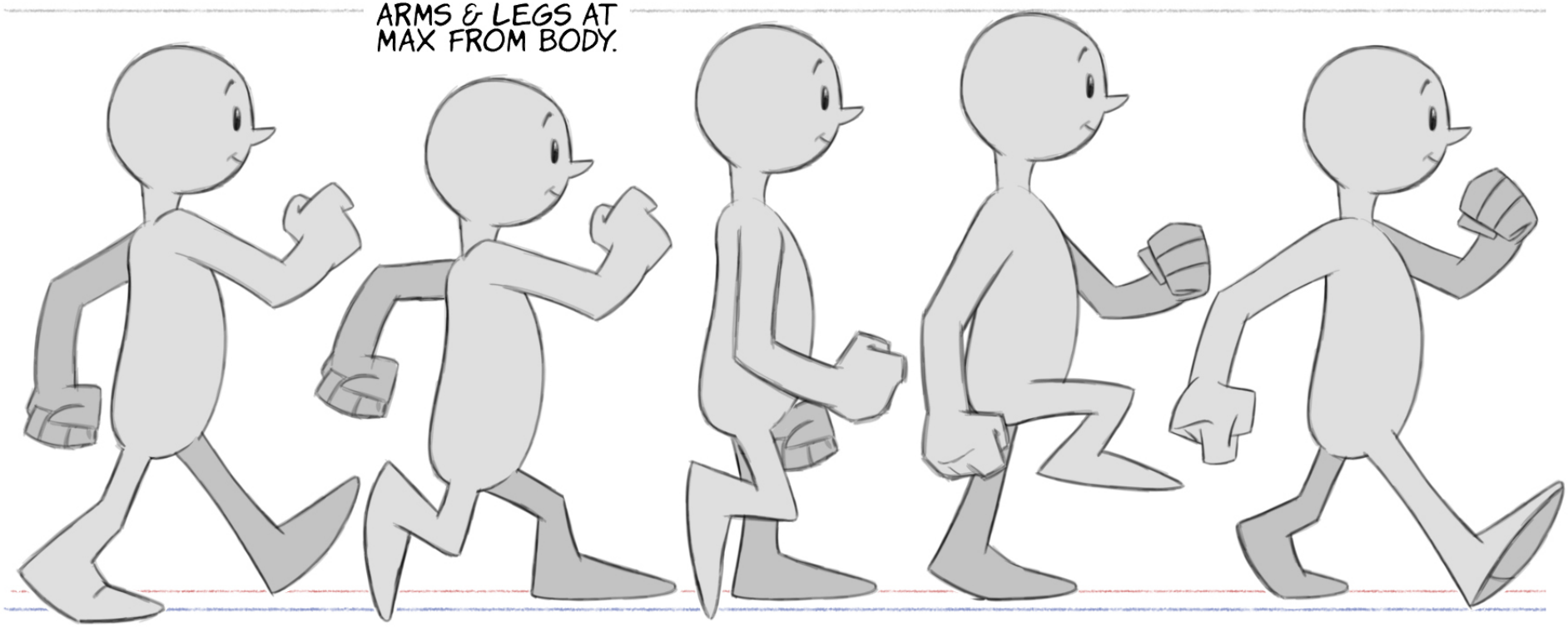
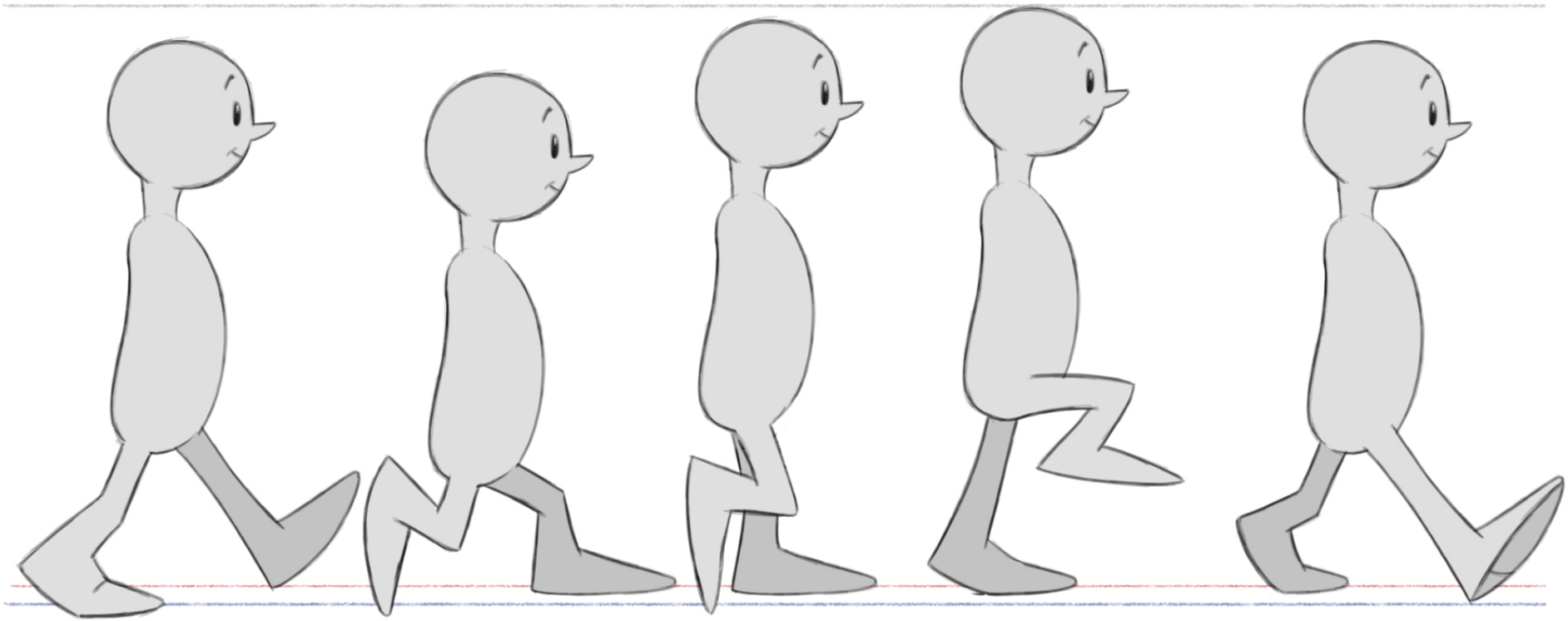
THE FOUR WALK CYCLE POSES (WITH ARMS)



THE FOUR WALK CYCLE POSES (NO ARMS)



CONTACT
DRAW THIS FIRST.

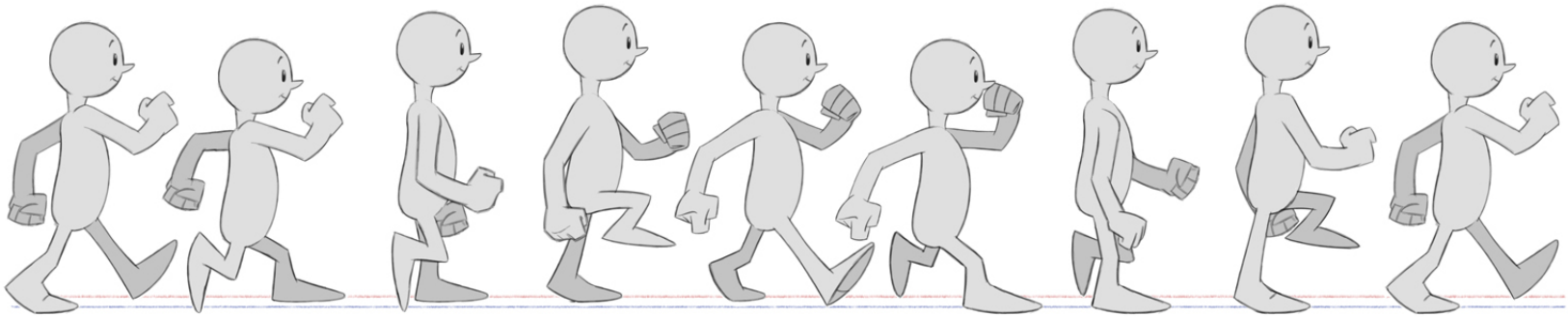
LOW

PASSING
DRAW THIS THIRD.

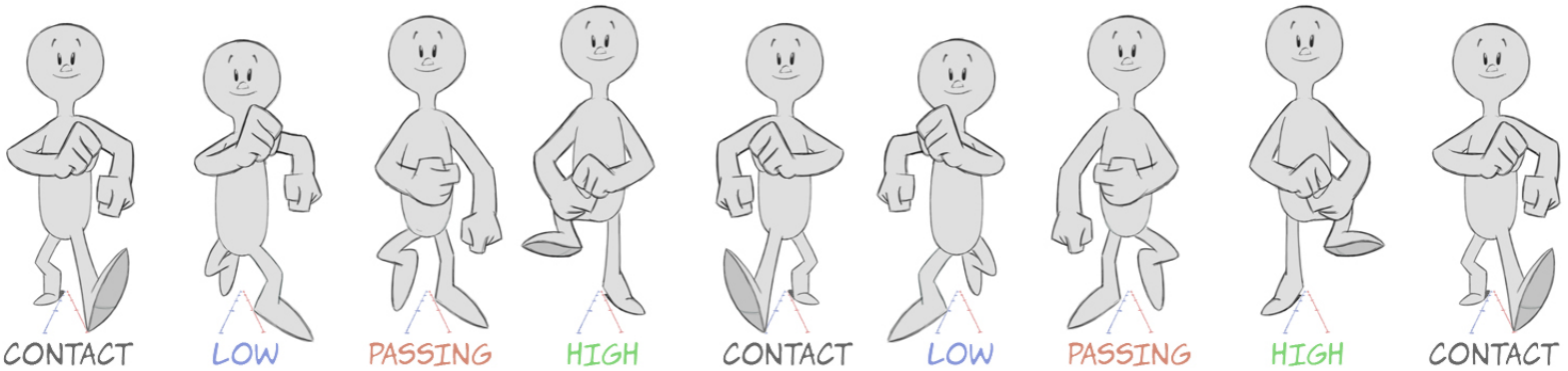
HIGH

CONTACT
DRAW THIS SECOND.

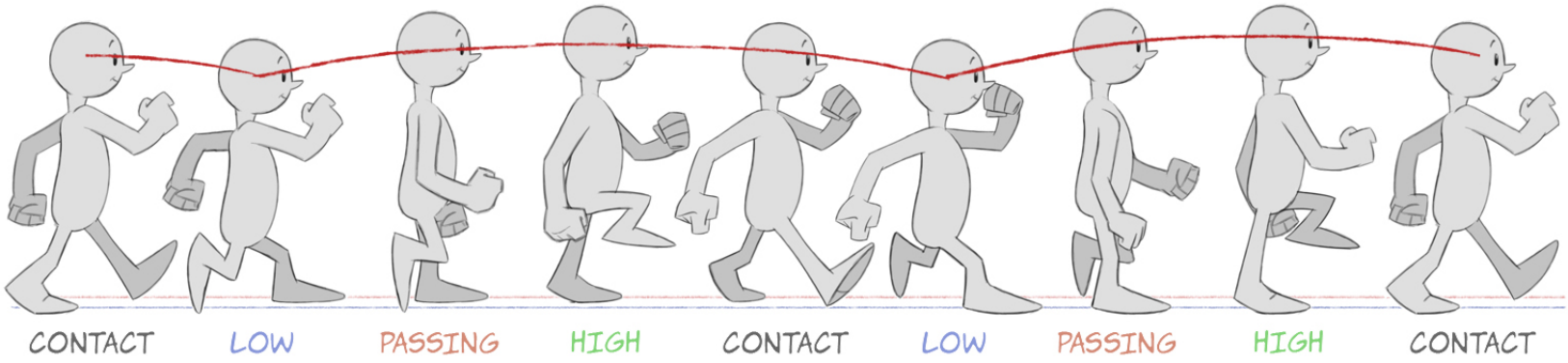
WALK CYCLE POSES (PROFILE VIEW)



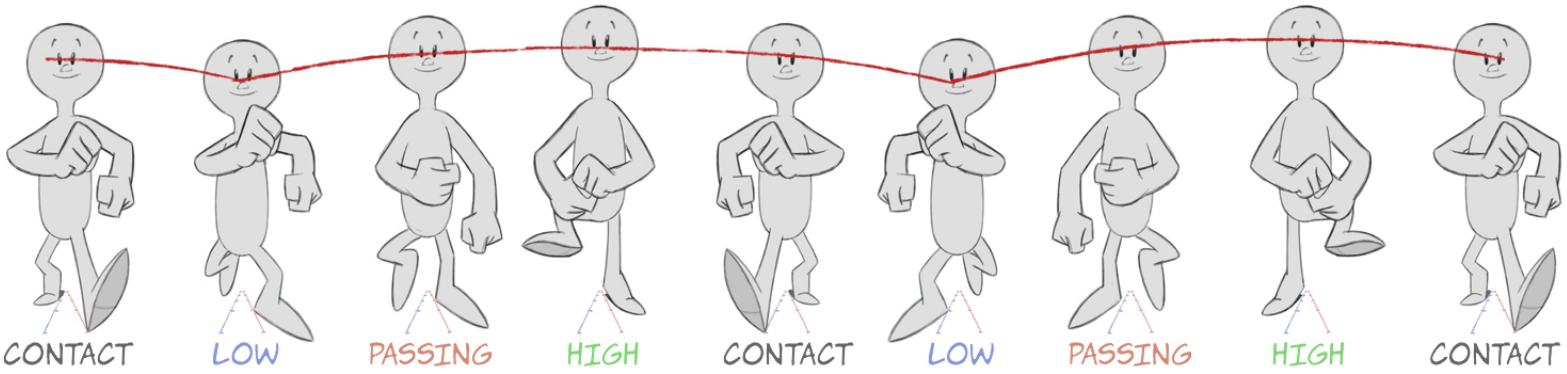
WALK CYCLE POSES (FRONT VIEW)



WALK CYCLE POSES (PROFILE VIEW)



WALK CYCLE POSES (FRONT VIEW)



24 FPS/30 FPS COMPARISON

24 FPS/30 FPS COMPARISON:
WALK CYCLE CONTACT POSE TIMING

24 FPS/30 FPS COMPARISON:
24 FPS RUN CYCLE ON "EIGHTS" (VS. THE 30 FPS TIMING)

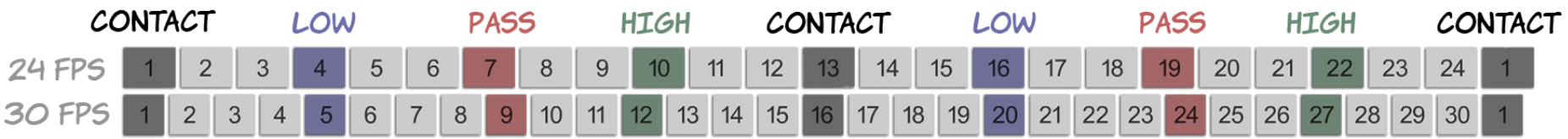
24 FPS/30 FPS COMPARISON:
24 FPS RUN CYCLE ON "SIXES" (VS. THE 30 FPS TIMING)

NOTE THAT THE 24/30 SYSTEMS DON'T DIVIDE EVENLY: YOU WILL NEED TO CHOOSE BETWEEN 8/9 AND 23/24 TO SYNC.

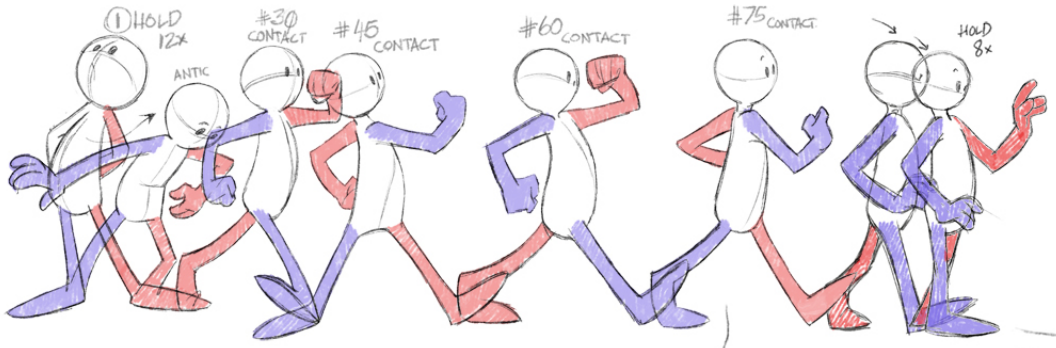
24 FPS/30 FPS COMPARISON:
A HELD POSE NEEDS 6X MINIMUM TO READ (OR 7X/8X ON 30 FPS)

24 FPS/30 FPS COMPARISON:
ANIMATING ON 24 FPS SAVES YOU 6 DRAWINGS PER SECOND!

24 FPS/30 FPS COMPARISON:
24 FPS WALK CYCLE EXTREMES (VS. THE 30 FPS TIMING)

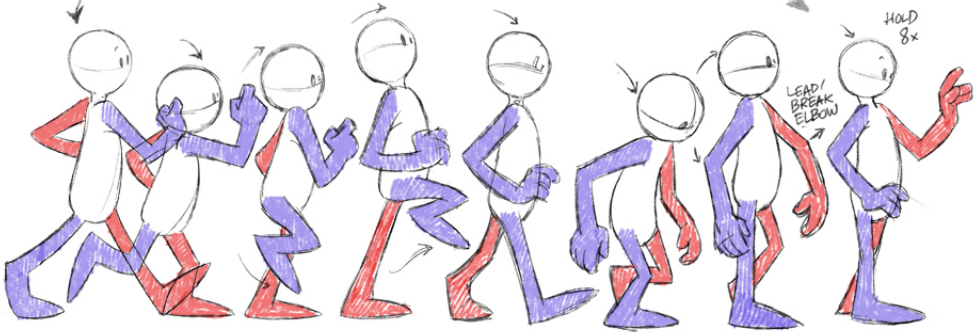


SETTING UP A WALK ANIMATION WITH CONTACTS & THUMBNAILS



WHEN YOU TACKLE YOUR FIRST WALK SCENES, I RECOMMEND THAT YOU ANIMATE THEM ACROSS THE SCREEN INSTEAD OF IN PLACE. THIS WILL ALLOW YOU TO SEE HOW THE WALK APPEARS FROM A MORE TYPICAL FIXED POSITION.

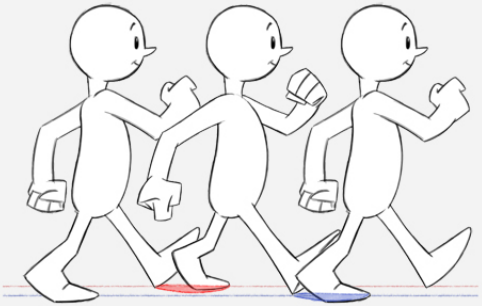
USE THE CONTACT POSES TO ESTABLISH THE FRAMEWORK OF THE WALK; ONCE YOU HAVE THEM IN PLACE, MUCH OF THE STAGING AND ANIMATION IS DETERMINED.



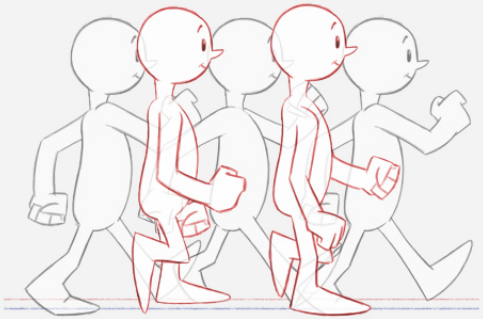
YOU STILL HAVE GREAT SCOPE FOR VARIATION OF THE WALK, BUT WITH THE CONTACTS FIXED, THE STRIDE IS ESTABLISHED.

USE THE THUMBNAILS TO CREATE NOTES ON TIMING AND ARCS IF YOU NEED TO.

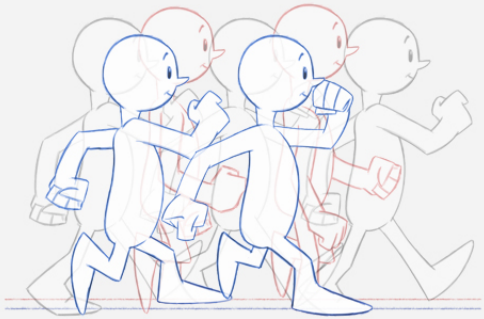
SEQUENCE OF ANIMATION



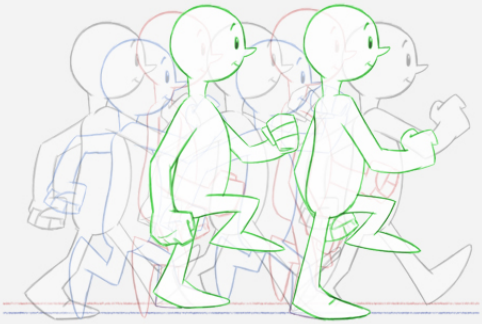
1. CREATE CONTACT POSES. USING THE FOOT'S SHADOW AS A GUIDE.



2. ADD PASSING POSES, HALFWAY BETWEEN THE CONTACTS.



3. ADD LOW POSES. THE ARMS ARE AT THEIR FARTHEST FROM BODY.

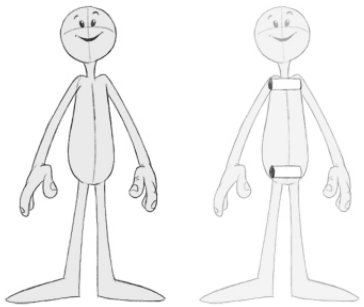


4. ADD HIGH POSES. THE BACK LEG IS STRAIGHTEST ON THIS POSE.

5. CHECK ARMS, LEGS & HEAD FOR ARCS & VELOCITY.

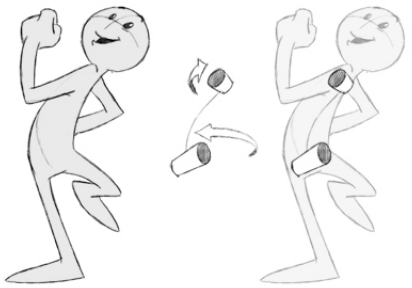
6. NOTE THE CURVED ARC OF THE HEAD (USING THE EYE AS REFERENCE).

COUNTERPOSE/TORQUE



WHEN SETTING UP CHARACTER RIGS OR MODEL SHEETS, IT'S COMMON TO USE A STATIC POSE WHERE THE SHOULDERS AND HIPS ARE EXACTLY ALIGNED. THIS IS THE BEST WAY TO DESIGN THESE REFERENCE POSES.

HOWEVER, WHEN YOU START TO CREATE SCENES, MOVE BEYOND THIS BASIC ORIENTATION. A NATURAL POSE WILL HAVE SOME DEGREE OF IMBALANCE.

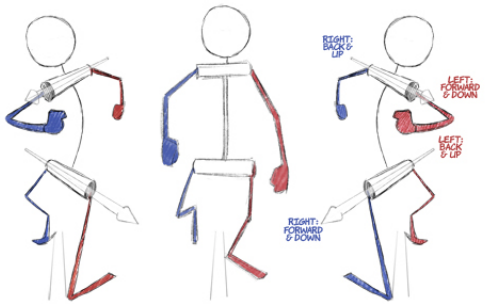


WITH MORE PHYSICAL MOVEMENTS, THE DEGREE OF TORQUE CAN INCREASE.

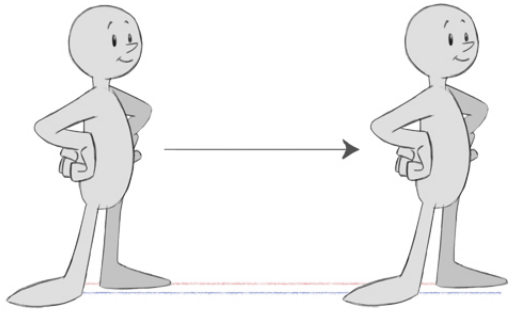
SCULPTORS LIKE MICHELANGELO USED THIS TECHNIQUE TO GIVE THEIR WORK A SENSE OF MOTION.

HERE'S AN EXAMPLE OF THIS PRINCIPLE IN THE CONTACT AND PASSING POSES OF A WALK.

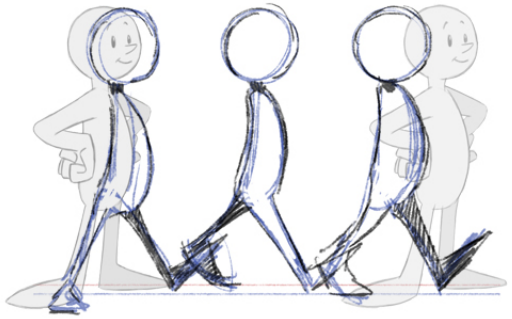
KEEP THIS IMAGE HANDY, AS IT'S EXTREMELY EASY TO FORGET THE ALIGNMENT.



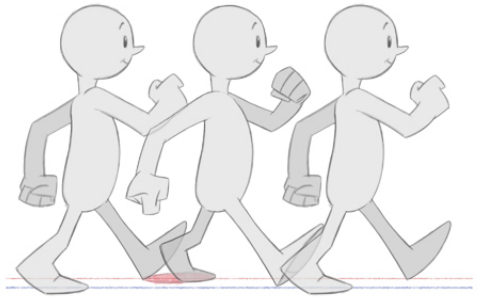
LAYING OUT THE CONTACT POSES



1. HERE ARE THE START AND STOP POSITIONS.

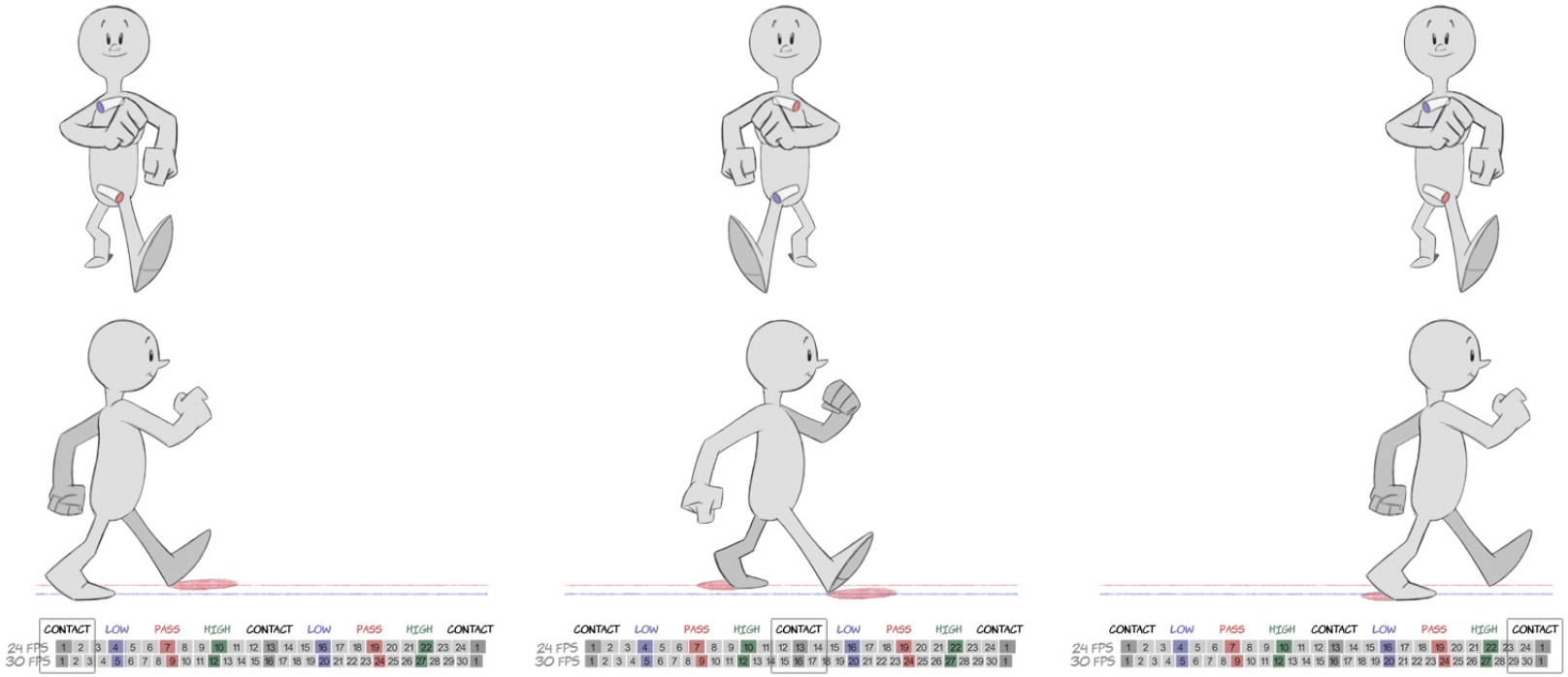


2. THUMBNAIL THE CONTACT POSES. ADD MORE STEPS IF NECESSARY.



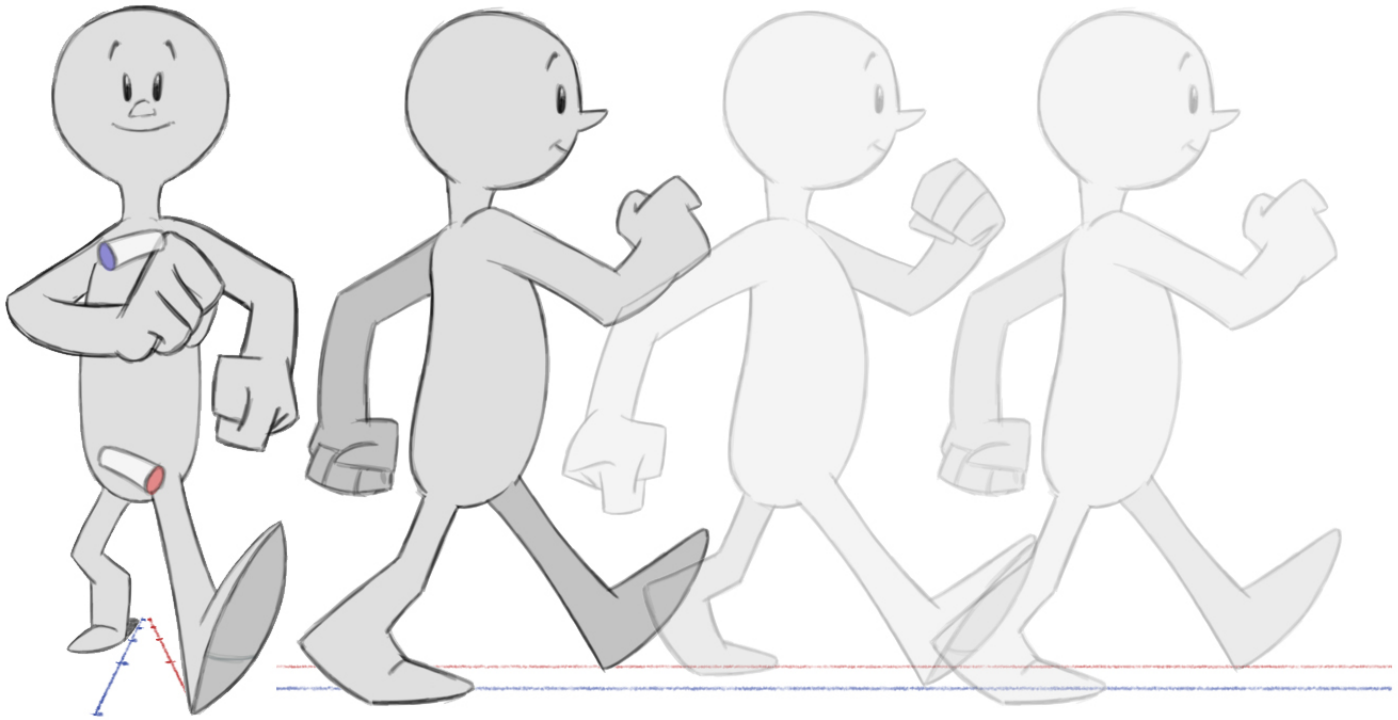
3. THE SECOND CONTACT IS A MIRROR IMAGE OF THE FIRST. THE THIRD CONTACT IS IDENTICAL TO THE FIRST.

THE CONTACT POSES



THE NUMBERING ON THE UPPER ROW IS FOR A 24 FPS ANIMATION.
THE NUMBERING ON THE LOWER ROW IS FOR A 30 FPS ANIMATION.

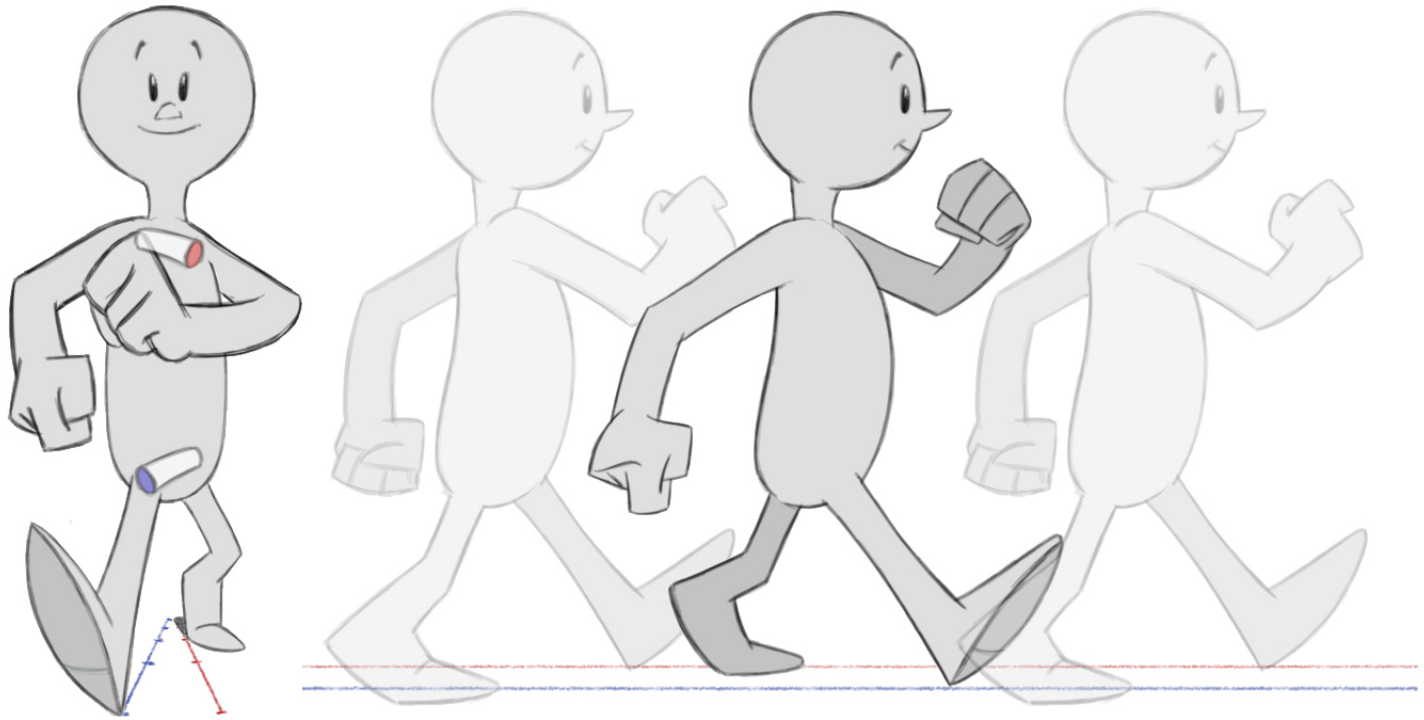
1. CREATE FIRST CONTACT



CONTACT

	CONTACT			LOW			PASS			HIGH			CONTACT			LOW			PASS			HIGH			CONTACT
24 FPS	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	1
30 FPS	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	1

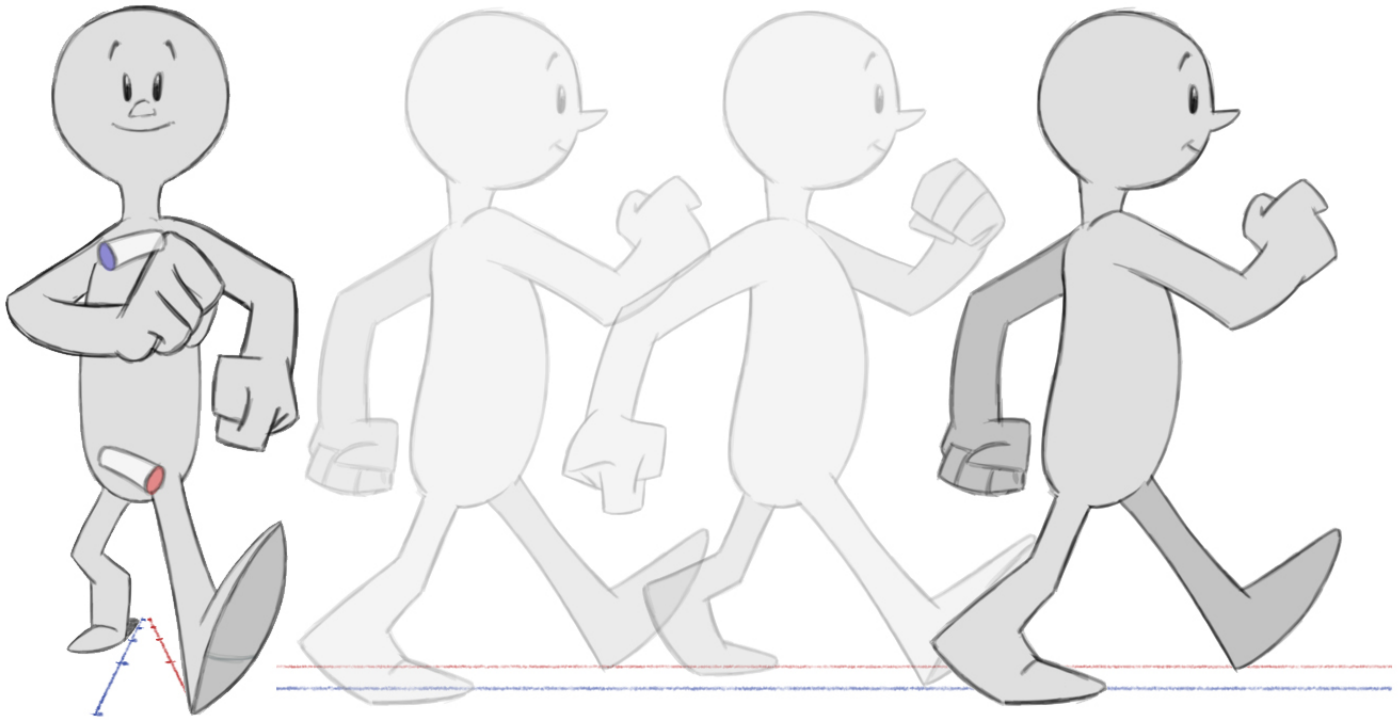
2. CREATE SECOND CONTACT



CONTACT

	CONTACT	LOW	PASS	HIGH	CONTACT	LOW	PASS	HIGH	CONTACT
24 FPS	1 2 3 4 5 6 7 8 9 10 11				12 13 14 15 16 17 18 19 20 21 22 23 24 1				
30 FPS	1 2 3 4 5 6 7 8 9 10 11 12 13 14				15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 1				

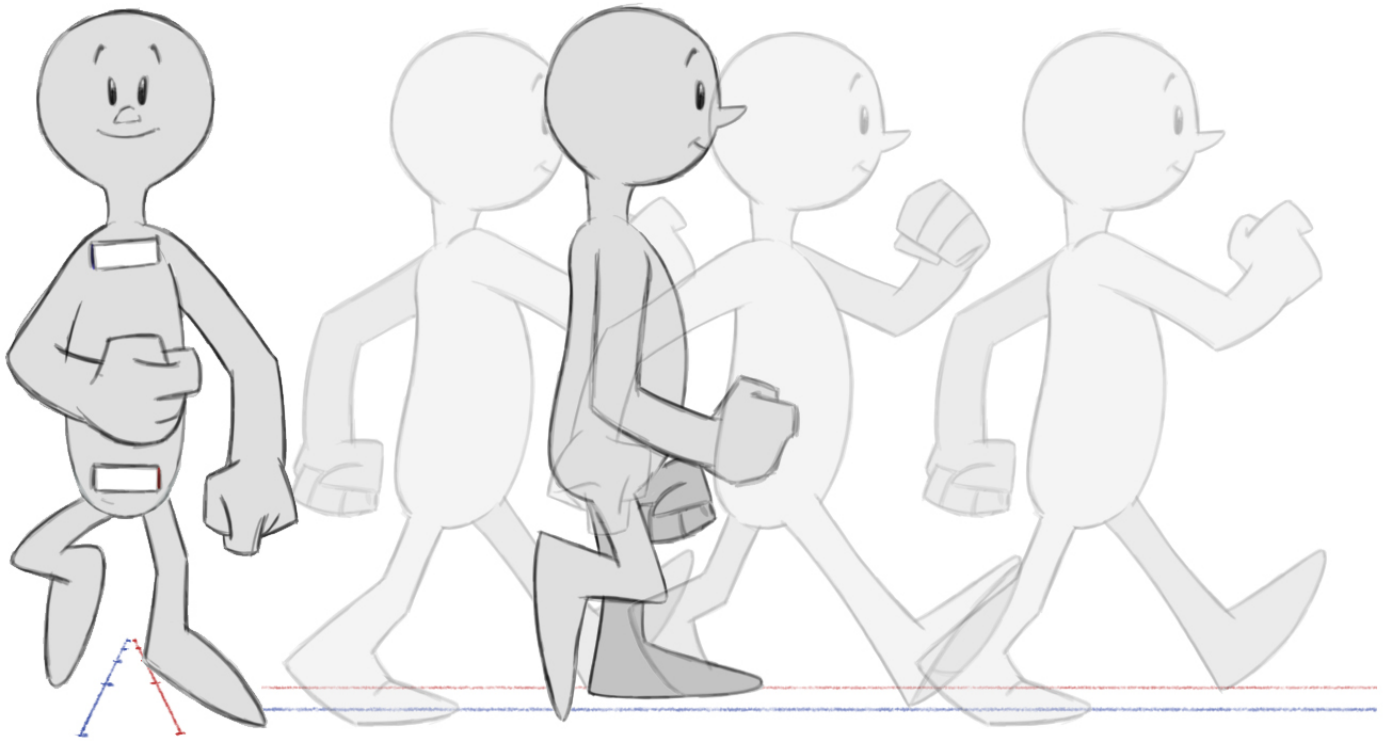
3. CREATE THIRD CONTACT



CONTACT

	CONTACT	LOW	PASS	HIGH	CONTACT	LOW	PASS	HIGH	CONTACT
24 FPS	1 2 3	4 5 6	7 8 9	10 11 12	13 14 15	16 17 18	19 20 21	22 23 24	1
30 FPS	1 2 3 4	5 6 7 8	9 10 11	12 13 14 15	16 17 18 19	20 21 22 23	24 25 26	27 28 29 30	1

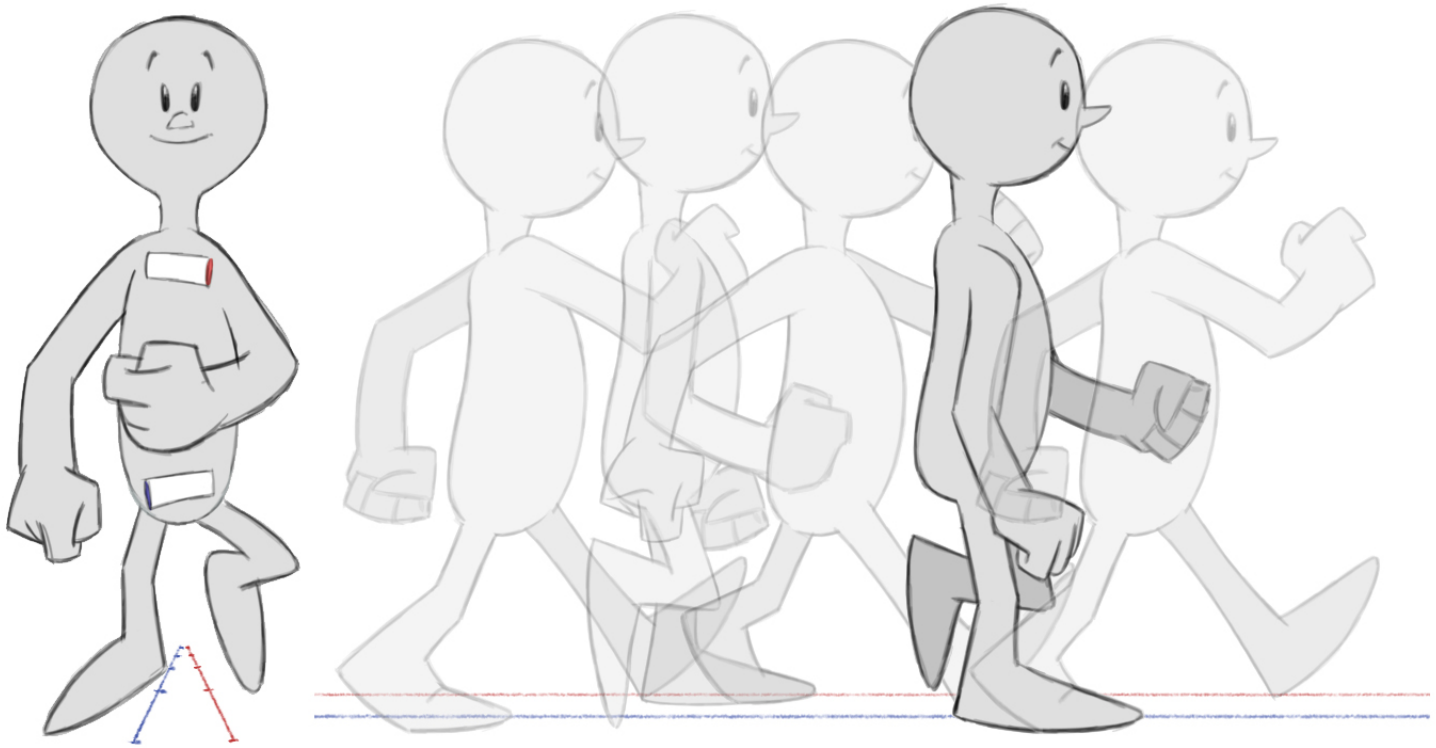
4. CREATE FIRST PASSING POSE



PASSING

	CONTACT		LOW			PASS		HIGH			CONTACT			LOW			PASS			HIGH			CONTACT
24 FPS	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	1
30 FPS	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	1

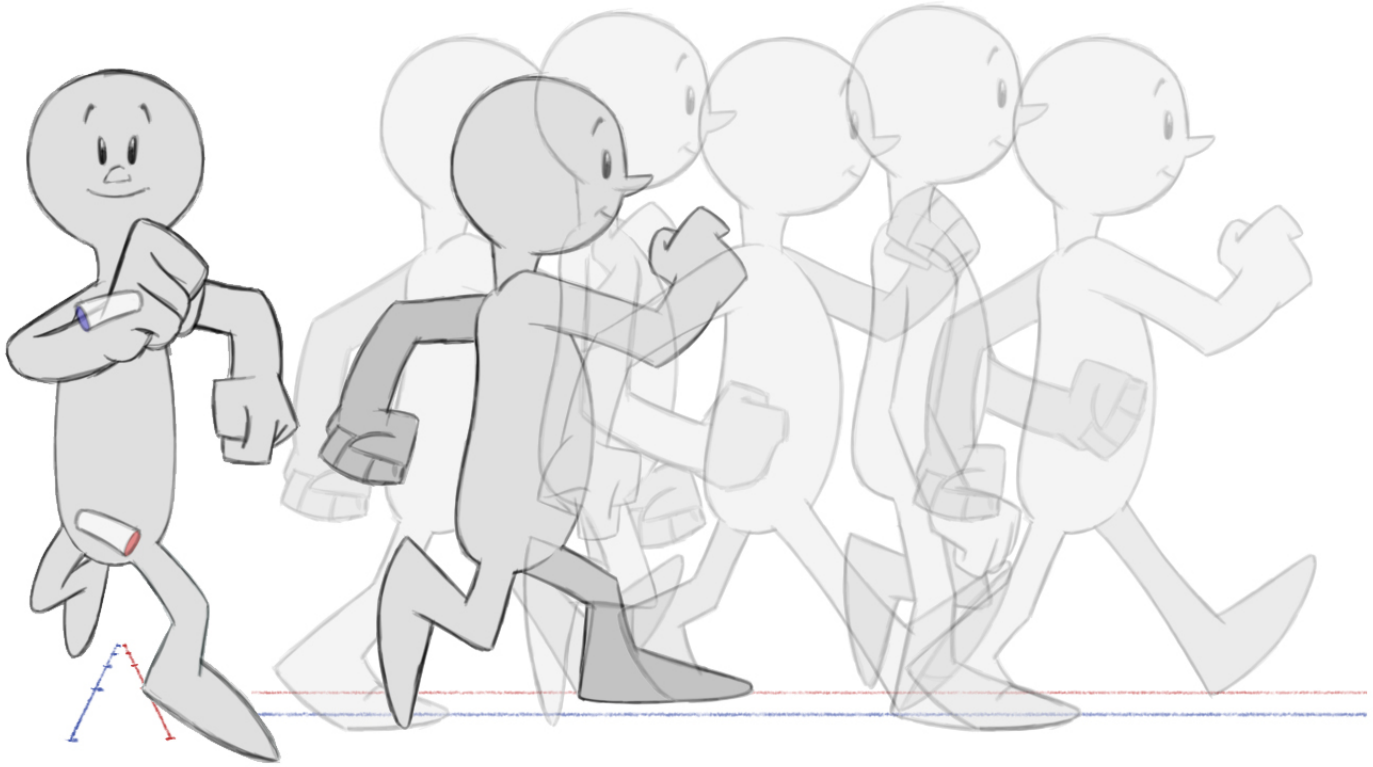
5. CREATE SECOND PASSING POSE



PASSING

	CONTACT	LOW		PASS			HIGH			CONTACT			LOW			PASS			HIGH			CONTACT
24 FPS	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	1
30 FPS	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	1

6. CREATE FIRST LOW POSE

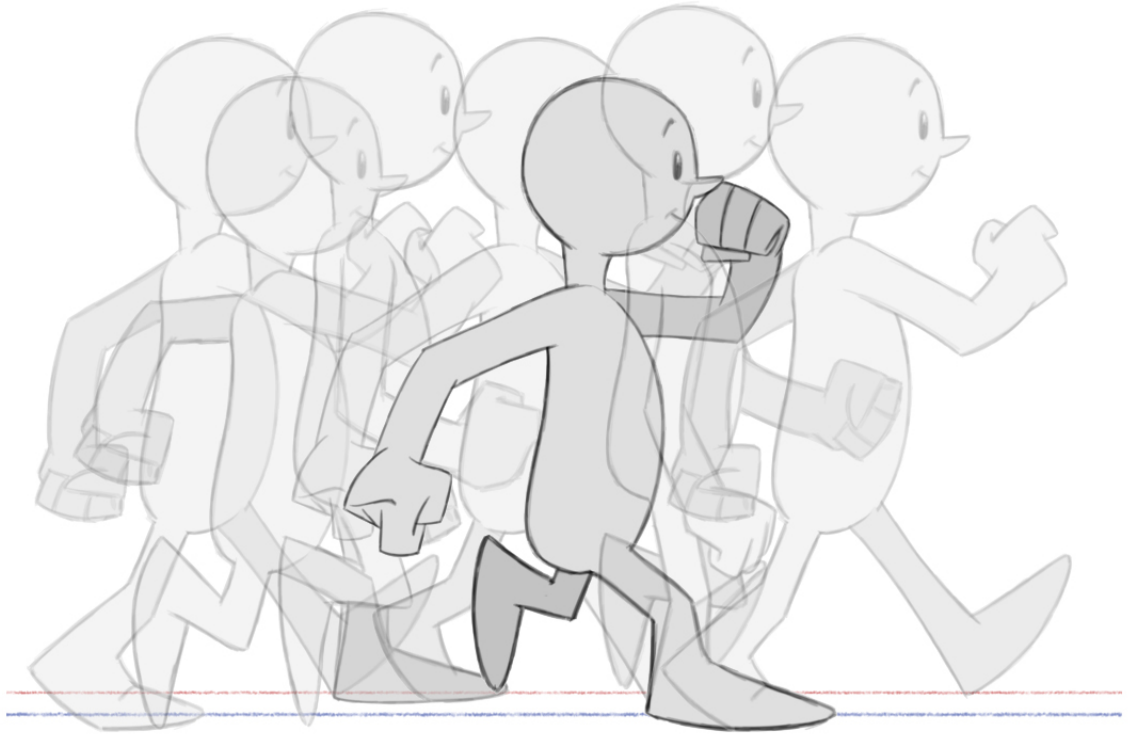


LOW

	CONTACT	LOW		PASS		HIGH		CONTACT		LOW		PASS		HIGH		CONTACT
24 FPS	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	1
30 FPS	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	1

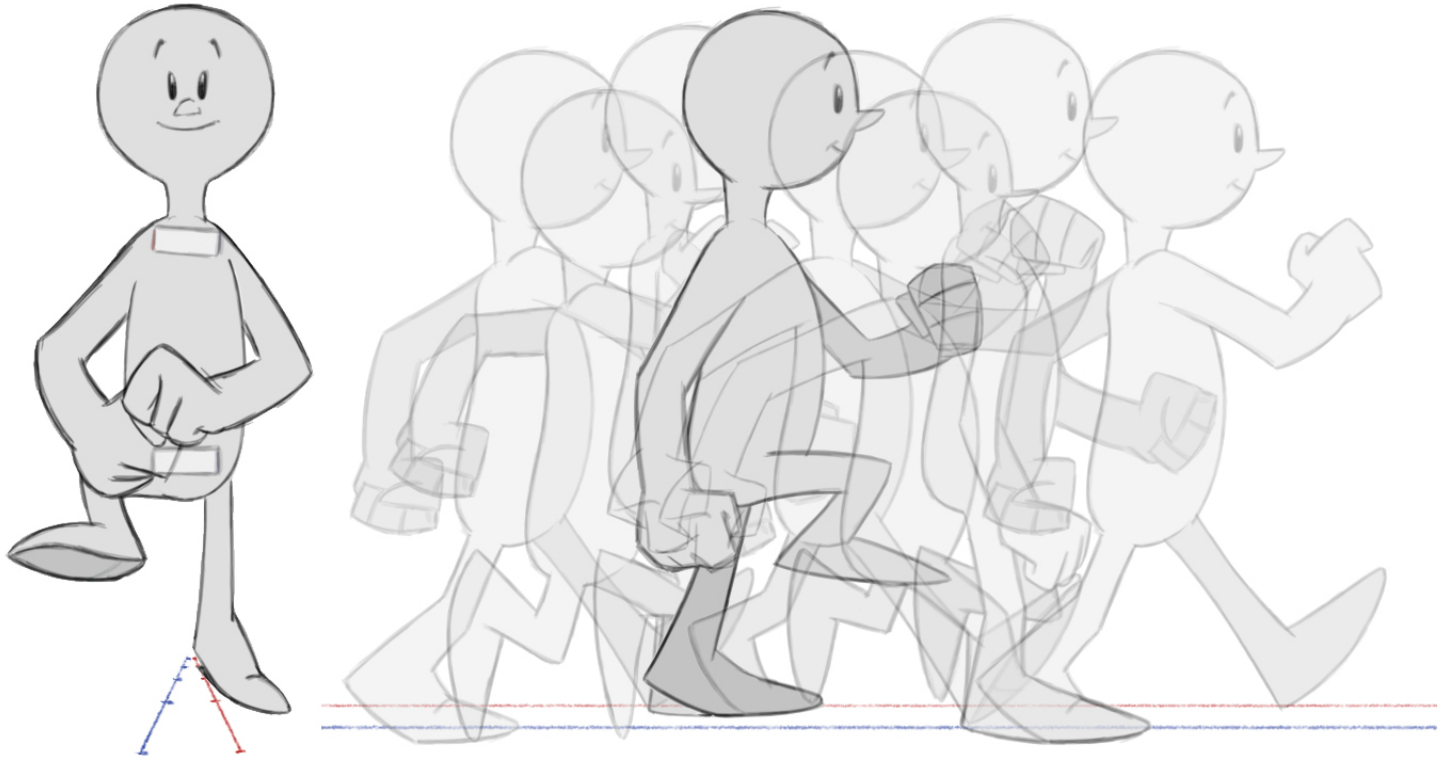
7. CREATE SECOND LOW POSE

LOW



	CONTACT			LOW			PASS			HIGH			CONTACT			LOW			PASS			HIGH			CONTACT
24 FPS	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	1
30 FPS	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	1

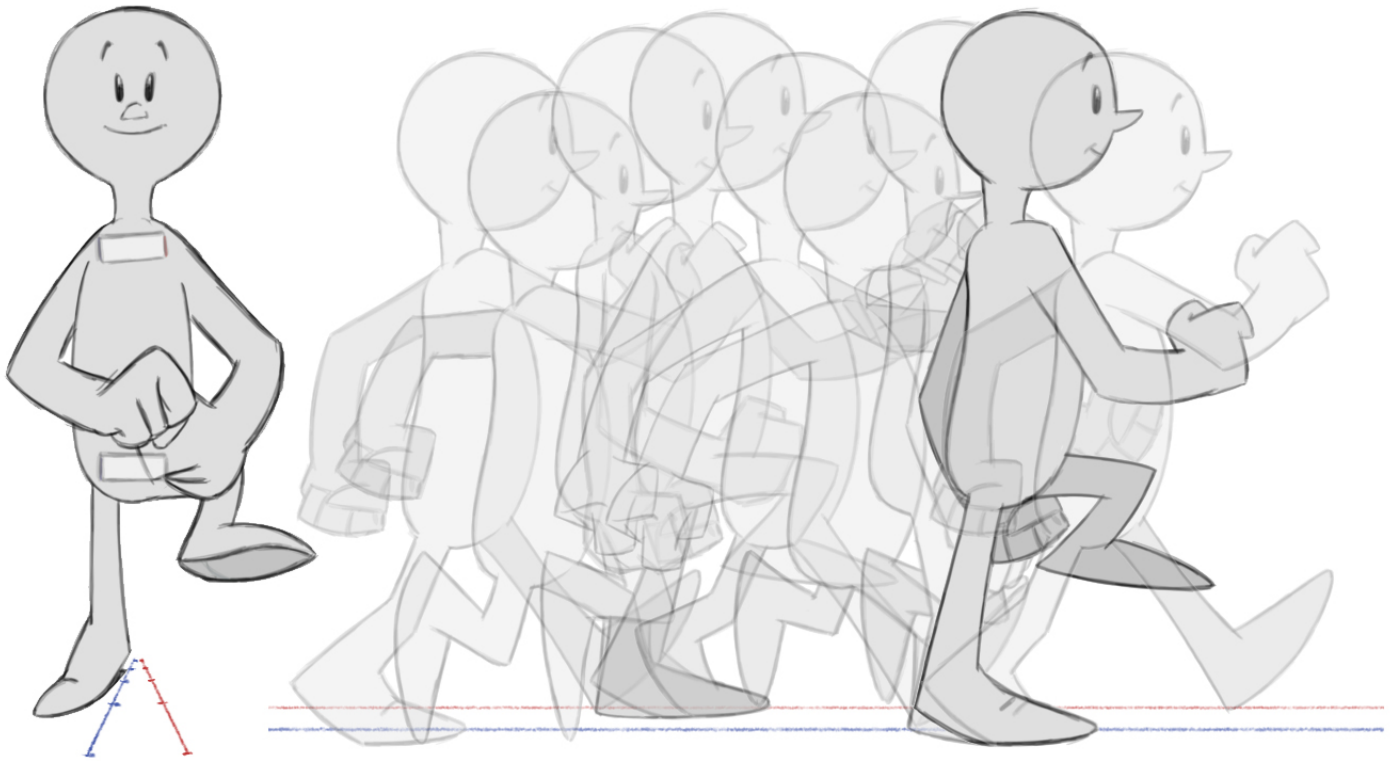
8. CREATE FIRST HIGH POSE



HIGH

	CONTACT			LOW			PASS			HIGH			CONTACT			LOW			PASS			HIGH			CONTACT
24 FPS	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	1
30 FPS	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	1

9. CREATE SECOND HIGH POSE

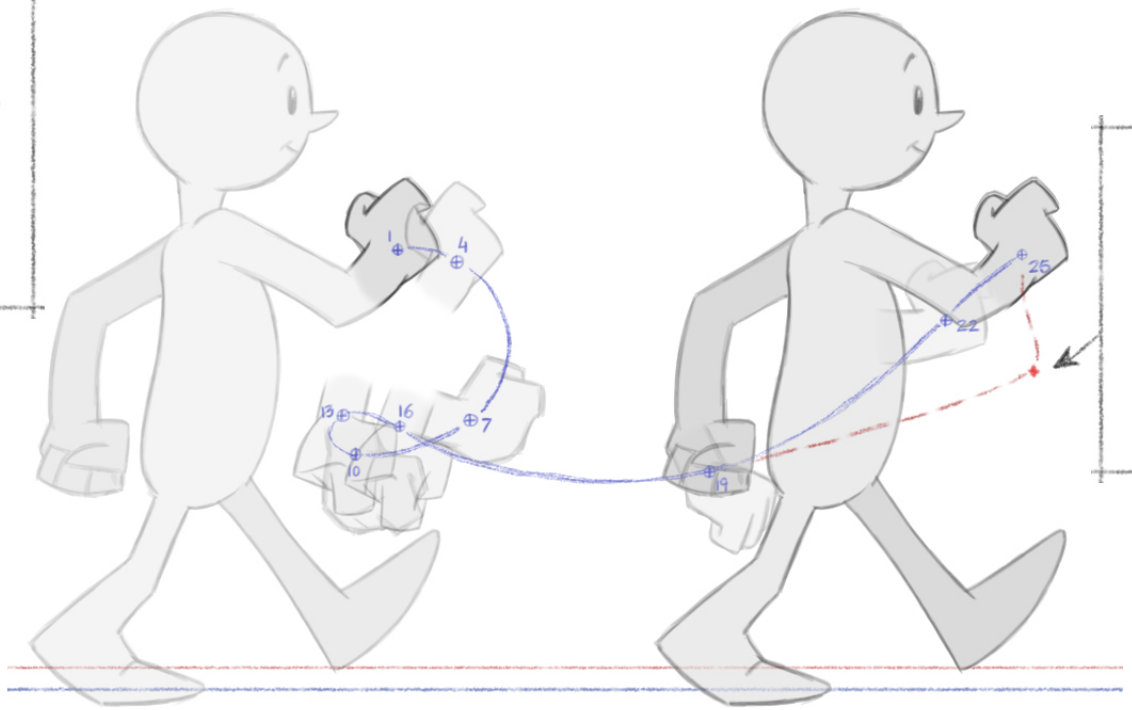


HIGH

	CONTACT	LOW		PASS		HIGH		CONTACT		LOW		PASS		HIGH		CONTACT
24 FPS	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	1
30 FPS	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	1

PLOT THE ARCS

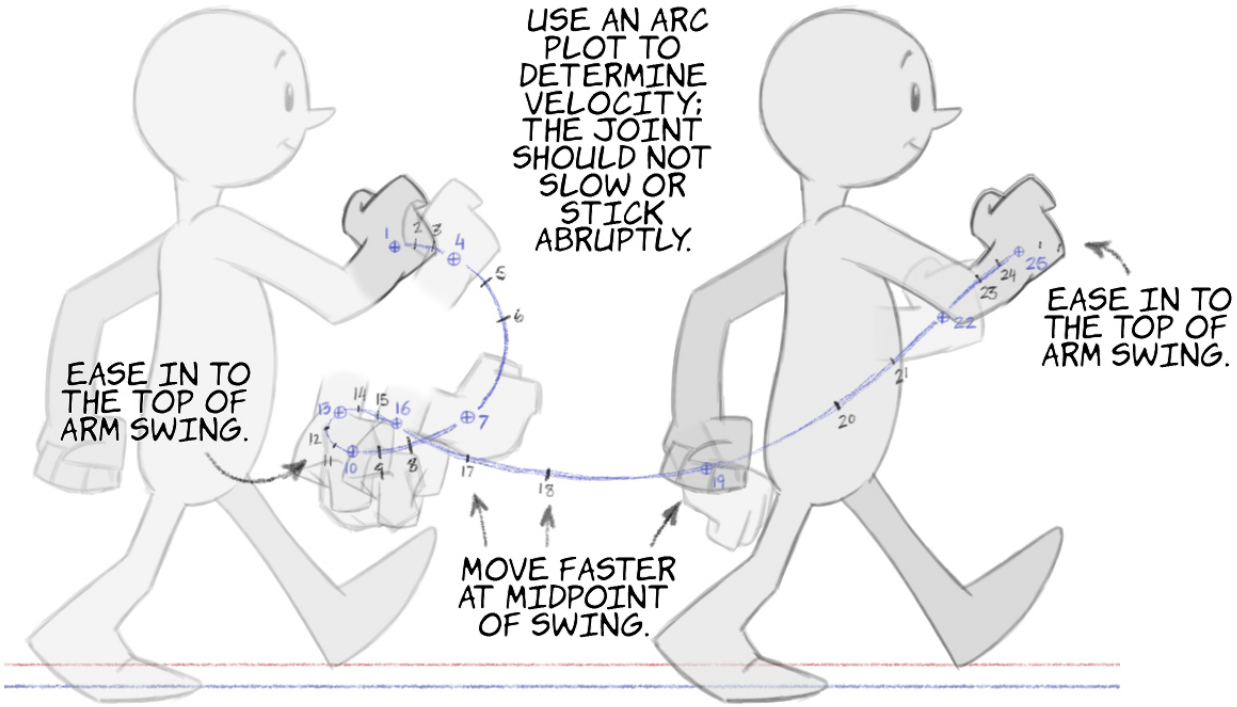
PICK A POINT, IN THIS CASE THE WRIST. USE A SEPARATE LAYER OR YOUR SOFTWARE TO DETERMINE THE POSITION OF THE JOINT ON EACH KEY.



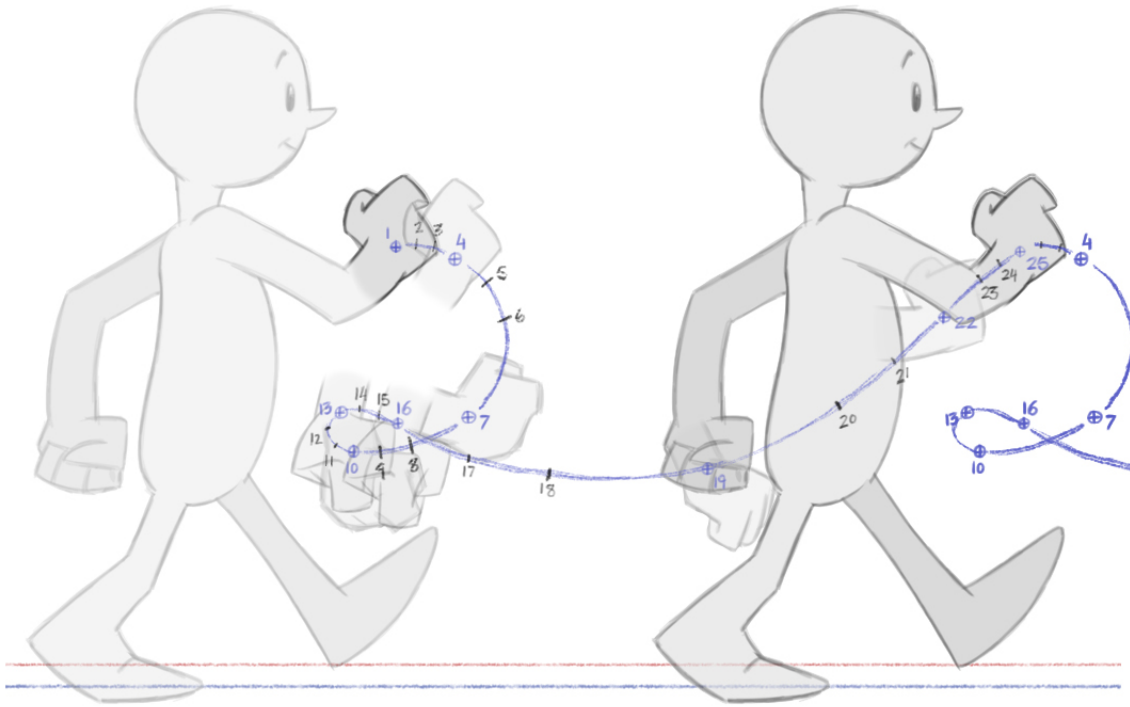
WATCH OUT FOR JOINTS THAT ARE OUT OF ARC.

CORRECT THE POSE WHERE THESE POPS APPEAR.

PLOT THE ARCS



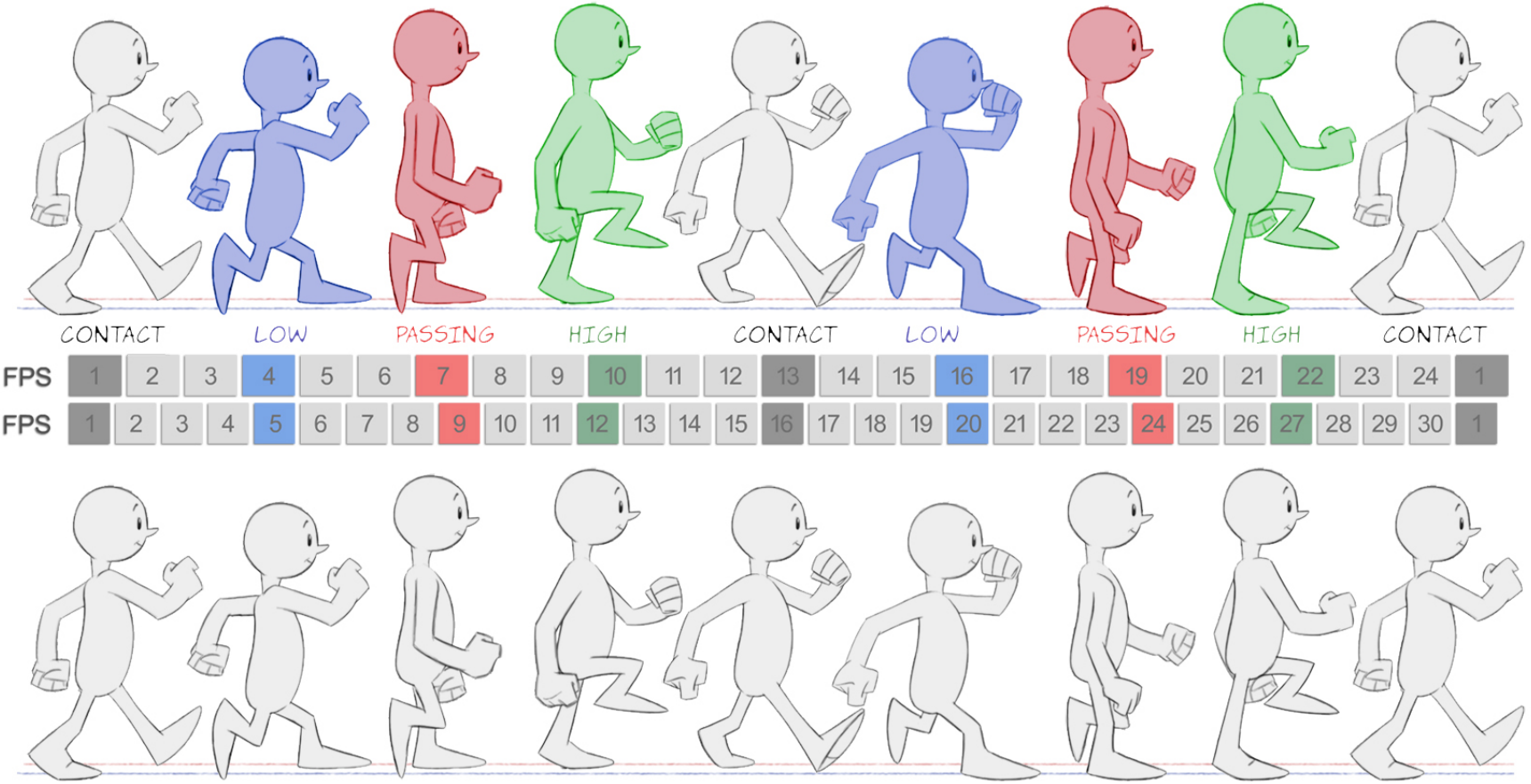
PLOT THE ARCS



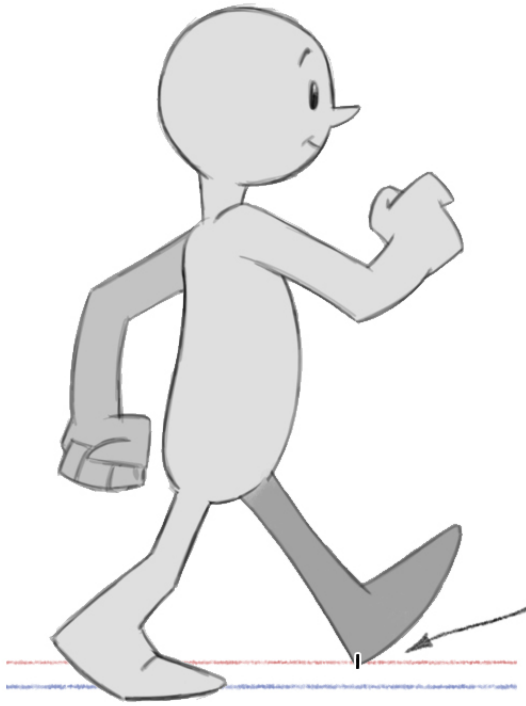
THE ARCS SHOULD MOVE SMOOTHLY FROM THE END OF THE FIRST CYCLE INTO THE NEXT.

WALK CYCLE: SIDE VIEW

THE LOW, PASSING & HIGH POSES ARE COLORED IN BLUE, RED & GREEN FOR CLARITY.



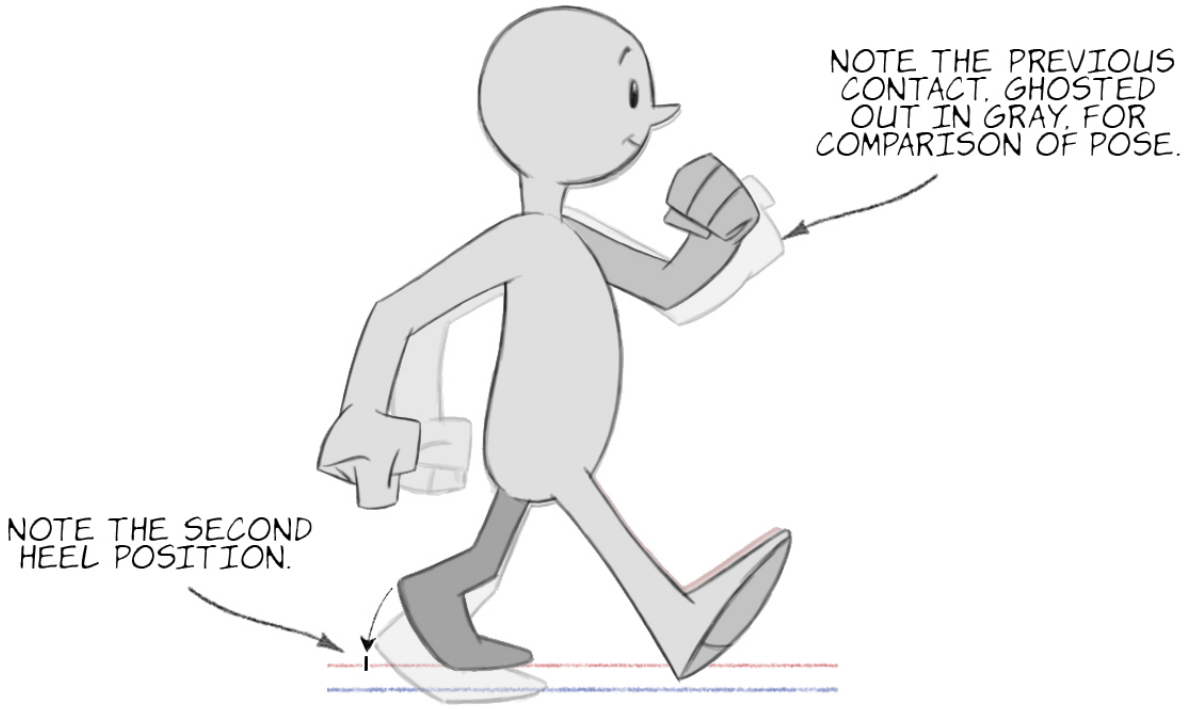
WALK IN PLACE. FOOT POSITIONS ON 24 FPS



FIRST SET THE CONTACT POINT OF THE LEADING FOOT (HERE IN RED).

	CONTACT			LOW			PASS			HIGH			CONTACT			LOW			PASS			HIGH			CONTACT
24 FPS	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	1
30 FPS	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	1

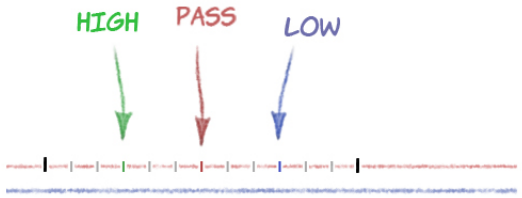
WALK IN PLACE. FOOT POSITIONS ON 24 FPS



	CONTACT			LOW			PASS			HIGH			CONTACT			LOW			PASS			HIGH			CONTACT
24 FPS	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	1
30 FPS	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	1

WALK IN PLACE: FOOT POSITIONS ON 24 FPS

THE FOOT POSITIONS FOR THE LOW, PASSING & HIGH POINTS ARE NOW MATHEMATICALLY DETERMINED. YOU MUST SPACE THEM EQUALLY BETWEEN THE CONTACT HEEL MARKS!



WALK IN PLACE. FOOT POSITIONS ON 24 & 30 FPS

THE 30 FPS FRAME RATE MEANS THAT YOU HAVE MORE FRAMES BETWEEN THE CONTACTS; YOU MUST ADJUST THE FOOT PLACEMENT ACCORDINGLY.

THE UPPER SERIES OF TICKS SHOWS THE 24 FPS POSITIONS.

THE LOWER SERIES OF TICKS SHOWS THE 30 FPS POSITIONS.

WALK IN PLACE. FOOT POSITIONS ON 24 & 30 FPS

WHEN ANIMATING ON 24 FPS, PLACE THE PASSING POSE EXACTLY HALFWAY BETWEEN THE CONTACTS. THE LOW AND HIGH POSES CAN BE HALVED AGAIN.

THIS CAN'T BE DONE ON 30 FPS, BECAUSE IT LEAVES 6 FRAMES ON ONE SIDE OF THE PASSING POSE AND 7 ON THE OTHER.

THE ABOVE SERIES OF TICKS HAS THE PASSING POSE IN THE EXACT CENTER. NOTE THE SLIGHT DIFFERENCE IN SPACING ON THE LEFT SIDE COMPARED TO THE NARROWER GAPS ON THE RIGHT. IT MAY NOT LOOK LIKE MUCH, BUT IT CAN CAUSE SLIPPAGE WHEN THE CHARACTER PANS ACROSS THE SCREEN.

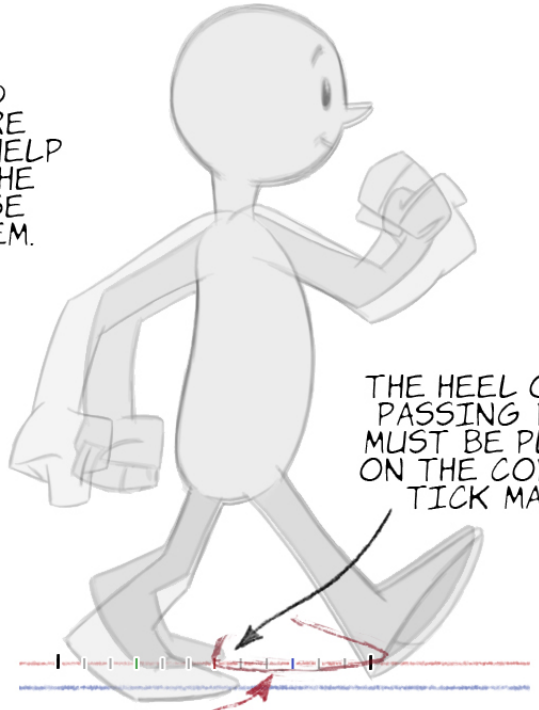
FOR LOOSER STYLES OF ANIMATION, YOU MAY GET AWAY WITH THIS. BUT IF YOUR WALK REQUIRES PRECISION, THEN SPACE THE FEET TICKS PERFECTLY:

THIS IS THE EXACT HALFWAY POINT ON 30FPS.

BEGINNERS NOTE: THIS IS A FINE DETAIL! IF YOU'RE ON YOUR FIRST CYCLE, DON'T WORRY TOO MUCH ABOUT THE 30 FPS FEET BEING THIS PRECISE...BUT KEEP THIS IN MIND IF YOU SEE FOOT SLIPPAGE IN LATER WORK.

WALK IN PLACE. PASSING POSE FOOT PLACEMENT

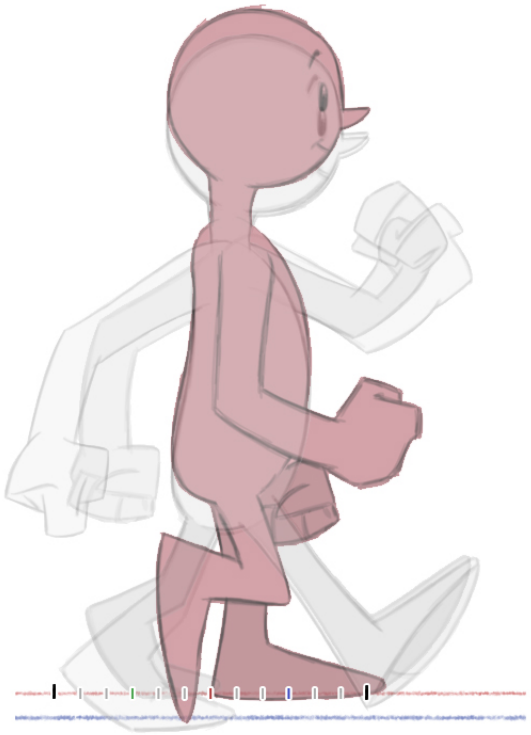
THE FIRST AND SECOND CONTACTS ARE OVERLAID. TO HELP DETERMINE THE PASSING POSE BETWEEN THEM.



THE HEEL OF THE PASSING POSE MUST BE PLACED ON THE CORRECT TICK MARK.

	CONTACT			LOW			PASS			HIGH			CONTACT			LOW			PASS			HIGH			CONTACT
24 FPS	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	1
30 FPS	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	1

WALK IN PLACE. PASSING POSE TIEDOWN



COMPLETED PASSING POSE IN RELATION TO CONTACTS.

THIS POSE IS SLIGHTLY HIGHER THAN THE CONTACT POSE.

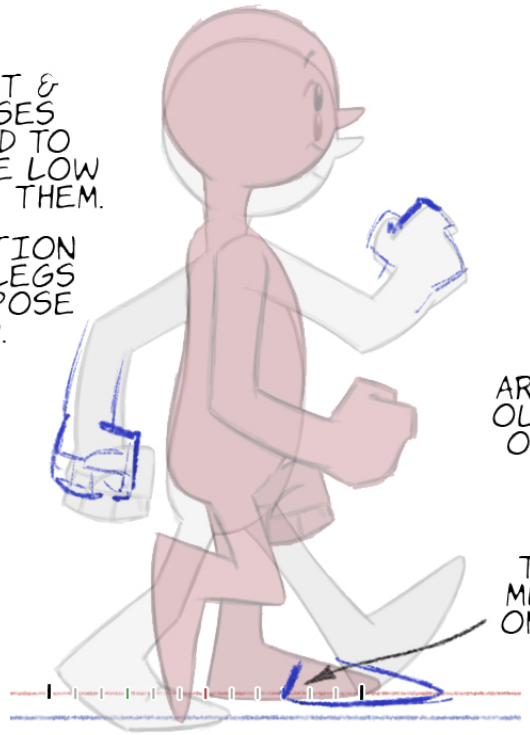
PASSING
(FRONT VIEW)

	CONTACT			LOW			PASS			HIGH			CONTACT			LOW			PASS			HIGH			CONTACT
24 FPS	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	1
30 FPS	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	1

WALK IN PLACE. LOW POSE (ROUGH)

THE CONTACT & PASSING POSES ARE OVERLAID TO DETERMINE THE LOW POSE BETWEEN THEM.

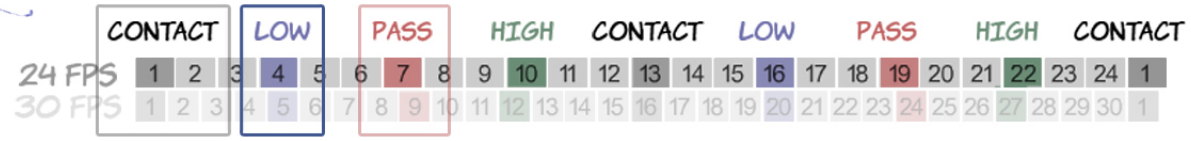
ROUGH POSITION OF ARMS AND LEGS ON THE LOW POSE (IN BLUE).



NOTE THAT THE ARMS ARE FARTHEST OUT FROM THE BODY ON THE LOW POSE.

THE HEEL OF THE LOW POSE MUST BE PLACED ON THE CORRECT TICK MARK.

LOW
(FRONT VIEW)

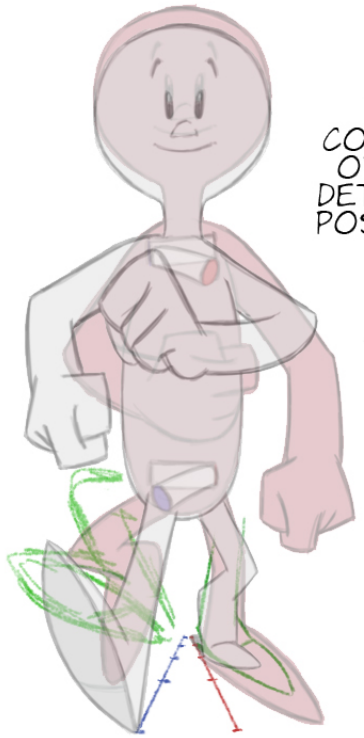


WALK IN PLACE. (LOW-POSE TIEDOWN)

LOW
(FRONT VIEW)

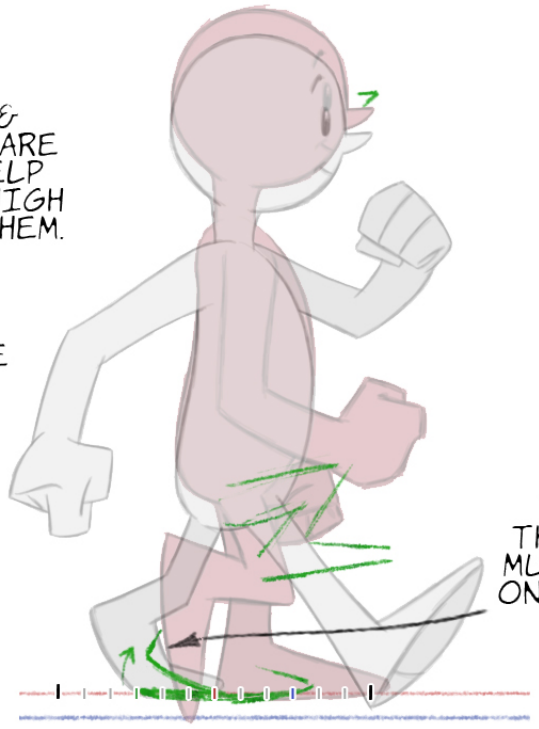
	CONTACT			LOW			PASS			HIGH			CONTACT			LOW			PASS			HIGH			CONTACT	
24 FPS	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	1
30 FPS	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	1

WALK IN PLACE (HIGH-POSE ROUGH)



THE PASSING & CONTACT POSES ARE OVERLAID TO HELP DETERMINE THE HIGH POSE BETWEEN THEM.

ROUGH POSITION OF LEGS ON THE HIGH POSE (IN GREEN).



THE HEEL OF THE HIGH POSE MUST BE PLACED ON THE CORRECT TICK MARK.

HIGH
(FRONT VIEW)

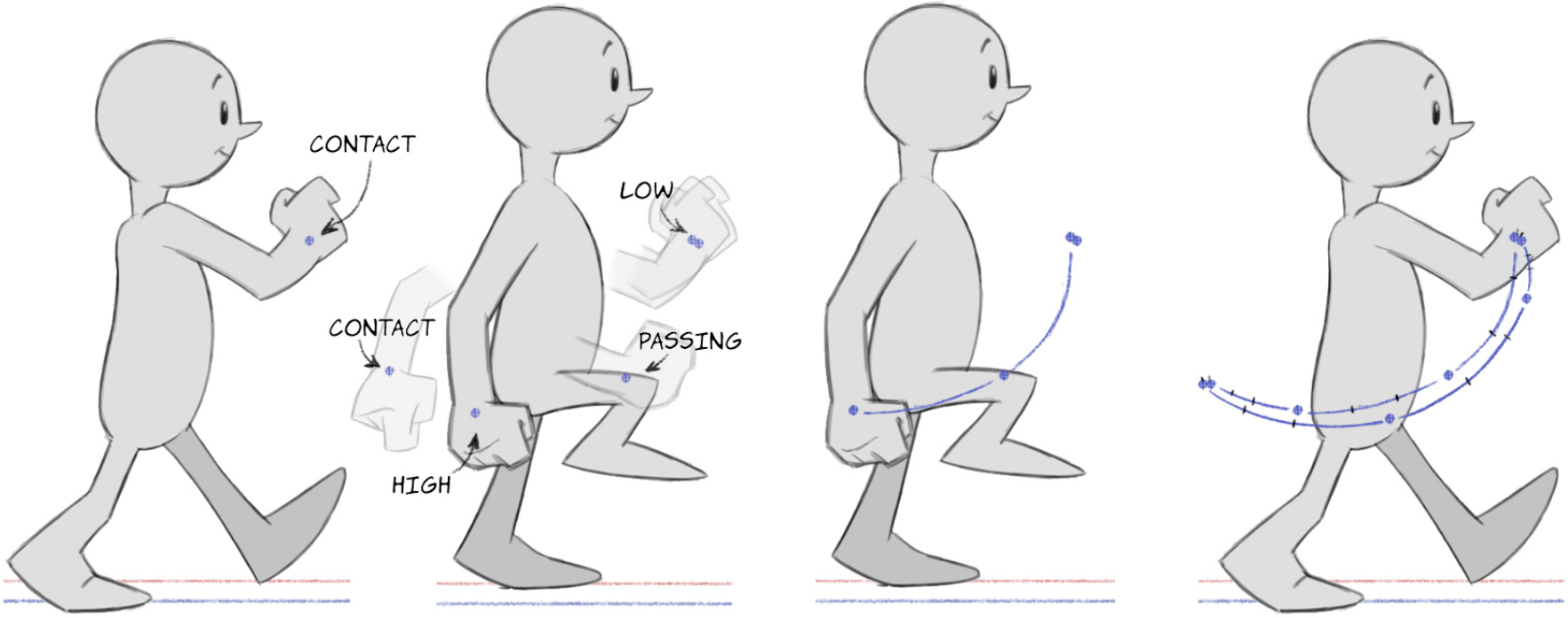
	CONTACT			LOW			PASS			HIGH			CONTACT			LOW			PASS			HIGH			CONTACT
24 FPS	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	1
30 FPS	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	1

WALK IN PLACE (HIGH-POSE TIEDOWN)

HIGH
(FRONT VIEW)

	CONTACT	LOW	PASS	HIGH	CONTACT	LOW	PASS	HIGH	CONTACT
24 FPS	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 1								
30 FPS	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 1								

PLOT THE ARCS (RIGHT WRIST):
LEFT ARM REMOVED FOR CLARITY



1. SELECT A BODY PART (E.G., THE RIGHT WRIST) AND PLOT ITS POSITION.

2. CONTINUE TO PLOT THE BODY PART ON THE OTHER EXTREMES.

3. PLOT THE ARCS. TWEAK POSES AS NEEDED TO CREATE A SMOOTH ACTION.

4. BE SURE THAT VELOCITY IS LOGICAL, SLOW IN AND OUT OF THE CONTACTS.

COMMON ERROR: LINEAR PATH

IF THE CHARACTER MOVES IN VERTICALLY EVEN INCREMENTS (IN PLACE), AND IS THEN PANNED ACROSS THE SCREEN, THIS ZIGZAG IS THE RESULT (IT FEELS MECHANICAL).

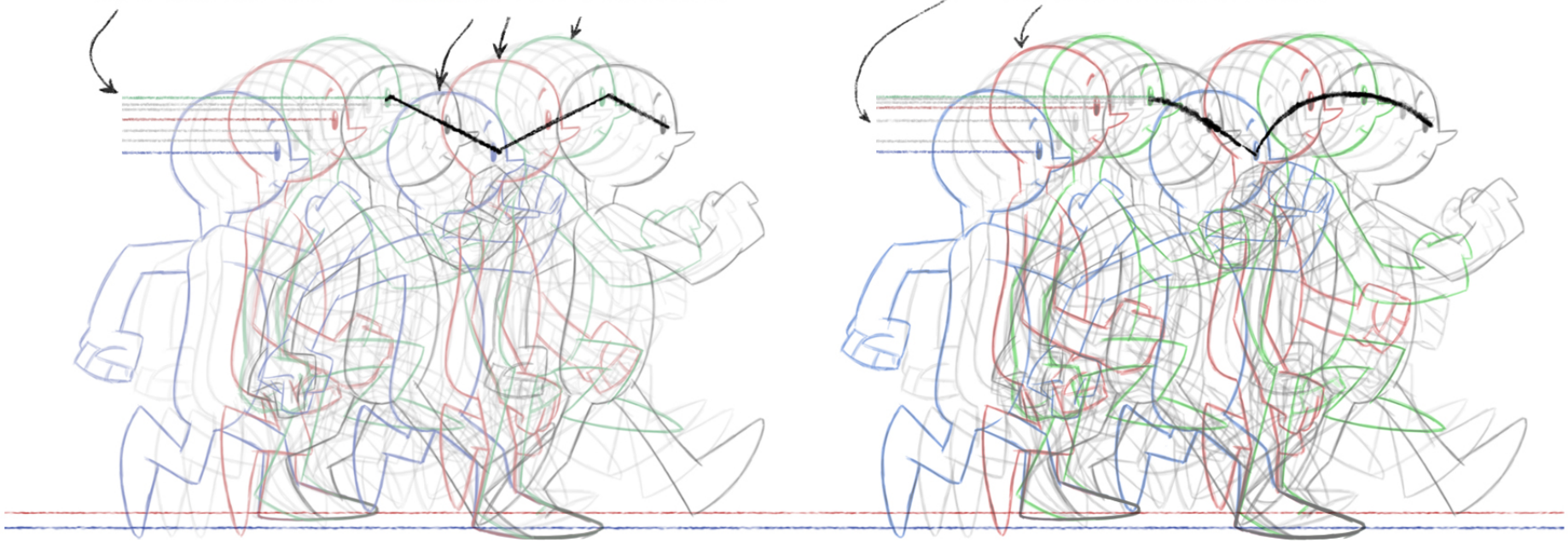
THERE IS SOME EASING IN AND OUT HERE, BUT IT'S TOO LITTLE.

ALSO NOTE THAT THE LINE BETWEEN THE LOW, PASSING & HIGH IS TOO STRAIGHT.

CORRECT: CURVED ARC PATH

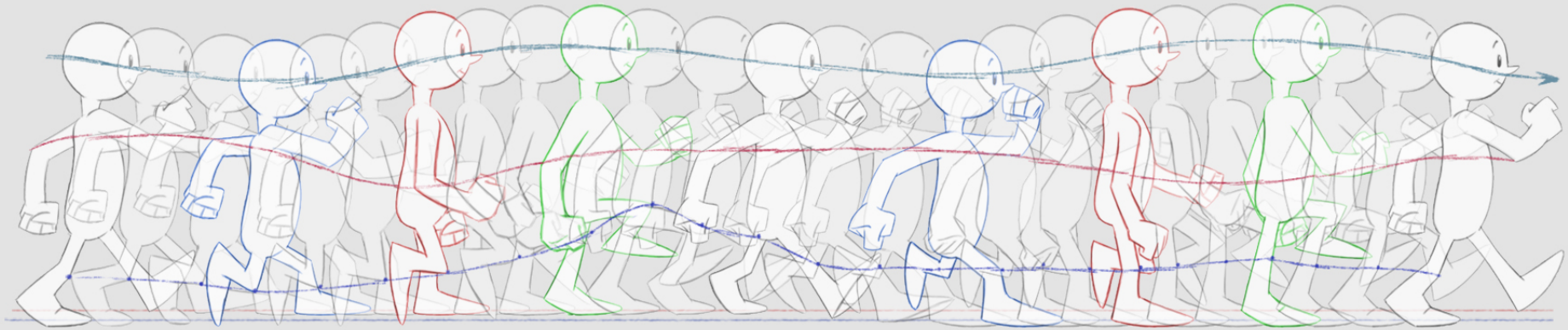
IF THE CHARACTER MOVES UP AND DOWN IN EVEN INCREMENTS (IN PLACE), AND IS THEN PANNED ACROSS THE SCREEN, THIS ZIGZAG IS THE RESULT (IT FEELS MECHANICAL).

BY EXAGERRATING THE EASE IN/OUT, AND BY MOVING THE PASSING POSE HEAD A LITTLE HIGHER, AN ARC APPEARS.



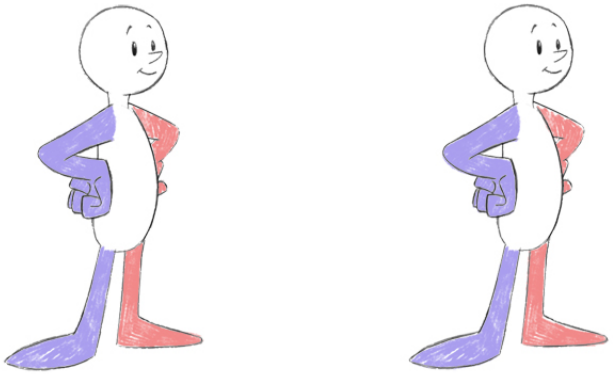
REMEMBER THIS PRINCIPLE WHEN YOU ANIMATE A WALK IN PLACE. IF YOUR VERTICAL MOTION IS TOO EVEN, A MECHANICAL AND LINEAR ARC WILL EMERGE WHEN YOU PAN THAT CHARACTER ACROSS THE SCREEN.

ARC PATH WITH INBETWEENS ADDED
(POSES MOVED APART FOR CLARITY)

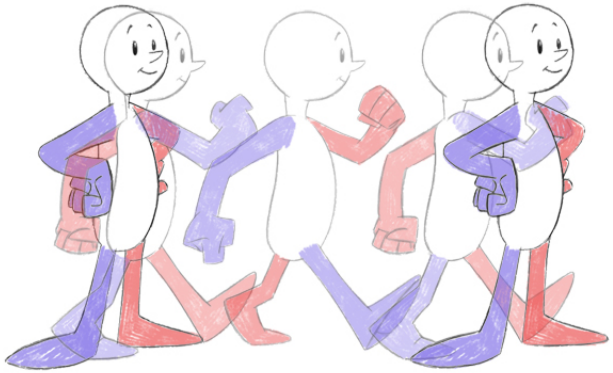


WHEN WE SEE THE WALK CYCLE ACROSS THE SCREEN, A NICE CURVED ARC PATH SHOULD APPEAR ON ALL BODY PARTS: HEAD, ELBOWS, KNEES, ETC.

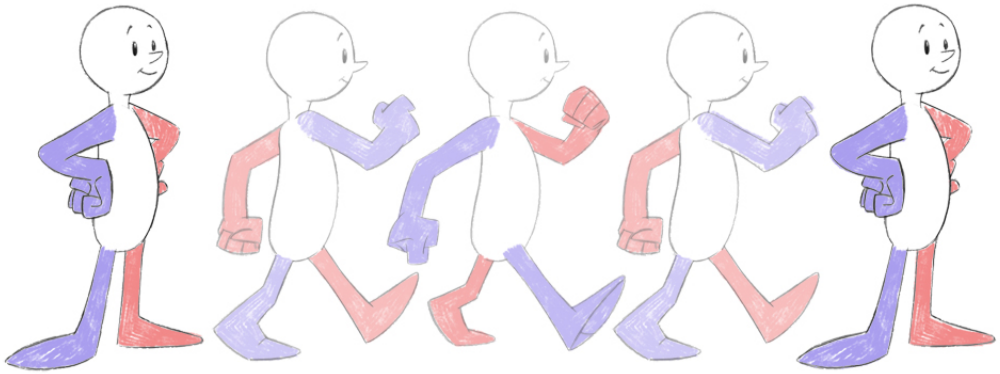
ANIMATING OUT OF A STANDING POSE



1. START AND STOP POSITIONS.



2. CONTACT POSITIONS ADDED.



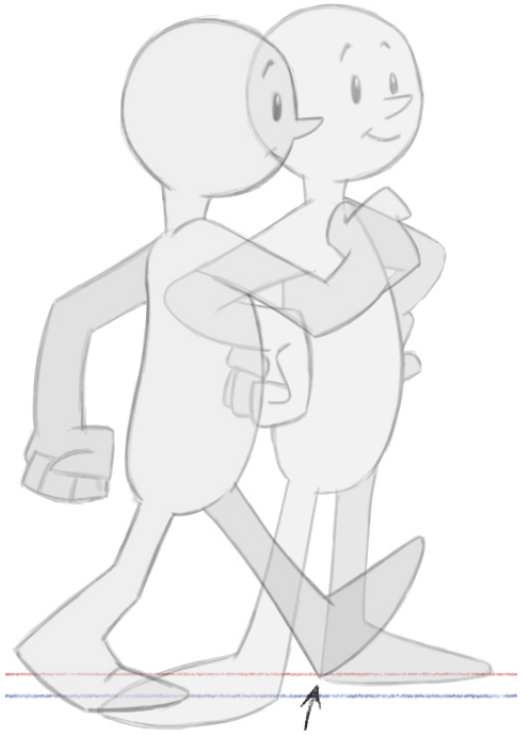
3. POSES SPREAD APART FOR CLARITY.

ANIMATING OUT OF A STANDING POSE

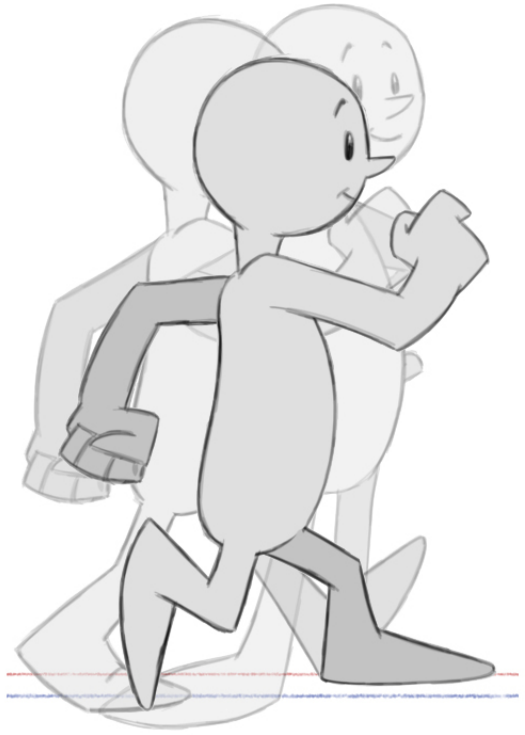
1. START POSE AND FIRST CONTACT: CHARACTER'S LEFT LEG IS CLOSEST TO THE DIRECTION OF MOTION, SO IT USUALLY MOVES FIRST.

2. ANTICIPATION POSE: BODY MOVES IN OPPOSITE DIRECTION OF WALK (AN OPPOSING ACTION). FOOT MOVES FORWARD TO STEP.

ANIMATING INTO A STOP POSE



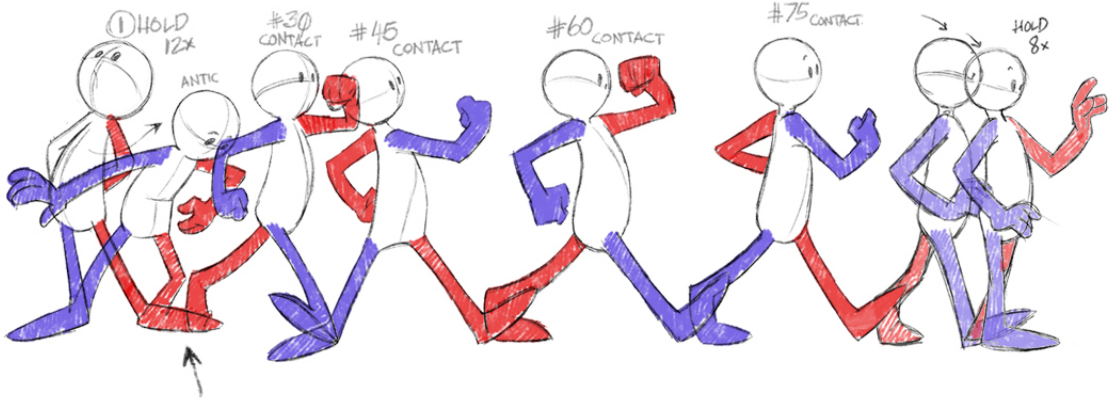
1. CONTACT AND STOP POSE:
MAKE SURE THAT THE HEEL POSITION FOR THE CONTACT MATCHES THE STOP POSE.



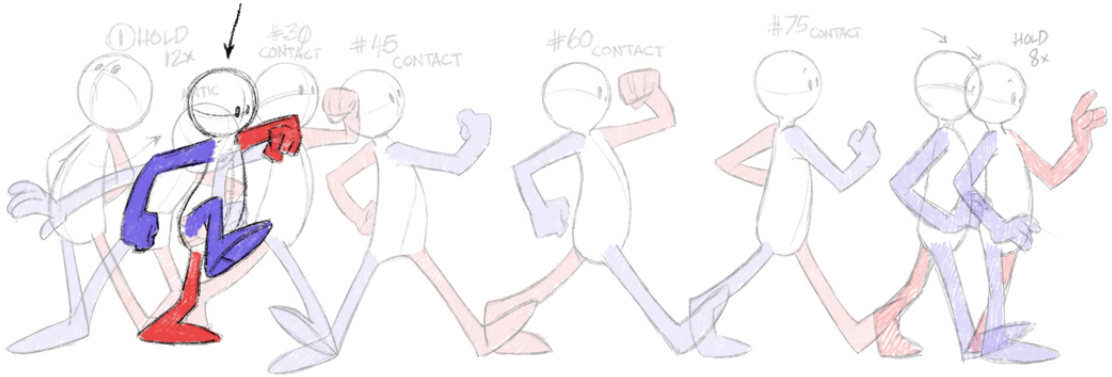
2. LOW POSE:
USE THE LOW POSE FROM THE WALK CYCLE TO WORK INTO THE STOP POSE.

3. OVERSHOOT & SETTLE:
YOU CAN EITHER SETTLE IN FROM THE LOW TO THE STOP, OR OVERSHOOT & SETTLE.

LEADING WITH THE TRAILING FOOT



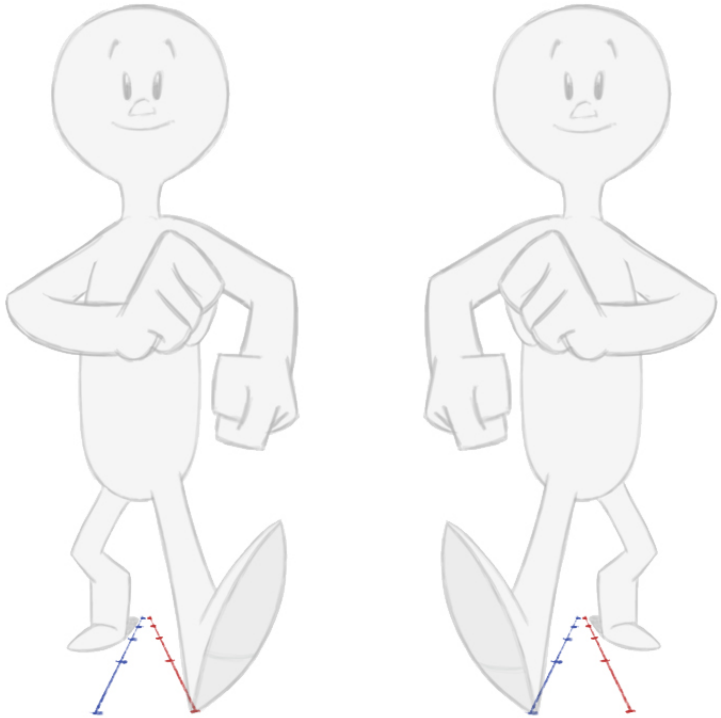
IT'S A GOOD RULE TO BEGIN A WALK WITH THE LEG CLOSEST TO THE DIRECTION OF MOTION. HOWEVER, THERE CAN BE EXCEPTIONS. BELOW YOU CAN SEE A STRONG WAY TO LEAD WITH THE BACKGROUND FOOT: THE ANTICIPATION POSE INTO THE WALK BRINGS THE RIGHT LEG FORWARD.



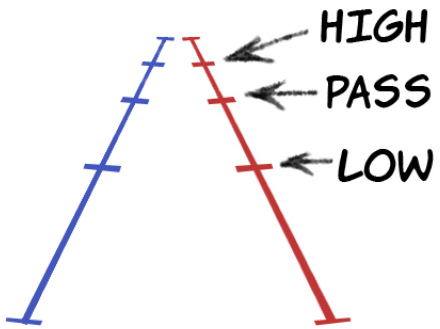
FOOT POSITIONS IN FRONT VIEW

THESE ILLUSTRATIONS USE A BLUE LINE FOR THE RIGHT FOOT, AND A RED LINE FOR THE LEFT.

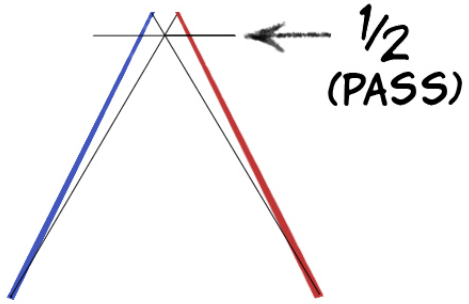
THIS IS THE CONTACT POSE; THE WALK MOVES FROM ONE CONTACT INTO THE OPPOSITE, AND BACK AGAIN.



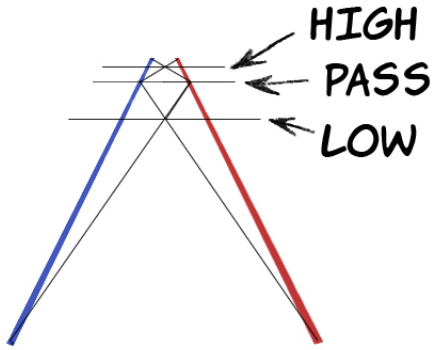
FOOT POSITIONS IN FRONT VIEW



IF YOU ESTIMATE THE POSITIONS FOR THE LOW, PASSING & HIGH POSES, THIS SORT OF SPACING WOULD RESULT.



HOWEVER, THE PERFECT HALFWAY POINT IS FOUND BY DRAWING AN X BETWEEN THE ENDS. THE INTERSECTION IS THE PASSING POSITION.



CONTINUE THIS PROCESS TO FURTHER SUBDIVIDE, FINDING THE HALFWAY BETWEEN THE CONTACTS & PASSING POSES TO DETERMINE THE LOW & HIGH FOOT POSITIONS.

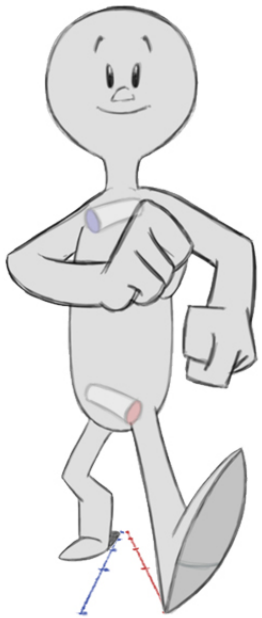
YOU MAY FIND THAT THE OPTICALLY PERFECT SOLUTION ON THE RIGHT IS TOO CLUTTERED AS THE FOOT IS FARTHEST FROM THE CAMERA; YOU MAY OFTEN BE ABLE TO WORK WITH AN EYEBALLED VERSION, AS ON THE FAR LEFT, ESPECIALLY IF THE PROJECT STYLE IS CARTOONY.

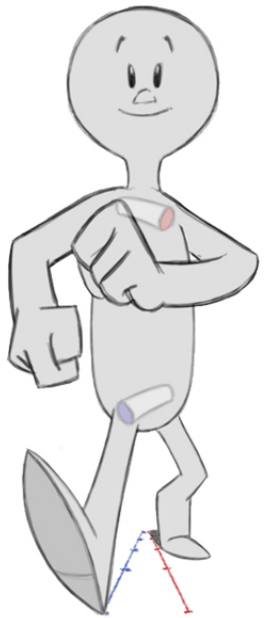
CONTACT
(FRONT VIEW)

THE SECOND CONTACT IS A MIRROR OF THE FIRST.

THE HEELS MUST TOUCH THE CORRECT POINTS ON THE LINES.

WALK IN PLACE (CONTACTS)





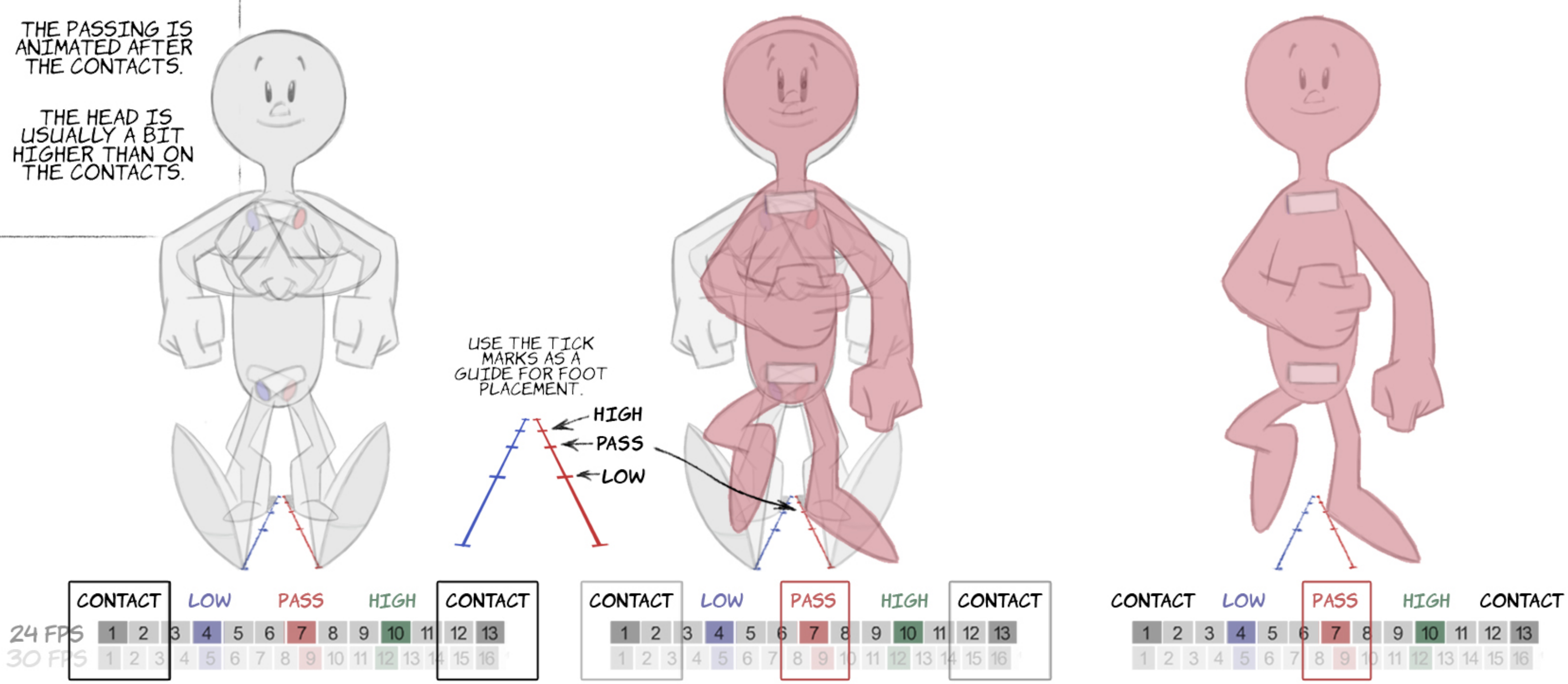
	CONTACT			LOW			PASS			HIGH			CONTACT	CONTACT			LOW			PASS			HIGH			CONTACT
24 FPS	1	2	3	4	5	6	7	8	9	10	11	12	13	1	2	3	4	5	6	7	8	9	10	11	12	13
30 FPS	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

WALK IN PLACE (PASSING)

PASSING
(FRONT VIEW)

THE PASSING IS ANIMATED AFTER THE CONTACTS.

THE HEAD IS USUALLY A BIT HIGHER THAN ON THE CONTACTS.



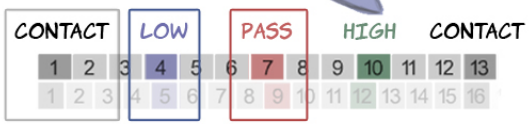
WALK IN PLACE (LOW)

LOW
(FRONT VIEW)

IMAGE #1 IS THE CONTACT POSE & PASSING POSE (IN RED).

THE ARMS ARE AT THEIR MOST OUTSTRETCHED FROM THE BODY.

THE HEELS MUST TOUCH THE CORRECT POINTS ON THE LINES.



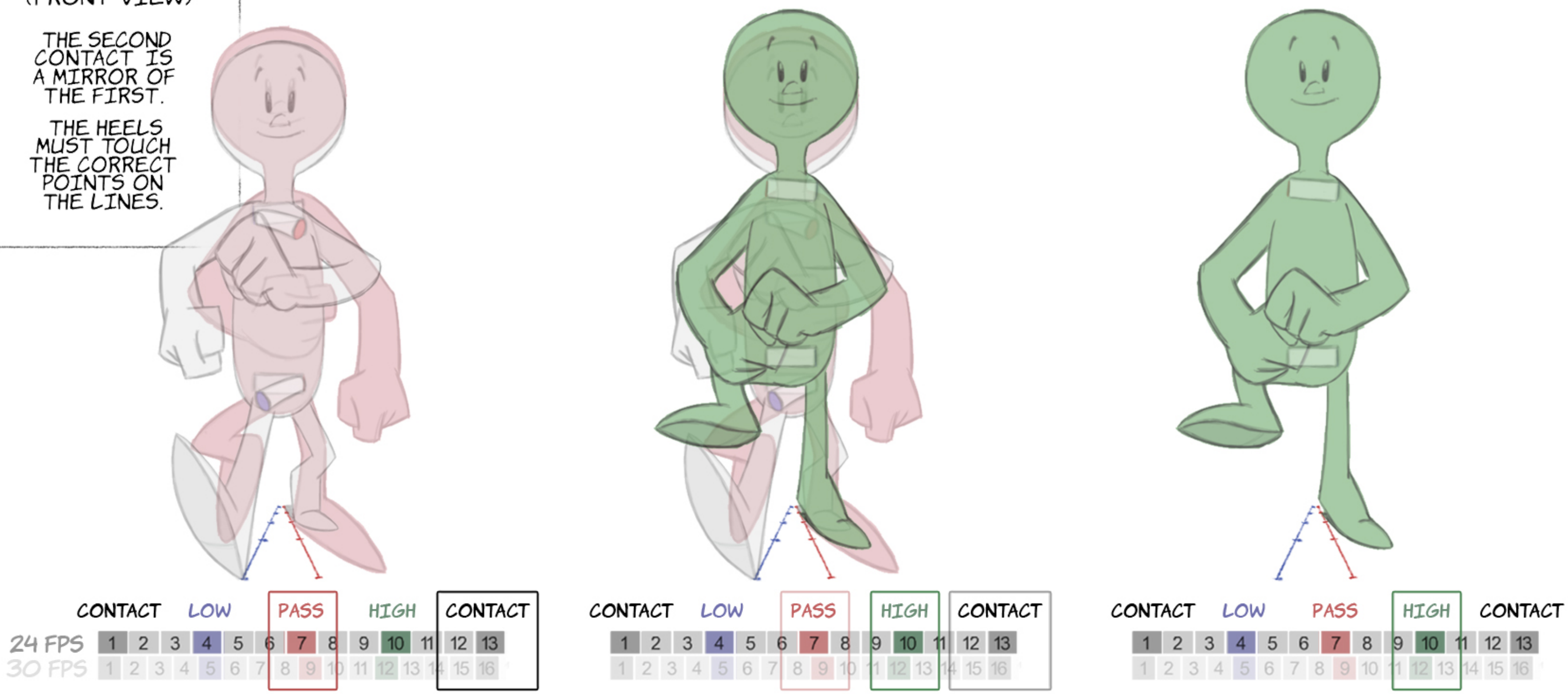
HIGH

(FRONT VIEW)

THE SECOND CONTACT IS A MIRROR OF THE FIRST.

THE HEELS MUST TOUCH THE CORRECT POINTS ON THE LINES.

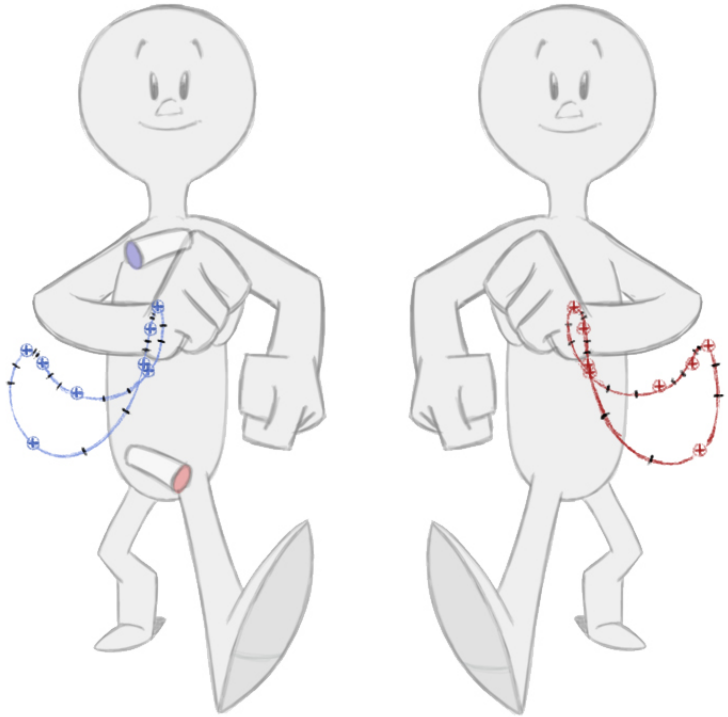
WALK IN PLACE (HIGH)



PLOT ARCS & VELOCITIES

AS YOU DID WITH THE PROFILE VIEW, BE SURE TO PLOT ARCS & VELOCITIES IN THE FRONT VIEW.

THE BLUE FIGURE 8 IS A PLOT OF THE RIGHT WRIST JOINT.



THE RED FIGURE 8 IS A PLOT OF THE LEFT WRIST JOINT.

OF COURSE, THE ARC PATHS SHOULD BE MIRROR IMAGES OF THOSE ON THE OPPOSITE SIDE!