Exploring Our Solar System

Grade Level or Special Area: First Grade
Written by: Kelly Schettler, Platte River Academy, Highlands Ranch, Colorado
Length of Unit: 10 lessons (approximately 10 days; one day = 40 – 50 minutes)

I. ABSTRACT
In this unit, the students will become junior astronomers as they explore what is beyond our clouds. Through literature, the students will learn how we get day and night, as well as important information about the different planets that share our solar system. Through hands-on experiments, the students will understand the many relationships and connections between the Earth, Sun, and Moon. The students will also learn about our most important star, our sun, and understand how historians used our sky to tell stories with the stars. This unit will help the students begin to comprehend just how large and incredible our universe is.

II. OVERVIEW
A. Concept Objectives
   1. Students will understand the processes and interactions of Earth’s systems and the structure and dynamics of Earth and other objects in space (State Science Standard # 4).
   2. Students will understand the general characteristics of the atmosphere (State Science Standard # 4.2).
   3. Students will recognize the structure of the solar system, composition and interactions of objects in the universe (State Science Standard # 4.4).

B. Content from the Core Knowledge Sequence
   1. First Grade Science: Astronomy: Introduction to the Solar System (p. 39)
      a. Sun: source of energy, light, heat
      b. Moon: phases of the moon (full, half, crescent, new)
      c. The nine planets (Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune, Pluto)
      d. Stars
         i. Constellations; Big Dipper
         ii. The sun is a star.
      e. Earth and its place in the solar system
         i. The Earth moves around the sun; the sun does not move.
         ii. The Earth rotates (spins); one rotation takes one day (24 hours)
         iii. Sunrise and sunset
         iv. When it is day where you are, it is night for people on the opposite side of the Earth.

C. Skill Objectives
   1. The students will learn that we would be unable to survive on Earth without the energy, light, and heat from the sun.
   2. The students will learn that day and night are created by the rotation of the Earth every twenty-four hours.
   3. The students will learn that even though they cannot feel this rotation, it is constant.
   4. The students will show the rotation of the Earth, its revolution around the sun, and the moon’s revolution around the Earth using their bodies.
   5. The students will learn that it takes 365 days to revolve around the sun one time; which is called a year.
6. The students will be able to explain the difference between sunrise and sunset and how these are formed.
7. The students will create a model that shows the rotation of the Earth, its revolution around the sun, and the moon’s revolution around the Earth.
8. The students will follow directions to create this model.
9. The students will write a short paragraph about what they have learned about the sun, Earth, and moon and their relationships to each other.
10. The students will learn that our sun is really a star.
11. The students will learn important terms related to space and science through literature.
12. The students will learn that a constellation is a group of stars that makes a picture.
13. The students will understand that stars create their own light, while planets and moons reflect the sun’s light.
14. The students will create their own constellations.
15. The students will learn that travelers use a constellation called the Big Dipper to locate the North Star.
16. The students will understand that the North Star is the only star in the sky that doesn’t move each night.
17. The students will recreate a Big Dipper.
18. The students will label the Big Dipper and North Star on their project.
19. The students will hear a story that tells all of the verses to *Twinkle, Twinkle, Little Star*.
20. The students will make a dictionary to fill with terms they learn throughout this unit.
21. The students will learn that the moon has phases it goes through at different times of the month as it travels around the Earth and sun.
22. The students will do an experiment to see the different phases a moon goes through.
23. The students will understand that the moon phases are actually created by the moon being in the Earth’s shadow as they both revolve around the sun.
24. The students will sequence the phases of the moon.
25. The students will learn the different names given to these phases.
26. The students will learn about the nine planets through literature.
27. The students will add additional science terms to their astronomy dictionaries.
28. The students will learn that our moon is called a satellite because it travels around a planet.
29. The students will understand that an orbit is a path around the sun.
30. The students will create a planet book with important facts about each of the planets in our solar system.
31. The students will use what they have learned about the planets to complete fill-in-the-blank sentences in their planet book.
32. The students will follow directions to complete this project.
33. The students will continue to complete their planet books with important facts about each of the planets in our solar system.
34. The students will review and solidify what they have learned throughout this unit by playing SPACE BINGO.
35. The students will create their own BINGO boards by answering questions about astronomy.
36. The students will take a written test demonstrating what they have learned throughout this unit.
37. The students will correctly sequence the planets on a mini poster of the solar system.
38. The students will complete their astronomy dictionaries by adding important terms they learned from this unit.

III. BACKGROUND KNOWLEDGE
A. For Teachers
1. *The Planets in our Solar System* by Franklyn Branley
2. *Space Exploration* by Mary Jo Keller
3. *Solar System* by Linda Milliken
B. For Students
1. Kindergarten: Geography: Spatial Sense (p. 11)
2. Kindergarten: An Overview of the Seven Continents (p. 11)
3. First Grade Science: The Earth (p. 39)
4. First Grade Geography: Spatial Sense (p. 27)

IV. RESOURCES
A. *What Makes Day and Night* by Franklyn Branley (Lesson One)
B. *The Sun and Other Stars* by Richard Harris (Lesson Three)
C. *The Big Dipper and You* by E.C. Krupp (Lesson Four)
D. *Twinkle, Twinkle, Little Star* by Iza Trapani (Lesson Four)
E. *The Moon* by Melvin and Gilda Berger (Lesson Five)
F. *The Planets in our Solar System* by Franklyn Branley (Lessons Six - Eight)
G. *The Planets* by Gail Gibbons (Lessons Six - Eight)
H. *Glow in the Dark Book of Space* by Nicholas Harris (Lesson Nine)

V. LESSONS
Lesson One: The Sun, Earth, and Moon (approximately 40 – 50 minutes)
A. Daily Objectives
1. Concept Objective(s)
   a. Students will understand the processes and interactions of Earth’s systems and the structure and dynamics of Earth and other objects in space.
   b. Students will understand the general characteristics of the atmosphere.
   c. Students will recognize the structure of the solar system, composition and interactions of objects in the universe.
2. Lesson Content
   a. Sun: source of energy, light, heat
   b. Earth and its place in the solar system
      i. The Earth moves around the sun; the sun does not move.
      ii. The Earth rotates (spins); one rotation takes one day (24 hours)
      iii. Sunrise and sunset
      iv. When it is day where you are, it is night for people on the opposite side of the Earth.
3. Skill Objective(s)
   a. The students will learn that we would be unable to survive on Earth without the energy, light, and heat from the sun.
   b. The students will learn that day and night are created by the rotation of the Earth every twenty-four hours.
   c. The students will learn that even though they cannot feel this rotation, it is constant.
d. The students will show the rotation of the Earth, its revolution around the sun, and the moon’s revolution around the Earth using their bodies.
e. The students will learn that it takes 365 days to revolve around the sun one time, which is called a year.
f. The students will be able to explain the difference between sunrise and sunset and how these are formed.

B. **Materials**
1. *What Makes Day and Night* by Franklyn Branley

C. **Key Vocabulary**
1. Rotate – to spin around
2. Sunrise – when we first start seeing the sun in the morning
3. Sunset – when it starts getting darker in the evening
4. Revolve – to travel around something

D. **Procedures/Activities**
1. *This unit should be taught after the students have already learned the basic geography of the Earth (oceans, continents, maps, compass directions) as well as what is inside the Earth, volcanoes, geysers, and rocks and minerals. This provides a smooth transition into this unit.*
2. Gather the students to an area where they can sit close to you.
3. Explain to the students that now that they have learned about the Earth, what is on it and inside of it, they are now ready to learn what is going on around the Earth in space.
4. Ask the students what they can see in the sky when they look outside during the day (sun).
5. Ask the students what they can see when they look outside at night (moon and stars).
6. Explain that these are all things that are part of our solar system, as well as many planets and other interesting things they will learn about.
7. Tell the students that today they are going to learn a little bit about the sun. Explain that it is very important to Earth. It gives us light so we can see, and it also gives us heat (like a big fire to keep us warm). Explain that without the sun we would freeze.
9. Tell the students that when you read this book, they will learn about how we get day and night.
10. Read pages 1 – 8. After reading page 8, explain that the Earth really does spin all of the time. Ask the students to close their eyes and sit very still. Ask them if they can feel the Earth spinning.
11. After approximately one minute, ask if anyone felt the Earth moving (no).
12. Read page 10. After reading tell the students that the Earth is actually spinning at 1,000 mph. That is faster than even airplanes go. Explain that they can’t feel it move because the Earth is so large and they are so small. Plus, the Earth never stops spinning, so they don’t know what it would feel like if it ever did stop.
13. Continue reading. Stop reading after page 14. Tell the students that this page is very important to understand because this is why we have day and night. Explain that you are going to need some helpers.
14. Choose two students to join you in front of the class.
15. Tell the class that you are going to choose one of the students to be the sun, the largest thing in our solar system. (Choose one of the students to represent the sun.)
16. Next, tell the class that the other student is going to be Earth, our home.
17. Position the student helpers so they are approximately 3 feet apart.
18. Ask the class what they just learned about the Earth from the book (it spins).
19. Ask the student who is being Earth to stand in one spot and spin around very slowly. Tell the class, that although the Earth spins at 1,000 mph, we are going to have this student spin very slowly so we can see what is really happening. Explain to the class that scientists call this type of spinning *rotating*.
20. Next, explain that our sun doesn’t move like our Earth; it stays still.
21. Next, have “Earth” spin until he/she is facing the “Sun”. Tell the class to notice that right now anyone who lives on this part of the Earth would be facing the sun so they would have daytime. However, those people who live on the other side of the Earth, not facing the sun, would have night.
22. Ask the “Earth” to slowly start rotating. As this student rotates, point out that all of the people that just had daytime are now slowly getting closer to having nighttime because they are turning away from the sun. Allow the student helper to model this.
23. Explain that although this student can spin around one time in only a few seconds, the real Earth takes about twenty-four hours to spin around just one time. Explain that this is quite a long time. When we wake up in the morning, the sun is out until it is just about time for bed, and then we sleep for almost the entire time we are not facing the sun (nighttime). Another day starts as the Earth faces the sun again.
24. Ask if there are any questions.
25. Thank your helpers and have them return to their spots.
26. Read pages 16 – 20. After reading page 20, explain that the students can try this experiment at home.
27. Continue reading. While reading page 22, pause to explain that sunrise is when we first start seeing the sun in the morning and sunset is when it starts getting darker in the evening.
28. After reading page 29, explain that the moon rotates just like the Earth, but it doesn’t spin as fast. So if we lived on the moon we would have two weeks of daytime and then two weeks of nighttime.
29. Finish reading the rest of the story.
30. Next, tell the class that they just learned about how we get day and night, but that the Earth and the sun actually do even more than that.
31. Tell the students that you are going to need more helpers.
32. Before choosing students, tell the class to return to their seats because they will need a lot more room for this next activity.
33. After the students are seated, choose two students to be your helpers. Have them come to the front of the room.
34. Choose one of the students to be the sun and the other to be the Earth. Have the students stand approximately three feet from one another.
35. Ask the class to tell you what they learned about the Earth (it spins/rotates one time in twenty-four hours so we get day and night).
36. Have “Earth” start slowly spinning in place (rotating).
37. Explain that not only does the Earth rotate, but it also does something that is called *revolving*. Explain that this means it goes around the sun.
38. Have “Earth” continue spinning/rotating while now revolving as well. Explain to the class that this is actually quite difficult to do. Assist the student who is “Earth” until he/she is able to easily rotate and revolve around the sun at the same time.
39. Explain that the sun only needs to stand and shine on the Earth, that’s it.
40. Tell the students that it takes the Earth about 365 days to get around the sun just one time. Ask the class if they know what we call this (year).
41. Tell the students, to make things even more difficult, there is still more going on here than what we are already doing. Have your “Earth” student stand still to rest for a while.
42. Tell the class that you need another helper.
43. Choose one student. Explain that this student is going to be the moon. Explain that while the Earth is rotating and revolving, the moon is revolving around the Earth. *(Although the moon rotates as well, this would be too much to model at this time.)*
44. Have the student being the Earth stand still for a moment and have the “Moon” walk around him/her. Explain to the class that this is happening while the Earth is going around the sun and rotating.
45. Ask your helpers if they think they can do it. Have them try. Assist as necessary. Make sure to remind the Earth to go slowly or the moon will not be able to get around him/her.
46. After the helpers have successfully done this a few times, have them return to their seats.
47. Tell the students that you are going to choose three more students to try this. Tell them that you will ask questions, and whoever can answer them can be a helper.
48. Ask: What does the moon do? (rotates around the Earth) Call on a student to answer the question. The first one to answer correctly can join you at the front of the room.
49. Repeat this with the following two questions: What does the Earth do? (rotates and revolves around the sun) What does the sun do? (stays still and shines)
50. After you have three helpers, designate a sun, moon, and Earth and have them model what happens between the Earth, moon, and sun. Assist as necessary.
51. After they have been successful, have them return to their seats. Explain that you will be asking for volunteers each day to demonstrate this, so if they didn’t get a turn, they will another day.
52. Tell the students that tomorrow they will make a model of the moon, sun, and Earth to take home that shows how they all spin.

E. **Assessment/Evaluation**

1. Observe the students throughout the lesson for comprehension.

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**Lesson Two: Making Models (approximately 40 – 50 minutes)**

A. **Daily Objectives**

1. Concept Objective(s)
   a. Students will understand the processes and interactions of Earth’s systems and the structure and dynamics of Earth and other objects in space.
   b. Students will understand the general characteristics of the atmosphere.
   c. Students will recognize the structure of the solar system, composition and interactions of objects in the universe.

2. Lesson Content
   a. Sun: source of energy, light, heat
   b. Earth and its place in the solar system
      i. The Earth moves around the sun; the sun does not move.
      ii. The Earth rotates (spins); one rotation takes one day (24 hours)
      iii. Sunrise and sunset
iv. When it is day where you are, it is night for people on the opposite side of the Earth.

3. **Skill Objective(s)**
   a. The students will create a model that shows the rotation of the Earth, its revolution around the sun, and the moon’s revolution around the Earth.
   b. The students will follow directions to create this model.
   c. The students will write a short paragraph about what they have learned about the sun, Earth, and moon and their relationships to each other.

B. **Materials**
1. One copy of Appendix A for each student and one for the teacher
2. Two brads (brass fasteners) for each student and two for the teacher
3. Crayons for each student and for the teacher
4. One pair of scissors for each student and one pair for the teacher
5. One copy of Appendix B for each student and one for the teacher
6. One pencil for each student and one for the teacher

C. **Key Vocabulary**
None

D. **Procedures/Activities**
1. To begin the lesson, ask the class who can remember how we get day and night.
2. Review as necessary.
3. Repeat steps 48 – 50 from Lesson One to review the terms rotate and revolve.
4. After the students have successfully modeled what happens between the moon, sun, and Earth have them return to their seats.
5. Explain that today the students will make a model of what happens between the moon, sun, and Earth that they can take home today.
6. Gather the students to an area where they can sit close to you.
7. Hold up a copy of Appendix A.
8. Read the directions at the top of the page. Then, as the students watch, cut out the shapes and connect them, reviewing the directions as you work.
9. Explain that this would look a lot nicer if it were colored. Tell the students that before they do any cutting, they should color their sun, moon, and Earth.
10. Next, explain that this model shows how the Earth revolves around the sun and how the moon revolves around the Earth. Ask the class what is missing. Lead the class to realize that in this model the Earth isn’t able to rotate. *If you would like the class to make models in which the Earth can rotate, explain how the students can cut the Earth off the stick it is on and then reattach it with a brad. Then it will be able to spin on this stick as well as revolve around the sun. If you choose to do this, each student will need three brads instead of two to complete the model.*
11. Ask if there are any questions.
12. Have the students return to their seats.
13. Choose helpers to pass out one copy of Appendix A to each student.
14. Explain to the class that when they are ready for their brads, you will have them on your desk (or in some other central location).
15. As the students work, walk around the room and assist as necessary.
16. After the students finish their models, tell them to put these models in their homework folder to take home today.
17. Next, explain that the students are going to write on the Earth.
18. Hold up a copy of Appendix B. Explain that they aren’t going to write on the real Earth, but on this mini Earth instead.
19. Explain that on this page they need to write about what they have learned so far about the Earth, moon, and sun. Tell them that you want them to write as much as they can remember.

20. Hang a copy of Appendix B on the board so you can model for the students what you would like them to do. Say: “Who can help me think of something that I can write on my Earth?” (Some things the students might say: The Earth travels around the sun, the moon travels around the Earth, rotate means to spin, revolve means to travel around something, the Earth gets around the sun one time in 365 days, the Earth spins around one time in 24 hours, when the Earth spins we get daytime and nighttime, when it is day for us, it is night for people on the other side of the Earth, the sun gives us light and heat.)

21. Call on a student to share something. Write it on your Earth paper.

22. Continue until your Earth paper is full.

23. Next, tell the students that when their Earth is full, they need to write their name on the name line, and then cut out the Earth.

24. Explain that after they are finished they need to turn in their Earth.

25. Ask if there are any questions.

26. Pass out one copy of Appendix B to each student.

27. Tell the students that they can begin as soon as they get their paper.

28. As the students work, walk around the room to assist as necessary.

29. When the students are finished, tell the class that tomorrow they will learn more about the sun.

E. **Assessment/Evaluation**

1. Evaluate the students’ Earth papers to see that they understand the content taught so far.

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**Lesson Three: Stars and Constellations (approximately 40 – 50 minutes)**

A. **Daily Objectives**

1. **Concept Objective(s)**
   a. Students will understand the processes and interactions of Earth’s systems and the structure and dynamics of Earth and other objects in space.
   b. Students will understand the general characteristics of the atmosphere.
   c. Students will recognize the structure of the solar system, composition and interactions of objects in the universe.

2. **Lesson Content**
   a. Stars
      i. Constellations; Big Dipper
      ii. The sun is a star.

3. **Skill Objective(s)**
   a. The students will learn that our sun is really a star.
   b. The students will learn important terms related to space and science through literature.
   c. The students will learn that a constellation is a group of stars that makes a picture.
   d. The students will understand that stars create their own light, while planets and moons reflect the sun’s light.
   e. The students will create their own constellations.

B. **Materials**

1. *The Sun and Other Stars* by Richard Harris
2. One small carpet square (approximately 10” x 10”)

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3. One piece of 12” x 18” black construction paper for each student and one for the teacher
4. Enough sharp toothpicks for five per each student in the class and five for the teacher (this allows for extras in case some break)
5. One flashlight (if you do not have a classroom window that faces outside)

C. **Key Vocabulary**

1. Solar system – the sun, planets, and their moons
2. Astronomer – someone who studies space
3. Telescope – something used to see stars
4. Constellation – a group of stars that makes a picture

D. **Procedures/Activities**

1. To begin the lesson, ask the class who can remember how we get day and night.
2. Review as necessary.
3. Repeat steps 48 – 50 from Lesson One to review the terms rotate and revolve.
4. After the students have successfully modeled what happens between the moon, sun, and Earth have them gather in an area where they can sit close to you.
5. Explain to the students that today they are going to learn more about the sun.
6. Ask: “Does anyone know what the sun is? Is it a planet…a moon?”
7. Allow a few students to share their answers. Explain that the sun is actually a star.
8. Tell the students that you have a book that is going to teach them a lot about the sun and other stars.
10. After reading page 13, explain that the word sun in Latin is “sol”. Therefore, “solar system” really means “sun system”. Explain that when people use the term *solar system*, this means the sun, planets, and their moons—all of this makes up a solar system.
11. Continue reading. After reading page 21, stop and review the terms *astronomer* and *telescope*.
12. Continue reading. After finishing the book, tell the students that they are going to get to make their own constellations today.
13. Remind the students that a constellation is a group of stars that makes a picture.
14. Hold up a piece of black construction paper.
15. Explain that you chose black paper because the night sky looks black late at night.
16. Next, tell the students that you are going to use a toothpick to poke holes in the paper to make a picture. Set the carpet square on your lap and set the black paper on it. Use a toothpick to model how to poke holes in the paper carefully. Create a picture that is easily recognizable. (For example, a smiley face or a letter of the alphabet.) Be sure to make it large enough to been seen by all of the class when you hold it up next to a window.
17. Before showing the class your constellation, remind them that stars actually make their own light; they glow. But for this project you will need light to be shown behind your paper in order to see your constellation.
18. Choose a student to go turn off the classroom lights.
19. Hold your constellation picture up to the classroom window (or shine a flashlight behind your paper). Ask the class if they can tell what your constellation is.
20. Call on a student to say what they think it is.
21. Ask the students if they have any questions about how to create their own constellations.
22. Explain that when they get their toothpick and paper, they need to find a spot around the room where they can sit comfortably on the carpet and work. Tell the students that when they are finished, they can hold their constellations up to the window to see their pictures. Explain that if they have enough room on their papers, they can make more than one constellation. Tell the students that you will have extra toothpicks if theirs breaks or gets too dull to poke with.

23. Pass out one piece of black paper and one toothpick to each student. Tell them they can begin.

24. Walk around the room assisting as necessary.

25. After all of the students have finished their constellations, tell them to turn in their papers and you will choose a few to hang on the window. (Choose and hang a few of the papers.)

26. Explain to the class that tomorrow they will learn about an important constellation called the Big Dipper.

E. Assessment/Evaluation
1. Make observations during the lesson to see that students understand the content being taught.

Lesson Four: The Big Dipper (approximately 40 – 50 minutes)

A. Daily Objectives
1. Concept Objective(s)
   a. Students will understand the processes and interactions of Earth’s systems and the structure and dynamics of Earth and other objects in space.
   b. Students will understand the general characteristics of the atmosphere.
   c. Students will recognize the structure of the solar system, composition and interactions of objects in the universe.

2. Lesson Content
   a. Stars
      i. Constellations; Big Dipper
      ii. The sun is a star.

3. Skill Objective(s)
   a. The students will learn that travelers use a constellation called the Big Dipper to locate the North Star.
   b. The students will understand that the North Star is the only star in the sky that doesn’t move each night.
   c. The students will recreate a Big Dipper.
   d. The students will label the Big Dipper and North Star on their project.
   e. The students will hear a story that tells all of the verses to Twinkle, Twinkle, Little Star
   f. The students will make a dictionary to fill with terms they learn throughout this unit.

B. Materials
1. One piece of 12” x 18” black construction paper for each student and one for the teacher
2. Ten shiny silver star stickers for each student and ten for the teacher
3. The Big Dipper and You by E.C. Krupp
4. One white crayon or piece of white chalk for each student
5. Twinkle, Twinkle, Little Star by Iza Trapani
6. One copy of Appendices C and D (copied back to back) for each student and one for the teacher
7. One pencil for each student and one for the teacher

C. Key Vocabulary
1. Label – to write the name of something next to its picture
2. Dictionary – a book of words with definitions explaining what each word means

D. Procedures/Activities
1. To begin the lesson, ask the class who can remember what the sun is (a star).
2. Next, ask who can tell you what a constellation is (a picture made of stars).
3. Remind the students that they got to make their own constellations yesterday, but explain that there is one important constellation that you want all of the students to know. Tell the students that this constellation points to the North Star, the star that was mentioned in the book they read yesterday that helped people know what direction they are going if they are lost.
4. Hold up the book *The Big Dipper and You*. Tell the students that you are only going to read the first few pages of this book and then the students are going to make the big dipper.
6. Explain that the Big Dipper is made of seven stars, three for the handle and four for the bowl. Hold up the front cover of the book again so the students can count the stars in the dipper.
7. Hold up a piece of black construction paper and a sheet of ten silver stars.
8. Using your paper, model how the students can create the bowl of the Big Dipper by placing four stars in the center of the paper in the shape of a rectangle. Then show the students how to place the other three to make the handle.
9. Explain that after they make their dipper they will still have three stickers left. Tell the students that one of these stickers if for the North Star. Open the book to page 6. Point out that the illustration on this page shows how to find the North Star using the two bottom stars of the dipper’s bowl.
10. Show the students how to use the two stars at the bottom of the Big Dipper’s bowl on their paper to place a sticker where the North Star should be.
11. Next, tell the students that they get to keep the other two stars for themselves.
12. Explain that there are only a few more things they will need to do on their papers. Hold up a white crayon (or piece of chalk). Tell the students that they need to label the North Star and the Big Dipper. Explain that to label something means to write the name of it next to its picture. Model this on your paper by labeling the North Star and the Big Dipper.
13. Ask if there are any questions.
14. Have the students return to their desks.
15. Pass out one piece of black construction paper, one sheet of ten shiny star stickers, and one white crayon (or piece of chalk) to each student.
16. Tell the students they can begin as soon as they get their supplies.
17. As the students work, walk around the room to assist as necessary.
18. When the students finish, tell them that they can put this paper into their homework folders to take home.
19. Gather the students to an area where they can sit close to you.
20. Hold up the book *Twinkle, Twinkle, Little Star*.
21. Ask if any of the students know a song by this title. *(If a lot of the students know the song, have them sing it.)*
22. Tell the students that this book has more versus to the song.
23. Read the book. *(You may want to pass this book on to the music teacher to teach the class the rest of the song.)*
24. After reading the book, explain that they know so much more about stars than they did just a few days ago. Tell the class that there is still so much about space to learn.
25. Tell the students that in order to remember some of the important science words they have been learning, they are going to start a science dictionary. Explain that a dictionary is a book of words with definitions describing what each word means.
26. Hold up a copy of Appendices C and D copied back to back.
27. Explain that they are going to use this page as their Astronomy Dictionary.
28. Show the students that if they fold the page in half (hamburger way) it makes a mini book. Model this by folding your paper.
29. Explain that the first thing the students need to do is write their names on the front of their book.
30. Pass out one copy of Appendices C and D (copied back to back) to each student.
31. Tell the students to fold their paper and write their name on the front.
32. Hang your dictionary on the board so you can model what the students need to do.
33. Tell the class that today you are only going to add one word--constellation.
34. Show the students that this word is already written in their books, but it does not have a definition yet.
35. Ask: “Who can tell me what a constellation is?” Call on a few students to give you a definition.
36. On the board, after the word constellation, write: “A group of stars that makes a picture”. Model where to write this in your dictionary. Tell the students to write this in their books as well.
37. After the students have finished writing, explain that the next thing they need to do is draw a picture of a constellation in the small box next to the word constellation. Point to this box on your paper.
38. Ask the students what they think they should draw in this box. Lead the students to realize they should draw a very small picture made of a few stars. Sketch a quick picture made of stars on the board so the students understand what they need to do.
39. Tell the students to quickly draw their constellations and then turn in their dictionaries to the homework box.
40. Explain that you will pass out this book again another day. Tell the students that tomorrow they will take a trip to the moon, another part of our solar system.

E. Assessment/Evaluation
1. Quickly check through the students’ dictionaries to see that they have correctly written the definition of a constellation.

Lesson Five: The Phases of the Moon (approximately 40 – 50 minutes)
A. Daily Objectives
1. Concept Objective(s)
   a. Students will understand the processes and interactions of Earth’s systems and the structure and dynamics of Earth and other objects in space.
   b. Students will understand the general characteristics of the atmosphere.
   c. Students will recognize the structure of the solar system, composition and interactions of objects in the universe.
2. Lesson Content
   a. Moon: phases of the moon (full, half, crescent, new)
3. **Skill Objective(s)**
   a. The students will learn that the moon has phases it goes through at different times of the month as it travels around the Earth and sun.
   b. The students will do an experiment to see the different phases a moon goes through.
   c. The students will understand that the moon phases are actually created by the moon being in the Earth’s shadow as they both revolve around the sun.
   d. The students will sequence the phases of the moon.
   e. The students will learn the different names given to these phases.

B. **Materials**
   1. *The Moon* by Melvin and Gilda Berger
   2. One orange for each student (not peeled)
   3. One new pencil for each student (sharpened)
   4. One large lamp with the lamp shade removed
   5. One copy of Appendix E for each student and one copy for the teacher
   6. One pair of scissors for each student and one pair for the teacher
   7. One container of glue for each student and one for the teacher
   8. One strip of black construction paper approximately 2.5” x 18” (cut these strips from 11” x 18” paper) for each student and one for the teacher
   9. Tape

C. **Key Vocabulary**
   1. Phases – the different shapes of the moon

D. **Procedures/Activities**
   1. *Before the lesson, poke a pencil through the center of each orange, but don’t let it come out the other end (the students will be holding these and they might get poked if it sticks out). These will be used for an experiment later in the lesson.*
   2. Tell the students that today they are going to learn more about the moon.
   3. Gather the students to an area where they can sit close to you.
   4. Hold up the book *The Moon*.
   5. Tell the students that this is a very short book that teaches about the moon.
   6. Read the book to the class.
   7. After reading, explain that the moon is like the Earth in that it is round and it doesn’t make its own light. It gets its light from the sun just like the Earth does.
   8. Ask the students if they have ever seen the moon when it doesn’t look round (yes).
   9. Tell the class that even though it looks like the moon changes shapes, it really doesn’t. Tell the class that they are going to do an experiment to understand what really happens.
   10. Tell the students to stand behind their desks.
   11. Choose some helpers to pass out an orange to each student. While they are being passed out, tell the students that they are not going to eat these. Tell them that they are going to pretend that they are moons.
   12. Tell the students that when they get their orange they need to carefully hold it by the pencil. Demonstrate this.
   13. Plug the lamp in at the front of the room and turn it on.
   14. Next, choose a student to turn off the lights (if you have blinds in your room they should be closed as well to make the room as dark as possible).
   15. Tell the students to pretend that the light at the front of the room is the sun and that they are holding the moon.
   16. Have the students face the lamp.
17. Explain that if they hold the orange/moon directly in front of them they will see
the part of the orange that is in shadow. Explain that this is called a New Moon.
Tell the students that they wouldn’t be able to see the moon in the sky because
they can’t see the part of the moon being lit by the sun.
18. Next, have the students turn 90 degrees to their right. Tell them to look at the
part of the orange they can see now (only half of it is lit). Explain that this is
called a half moon because we would only see the half that is lit up.
19. Next have the students turn so their back is to the light. Tell the students to hold
their “moons” about one foot above their heads. Explain that this is called a full
moon because all of it is lit and it looks like a large circle.
20. Have the students turn another 90 degrees to their right to look at another half
moon. Tell them that this time the other half of the moon is lit.
21. Explain that each time the moon has a different shape that we can see, this is
called a phase.
22. Allow a few more minutes for the students to move around looking at different
phases.
23. After approximately two or three minutes, choose a student to turn on the
classroom lights again. Turn off your lamp and tell the students to throw out
their moons, pencil included. Tell them that this project is too messy to take
home, but tell the students that they can always make this project at home easily.
24. Have the students return to their seats.
25. Hold up a copy of Appendix E.
26. Explain that this sheet shows the different phases of the moon and the names of
each phase.
27. Tell the students that today they are going to put the phases in the correct order.
28. Gather the students to an area where they can sit close to you.
29. Hold up a copy of Appendix E. Show the students the different phases and what
they are called (Point out that there are two of each type. For example, there are
two half moons, one with the left side lit and one with the right side lit).
30. Explain that it takes about one month for the moon to go through each of these
phases.
31. Tell the students that their job will be to cut out the moons so that their names are
still attached so they will know what they are called. Cut out each of your moons
to demonstrate this.
32. Tell the students if they accidentally cut off the name, you will have tape out so
they can re-attach it.
33. Next, hold up a strip of black construction paper.
34. Tell the students that their job will be to put the moon phases in order starting
with a new moon.
35. Find you new moon and glue it to the far left side of the strip of paper to
demonstrate what the students should do.
36. Explain that the next phase they would see would be a crescent moon because the
moon and Earth would both move slightly so a small piece of the moon that
looks like a banana would be lit. Glue this piece on the paper next to the New
Moon.
37. Continue until you have glued all of the phases in order on your sample. The
order is New, Crescent, Half, Gibbous, Full, Gibbous, Half, Crescent. Make sure
to explain to the students that they need to be watching for which part of the
moon is lit so they don’t confuse the order.
38. Ask if there are any questions. Tell the students that you will hang up your sample just in case they need a model to look at while they are working. Explain that this can get tricky because there are two of each phase.

39. Tell the students to set their pieces on their paper in order before they glue them, and then raise their hand. Explain that you will walk over and check to see that it is in the correct order before they glue down the moons.

40. Have the students return to their seats.

41. Choose helpers to pass out a copy of Appendix E, a container of glue, and a strip of black paper to each student.

42. Tell the students that they can begin as soon as they get their supplies.

43. Hang up your sample on the board.

44. Walk around to assist as necessary. Remind the students to not cut off the name of the phase and not to glue down their moons until you have checked to see that they are in the correct order.

45. As you see students finishing, have them turn in their papers.

46. Tell the students that tomorrow they will start learning about the different planets in our solar system.

E. Assessment/Evaluation

1. Check the students moon strips to see that they put the phases in the correct order.

Lesson Six: The Planets (approximately 40 – 50 minutes)

A. Daily Objectives

1. Concept Objective(s)
   a. Students will understand the processes and interactions of Earth’s systems and the structure and dynamics of Earth and other objects in space.
   b. Students will understand the general characteristics of the atmosphere.
   c. Students will recognize the structure of the solar system, composition and interactions of objects in the universe.

2. Lesson Content
   a. The nine planets (Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune, Pluto)

3. Skill Objective(s)
   a. The students will learn about the nine planets through literature.
   b. The students will add additional science terms to their astronomy dictionaries.
   c. The students will learn that our moon is called a satellite because it travels around a planet.
   d. The students will understand that an orbit is a path around the sun.
   e. The students will create a planet book with important facts about each of the planets in our solar system.
   f. The students will use what they have learned about the planets to complete fill-in-the-blank sentences in their planet book.
   g. The students will follow directions to complete this project.

B. Materials

1. The Planets in our Solar System by Franklyn Branley
2. The dictionaries the students made from Lesson Four and the teacher’s dictionary
3. One copy of Appendices F – O for each student (stapled as a packet)
4. Two copies of Appendices F – O for the teacher (stapled as two packets)
5. One pair of scissors for each student and one for the teacher
C. **Key Vocabulary**

1. **Planet** – a ball of rock or gas that moves around a star
2. **Orbit** – a path
3. **Satellite/moon** – something that travels around a planet

D. **Procedures/Activities**

1. **Before starting the lesson, complete one of the planet books to use as a sample.**
   *In order to complete this book, you will need to read through this lesson and Lessons Seven and Eight. You will use the other teacher planet book copy during the lessons with the students so you can model what they need to do.*

2. To review what the students have learned so far, tell the students that they are going to do a little work in their dictionaries.

3. Pass out the dictionaries the students started in Lesson Four.

4. Hang your dictionary on the board so you can model what the students need to do.

5. On the board write the word “rotate” large enough so the students can see it. Explain that this is the next word they need to add to their dictionaries. Model where they need to write the word by writing it on your dictionary.

6. Ask the class who can explain what the word rotate means. Call on a few students to explain the word.

7. On the board write, “to spin around”.

8. Explain that after they finish writing the definition, they need to think about what kind of picture they should draw. Lead the students to realize that they could draw a spiral with an arrow on the end to show that something is spinning.

9. Work with the students to add the following words to their dictionaries:
   a. **Revolve** – to travel around something (picture – draw a planet going around the sun)
   b. **Sunrise** – when we first start seeing the sun in the morning (picture – draw a sun rising on the horizon)
   c. **Sunset** – when it starts getting darker in the evening (picture – draw a sun setting on the horizon)
   d. **Solar system** – the sun, planets, and their moons (picture – draw a sun with planets traveling around it)

10. After the students have added these words, explain that there are many more words, but they will add these words another day.

11. Tell the students to turn in their dictionaries.

12. Gather the students to an area where they can sit close to you.

13. Hold up the book *The Planets in our Solar System*. Tell the students that this book will teach about the different planets that are in our solar system.

14. Read pages 5 – 7. Stop reading after page 7. Explain that the pictures they see are real photos that were taken in space.

15. Continue reading pages 8 – 12. After reading page 12, explain that “satellite” is another word for a moon, something that travels around a planet.

16. Continue reading pages 14 – 16. After reading page 16 explain that the word “orbit” means a path.

17. Finish reading the rest of the book.

18. Next, explain that there are nine planets, including our Earth.

19. Tell the students that they will be making a very neat book to record information they learn about these planets.
20. Show the students your completed sample book. Explain that this book will take a few days to make but it will look great when it is finished.
21. Hold up a packet that has not been completed. Explain that this is what the book will look like when they start.
22. Tell the students that the first thing they need to do when they get their book is to write their name in the Earth. Point to where the Earth is.
23. Next, explain that you do not want them to color anything else on the cover, because they will color each planet as they finish its page in the book.
24. Tell the students to return to their seats.
25. Choose some helpers to pass out a packet to each student.
26. Remind the students to write their name in the Earth and then open to the first page that shows Mercury on the tab.
27. Hang your second planet book (the one that has not been completed yet) on the board so you can model what the students need to do.
29. Tell the class that you will read this book to get the information the students need to fill in the blanks on the pages in their planet books. Tell the students not to do anything in their books while you read.
30. Because this book does not have page numbers, I will describe what is on the page to describe when to stop reading.
31. Read the first part of the book. Stop reading after you finish reading the Mercury pages.
32. Tell the students to look at the Mercury page in their books. Explain that they need to figure out what words are missing from the sentences.
33. Read the first sentence. (Mercury is the ________ planet from the sun.)
34. Ask the students to raise their hands if they know the word that is missing. Call on a student to share their answer.
35. Write the correct answer on the board and model where to write the answer by writing it in the correct spot in your book.
36. Repeat steps 33 – 35 to complete the rest of the sentences on the Mercury page.
37. Next, explain that now it is time to illustrate the page so it looks like Mercury. Hold up the Mercury pages in The Planet to show the students that Mercury is a grayish color. Then hold up page 6 from The Planets in our Solar System to show this picture as well. Explain that it is brownish/grayish color because there is no water or grass on Mercury because it is too hot.
38. Explain to the students that they can start by coloring the whole page gray, then they can go back to add details like the craters that they see in the pictures. Tell the students to make sure they color lightly over the words so they will still be able to read it when the page is finished.
39. Quickly color your sample gray, and then add craters by drawing circles slightly darker than your original coloring.
40. Tell the students to make sure they color the small Mercury on the tab also.
41. Give the students a few minutes to color their pages.
42. When the students have finished, explain that now they need to cut carefully around the Mercury tab. Explain that they need to cut along the black line on the right side of the page, carefully cutting around the planet. Tell the students that after doing this Mercury will stick off the page. Tell the students to be careful not to cut off the planet.
43. Demonstrate how to cut carefully around the planet without cutting more than one page or cutting off the planet.
44. Walk around the room assisting students as necessary.
45. When the students have finished, tell them to close their book to the cover. Explain that they need to color in the planet Mercury on the cover as well because they have finished that page in the book.
46. Allow the students a few minutes to color the cover.
47. Tell the students that when they finish, they need to turn in their books. Remind the students to make sure they put their name on the Earth before they turn it in.
48. Explain that you will pass out their books again tomorrow.

E. Assessment/Evaluation
1. Check to see that the students completed the Mercury sentences in the book correctly.

Lesson Seven: The Planets Continued (approximately 40 – 50 minutes)
A. Daily Objectives
1. Concept Objective(s)
   a. Students will understand the processes and interactions of Earth’s systems and the structure and dynamics of Earth and other objects in space.
   b. Students will understand the general characteristics of the atmosphere.
   c. Students will recognize the structure of the solar system, composition and interactions of objects in the universe.

2. Lesson Content
   a. The nine planets (Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune, Pluto)

3. Skill Objective(s)
   a. The students will learn about the nine planets through literature.
   b. The students will continue to complete their planet books with important facts about each of the planets in our solar system.
   c. The students will use what they have learned about the planets to complete fill-in-the-blank sentences in their planet book.
   d. The students will follow directions to complete this project.

B. Materials
1. *The Planets in our Solar System* by Franklyn Branley
2. The student and teacher planet books from Lesson Six
3. One pair of scissors for each student and one for the teacher
4. Crayons or colored pencils for each student and for the teacher
5. *The Planets* by Gail Gibbons

C. Key Vocabulary
None

D. Procedures/Activities
1. Pass out the students’ planet books. Tell the students that they are going to do the Venus, Earth, Mars, and Jupiter pages today.
2. Tell them that the second planet from the sun is Venus. Have the students open to the Venus page in their packets.
3. Read the Venus pages from *The Planets.*
4. Repeat steps 32 – 46 from Lesson Six to complete the Venus page.
5. Remind the students that there shouldn’t be any white left when they are finished coloring their planet pages. They should add lots of detail and try their best to make their pages look like the real planets.
6. After the students finish the Venus page, tell the students that the third planet is their home.
7. Have the students open to the Earth page in their packets. Explain that although they know a lot about this planet already, you are still going to read the information in the book.

8. Read the Earth pages.

9. Repeat steps 32 – 46 from Lesson Six to complete the Earth page.

10. When the students finish, read the Mars pages.

11. Repeat steps 32 – 46 from Lesson Six to complete the Mars page in their packets.

12. Work with the students to complete the Jupiter page in their book by following the same steps used to complete the previous planet pages.

13. When the students finish, tell them to turn their books in and you will pass them out tomorrow so they can finish.

E. **Assessment/Evaluation**

1. Check to see that the students completed the planet sentences in the book correctly.

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**Lesson Eight: The Planets Concluded (approximately 40 – 50 minutes)**

A. **Daily Objectives**

1. **Concept Objective(s)**
   
   a. Students will understand the processes and interactions of Earth’s systems and the structure and dynamics of Earth and other objects in space.
   
   b. Students will understand the general characteristics of the atmosphere.
   
   c. Students will recognize the structure of the solar system, composition and interactions of objects in the universe.

2. **Lesson Content**

   a. The nine planets (Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune, Pluto)

3. **Skill Objective(s)**

   a. The students will continue to learn about the nine planets through literature.
   
   b. The students will complete their planet book with important facts about each of the planets in our solar system.
   
   c. The students will use what they have learned about the planets to complete fill-in-the-blank sentences in their planet book.
   
   d. The students will follow directions to complete this project.

B. **Materials**

   1. *The Planets in our Solar System* by Franklyn Branley
   
   2. The student and teacher planet books from Lesson Six
   
   3. One pair of scissors for each student and one for the teacher
   
   4. Crayons or colored pencils for each student and for the teacher
   
   5. *The Planets* by Gail Gibbons

C. **Key Vocabulary**

   None

D. **Procedures/Activities**

   1. Explain that today they students will finish their planet books.
   
   2. Tell the students to open their packets to the next planet page, Saturn.
   
   3. Read the Saturn pages in *The Planets*.
   
   4. Repeat steps 32 – 46 from Lesson Six to complete the Saturn page in their packets.
   
   5. Allow time for the students to finish their coloring and cutting.
6. Work with the students to complete the last three planets in the book by following the same steps used to complete the previous planet pages.
7. Tell the students that they will be able to take their planet books home after you check to see that they completed the sentences on each page correctly.
8. Have the students turn in their books.
9. Explain that tomorrow they will get to play a review game about what they have learned about space this past week.

E. Assessment/Evaluation
1. Check to see that the students completed the planet sentences in the book correctly.

Lesson Nine: Planet BINGO (approximately 40 – 50 minutes)

A. Daily Objectives
1. Concept Objective(s)
   a. Students will understand the processes and interactions of Earth’s systems and the structure and dynamics of Earth and other objects in space.
   b. Students will understand the general characteristics of the atmosphere.
   c. Students will recognize the structure of the solar system, composition and interactions of objects in the universe.
2. Lesson Content
   a. Sun: source of energy, light, heat
   b. Moon: phases of the moon (full, half, crescent, new)
   c. The nine planets (Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune, Pluto)
   d. Stars
      i. Constellations; Big Dipper
      ii. The sun is a star.
   e. Earth and its place in the solar system
      i. The Earth moves around the sun; the sun does not move.
      ii. The Earth rotates (spins); one rotation takes one day (24 hours)
      iii. Sunrise and sunset
      iv. When it is day where you are, it is night for people on the opposite side of the Earth.
3. Skill Objective(s)
   a. The students will review and solidify what they have learned throughout this unit by playing SPACE BINGO.
   b. The students will create their own BINGO boards by answering questions about astronomy.

B. Materials
1. One copy of Appendix P for each student and one for the teacher
2. One pencil for each student and one for the teacher
3. Glow in the Dark Book of Space by Nicholas Harris
4. Sixteen BINGO markers for each student and sixteen for the teacher

C. Key Vocabulary
None

D. Procedures/Activities
1. Before the lesson, set the book Glow in the Dark Book of Space open to the title page on your desk or somewhere near a light so the page “charges”.
2. Tell the students that you have been saving the best book for last. Explain that this book is a glow-in-the-dark book about space.
3. Gather the students to an area where they can sit close to you.
4. Open the book *Glow in the Dark Book of Space* to the title page. Explain that not all of the pages glow in the dark, but a lot of them do.
5. Choose one student to be the light helper. Ask him/her to go turn off the lights. *(If you have blinds in your room, these should be closed as well).*
6. Allow about one minute for the students to look at the phases of the moon that glow on the title page.
7. Have the student helper turn on the lights again. Read the next page. Explain that because this page has blue corners on the edges, it doesn’t glow in the dark.
8. Read the next page to the students. After reading it, ask the students if it will glow or not (yes, because the corners of the page are pink).
9. Have the student helper turn off the lights and allow time for the students to look at the glowing page.
10. Continue reading the book in this fashion.
11. After you finish the book, tell the students that to review what they have learned about space and the planets, they are going to play a BINGO game.
12. Have the students return to their seats.
13. Pass out one copy of Appendix P to each student.
14. Explain that they need to fill in the boxes on the BINGO board before they can play the game. Tell the students that you will ask a question, and the answer will go in one of the boxes on their BINGO board.
15. Hang a copy of Appendix P on the board for you to use as a sample to demonstrate what the students need to do.
16. Ask: “What planet do we live on?”
17. Call on a student to answer (Earth).
18. Write the correct answer on the board and then tell the students that they need to write this word somewhere on their BINGO board. Explain that they don’t want to put it in the same spot as their best friend because we want all of the boards to be different.
19. Write the word on your BINGO board somewhere.
20. After all of the students have written the word on their boards, ask: “What word means to spin around?”
21. Call on a student to answer (rotate).
22. Write the correct answer on the board and tell the students to write this answer on their boards somewhere.
23. Repeat steps 20 – 22 until each spot is filled in on the BINGO board. Ask the following questions:
   a. What travels around the Earth? (moon)
   b. What gives us light and heat? (sun)
   c. What planet is the farthest from the sun? (Pluto)
   d. What is a picture made of stars called? (constellation)
   e. Which planet is the largest? (Jupiter)
   f. Which planet is known as the red planet? (Mars)
   g. Which planet is closest to the sun? (Mercury)
   h. Which planet has lots of rings? (Saturn)
   i. The sun is a ______. (star)
   j. Which planet is tipped on its side? (Uranus)
   k. What phase of the moon looks like a banana? (crescent)
   l. What planet is second from the sun? (Venus)
   m. Which planet is sometimes the farthest because its orbit is oval? (Neptune)
n. What word means to travel around something? (revolve)

24. Tell the students that every box on their game board should be filled in now with a different word. Have the students check to see that they didn’t miss a box.

25. Next, pass out sixteen BINGO markers to each student.

26. Review the rules of BINGO so the students understand how to play.

27. When playing the game, instead of just calling out a word that the students find and cover with a marker, ask a question that the students must answer in order to figure out which word they should cover (just like when the students were making their boards). Ask the question. Allow time for the students to answer it in their head and mark their board, and then write the answer on the board for everyone to see. This will help the students review for the test tomorrow.

28. Play the game as many times as time will allow.

29. When it is time to stop for the day, tell the students that they can take their game boards home. Have the students put them in their homework folders.

30. Tell the students that they will be having a test tomorrow, and that they will do fine.

E. Assessment/Evaluation

1. Make observations while playing the game to see that the students knew the answers to the questions being asked.

Lesson Ten: Astronomy Test and Unit Conclusion (approximately 40 – 50 minutes)

A. Daily Objectives

1. Concept Objective(s)
   a. Students will understand the processes and interactions of Earth’s systems and the structure and dynamics of Earth and other objects in space.
   b. Students will understand the general characteristics of the atmosphere.
   c. Students will recognize the structure of the solar system, composition and interactions of objects in the universe.

2. Lesson Content
   a. Sun: source of energy, light, heat
   b. Moon: phases of the moon (full, half, crescent, new)
   c. The nine planets (Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune, Pluto)
   d. Stars
      i. Constellations; Big Dipper
      ii. The sun is a star.
   e. Earth and its place in the solar system
      i. The Earth moves around the sun; the sun does not move.
      ii. The Earth rotates (spins); one rotation takes one day (24 hours)
      iii. Sunrise and sunset
      iv. When it is day where you are, it is night for people on the opposite side of the Earth

3. Skill Objective(s)
   a. The students will take a written test demonstrating what they have learned throughout this unit.
   b. The students will correctly sequence the planets on a mini poster of the solar system.
   c. The students will complete their astronomy dictionaries by adding important terms they learned from this unit.
B. Materials
1. One copy of Appendix Q, page 1 and 2 (double sided) for each student and one for the teacher
2. One copy of Appendix R, page 1 and 2 (double sided) for the teacher
3. One copy of Appendix S for each student and one for the teacher
4. One packet of “Our Solar System” stickers (Made by McGraw-Hill / Instructional Fair # IF4345. This packet has 720 stickers in it, enough for 72 students)
5. The students’ dictionaries from Lesson Four

C. Key Vocabulary
None

D. Procedures/Activities
1. Tell the students that today they will be taking a test to show what they have learned about Astronomy.
2. Pass out one copy of Appendix Q to each student.
3. Tell the students to put their names in the top right-hand corner. *If your class is not familiar with taking tests, go over your expectations and rules before beginning.*
4. Explain to the students that you will read the entire test out loud (*in case you have students who are non-readers*).
5. Read through the test. Make sure to allow plenty of time for the students to finish their answers.
6. When the students finish, tell them to turn their test into the homework box. Tell them that you will grade them and return them tomorrow.
7. Tell the students that for their last day working on Astronomy, you have a final project for them to work on.
8. Pass out one copy of Appendix S to each student.
9. Explain that what they see on this page is the sun in the center and nine different orbits traveling around it. *If your class is not familiar with taking tests, go over your expectations and rules before beginning.*
10. Call on a student to share their definition of an orbit. (a path)
11. Explain that the box they see in the corner is called a key. Tell the students that this key tells the order of the planets. Explain that it will help them complete this mini solar system.
12. Tell the students that you are going to give them a strip of stickers. Explain that the strip has all of the planets on it and a sun.
13. Hold up one strip of stickers. Tell the students that even though we know the planets aren’t all the same size this is the way the stickers look.
14. Explain that the students need to figure out which orbit line each planet should be on.
15. Hang your copy of Appendix S on the board.
16. With the class, review the order of the planets. Tell the students that the strip of stickers already has the planets in the correct order starting with the sun.
17. Ask the students which planet is the closest to the sun (Mercury).
18. Take the Mercury sticker of your strip and put it somewhere on the first orbit line closest to the sun.
19. Repeat steps 17 and 18 for the rest of the planets.
20. Ask if the students have any questions.
21. Choose student helpers to pass out one strip of stickers to each student.
22. Tell the students they can begin when they get their stickers. Remind them to put their names on their papers.
23. Walk around observing and assisting as necessary.
24. When you see that most of the students have finished, tell them that they can put this sheet in their homework folders to take home.
25. Pass out the students’ dictionaries from Lesson Four.
26. Tell the students that they are going to finish their dictionaries today as well.
27. Have the students open their books to the next blank spot.
28. Follow steps 4 – 8 from Lesson Six to help the students add the following terms to their dictionaries:
   a. Astronomer – someone who studies space (picture – draw someone looking into space)
   b. Telescope – something used to see stars (picture – draw a mini telescope)
   c. Phases – the different shapes of the moon (picture – draw a crescent and a half moon)
   d. Planet – a ball of rock or gas that moves around a star (picture – draw a planet going around the sun)
   e. Orbit – a path (picture – draw orbit rings around a sun)
   f. Satellite/moon – something that travels around a planet (picture – draw a moon traveling around a planet)
29. When all of the students are finished, tell them that they can put their dictionaries in their homework folders to take home.

E. Assessment/Evaluation
   1. Grade the students’ tests using the answer key (Appendix R).
   2. Observe the order the students put the planets in on their Appendix S orbit sheet.

VI. CULMINATING ACTIVITY
   A. Take the students on a field trip to a planetarium to see a show about space.

VII. HANDOUTS/WORKSHEETS
   A. Appendix A: Sun, Earth, and Moon (Lesson Two)
   B. Appendix B: Writing on the Earth (Lesson Two)
   C. Appendix C: Astronomy Dictionary (Lesson Four)
   D. Appendix D: Astronomy Dictionary (Lesson Four)
   E. Appendix E: Phases of the Moon (Lesson Five)
   F. Appendix F: Planet Book (Lessons Six, Seven, and Eight)
   G. Appendix G: Planet Book (Lessons Six, Seven, and Eight)
   H. Appendix H: Planet Book (Lessons Six, Seven, and Eight)
   I. Appendix I: Planet Book (Lessons Six, Seven, and Eight)
   J. Appendix J: Planet Book (Lessons Six, Seven, and Eight)
   K. Appendix K: Planet Book (Lessons Six, Seven, and Eight)
   L. Appendix L: Planet Book (Lessons Six, Seven, and Eight)
   M. Appendix M: Planet Book (Lessons Six, Seven, and Eight)
   N. Appendix N: Planet Book (Lessons Six, Seven, and Eight)
   O. Appendix O: Planet Book (Lessons Six, Seven, and Eight)
   P. Appendix P: BINGO Board (Lesson Nine)
   Q. Appendix Q: Astronomy Test (Lesson Ten)
   R. Appendix R: Astronomy Test Key (Lesson Ten)
   S. Appendix S: Orbit Sheet (Lesson Ten)

VIII. BIBLIOGRAPHY
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Appendix A

Sun, Earth, and Moon

1. Cut out the pieces.
2. Connect the moon's dot to the dot in the center of the Earth with a brad (the moon piece goes behind the Earth).
3. Fasten Earth's other dot and the Sun's dot together (the earth piece goes behind the Sun).
4. Make the Moon move around Earth.
5. Make Earth move around the sun.

Adapted from: Brighter Vision Learning Adventures
Appendix B
Writing on the Earth

[Diagram of Earth with lines for writing]
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<th>Constellation</th>
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Appendix E
Phases of the Moon

Cut out the phases of the moon and paste them in the correct order.

Waxing Crescent
Full Moon
Waxing Gibbous
Waning Gibbous
Waning Half
Waxing Half
Waning Crescent
New Moon

Adapted from: The Wild Goose Company
1. Mercury is the _______ planet from the sun.

2. It is the _______ smallest planet.

3. Mercury is made up of _______ and _______.

1. Venus is the _______ planet from the sun.

2. It is almost the same size as ________.

3. Venus has clouds made up of ________.
1. Earth is the _______ planet from the sun.

2. It rotates one time in _______ hours.

3. Earth takes _______ days to get around the sun once.
1. Mars is the _______ planet from the sun.

2. It is known as the _______ planet.

3. Mars has ______ moons.
1. Jupiter is the _______ planet from the sun.

2. It is the ___________ planet.

3. Jupiter is made of __________.
1. Saturn is the _______ planet from the sun.

2. It has rings made of __________, __________, and __________.

3. Saturn has at least _____ moons.
1. Uranus is the _______ planet from the sun.

2. It ___________ on its side.

3. Uranus is the _________ biggest planet.
1. Neptune is the ________ planet from the sun.

2. Because of its ________ it is sometimes the last planet.

3. Neptune is almost the same size as __________.
1. Pluto is the _______ planet from the sun.

2. It is the ____________ and ___________ planet.

3. Pluto is smaller than the Earth’s ____________.
### Astronomy BINGO

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Astronomy Test

1. The sun is a _________________.
   - Planet
   - Moon
   - Star

2. A __________________________ is a group of stars that makes a picture.
   - Constellation
   - Solar system
   - Planet

3. Rotate means to ____________________.
   - Spin
   - Go around
   - Shine

4. Revolve means to _________________.
   - Spin
   - Go around
   - Shine

5. What is wrong with the order of the planets? Explain.
   ___________________________________________________________________
   ___________________________________________________________________
   ___________________________________________________________________
6. Circle one. True or False The moon changes shape each day.

7. Circle one. True or False The sun goes around the Earth.

8. What is the name of this constellation? Circle the answer.

   The North Star
   The Big Dipper
   The Spoon

9. Fill in the blank. Name one thing we get from the sun?

   ___________________________

10. Draw a line from the phase name to its picture.

   Full Moon

   Crescent Moon

   New Moon

   Half Moon
Astronomy Test

1. The sun is a _________________.
   Planet  Moon  Star

2. A ____________________________ is a group of stars that makes a picture.
   Constellation  Solar system  Planet

3. Rotate means to _________________.
   Spin  Go around  Shine

4. Revolve means to _________________.
   Spin  Go around  Shine

5. What is wrong with the order of the planets? Explain.
   ________________________________
   ________________________________
   ________________________________
   Pluto should be at the end and the Earth should be where Pluto is.
6. Circle one. True or False The moon changes shape each day.

7. Circle one. True or False The sun goes around the Earth.

8. What is the name of this constellation? Circle the answer.
   - The North Star
   - The Big Dipper
   - The Spoon

9. Fill in the blank. Name one thing we get from the sun?
   ________________
   Heat, light, energy

10. Draw a line from the phase name to its picture.
    - Full Moon
    - Crescent Moon
    - New Moon
    - Half Moon
Appendix S

Orbit Sheet