

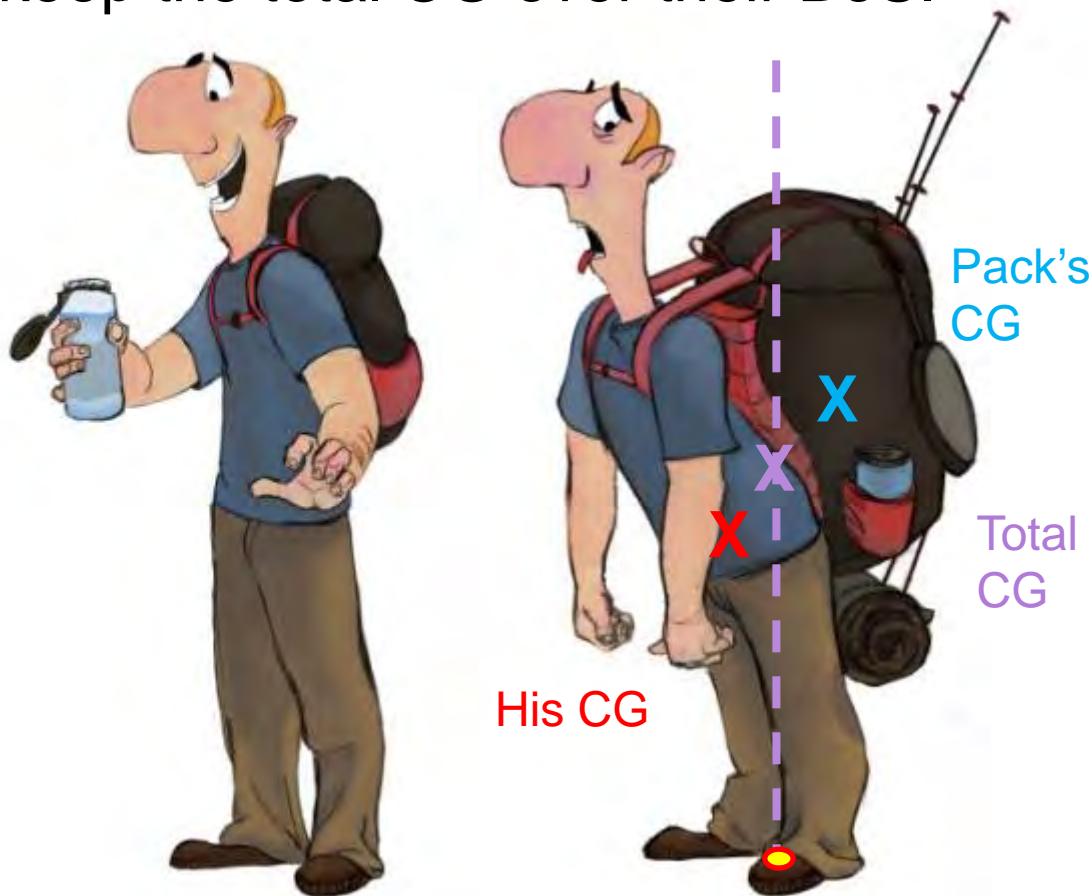
Special Poses



National Science Foundation
WHERE DISCOVERIES BEGIN

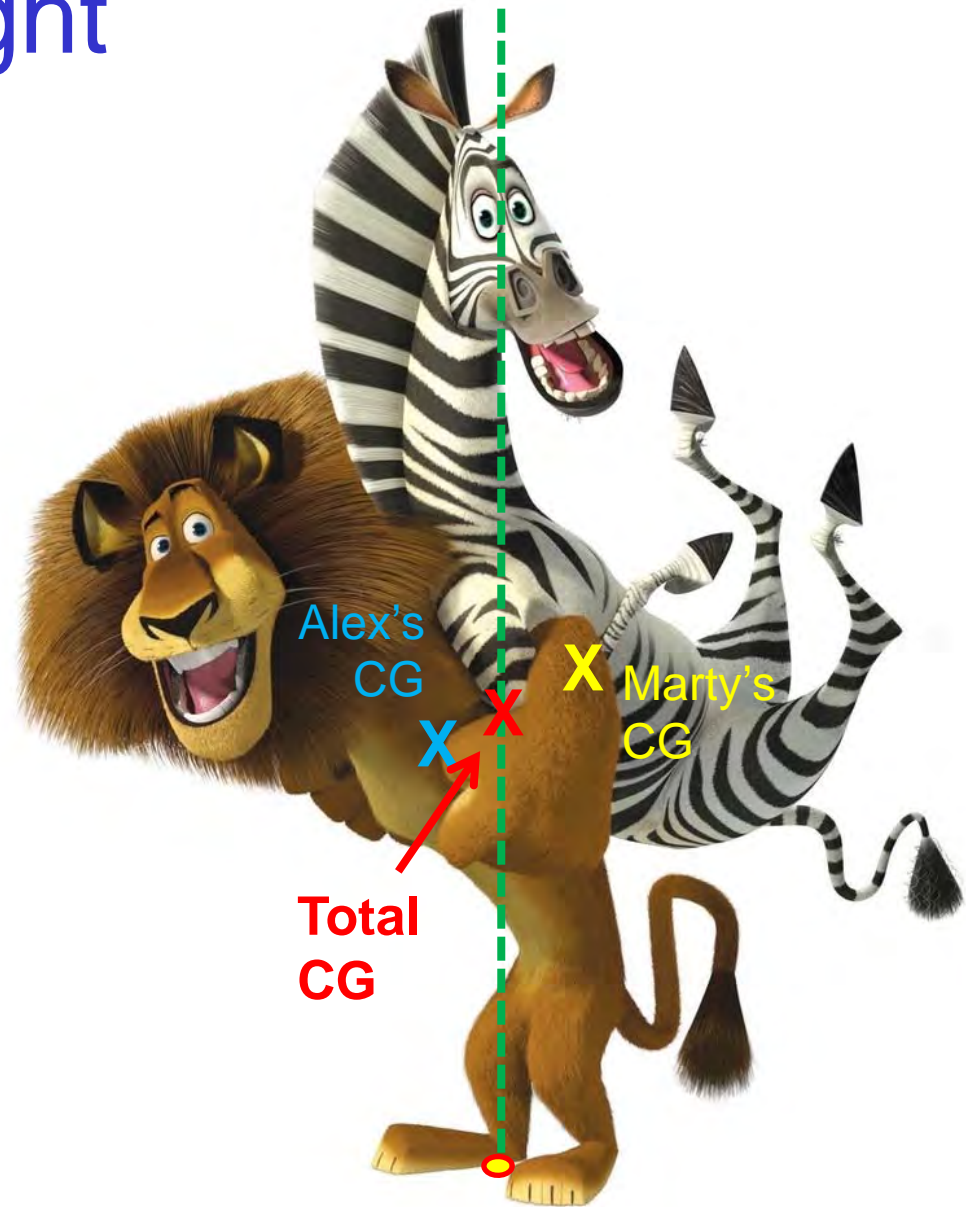
Carrying a Weight

A heavy backpack shifts the total CG towards the rear so a character needs to lean forward to keep the total CG over their BoS.



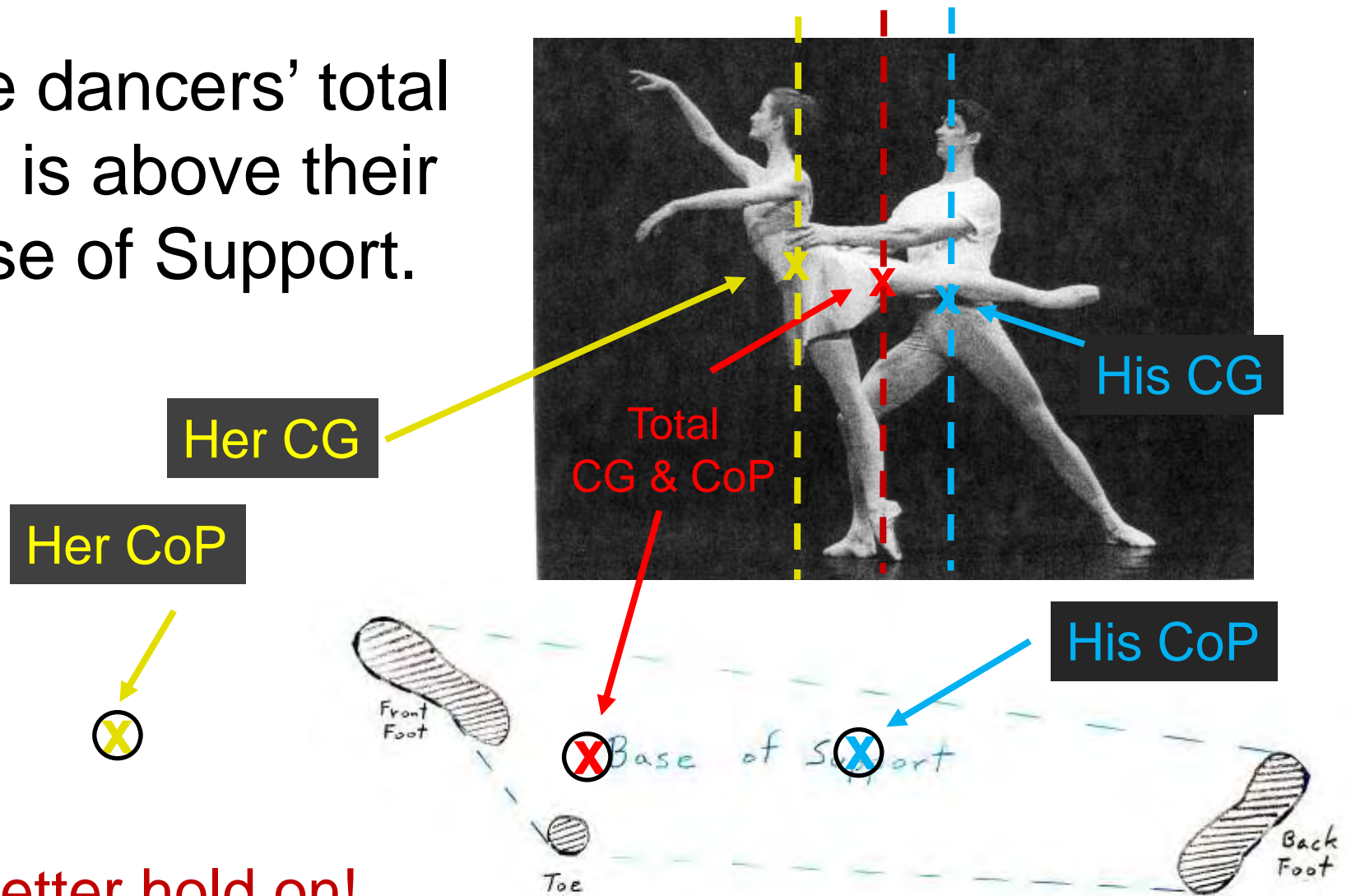
Carrying a Weight

The degree to which Alex leans forward to keep the total CG over his Base of Support indicates that he and Marty weight roughly the same.



Combined CG & Base of Support

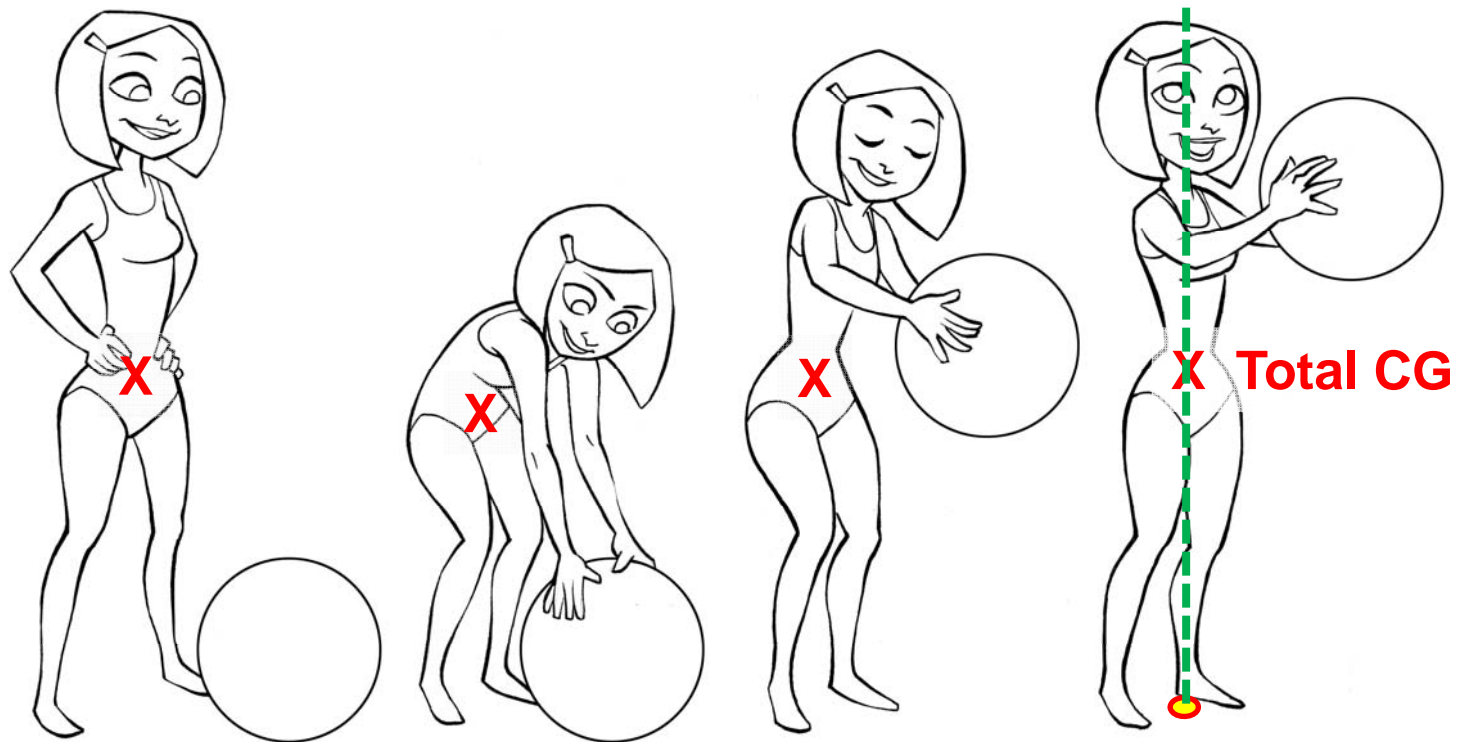
The dancers' total CG is above their Base of Support.



He better hold on!

Lifting a Light Weight

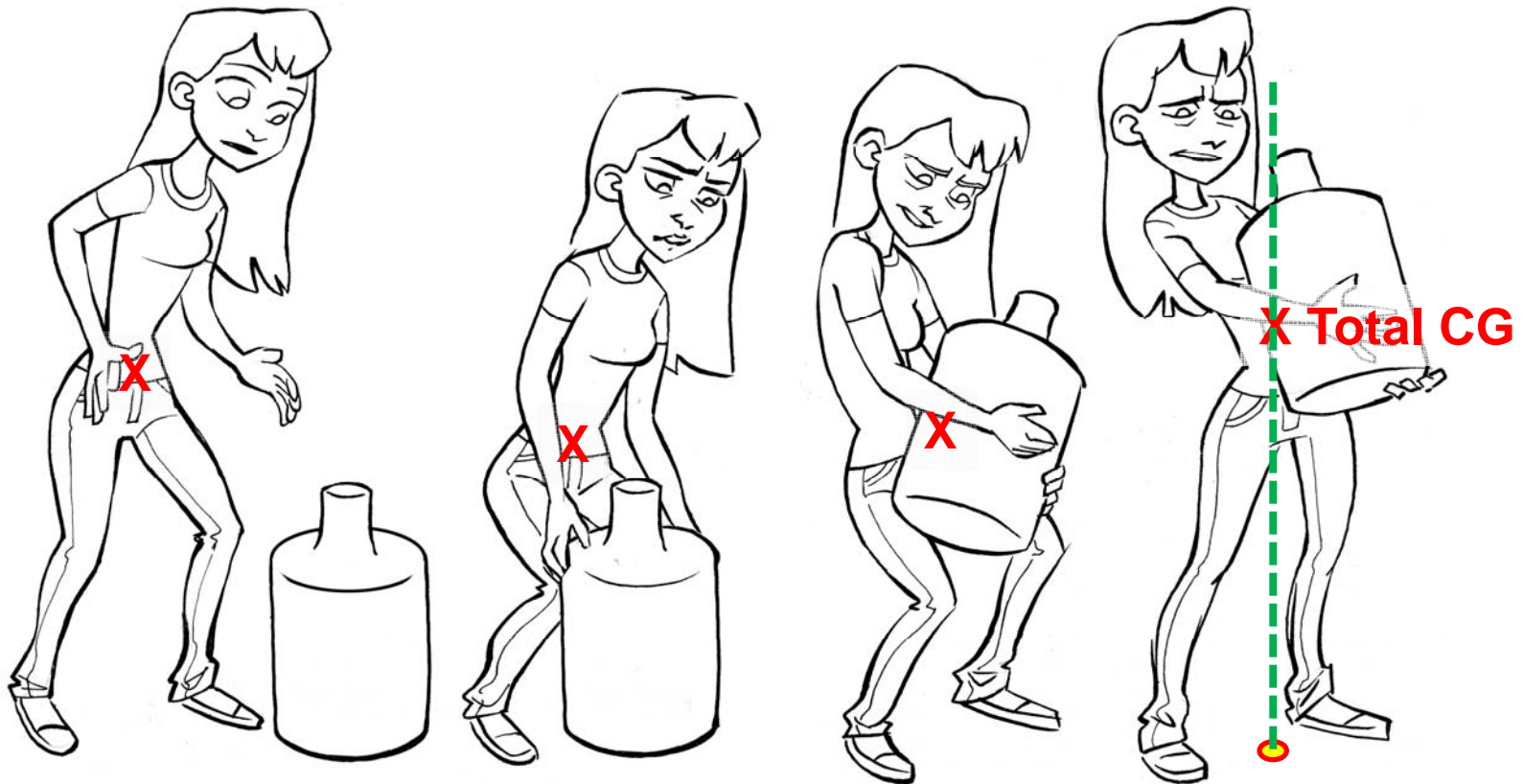
Lifting and holding a light ball has little effect on the location of the total center of gravity.



Center of gravity easily stays above her base of support

Lifting a Heavy Weight

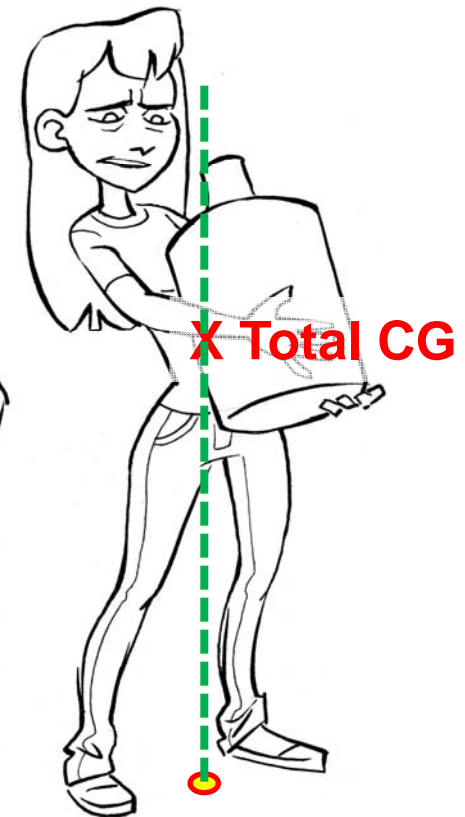
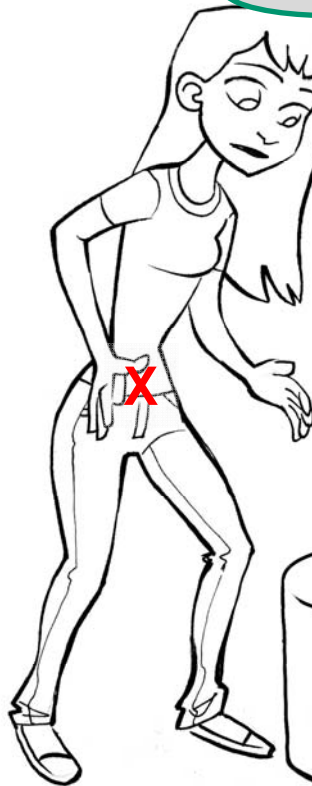
Lifting a heavy water bottle shifts the total CG.



Character leans back to keep the total CG above her feet

Lifting a Heavy Weight

The water... I hate my job. ...d.

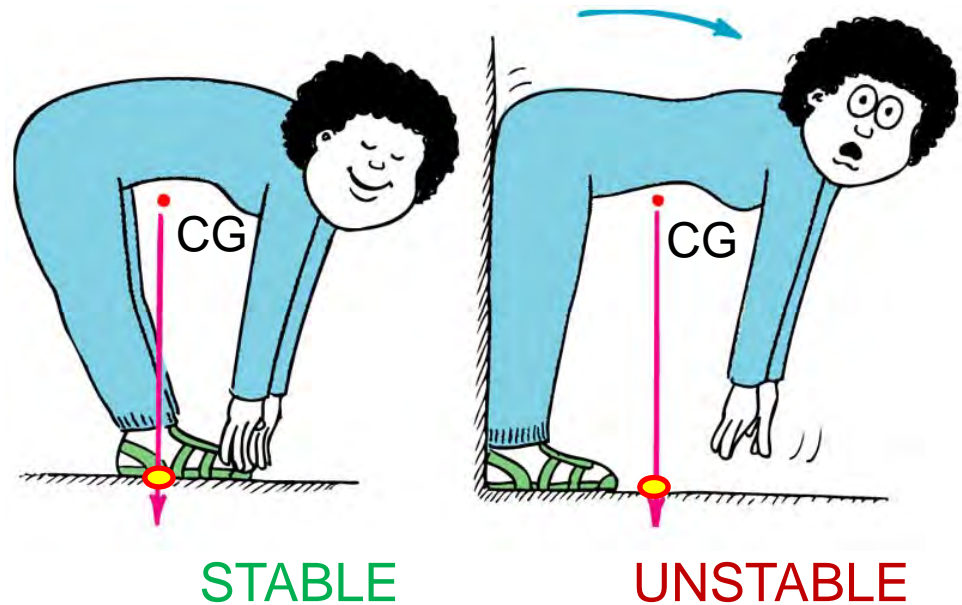


Character leans back to keep the total CG above her feet

Bending Forward



Katie Corna



When you bend down to pick something up, you have to shift your rear end backwards to keep CoP inside the BoS.

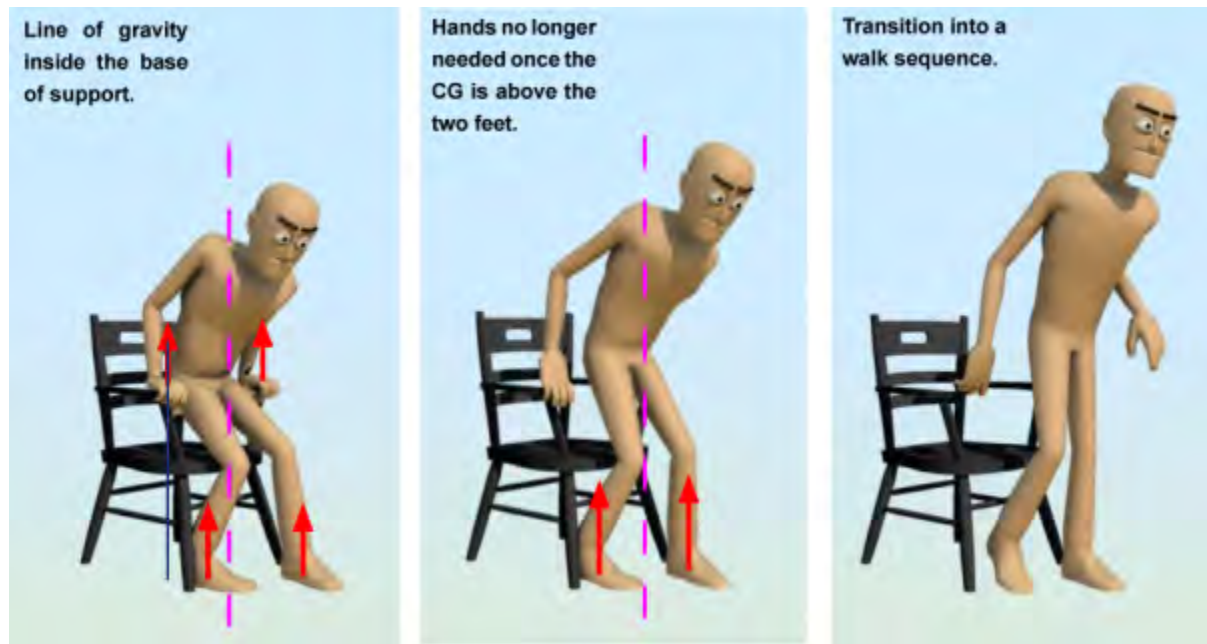
Rising from an Armchair

To rise from a chair, you need to lean forward to bring your center of gravity over your feet.



Rising from an Armchair

If the chair has arms then you can extend your base of support to include your hands.

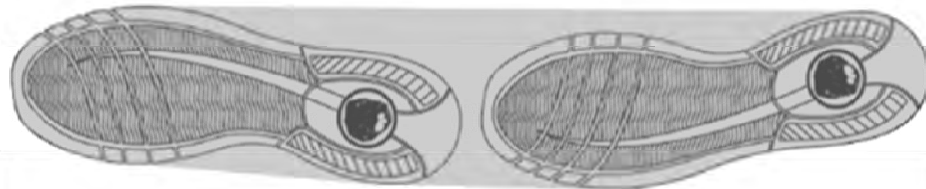


If the character stands up quickly then some of the poses may be out of balance. If so then the motion slows into the standing pose, much like a rising ball slows into its apex.

Using Arms for Balance

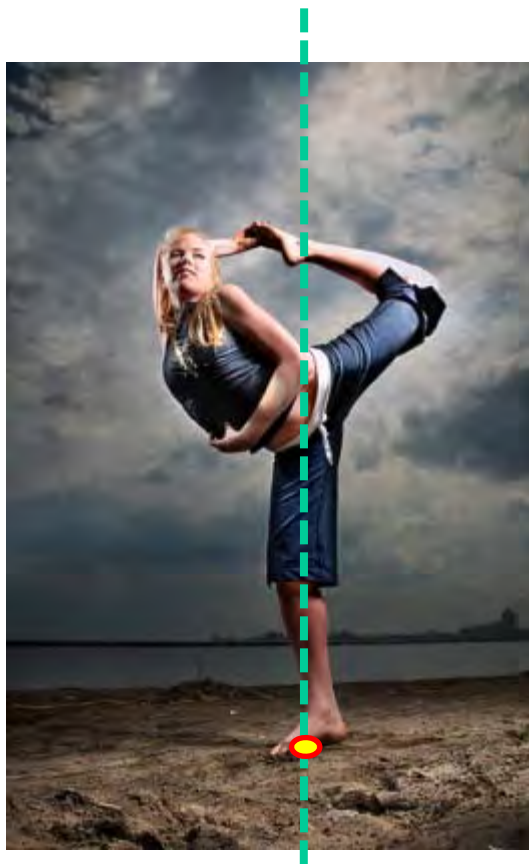
Balance is difficult with one foot in front of the other because base of support is narrow.

You tend to hold your arms out to allow rapid changes of your center of gravity, to control balance.



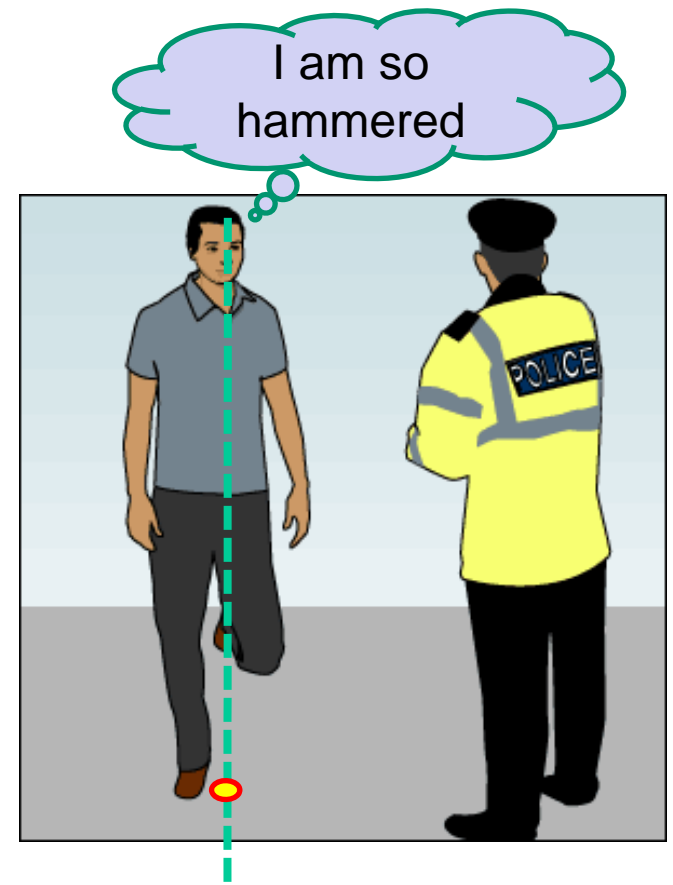
Standing on One Leg

To balance on one leg you need to shift CG so that it is over the planted foot.



Using
arms
helps

Line of Gravity



Reaching Forward

To reach forward as far as possible you naturally stick the opposite arm and leg as far back as possible.



This pose keeps your Center of Pressure under your foot while allowing your upper body to lean forward.

Defensive Poses

A defensive pose is one in which the character is braced for an attack.

Defensive poses often have the feet spread wide, to increase the base of support.

Crouching lowers CG and holding arms out allows for rapid shifts of the CG.

All these elements add stability to the stance.



Lam Nguyen

Summary

- To stay in balance while carrying a heavy weight a character typically leans to keep the Center of Pressure (CoP) in the Base of Support (BoS).
- When one character holds another the two have a combined total Center of Gravity and BoS.
- Raising the arms allows for quick repositioning of the CoP in order to maintain balance.
- Spreading the feet apart increases the BoS, making it easier to achieve and keep balance.