> bouncing ball

> objective(s):

Students will create a bouncing ball sequence with accurate physics.

> curricular focus:

This projects emphasizes using key framing and motion tween to create accurate accelerations and decelerations along with stretches and compressions.

> principles of animation:

- squash and stretch (https://youtu.be/haa7n3UGyDc)

> specifications:

save as: BouncingBall_MotionTween_LastnameF.fla
width: 1920 px
height: 1080 px
frame rate: 30/sec
duration: minimum 2 secs

> instruction:

- review squash and stretch principle
- review the differences between classic, shape and motion tween techniques
  - consult the LinkedIn Learning video tutorial series by Joseph Labrecque
- view examples in *Bouncing Ball Projects* folder

> procedure:

- set up document (see Specifications above)
- create environment
  - create your background wall
    create a rectangle 1920 px x 1080 px and centered on the document (x: 0, y:0)
  - create your floor
    create a rectangle 1920 px x 200 px and centered on the x axis and snapped to the bottom edge (x: 0, y:0)
- create bouncing ball motion tween sequence
  - use circle for ball
    ball should be same size at the apex of each arc
  - minimum three consecutive bounces on the floor
  - determine entrance and exit
    ball must begin off frame
    ball may exit the opposite side, or riccochet off the opposite document edge to remain inside the frame
  - focus on bounce physics
    see *Bouncing Ball Sequence* on page 3
    it is easier to start with straight lines for the entire path then add the bounce arcs later
    you may <u>not</u> follow a step-by-step tutorial on how to do a bouncing ball animation
- create more detailed environment (time permitting)
  - if you finish ahead of your classmates, do something more with your environment (colors, gradients, objects, etc.)

see requirements on page 2

> bouncing ball

> requirements:

- file
  - file specifications are adhered to
    - dimensions, frames/sec, duration, etc.
  - all layers are named appropriately
  - unused layers are deleted
- ball
  - ball is animated via motion tween only
    - motion tween should be single motion path
  - minimum three bounce impacts within document frame
  - accurate physics
    - ball is circular and slowest at the top of the bounce
      - ball is exact same size at apexes
    - ball gradually accelerates and stretches on descent
      - greatest stretch is just before impact on floor
    - ball squashes on impact
      - each impact should be successively less 'squashed'
      - second impact is squashed less than first impact, third less than second, etc.
    - ball gradually decelerates and reforms its shape on ascent
- environment
  - stage color must be custom (not left on default)
  - floor is horizontal line (near bottom) or rectangle (bleeds off bottom) and extends off both sides

> bouncing ball sequence

> bouncing ball physics

- ball will enter from one side
- at the top of the bounce
  - ball will be its natural round shape at the apex
  - drawings will be closer together because the ball is moving slower
- during descent
  - ball will gradually accelerate as it falls
    - it will be its fastest just before impact
  - ball will gradually stretch more as it falls
    - it will be its most stretches right before impact
  - drawings will be progressively further apart because the ball is moving faster
- during impact
  - ball will squash
- during ascent
  - ball will gradually decelerate as it rises
    - it will be its slowest just before apex
  - ball will gradually reform its original shape as it rises
    - it will be its most circular at the apex
  - drawings will be progressively closer because the ball is moving slower

> example

The image below is an explanation of the progression of a ball through a bounce sequence. It is not an exact representation of what you will create (image only shows two bounces).