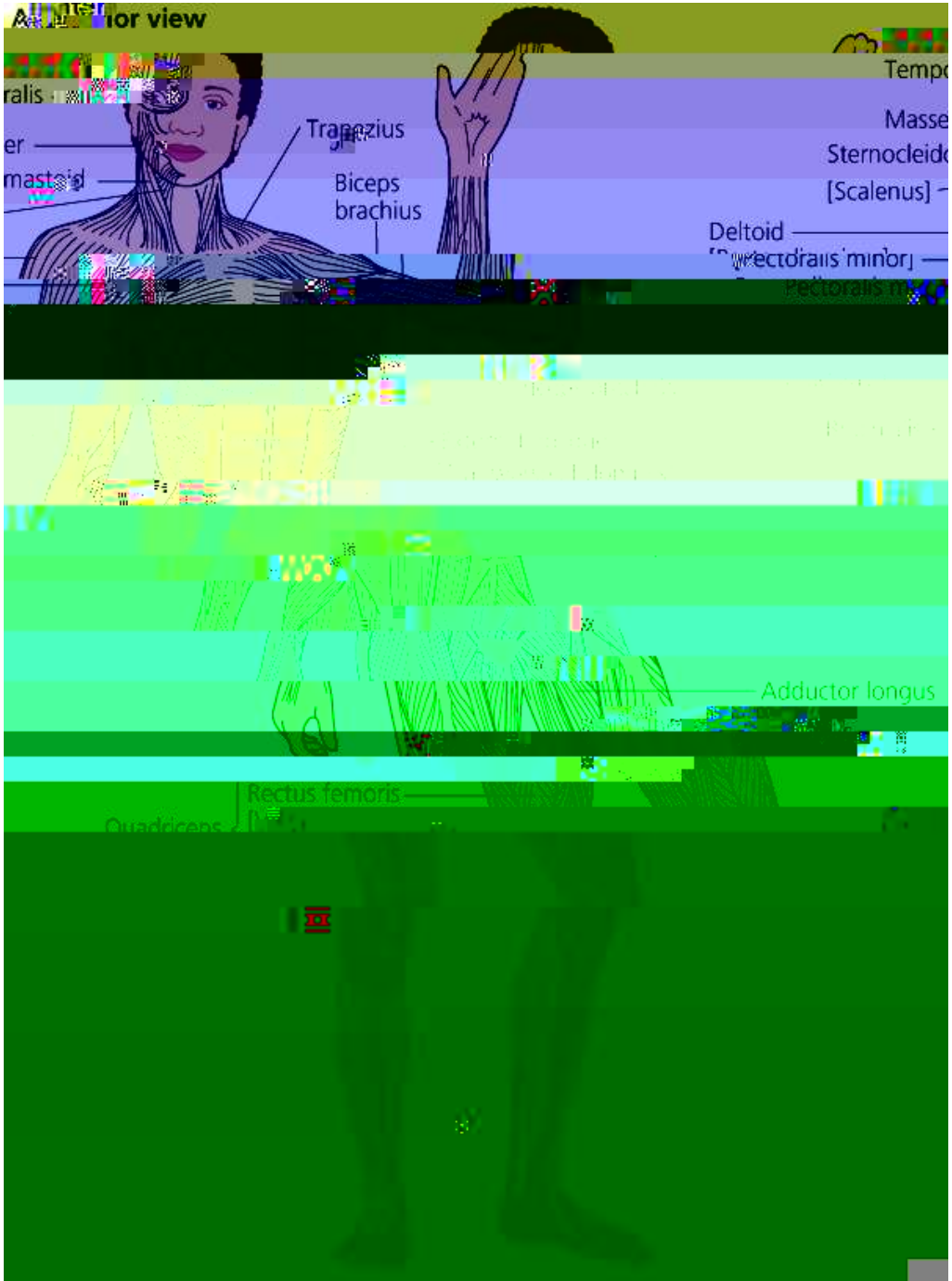
Tom Seabourne, Ph.D.

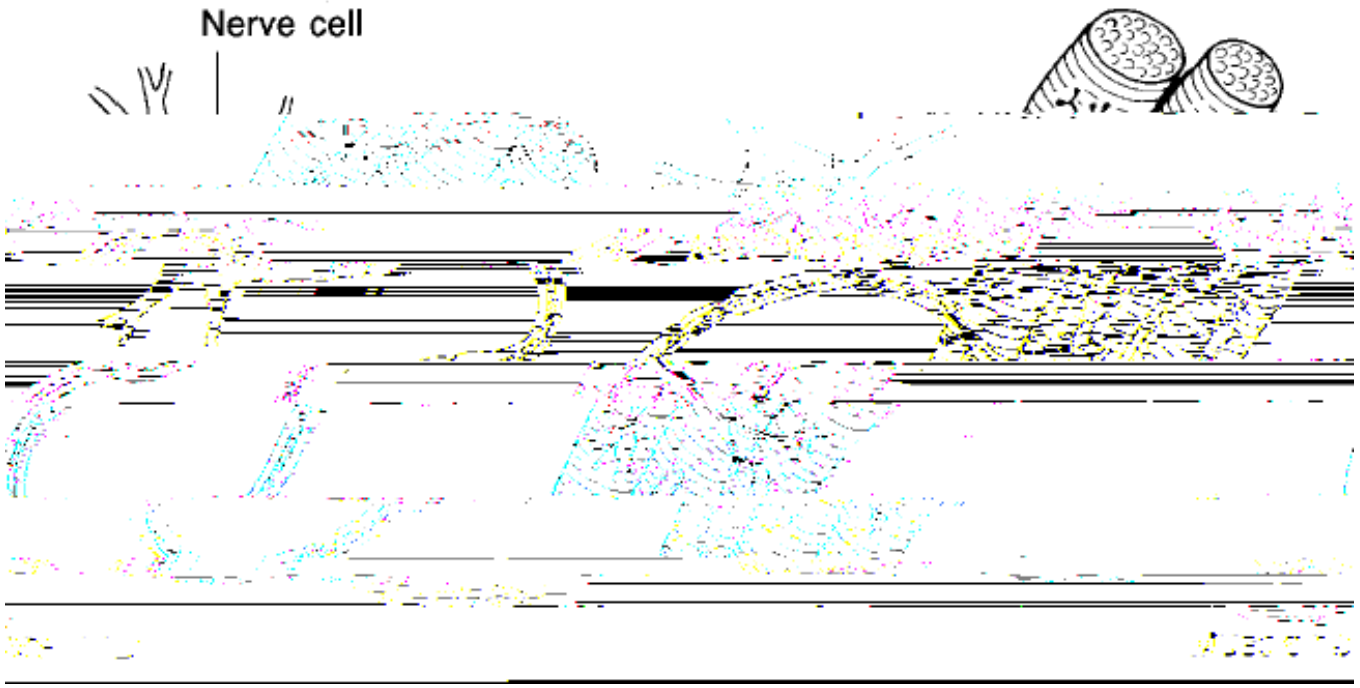
- Muscles consist of many *muscle fibers (cells)* connected in bundles
- Muscle fibers are made up of *myofibrils*
- Strength training increases the number of myofibrils and the size of muscle fibers = *hypertrophy*
- Inactivity reverses the process = *atrophy*


Trapezius
Biceps brachius
Deltoid
Adductor longus
Rectus femoris


Deltoid
Teres minor
Teres major
Latissimus dorsi
(buttock)


Muscl

- Motor units (nerves connected to muscle fibers) are recruited to exert force



- Increased muscle mass and size of muscle fibers
- Increased utilization and coordination of motor units
- Increased strength of tendons, ligaments, and bones
- Increased storage of fuel in and blood supply to muscles
- Improvements in blood fat levels and biochemical processes

- Improved performance of physical activities
- Injury prevention
- Improved body composition
- Enhanced self-image and quality of life
- Improved muscle and bone health with aging
- Prevention and management of chronic disease

- Muscular strength assessed by determining repetition maximum (1 RM), the maximum resistance that can be lifted once
- Muscular endurance assessed by counting the maximum number of repetitions of a muscular contraction

- Static (isometric) exercise = muscle contraction without a change in the length of the muscle
- Dynamic (isotonic) exercise = muscle contraction with a change in the length of the muscle
  - Concentric contraction = muscle applies force as it shortens
  - Eccentric contraction = muscle applies force as it lengthens

- Variable resistance = changing load to provide maximal resistance throughout a joint's range of motion
- Eccentric loading = placing load on a muscle as it lengthens
- Plyometrics = sudden eccentric loading and stretching followed by a concentric contraction
- Speed loading = moving a load as rapidly as possible
- Isokinetic exercise = exerting force at a constant speed against an equal force

- Choosing equipment: Weight machines versus free weights
  - Resistance is provided by both types
  - Exercise machines
    - Safer, convenient, and easy to use

- requency = days per week
- ntensity = amount of resistance
- ime = number of repetitions and sets
- ype = strength training exercises for all major muscle groups

- Choose resistance based on your current fitness level and goals
- To build strength
  - Lift heavy weights (80% of 1 RM)
  - Perform a low number of repetitions
- To build endurance
  - Lift lighter weights (40-60% of 1 RM)
  - Perform a high number of repetitions
- For a general fitness program
  - Lift moderate weights (70% of 1 RM)
  - Moderate number of repetitions

- To build strength and endurance, do enough repetitions to fatigue the muscles
- The heavier the weight, the fewer the repetitions (1-5) to fatigue = a program to build strength
- The lighter the weight, the higher the number of repetitions (15-20) to fatigue = a program to build endurance
- To build both strength and endurance, try to do 8-12 repetitions of most exercises

- Set = a group of repetitions followed by a rest period
- For general fitness, 1 set of each exercise is sufficient

- For a general fitness program:
  - 8–10 different exercises
  - Work all major muscle groups
  - Balance between agonist and antagonist muscle groups
  - Do exercises for large-muscle groups and multiple joints before exercises for small-muscle groups or single joints

- Warm up prior to each weight training session with a general warm-up and a warm-up for the exercises you will perform
- Cool down after weight training, relax for 5-10 minutes, lower your heart rate

Warm-up	Strength training exercises	Cool-down
5–10 min	for major muscle groups (8–10 exercises)	5–10 minutes

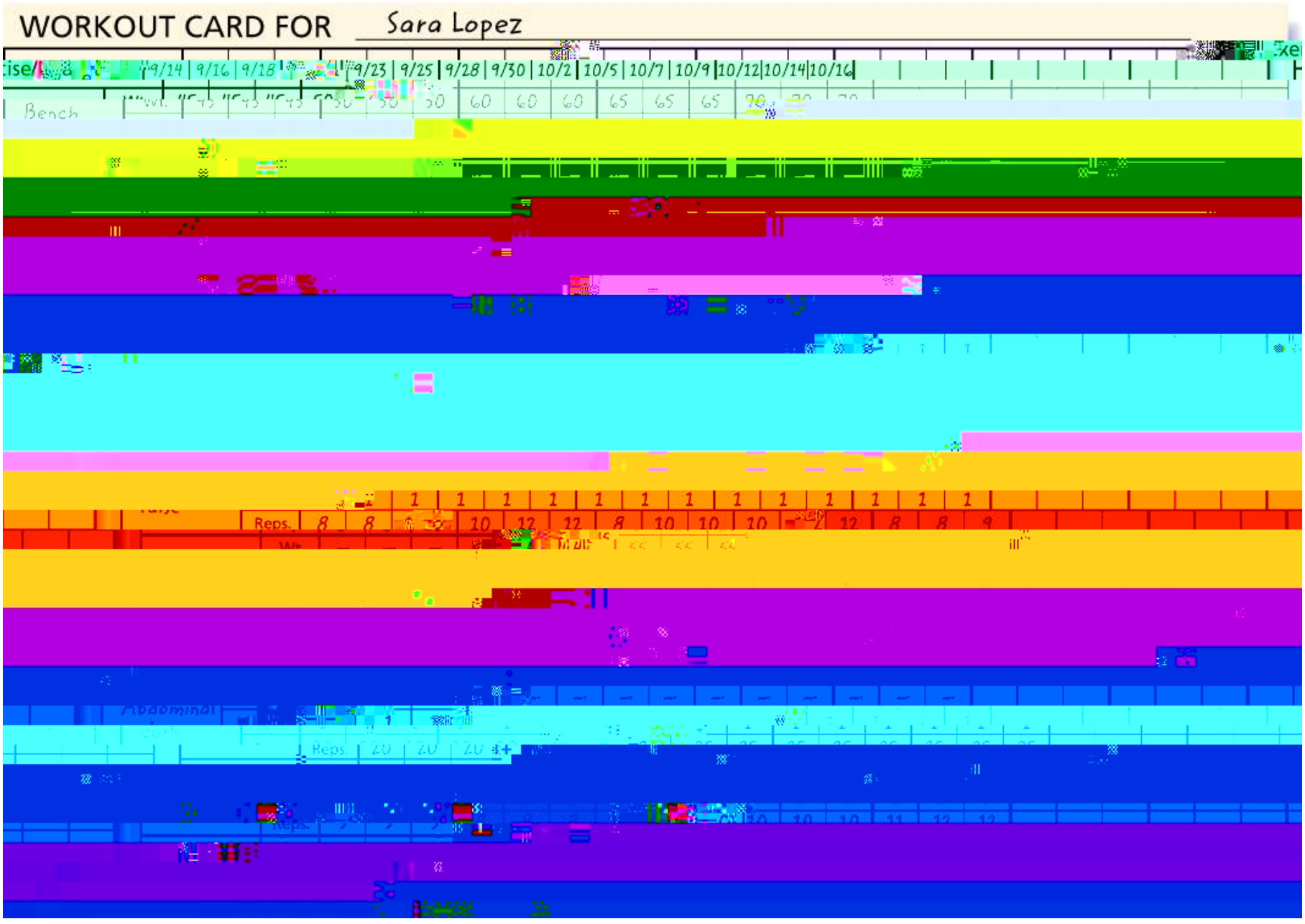
Sample

Frequency: 2–3 days per week

Intensity: Resis

Type of activity: Strength training exercises that focus

- To start: Choose a weight with which you can do 8–12 repetitions with good form
- To progress: Add resistance when you can do more than 12 repetitions
- Maintain good form at all times
- Track your progress


WORKOUT CARD FOR Sara Lopez
9/14 | 9/16 | 9/18 | 9/23 | 9/25 | 9/28 | 9/30 | 10/2 | 10/5 | 10/7 | 10/9 | 10/12 | 10/14 | 10/16
Bench
60 60 60 65 65 65
Reps. 8 8 10 12 12 8 10 10 10 12 8 8 9
Abdominal
Reps. 20 20 20

- Performing more sets of a smaller number of repetitions with a heavier weight
- Cycle training (periodization) by varying type and amount of exercise
- Consult a coach certified by the National Strength and Conditioning Association

- Use proper lifting techniques
- Use spotters and collars with free weights
- Be alert for injuries