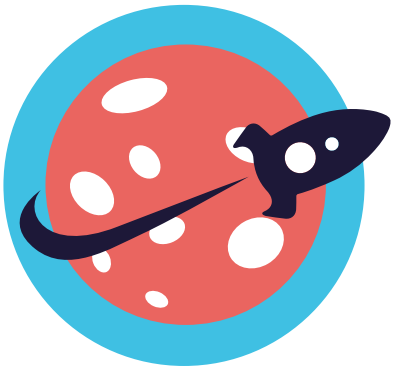

MINI MARS MISSION

1st-2nd Grade Program

Cosmosphere
EDUCATION

Table of Contents

Lesson 1 - Mice in Space (Reading)	
Kansas College and Career Ready Standards	
1st Grade Standards	
RL1.1	Ask and answer questions about key details in a text
RL1.2	Retell stories, including key details, and demonstrate understanding of their central message or lesson
RL1.3	Describe character, settings, and major events in a story, using key details
RL1.4	Identify words and phrases in stories or poems that suggest feelings or appeal to the senses
RL1.5	Explain major differences between books that tell stories and books that give information, drawing on a wide reading of a range of text types.
RL1.6	Identify who is telling the story at various points in a text
RL1.7	Use illustrations and details in a story to describe its characters, setting, or events
RL1.9	Compare and contrasts the adventures and experiences of characters in stories
2nd Grade Standards	
RL2.1	Ask and answer such questions as *who, what, where, when*, *why*, and *how* to demonstrate understanding of key details in a text
RL2.2	Recount stories, including fables and folktales from diverse cultures, and determine their central message, lesson, or moral
RL2.3	Describe how characters in a story respond to major events and challenges
RL2.4	Describe how words and phrases (e.g., regular beats, alliteration, rhymes, repeated lines) supply rhythm and meaning in a story, poem, or song
RL2.5	Describe the overall structure of a story, including describing how the beginning introduces the story and the ending concludes the action
RL2.6	Acknowledge differences in the points of view of characters, including by speaking in a different voice for each character when reading dialogue aloud
RL2.7	Use information gained from the illustrations and words in a print or digital text to demonstrate understanding of its characters, setting, or plot
RL2.10	By the end of the year, read and comprehend literature, including stories and poetry, in the grades 2-3 text complexity band proficiently, with scaffolding as needed at the high end of the range

Objectives

- Students will listen to a story
- Students will answer questions about the story
- Students will describe character elements
- Students will compare and contrast characters

Essential Questions

- What parts of the text help us understand it better?
- Why are the words in a text important?
- Why are pictures in a text helpful?

Suggested Lesson Plan

1. Read the book, *Mousetronaut* by Astronaut Mark Kelly.
2. Ask students about key details in the text and describe characters and settings. Use the attached prompts to assist.
3. Read the afterword to *Mousetronaut*.
4. Compare the story to the afterword. Fiction vs. nonfiction text
5. After reading the story, have students draw the special cage they believe the mice would need. Ask them to include Meteor in the picture.
6. Have students practice retelling the story to their parents/families for homework.

Materials

1. *Mousetronaut* by Astronaut Mark Kelly
2. Reading prompts
3. Worksheet with space for drawing and comments on student's retelling of story

Reading Prompts

1. Who are the special guests going on the mission?
2. Who is Meteor?
3. Why do the other mice think Meteor will not be chosen for the mission?
4. How many mice will be chosen for the flight?
5. What is the name of the special cage?
6. Why do you think the cage must be special?
7. What does the word weightlessness mean?
8. How long as the flight?
9. What did Meteor do to save the mission?
10. Why was Meteor's official title Mousetronaut?
11. How did the astronauts feel after the missiion? How do you know?
12. Who is the narrator?
13. Compare and contrast Meteor to the other mice in the story.

Afterword:

1. How many mice were on the mission in 2001?
2. What was special about their cages? Why did they need special cages?
3. Who were the first people to fly?
4. What was special about the space shuttle?
5. What do people need to do to travel in space?
6. What animals have traveled to space?

Lesson 2 - Mission Control (Communications)	
Kansas College and Career Ready Standards	
1st Grade Standards	
SL.1.1	Participate in collaborative conversations with diverse partners about *grade 1 topics and texts* with peers and adults in small and larger groups.
SL.1.1a	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).
SL.1.1b	Build on others' talk in conversations by responding to the comments of others through multiple exchanges.
SL.1.1c	Ask questions to clear up any confusion about the topics and texts under discussion.
SL.1.2	Ask and answer questions about key details in a text read aloud or information presented orally or through other media.
SL.1.3	Ask and answer questions about what a speaker says in order to gather additional information or clarify something that is not understood.
SL.1.4	Describe people, places, things, and events with relevant details, expressing ideas and feelings clearly.
SL.1.5	Add drawings or other visual displays to descriptions when appropriate to clarify ideas, thoughts, and feelings.
SL.1.6	Produce complete sentences when appropriate to task and situation. (See grade 1 Language standards 1 and 3 on page 26 [of the CCSS] for specific expectations.)
2nd Grade Standards	
SL.2.1	Participate in collaborative conversations with diverse partners about grade 2 topics and texts with peers and adults in small and larger groups.
SL.2.1a	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.2.1b	Build on others' talk in conversations by linking their comments to the remarks of others.
SL.2.1c	Ask for clarification and further explanation as needed about the topics and texts under discussion.
SL.2.2	Recount or describe key ideas or details from a text read aloud or information presented orally or through other media.

Kansas College and Career Ready Standards -- 2nd Grade Cont.	
SL.2.3	Ask and answer questions about what a speaker says in order to clarify comprehension, gather additional information, or deepen understanding of a topic or issue.
SL.2.4	Tell a story or recount an experience with appropriate facts and relevant, descriptive details, speaking audibly in coherent sentences.
SL.2.6	Produce complete sentences when appropriate to task and situation in order to provide requested detail or clarification. (See grade 2 Language standards 1and 3 on page 26 [of the CCSS] for specific expectations.)

Objectives

- Students will practice communicating directions
- Students will work together
- Students will practice listening
- Students will ask questions for clarification

Essential Questions

- Why is it important to work together?
- What is the best way to give directions?
- How do you ask questions for clarification?
- Why would it be important in going to Mars to be able to communicate clearly?

Suggested Lesson Plan

1. For this lesson you could either use a building toy or paper to cut/fold..
2. Show the students the raw materials first each group will be working with.
3. Explain to the students that they will be practicing communication by making/building something.
4. Start by naming each piece of the materials that the students will have, if you're using building toys. This will reduce confusion.
5. Separate students into groups of about five.
6. Have one student make/build something in an area that is out of sight to the rest of the group.
7. Have the single student who can see the object to be made/built try and verbally give their group members step-by-step instructions on how to make/build the object while the object remains out of sight. The other students can ask questions for clarification during this time, but *cannot* look at the object that is out of sight.
8. After the rest of the group thinks they have completed building what their classmate has directed them to, have them compare the two objects and draw them and their differences on the included worksheet.
9. To extend the activity, have students take turns making/building an object and giving the instructions for what they've made/built to their group members.

Materials

- A building toy (Tinker Toys, LEGOs, etc) or paper to cut/fold
- An improvised divider (a table turned on its side, an open door blocking students from seeing each other, etc)

Lesson 3 - Mouse Cage Measurements (Mathematics)

Kansas College and Career Ready Standards

1st Grade Standards

1.MD	1. Order three objects by length; compare the lengths of two objects indirectly by using a third object. 2. Express the length of an object as a whole number of length units, by laying multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same-size length units that span it with no gaps or overlaps. *Limit to contexts where the object being measured is spanned by a whole number of length units with no gaps or overlaps.*

2nd Grade Standards

2.MD	1. Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes. 2. Measure the length of an object twice, using length units of different lengths for the two measurements; describe how the two measurements relate to the size of the unit chosen. 3. Estimate lengths using units of inches, feet, centimeters, and meters. 4. Measure to determine how much longer one object is than another, expressing the length difference in terms of a standard length unit.
2.MD	5. Use addition and subtraction within 100 to solve word problems involving lengths that are given in the same units, e.g., by using drawings (such as drawings of rulers) and equations with a symbol for the unknown number to represent the problem. 6. Represent whole numbers as lengths from 0 on a number line diagram with equally spaced points corresponding to the numbers 0, 1, 2,…, and represent whole-number sums and differences within 100 on a number line diagram.

Objectives

- Students will order objects by length
- Students will measure length using a length unit or tools
- Students will determine length difference

Essential Questions

- Why is it important to have accurate measurements?

Suggested Lesson Plan

1. Discuss grade appropriate standards about length and measurement with your students.
2. Explain to students that they will determine the measurements for special mouse cages based on how many mice are going on the mission.
3. Separate your students into groups of about four.

Suggested Lesson Plan, cont.

4. Discuss grade appropriate standards about length and measurement with your students.
5. Explain to students that they will determine the measurements for special mouse cages based on how many mice are going on the mission.
6. Separate your students into groups of about four.
7. Provide each group with measuring tape, ruler, or yardstick and masking tape.
8. Have the students decide how many of the included mice should go on their mission.
9. Every mouse needs 4 inches of living space.
10. Each group of students will calculate how much space will be needed for their mouse cage.
11. Using a measuring tape and masking tape the students will measure out how big their Mouse Hotels will be.
12. For second grade standards the mice will need a different amount of space depending on their size.
13. One inch of mouse will need two inches of living space.
14. Have the students measure their mice then calculate how much space each mouse will need inside the cage
15. They will place tape in the size of their needed mousecage on the floor.

Materials

- Measuring blocks or units (1st grade)
- Measuring tape, rulers, or yardsticks (2nd grade)
- Masking tape
- Copies of the mice included, below.

Lesson 4 - Designing a Spacesuit (Engineering Design and Matter)

Next Generation Science Standards

2-PS1-1	Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties. [Clarification Statement: Observations could include color, texture, hardness, and flexibility. Patterns could include the similar properties that different materials share.]
2-PS1-2	Analyze data obtained from testing different materials to determine which materials have the properties that are best suited for an intended purpose. [Clarification Statement: Examples of properties could include, strength, flexibility, hardness, texture, and absorbency.] [Assessment Boundary: Assessment of quantitative measurements is limited to length.]
K-2-ETS1-1	Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.
K-2-ETS1-2	Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.
K-2-ETS1-3	Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.

Objectives

- Students will make observations using different properties
- Students will classify objects based on observations
- Students will plan and draw a design to be built
- Students will build something with with given materials
- Students will test and analyze their design

Essential Questions

- Why is it important to make good observations?
- How do observable properties help determine an object's purpose?
- When is classification necessary?

Suggested Lesson Plan

1. Show students the included picture of different possible materials to use in creating a spacesuit
2. Ask students to classify the items into the different categories on the corresponding worksheet
3. Discuss the students' classifications as a class
4. Show students the included picture of different possible materials to use in creating a spacesuit

Suggested Lesson Plan, cont.

5. Have students research current spacesuits and their problems, then define the problem with spacesuits as they see them on the corresponding worksheet
6. Have students draw and annotate an improved spacesuit for the pictured mouse.
7. Have students cutout the mouse pictured below for their spacesuit.
8. Have students build their spacesuit out of given materials.
9. Build your own spacesuit out of given materials.
10. Help students test their spacesuits' strength by dropping them from a height and observing what happens. Have them record their observations.
11. Help students test their spacesuits' flexibility by placing them across the fold of a book, closing the book, and observing what happens. Have them record their observations.
12. Help students test their spacesuits' temperature control by heating them up under a hair dryer and observing what happens. Have them record their observations.
13. Perform the same tests on the spacesuit you created and have students observe and record their observations.
14. Have students answer the follow up questions.

Materials

- Paper, wax paper, aluminum foil, plastic wrap, balloons, cotton balls
- Included picture of selected materials
- Craft supplies--glue, scissors, tape, markers, etc.
- Cutout of mouse to build spacesuit for

Lesson 6 - Building a Spacecraft (Engineering Design and Matter)	
Next Generation Science Standards	
2-PS1-1	Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties. [Clarification Statement: Observations could include color, texture, hardness, and flexibility. Patterns could include the similar properties that different materials share.]
2-PS1-2	Analyze data obtained from testing different materials to determine which materials have the properties that are best suited for an intended purpose. [Clarification Statement: Examples of properties could include, strength, flexibility, hardness, texture, and absorbency.] [Assessment Boundary: Assessment of quantitative measurements is limited to length.]
2-PS1-3	Make observations to construct an evidence-based account of how an object made of a small set of pieces can be disassembled and made into a new object. [Clarification Statement: Examples of pieces could include blocks, building bricks, or other assorted small objects.]
K-2-ETS1-1	Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.
K-2-ETS1-2	Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.
K-2-ETS1-3	Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.

Objectives

- Students will make observations using different properties
- Students will classify objects based on observations
- Students will plan and draw a design to be built
- Students will build something with with given materials
- Students will test and analyze their design

Essential Questions

- Why is it important to make good observations?
- How do observable properties help determine an object's purpose?
- When is classification necessary?

Suggested Lesson Plan

1. As a class, discuss and list observable properties such as color, texture, hardness, and flexibility.
2. Layout materials for students to make a spaceship

Suggested Lesson Plan, cont

3. Ask students to classify the items into different categories, based on observable properties. The students should be allowed to create the classifications themselves.
4. Allow students to test different materials to see what they could or could not use to build a model spacecraft for their mousetronaut
5. Separate students into groups of about five.
6. Allow them to use the provided materials to build a spaceship
7. Test the spaceships using the tests outlined previously. Students can also repeat the observation process using the corresponding worksheet.
    a. To adapt the test for flexibility, use wax paper to keep the spaceship from damaging the book's actual pages.
8. Discuss why the students used some materials and not others, and what materials were best for assembling their spaceships.
9. Have students disassemble their spaceships and figure out what else they could build with the same parts. This could be anything from a launch pad to a scientific tool.

Materials

- Marshmallows (large and small), toothpicks, straws, graham crackers, licorice, paper, and tape
- Scissors

Lesson 6 - Observing the Sky (Science)

Next Generation Science Standards

1-ESS1-1	Use observations of the sun, moon, and stars to describe patterns that can be predicted. [Clarification Statement: Examples of patterns could include that the sun and moon appear to rise in one part of the sky, move across the sky, and set; and stars other than our sun are visible at night but not during the day.] [Assessment Boundary: Assessment of star patterns is limited to stars being seen at night and not during the day.]
1-PS4-2	Make observations to construct an evidence-based account that objects can be seen only when illuminated. [Clarification Statement: Examples of observations could include those made in a completely dark room, a pinhole box, and a video of a cave explorer with a flashlight. Illumination could be from an external light source or by an object giving off its own light.]

Objectives

- Students will make observations
- Students will observe patterns
- Students will make predictions

Essential Questions

- How do observations help us learn?
- What happens to the objects in the sky?
- How do you make a good prediction?

Suggested Lesson Plan

1. Discuss the introduction to the students' worksheet, specifically why it might be important to observe events in the sky before traveling to space
2. Have students make observations of the sun, the moon, and stars three times per day: morning, afternoon, and night. Ask students to spend about five minutes going outside and looking at the sky to make observations. Complete the corresponding chart.
    a. Examples of observations include noting what is in the sky and where it is (East, West, overhead, etc or by landmarks like a field or parking lot, etc).
3. After 4 days of observations, discuss as a class the patterns the students have observed.
    a. Examples of patterns include the sun and moon rising in the ast and setting in the west, stars only appearing at night, the shape of the moon changing, etc.
4. Have students make a prediction about what they believe will happen on the 5th day.
5. Continue the observations for up to 15 days total, repeating the process of discussing and making predictions as time allows.
6. Using the observations, explain the concept of the moon only being visible when illuminated. The sunlight reflects off the moon's surface, which allows us to view it on earth. The moon's shape looks like it changes but it really is only because of what part we see reflected: it's all about location.

Materials

- Included observation chart

For more information please contact
the school programs manager at

620.665.9319 or fieldtrips@cosmo.org

1100 North Plum St.
Hutchinson, Kansas

COSMOSPHERE
INTERNATIONAL SCIED CENTER
SPACE MUSEUM

620.662.2305
www.cosmo.org