

# > bouncing ball

## > objective(s):

Students will create a bouncing ball sequence with accurate physics.

## > curricular focus:

This project emphasizes using key framing 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\_Frame\_LastnameF  
**width:** 720 px  
**height:** 720 px  
**frame rate:** 24/sec  
**duration:** maximum 1 second

## > instruction:

- review squash and stretch principle
- review the differences between classic, shape and motion tween techniques
- view examples in *Bouncing Ball Projects* folder

## > procedure:

- begin tutorial
  - open Adobe Animate CC
  - go to Help menu and select Hands-on Tutorial
  - select *Bouncing Ball*
  - select *Watch Intro Video (2:17)*
  - when video is complete select Get Started
  - change the frame rate to 24 FPS
    - go to the Properties panel and change FPS to 24
  - begin tutorial
    - follow the steps demonstrated along with the adjustments shown on *Accurate Physics* on page 2
      - ball will be perfect circle at top
      - ball will be squashed at bottom edge of document
      - ball frames will overlap more at the top due to slower speed
      - ball frames will separate more at bottom due to higher speed
  - save as: BouncingBall\_Frame\_LastnameF
- create animated GIF
  - go to File: Select Export: Animated GIF
  - change background color
    - select Matte and change color to white or light gray (or other light color)
  - set Looping to Forever

*see requirements on page 2*

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## > requirements:

- file
  - file specifications are adhered to  
dimensions, frames/sec determined by tutorial
- ball
  - ball is animated using frame by frame only
  - must use 14-18 keyframes
    - 7-9 ball keyframes that are copied and reversed
  - accurate physics
    - ball is circular and slowest at the top of the bounce
    - ball gradually accelerates and stretches on descent
      - greatest stretch is just before impact on floor
    - ball squashes on impact
    - ball gradually decelerates and reforms its shape on ascent
  - ball's mass remains constant
    - for example: as it stretches it also becomes skinner

## > accurate physics

(1-4) The ball is slowest at the top of the sequence, so there are more keyframes and the balls overlap more.

(2-6) The mass of the ball does not change. As it accelerates, it stretches vertically, but its width diminishes proportionally.

(7) Try an additional keyframe showing it returning to form.

(8) The ball impacts and squashes on the bottom document edge.

