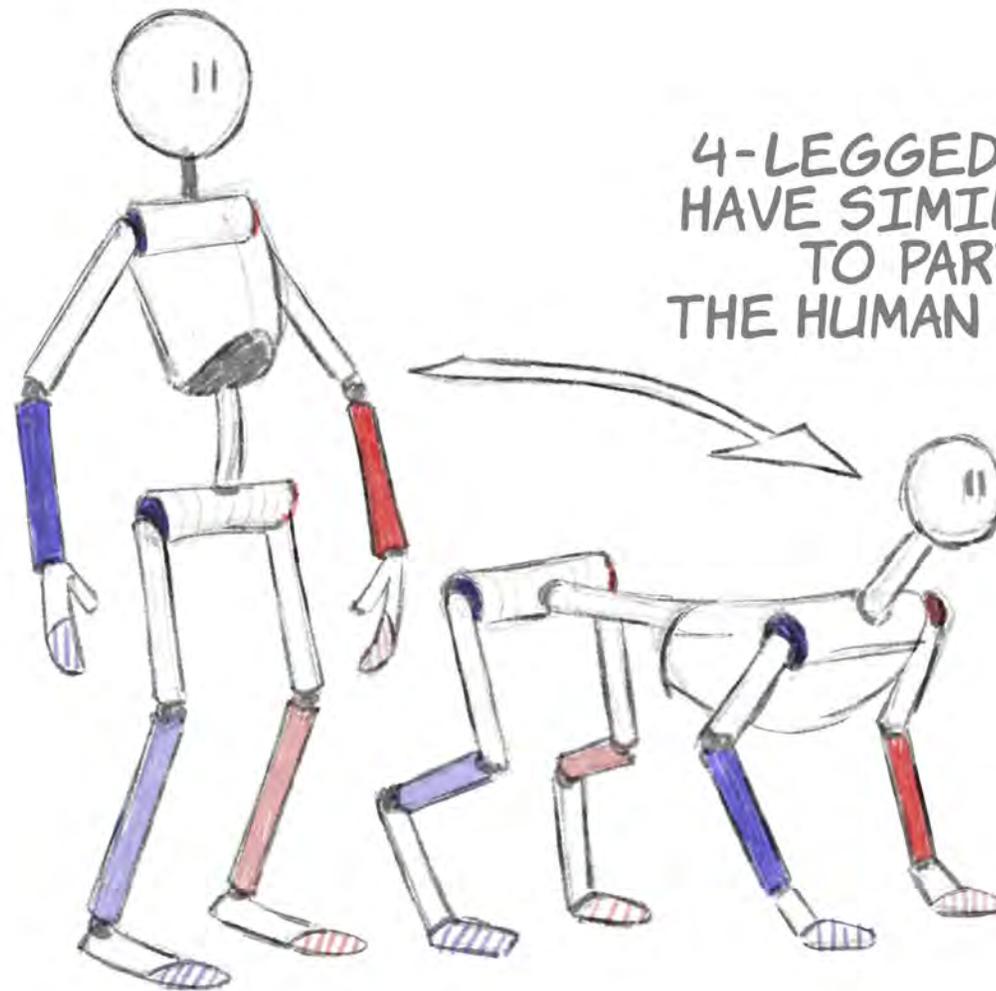
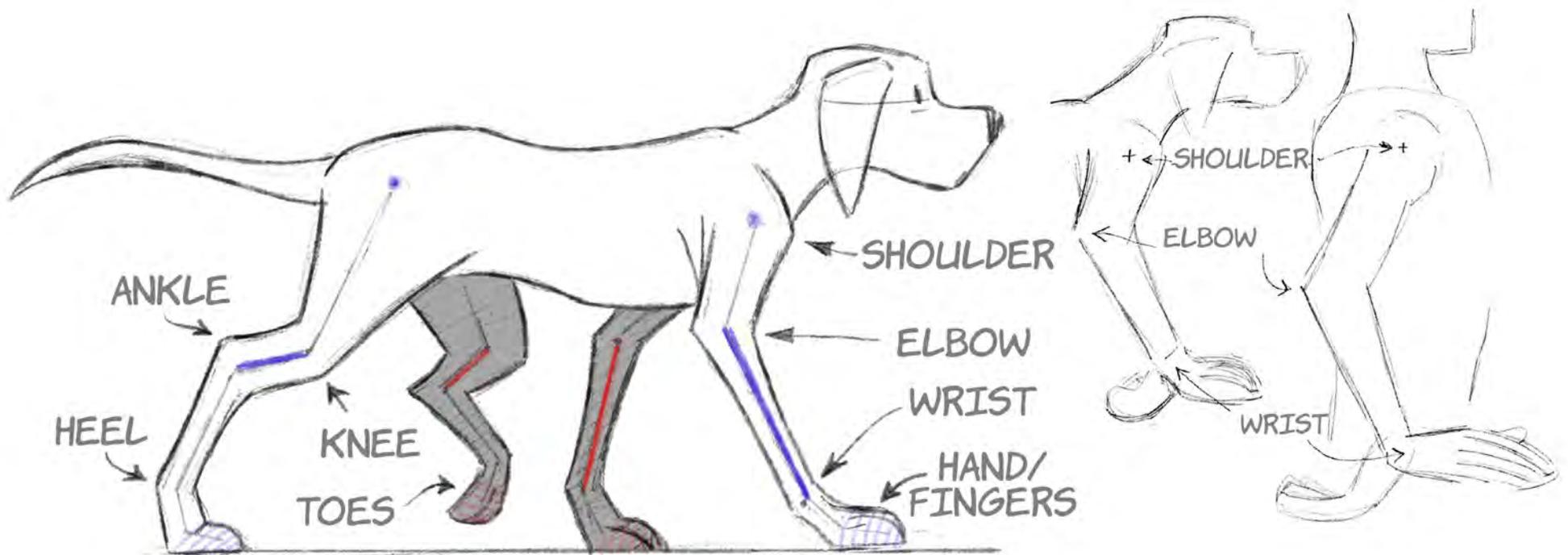


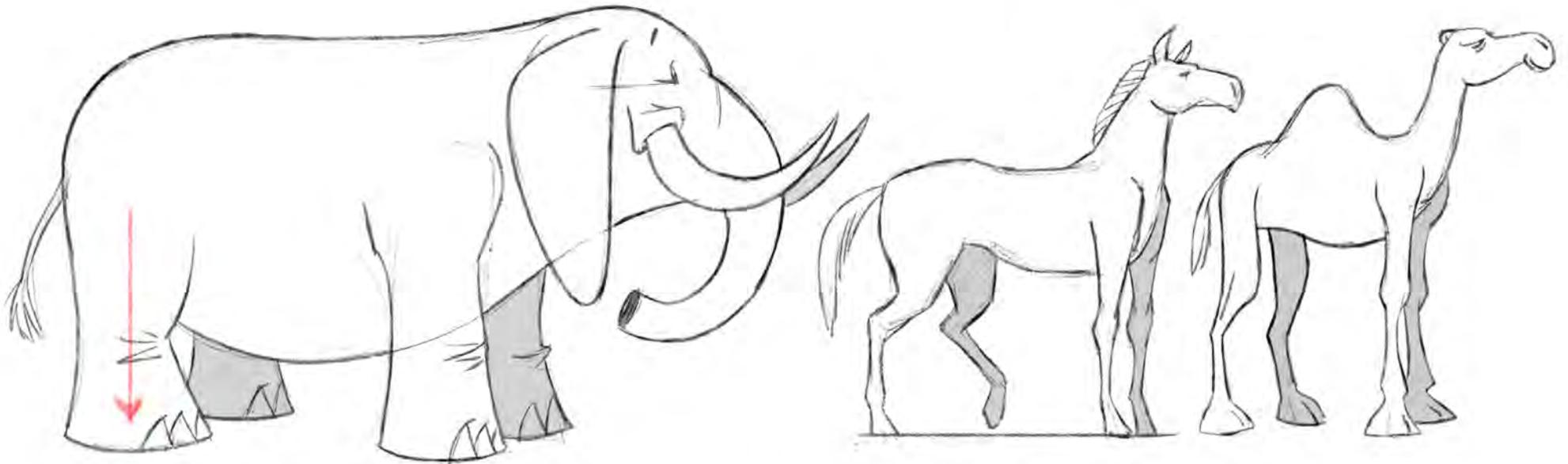
2D Animation: Animal Walk Cycles

with Dermot O'Connor





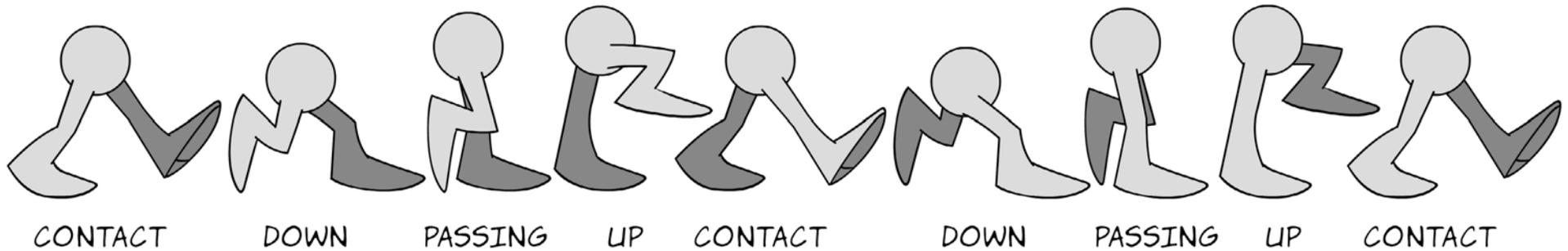
DIFFERING QUADRUPED ANATOMIES



THE PRINCIPLES OF WALKS AND RUNS ARE UNIVERSAL ACROSS SPECIES, BUT WATCH OUT FOR QUIRKS. FOR EXAMPLE, THE BACK LEG OF THE ELEPHANT BENDS MUCH LESS, AND DOESN'T CONTRACT LIKE THE HORSE'S. AS IT HAS TO ACT MORE LIKE A PILLAR TO SUPPORT FAR MORE WEIGHT.

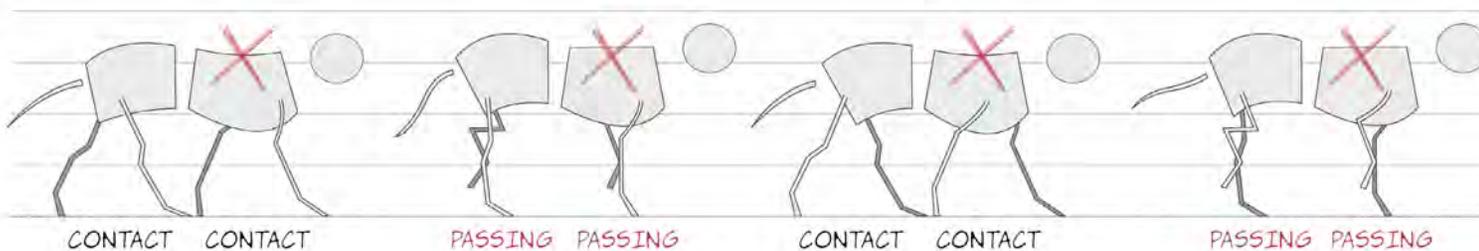
POSES OF WALK CYCLES

A WALK CYCLE IS MADE FROM FOUR POSES:
THE CONTACT, DOWN, PASSING, AND UP POSES.

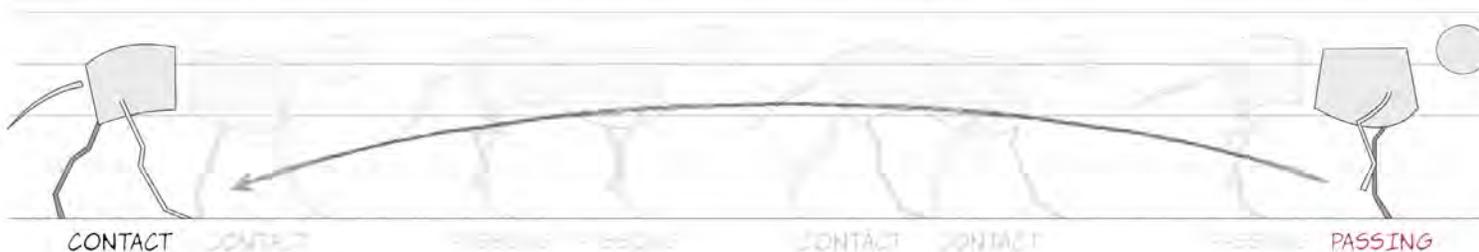


4-LEGGED WALK CYCLE

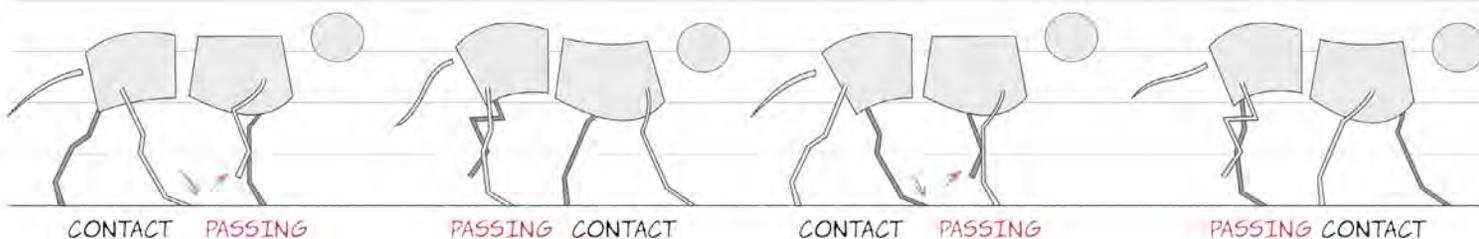
THE FRONT AND BACK LEGS MOVE THROUGH THEIR OWN CYCLES. EACH HAS ITS OWN CONTACT AND PASSING POSES. HOWEVER, THEY DO **NOT** MOVE IN TANDEM, AS IN THIS IMAGE.



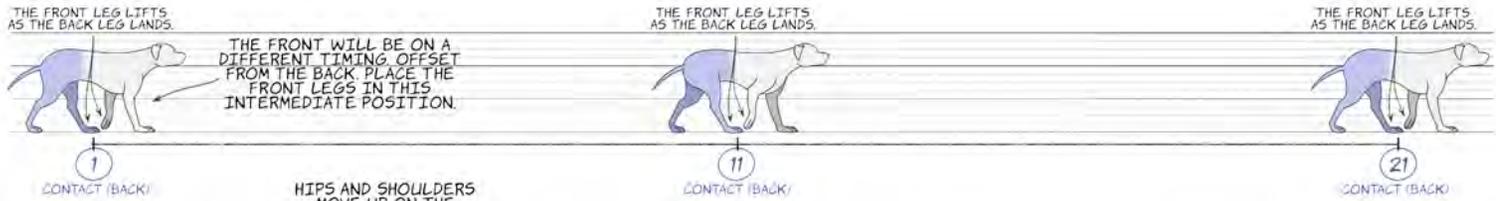
THE MOTION OF FRONT AND BACK CYCLES IS OFFSET. THE SECOND **PASSING** POSE OCCURS CLOSE TO THE FIRST **BACK CONTACT**.



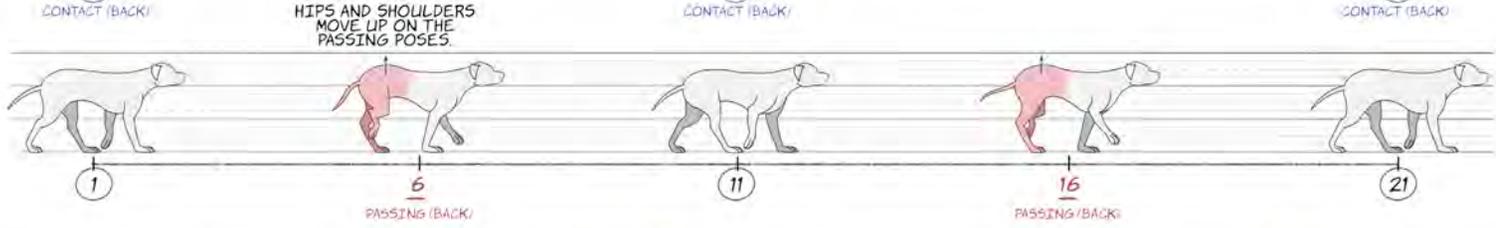
THIS OFFSET HELPS THE ANIMAL TO BALANCE ITSELF. NOTE THAT AS THE **BACK LEFT LEG LANDS**, THE **FRONT LEG** BEGINS TO RISE.



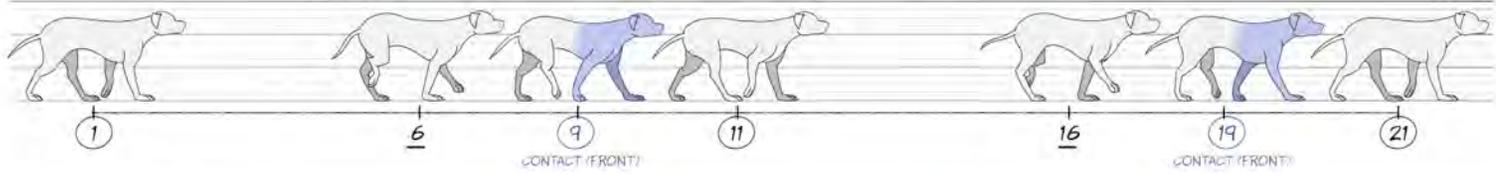
START WITH THE CONTACT POSES ON THE BACK OF THE ANIMAL.



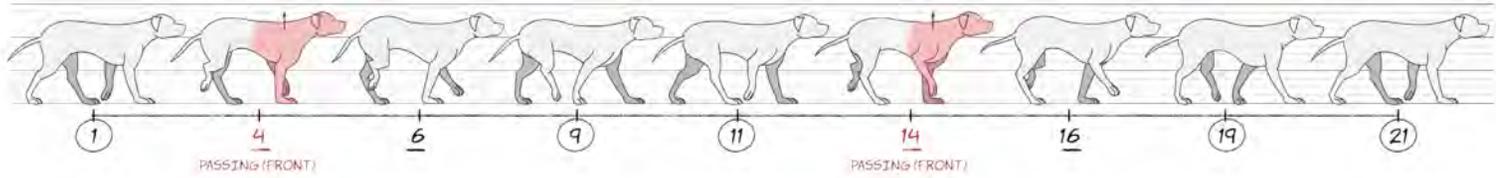
ADD THE PASSING POSES FOR THE BACK LEGS.



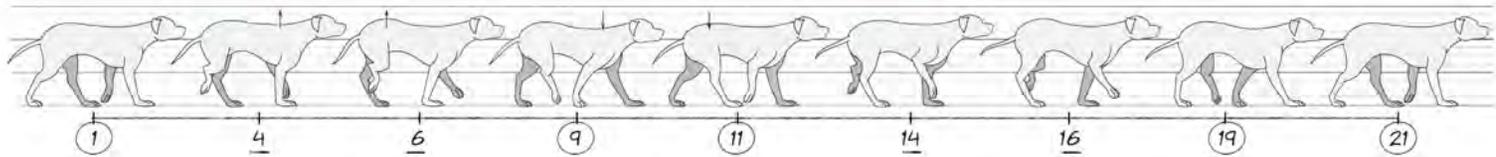
TIE DOWN THE FRONT LEGS, PLACING THE CONTACT POSES. NOTE: THE FRONT CONTACT TRAILS THE REAR BY 2 FRAMES.



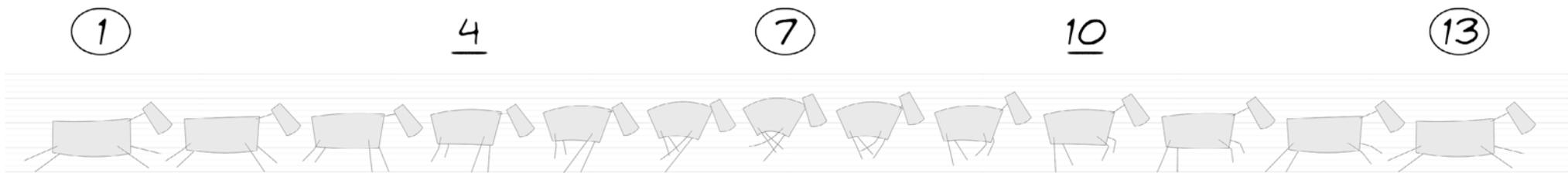
ADD THE PASSING POSE FOR THE FRONT LEGS (ADJUST THE OTHER FRONT LEGS TO MATCH).



NOTE THE UP AND DOWN MOTIONS: STRONGEST ON THE HIPS AND SUBTLE ON THE FRONT AND HEAD.

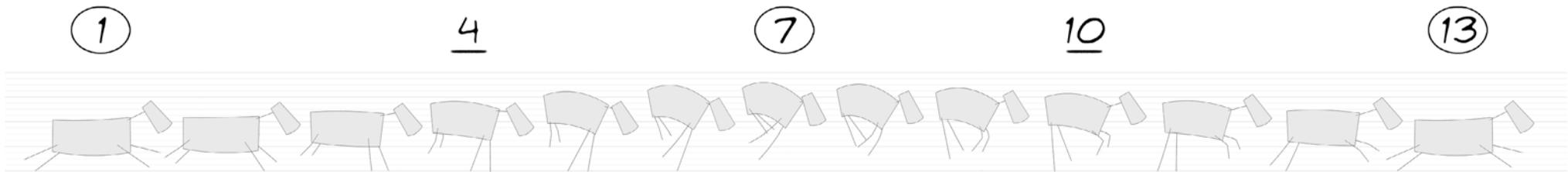


BASIC RUN / GALLOP



A BASIC RUN CAN BE CREATED WITH JUST TWO KEYS: IN THIS EXAMPLE, FRAMES 1 AND 7. FRAME 13 IS A DUPLICATE OF FRAME 1, WHICH COMPLETES THE CYCLE. THE BREAKDOWNS ON 4 AND 10 ARE USED TO MAKE SURE THAT THE FEET CONTACT THE GROUND, RATHER THAN SLICING THROUGH IT OR FLOATING ABOVE IT.

BASIC RUN / GALLOP



IN ORDER TO ADD MORE ENERGY TO THE RUN, RAISE THE HIND QUARTERS OF THE ANIMAL. THIS GIVES GREATER FORCE TO THE IMPACTS OF THE REAR LEGS.

BASIC RUN / GALLOP

①

4

⑦

10

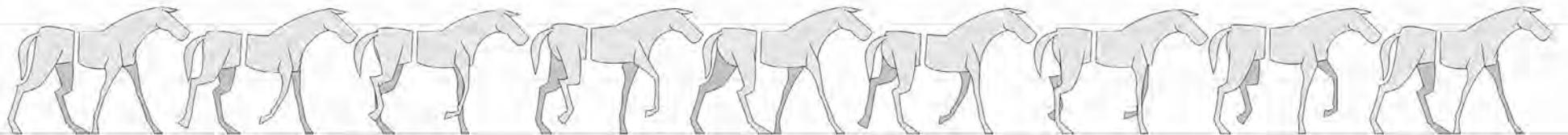
⑬



THE UPPER ROW SHOWS THE MORE BASIC RUN. THE BOTTOM ROW SHOWS THE MORE ENERGETIC VERSION, WITH THE HIND QUARTERS RAISED ON FRAME 7.

HORSE WALK CYCLE

THE FRONT AND BACK LEGS MOVE THROUGH A SERIES OF CONTACT AND PASSING POSES. **HOWEVER**, THEY DO NOT MOVE IN SYNC. AS IN THIS ILLUSTRATION.



1
CONTACT

5

9
PASSING

13

17
CONTACT

21

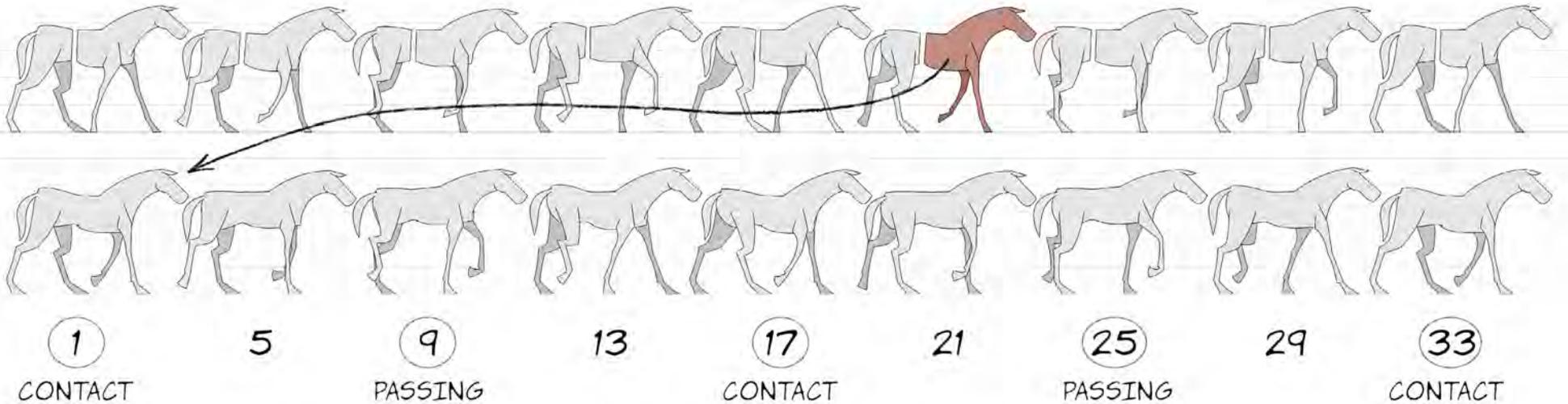
25
PASSING

29

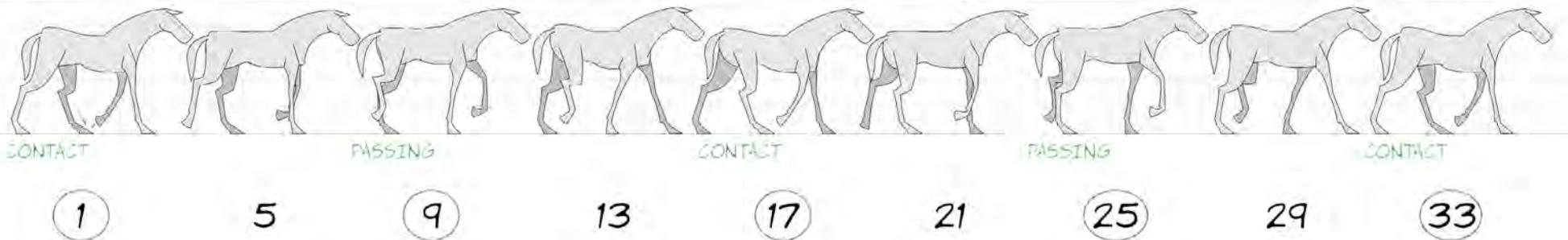
33
CONTACT

HORSE WALK CYCLE

OFFSET THE FRONT AND REAR CYCLES. MOVING THE FRONT CONTACT POSE BACK IN TIME BY ABOUT 20 FRAMES.



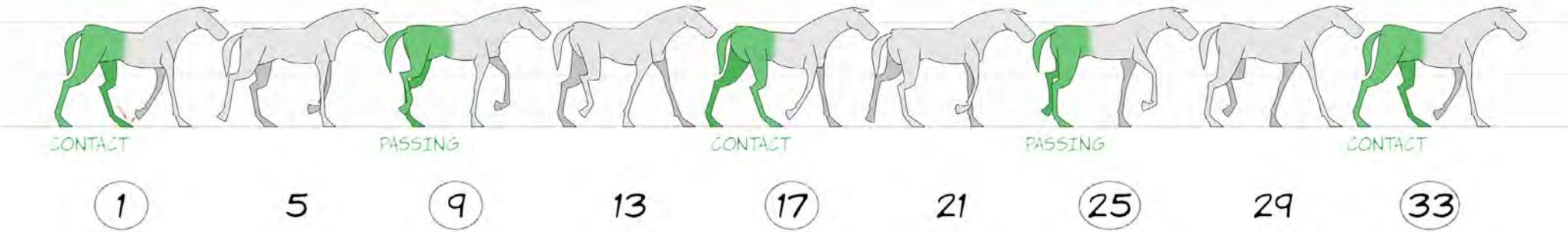
HORSE WALK CYCLE



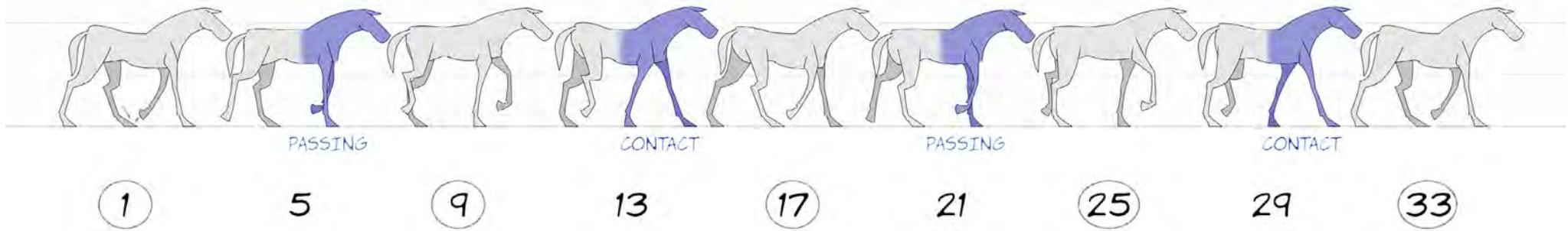
THE FRONT LEG LIFTS OFF THE GROUND AS THE BACK LEG CONTACTS IT.

THIS WALK CYCLE PLACES THE CONTACTS EVERY 16 FRAMES. YOU CAN TIME THEM A LITTLE FASTER, BUT IF THE WALK IS TOO QUICK, IT MAY START TO LOOK CARTOONY. A FASTER TIMING THAN THIS SHOULD IDEALLY USE SMALLER STEPS.

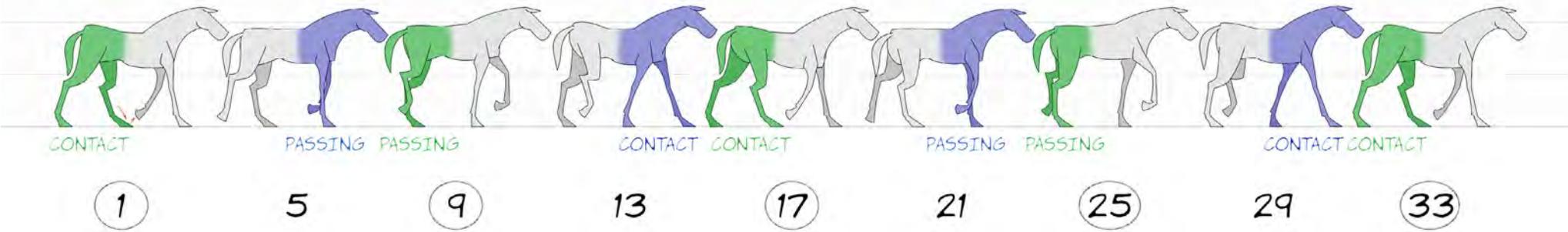
HORSE WALK CYCLE



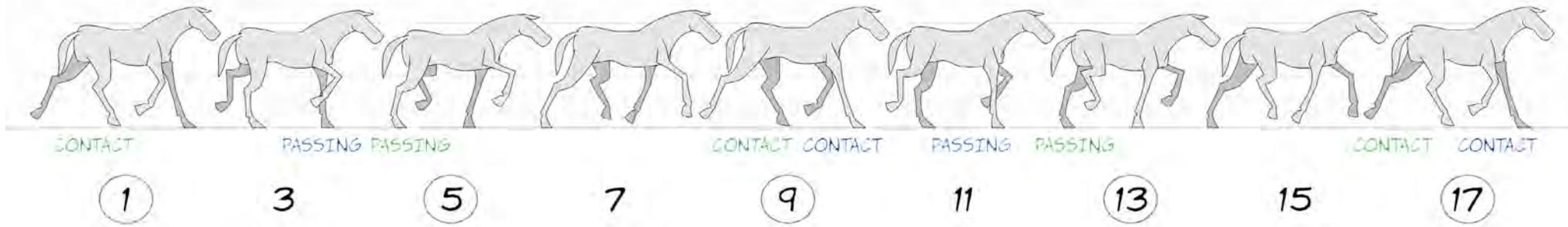
HORSE WALK CYCLE



HORSE WALK CYCLE



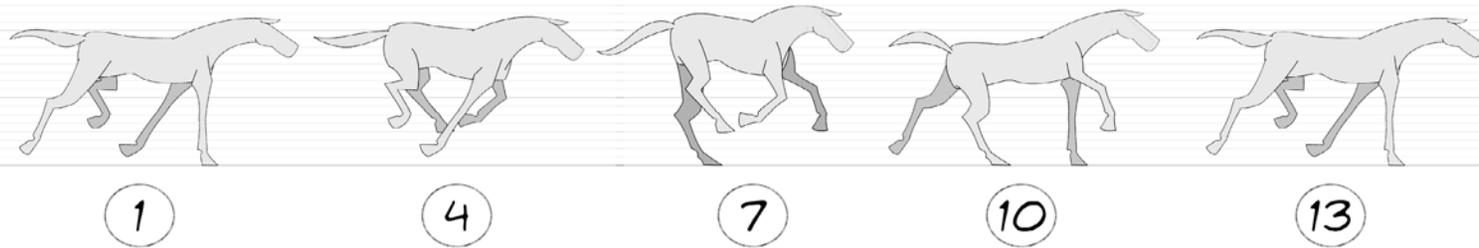
HORSE TROT CYCLE



THE TROT CYCLE IS ON A FASTER TIMING, HITTING THE CONTACTS EVERY 8 FRAMES (SO THAT THE REAR LEGS CONTACT ON FRAMES 1, 9, AND 17).

ALSO NOTICE THAT THE FRONT AND BACK LEGS MOVE UP AND DOWN IN TANDEM, SO THAT THE SPINE IS HORIZONTAL THROUGHOUT THE TROT.

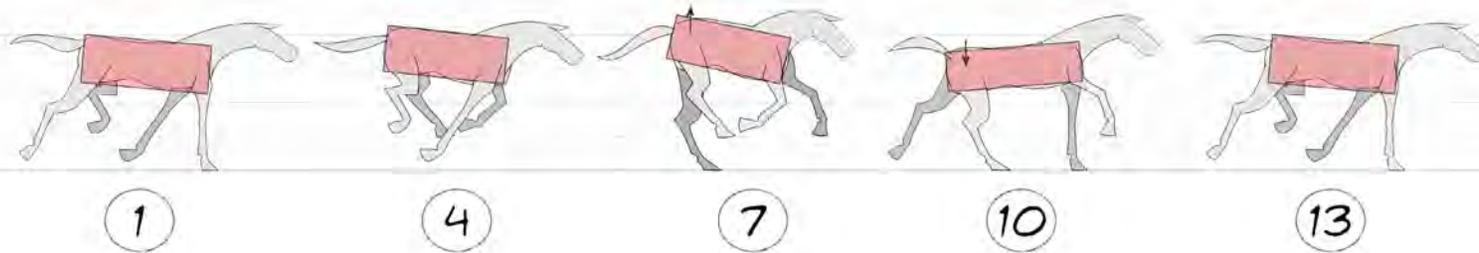
HORSE GALLOP CYCLE



THE RUN OR GALLOP IS MUCH FASTER, COMPLETING A FULL CYCLE EVERY 12 FRAMES, OR HALF A SECOND.

NOTICE THAT ALL FOUR LEGS ARE OFF THE GROUND ON FRAME 4 (AND USUALLY IN A FRAME EITHER SIDE OF IT).

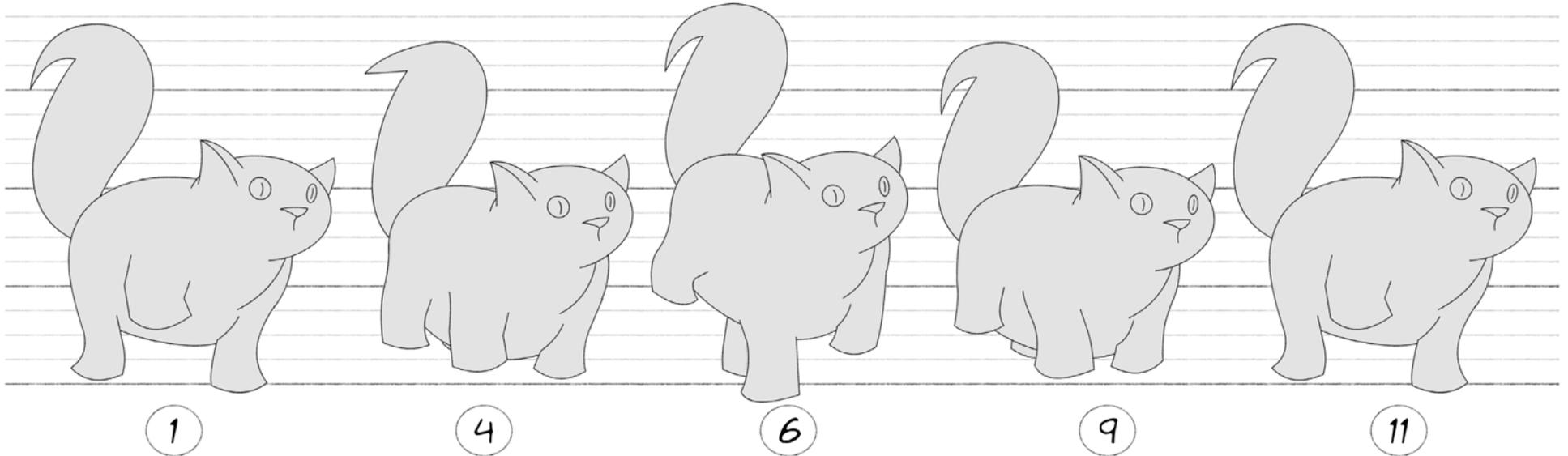
HORSE GALLOP CYCLE



NOTICE THE CHANGING ORIENTATION OF THE SPINE, WHICH TILTS FORWARD ON FRAME 7, AND BACKWARD ON FRAME 10.

CUSTOM CAT WALK

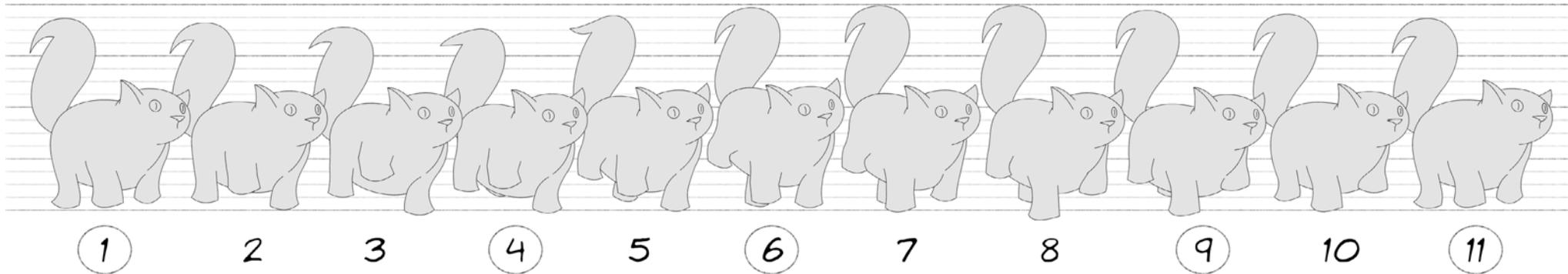
YOU CAN CREATE YOUR OWN CUSTOM WALKS. THIS ONE IS BASED ON A SMALL FAT CAT WHO HAS A VERY LIGHT AND COMICAL TROT ACTION.



IN THIS WALK, THE LEGS MOVE IN A SIMPLE VERTICAL PISTON ACTION. THEY MOVE UP AND DOWN WITHOUT MOVING IN AN ARC.

CUSTOM CAT WALK

THE FRONT LEGS ARE OFFSET SLIGHTLY,
CREATING A MORE NATURAL VERSION
OF THE BOUNCY WALK.



IN THIS WALK, THE LEGS MOVE IN A SIMPLE VERTICAL PISTON
ACTION. THEY MOVE UP AND DOWN WITHOUT MOVING IN AN ARC.