National Aeronautics and Space Administration

Train Like an Astronaut: Adapted Physical Activity Strategies

Crew Strength Training

YOUR MISSION

You will perform body-weight squats and push-ups to develop upper and lower body strength in muscles and bones. You will also record observations about improvements in strength training during this physical experience in the Mission Journal.

LINK TO SKILLS AND STANDARDS

APENS: 2.01.08.01 Understand variance in "motor milestones" such as typical or average age of achievement for individuals with disabilities – Implement activities that strengthen postural muscles and extremities necessary for locomotion.

Activity Specific Terms/Skills

Squats, push-ups, bone and muscle strengths, cardiac vascular, repetition, endurance, team work, resistance, heart rate

SPACE RELEVANCE

Astronauts must perform physical tasks in space that require strong muscles and bones. In a reduced gravity environment, muscles and bones can become weak, so astronauts must prepare by strength training. They work with NASA strength and conditioning specialists on Earth and continue to work in space to keep their muscles and bones strong for exploration missions and discovery activities.

WARM-UP & PRACTICE

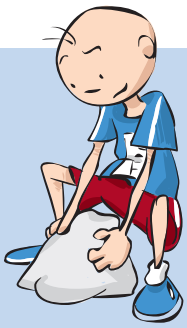
Warm-up

Assistance/Supported squat or activities that mimic a squat:

- Shooting a basketball, Bowling, Dancing
- Step-up, Wall push-ups, Walk stairs, Rowing

Practice:

- Use hand or wrist weight
- Tug-of-war
- Resistance exercises (stand face-to-face, gently pushing against each other's palms)
- On back, perform straight or bent leg lifts; the Dead Bug movement
- Demonstrate animal poses: 'seal', 'bear crawl', or yoga poses: comic book 'Superman' position etc., have performer attempt and hold for desired count

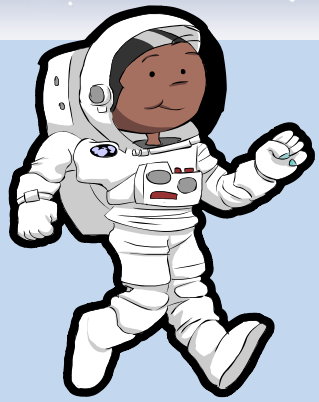


SUGGESTED ADAPTED EQUIPMENT:

- THERA-BANDS/RESISTANT BANDS OR CORDS
- HAND WEIGHTS
- WEIGHT BARS
- CANNED GOODS WEIGHT LIFTING
- MEDICINE BALLS

Crew Strength Training

LET'S "TRAIN LIKE AN ASTRONAUT!"



Individual Play (Adjust steps and procedures as appropriate for participants. After each activity, rest for 60 seconds)

Body weight squats:

- Using only your body weight, perform a squat (each squat is a repetition).
- Stand with your feet shoulder width apart, back straight, looking forward, arms at your side.
- Lower your body, bending your knees while keeping your back straight (as if sitting). Raise your arms forward for balance as you squat. At the bottom of the motion, your upper legs should be close to parallel with the floor and your knees should not extend past your toes.
- Raise your body back to a standing position.
- Try to perform 10 to 25 squat repetitions, increasing over time as possible

Push-ups:

- Using your arms to lift your body, perform a push-up (each push-up movement is a repetition).
- Lie down on the floor on your stomach.
- Place your hands on the floor, under your shoulders, shoulder width apart.
- Using only your arms to lift your body, lift up slightly until your lower body is off the floor and only your toes and hands are touching the floor. (If this is difficult, you may keep your knees on the floor.) This will be your starting position.
- Straighten your arms to raise your body. Do not lock your elbows.
- Lower your body back to the starting position.
- Try to perform 10 to 25 push-up repetitions, increasing over time as possible.

TRY THIS! *Some ideas for Adapted Activity*

Push-ups and/or related exercises:

- Perform at various levels: table, stool, bench, wall or wall bar, steps, etc.
- Wheelchair push up: Seated in chair with arms, place hands on arm rests and lift body. Hold position In push up position, alternate right and left hand crossing midline to touch opposite shoulder, keeping plank; attempt in wall push up position

Plank and/or related exercises:

- Perform at various levels: table, stool, bench, wall or wall bar, steps, etc.
- While in plank, place ball between body and floor and use hands, walk out and back

Seated isometric exercises:

- In a chair or at bench edge, hold, breathe, and squeeze abdominal muscles Wall sit with back against wall, knees @ 90 degrees; hold, breathe, and squeeze abdominal muscles
- On a core ball, knees @ 90 degrees; squeeze abdominal muscles