

Objective:

Students will participate in physical activities modeled after the real-life physical requirements of humans traveling in space. Students will learn what is necessary for humans to physically survive in space, develop physical fitness, and record, manipulate, and represent data.

Arkansas State Standards Addressed:

Math

1st grade:

- **AR.Math.Content.1.OA.C.6** – Add and subtract within 20, demonstrating computational fluency for addition and subtraction within 10
- **AR.Math.Content.1.MD.C.6** – Ask and answer questions about the total number represented, how many in each category, and how many more or less are in one category than another

2nd grade:

- **AR.Math.Content.2.OA.B.2** – Fluently add and subtract within 20 using mental strategies
- **AR.Math.Content.2.MD.D.10** – Draw a picture graph and a bar graph, with a single-unit scale, to represent data set with up to four categories

3rd grade:

- **AR.Math.Content.3.OA.D.8** – Solve two-step word problems using the four operations
- **AR.Math.Content.3.MD.B.3** – Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step “how many more” and “how many less” problems using information presented in scaled picture graphs and scaled bar graphs.

Speaking and Listening

1st grade:

- **SL.1.1.A** – Follow agreed-upon rules for discussions (e.g., listening to others with care, speaking one at a time about the topics and texts under discussion).

2nd grade:

- **SL.2.1.A** – Follow agreed-upon rules for discussions (e.g., gaining the floor in respectful ways, listening to others with care, speaking one at a time about the topics and texts under discussions).

3rd grade:

- **SL.3.1.B** – Follow agreed-upon rules for discussions (e.g., gaining the floor in respectful ways, listening to others with care, speaking one at a time about the topics and texts under discussion).
- **SL.3.1.D** – Explain their own ideas and understanding in light of the discussion

4th grade:

- **SL.4.1.B** – Follow agreed-upon rules for discussions and carry out assigned roles.
- **SL.4.1.D** – Review the key ideas expressed and explain their own ideas and understanding in light of the discussion.

Science

1st grade:

- **NS.1.1.1** – Communicate observations orally, in writing, and in graphic organizers

2nd grade:

- **NS.1.2.1** – Communicate observations orally, in writing, and in graphic organizers

3rd grade:

- **NS.1.3.1** – Communicate observations orally, in writing, and in graphic organizers

4th grade:

- **NS.1.4.1** – Communicate observations orally, in writing, and in graphic organizers

- **NS.1.4.10** – Identify patterns and trends in data

- **NS.1.4.11** – Generate conclusions based on evidence

Activity:

Complete a set of exercises designed for astronauts (testing physical fitness). Demonstrate each exercise for the students as an example. Set a timer for 30 seconds and have students count how many they are able to complete within the time. Have students record their number on a sheet of paper for each exercise. Exercises are from the book *Astronaut Academy*. Directions for each exercise are included here for convenience.

- Star Jumps
 - Crouch down bending your legs at the knees.
 - Jump up and make a star shape with your arms and legs.
 - Land with your feet together.
- Squat Thrusts
 - Put your hands on the floor, shoulder width apart, and stretch your legs behind you.
 - Jump your legs forward so they are tucked underneath you.
 - Return to the first position.
- Step Ups
 - Stand in front of the bottom step of the stairs (if no stairs are available, a step stool or solid box would work]
 - Put your left foot on the step.
 - Put your right foot on the step.
 - Bring your left foot back to the floor.
 - Bring your right foot back to the floor.
- Standing Squats
 - Stand with your feet shoulder width apart.
 - Lower your body so your knees are bent. Be careful not to extend your knees past your feet.
 - Stand up.
- Wall Push-Ups
 - Stand facing a wall with feet shoulder width apart. Put your hands flat against the wall with arms stretched in front.
 - Slowly bend your arms until you are 2 inches from the wall. Keep your back straight.
 - Push away from the wall.

This activity could be used in a physical education classroom or for an extended math lesson where students use the number of exercises recorded to add, subtract, and compare which number is more

or less. Students could also build skills in graphing using the total numbers for each exercise. This activity could also be used as a brain break in the classroom.

For an additional exercise that focuses on balance and also allows opportunity for recording data, gather hula hoops and bean bags. Each student will stand 10 steps away from a hula hoop. Standing on one leg, they will try to throw the bean bag into the target area. They will complete the exercise 10 times and record how many times they make it into the hula hoop.

NASA has also created several activities for use in the classroom that relates physical Earth-based needs to the requirements of exploring space, including exercises in agility, dexterity, balance, and strength. These activities include those completed individually, with partners, in small groups, and as a whole class. These activities can be found here:

www.nasa.gov/audience/foreducators/trainlikeanastronaut

Additional Resources at Bentonville Public Library:

The following resources are specifically about astronauts and the training required to travel to and survive in space. Accelerated Reader levels are included where available. All items are available for checkout at the Bentonville Public Library; call numbers are included in brackets. Online resources are available through BPL's Student Portal: <http://www.bentonvillelibrary.org/student-portal/>

Books

- *All About Astronauts* by Miriam Gross. Non-Fiction. AR Reading Level: 4.7. [JNF 629.45 GRO]
- *Astronaut Academy* by Steve Martin. Non-Fiction. [JNF 629.4 MAR]
- *Astronaut Living in Space* by Kate Hayden. Non-Fiction. AR Reading Level: 3.9. [ENF 629.47 HAY]
- *Astronauts Explore the Galaxy* by Carmen Bredeson. Non-Fiction. AR Reading Level: 4.0. [JNF 629.45 BRE]
- *I Want to Be an Astronaut* by Byron Barton. Picture Book. [PIC Barton Byron]
- *Mousetronaut* by Mark Kelly. Picture Book. AR Reading Level: 5.9. [PIC Kelly Mark]
- *A Trip Into Space* by Lori Haskins Houran. Picture Book. AR Reading Level: 1.2. [PIC Houran Lori Haskins]
- *Usborne Official Astronaut's Handbook* by Louie Stowell. Non-Fiction. [JNF 629.13 STO]

Online Resources

- *Pebble Go*, a database specifically geared toward young learners, has a section on Astronauts, including information on what they do, what they wear, tools, and how to become an astronaut. This can be found under Science/Earth and Space Sciences/Space Science/Exploring Space/Astronauts.

Explore Space Exhibit Information:

Explore Space: A Cosmic Journey, a traveling exhibition for libraries, is part of the STAR Library Education Network (STAR_Net) led by the National Center for Interactive Learning at the Space Science Institute. Exhibit partners include the American Library Association, the Lunar and Planetary Institute, and Afterschool Alliance. Explore Space is supported through a grant from the National Science Foundation.

