> button, choose [AWB] in the menu, and choose the desired option (🕮22).
- The option you configured is now displayed.

AWB	Auto	Automatically sets the optimal white balance for the shooting conditions.
☀	Day Light	For shooting outdoors in fair weather.
☁	Cloudy	For shooting in cloudy conditions, in the shade, or at twilight.
💡	Tungsten	For shooting under ordinary incandescent (tungsten) lighting and similarly colored fluorescent lighting.
⚊	Fluorescent	For shooting under warm-white (or similarly colored) or cool-white fluorescent lighting.
⚊	Fluorescent H	For shooting under daylight fluorescent and similarly colored fluorescent lighting.
🖐	Custom	For manually setting a custom white balance (🕮57).

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White Balance: Custom
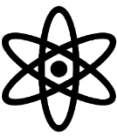
※ **If AUTO white balance or the other pre-set settings don't give a realistic color tone, follow the Custom white balance procedure to get a better color match**
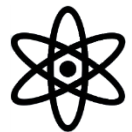
Custom White Balance

For image colors that look natural under the light in your shot, adjust white balance to suit the light source where you are shooting. Set the white balance under the same light source that will illuminate your shot.
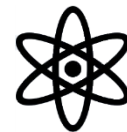
- Follow the steps in "Adjusting White Balance" (□56) to choose [▨].
- Aim the camera at a plain white subject, so that the entire screen is white. Press the <DISP.> button.
- The tint of the screen changes once the white balance data has been recorded.

(!) • Colors may look unnatural if you change camera settings after recording white balance data.

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White Balance: Examples

- These photos shot in Tungsten light using different white balance settings
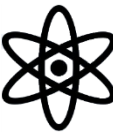

Auto

Daylight

Cloudy


Tungsten

Fluorescent

Fluorescent Daylight

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Using the Flash

- **It is generally best to use ambient lighting**

- **The flash on the camera works best at close ranges in a room with a close ceiling that will reflect the light**

    - **Build Room fits this description, CAD room does not**

- **The flash will not be effective when taking photos in the arena or in the pits or taking photos of a large assembled group**

- **Experiment with flash On & Off when taking photos at close ranges if the lighting is low and see what works best**

- **Use flash when AUTO White balance is selected**

- **Flash can be turned off/on by manually raising the flash door or by the button on the back camera wheel**

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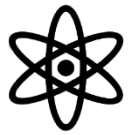
Limitation of Built in Flash
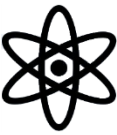
⚛ **Flip-up flash on cameras has limited range**

Flash Engaged

Ambient Light

⚛ **Is usually best to use ambient light**

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Taking Pictures of the Robot on the field or team members while dancing
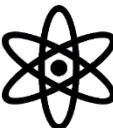
- **Put the camera in Av mode**

- **Use the wheel on the back to select the aperture setting to the lowest number**

  - **This will drive the highest shutter speed and reduce blur**

  - **Select ISO speed that gives a shutter speed above 1/150th**

Specific Aperture Values ([Av] Mode)

Set your preferred aperture value before shooting as follows. The camera automatically adjusts the shutter speed to suit your aperture value. For details on available aperture values, see "Aperture" (162).

1 Enter [Av] mode.
- Set the mode dial to [Av].

2 Set the aperture value.
- Turn the <◎> dial to set the aperture value.

⊘ • Orange display of shutter speeds when you press the shutter button halfway indicates that the settings deviate from standard exposure. Adjust the aperture value until the shutter speed is displayed in white, or use safety shift (see below).

✎ • [Av]: Aperture value (size of the opening made by the iris in the lens)
• To avoid exposure problems in [Tv] and [Av] modes, you can have the camera automatically adjust the shutter speed or aperture value, even when standard exposure cannot otherwise be obtained. Press the <MENU> button and set [Safety Shift] on the [📷] tab to [On] (23).
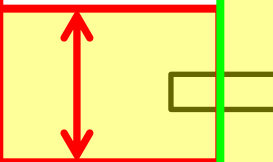However, safety shift is disabled when the flash fires.
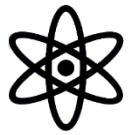
Depth of Field
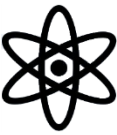
- **Aperture opening of f-stop controls the depth of field or the distance from the camera that remains in focus**

    - The smaller the f-stop number, the narrower the depth of field

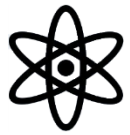   - The higher the f-stop number, the wider the depth of field

- **Example set-up**

f2.8 Very narrow depth of field
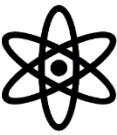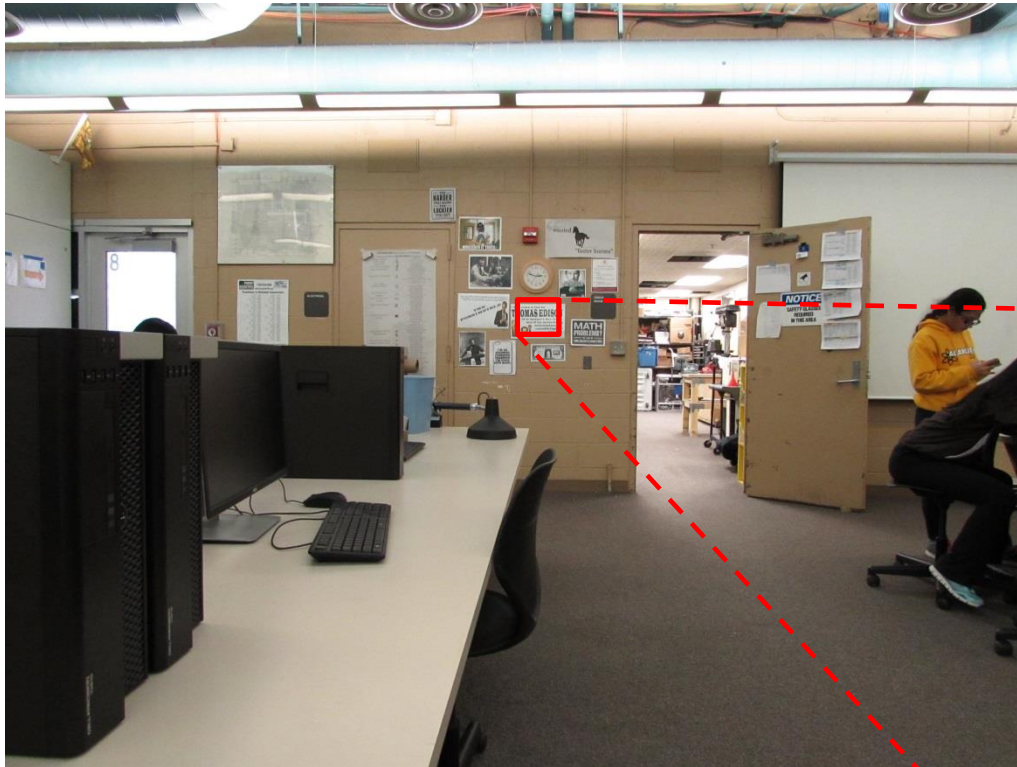
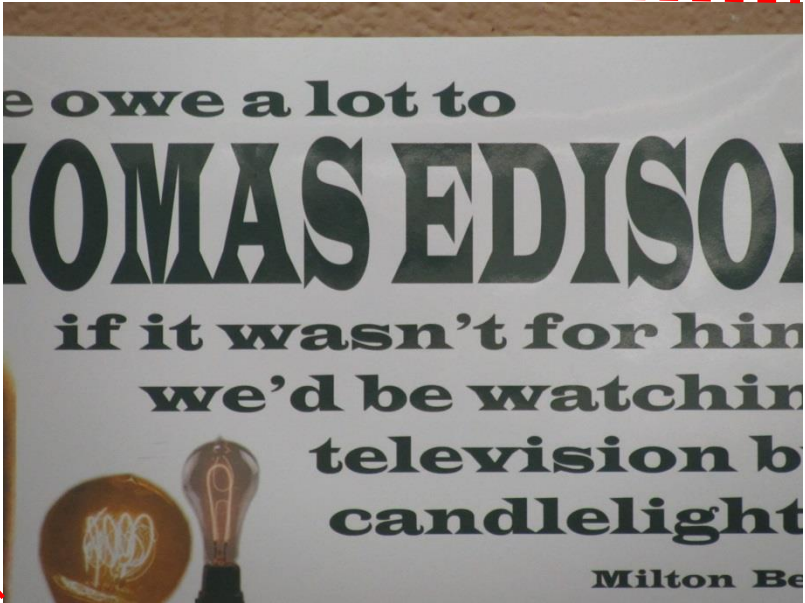F22 Very deep depth of field

△ ○ □

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Range of Zoom

✸ **Zoom Lens can provide a wide range of telephoto, magnification effect: 25x in this example**

129 mm Focal Length on Canon SX510HS: Max Optical Zoom

4 mm Focal Length on Canon SX510HS: Widest Angle

# Shutter Speed, ISO-Speed and f-Stop for Equal Exposure for the Same lighting condition
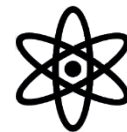
Combinations of f-Stop, Shutter Speed, and ISO-Speed for a consistent Exposure for the Same Lighitng					
Constant ISO-Speed of 400		Constant Shutter Speed 1/250		Constant f-Stop of 8.0	
f-Stop	Shutter Speed	f-Stop	ISO-Speed	Shutter Speed	ISO-Speed
2.8	1/2000	2.8	50	1/30	50
4.0	1/1000	4.0	100	1/60	100
5.6	1/500	5.6	200	1/125	200
8.0	1/250	8.0	400	1/250	400
11	1/125	11	800	1/500	800
16	1/60	16	1600	1/1000	1600
22	1/30	22	3200	1/2000	3200
32	1/15	32	6400	1/4000	6400

✴ **This lighting example is typical of an outdoor scene in full sun**

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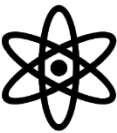# ISO-Speed and Grain or Sharpness
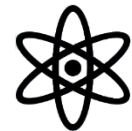
❋ **100 ISO-Speed**

Full Frame Image

Zoomed Portion

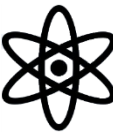# ISO-Speed and Grain or Sharpness

3200 ISO-Speed

Full Frame Image
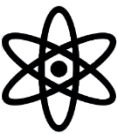
Zoomed Portion

ISO-Speed and Grain or Sharpness

⁂ **3200 ISO-Speed with the Canon SX510HS will deliver acceptable images for the full frame but images will not hold up when cropped for a tighter image**
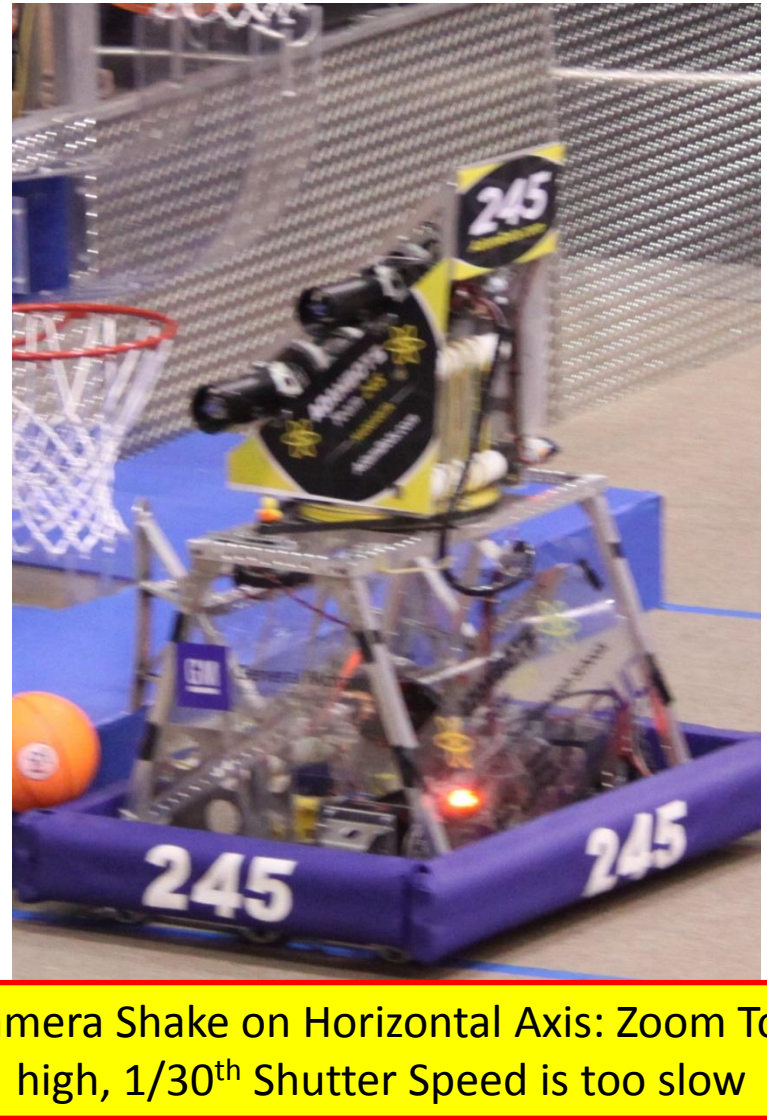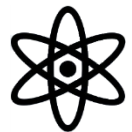
100 ISO-Speed

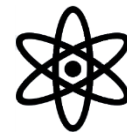3200 ISO-Speed

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Sharp Focus and Steady Camera Platform Higher Shutter Speed (1/150th)

Camera Shake on Horizontal Axis: Zoom Too high, 1/30th Shutter Speed is too slow

Examples: Shutter Speed too Slow for Action

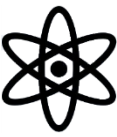Heads were not moving and are relatively sharp

Clapping hands are a Blur but heads are more clear

This is okay if this is the desired effect but is an example of subject motion in too dark an area with a shutter speed too slow

Team in Dark area, shutter speed of 1/25th to make exposure is too slow for the action

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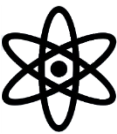Team 245

Full sunlight easy shot at 1/200th of a second 200 ISO-Speed f7.1 Sunlight White Balance. Difficult for team members to look into the sun, but makes for a nice chot

Darker Indoor Shoot at 1/60th of a Second at 1600 ISO-Speed canon 50D f4 Fluorescent White Blanace

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