**Expert Pack: Our Solar System**

Lexile Range: 530-650

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| **Topic/Subject:** Our Solar System  **Essential Questions:**   * *What do we know about our Solar System?* * *What are the characteristics of the planets and sun in our Solar System?* |
| **Texts/ Resources**  Books   1. *National Geographic Reader: Planets* by Elizabeth Carney 2. *Leap Year Birthday* by Brad Bolchunos 3. *Planets of My Solar System* by Dina Anastasio 4. *Our Solar System* by Bruce D. Cooper   Video/Interactive   1. Turtle Diary: Solar System 2. Study Jams: the Universe |
| **Rationale and Suggested Sequence for Reading**  The purpose of this series of texts is for students to begin to grow an understanding of our Solar System. The set begins with an engaging, animated, and narrated video, Turtle Diary: Solar System, on the Solar System. Next, a broad overview of the Solar System as a whole is given in the first book, *Planets of My Solar System*. This book of poems from Reading A-Z gives students an easy-to-understand introduction to each plant. The next text in the study of the Solar System is *National Geographic Reader–Planets*. *National Geographic Reader– Planets* will be explored as a read-aloud text with students. In-depth information about the planets is described in this book. Then, students watch a video and a read another informational book about the solar system. The video, Study Jams: The Universe, and excerpts from the book, *Our Solar System*, will be used to reinforce learned knowledge about the solar system and raise student curiosity about space, our galaxy and the universe. Finally, the book, *Leap Year Birthday*, is an illustrated leveled reader in which students may apply previous learned knowledge about the Earth orbiting the sun and how that affects every fourth calendar year. Although *Leap Year Birthday* is considered less complex than some of the other texts in this set, it is placed at the end of the set so students have familiarity with the subject matter. Therefore, this book may be explored by students with partners or independently. |
| **The Common Core Shifts for ELA/Literacy**   1. Regular practice with *complex text* and its academic language. 2. Reading, writing, and speaking grounded in *evidence* from text, both literary and informational. 3. Building *knowledge* through content-rich nonfiction. |
| **College and Career Readiness Anchor Standards for Reading Literacy and/or Informational Texts**   1. *Read closely to determine what the text says explicitly and to make logical inferences from it*; cite specific textual evidence when writing or speaking to support conclusions drawn from the text. 2. *Determine central ideas of themes of a text* and analyze their development; summarize the key supporting details and ideas. 3. *Read and comprehend complex literary and informational texts independently and proficiently.* |
| **Annotated Bibliography**  **N/A Turtle Diary: Solar System**  Author: Turtle Diary  Genre: Interactive Video and Website  Synopsis: An animated, narrated video about the planets and the sun in our Solar System. After the video are three, optional activities (placing and naming the planets; using ordinal numbers to describe the planets; answer questions on a quiz).  Length: 02:31  Citation: Solar System. Retrieved February 6, 2015 from <http://www.turtlediary.com/grade-1-games/science-games/solar-system.html>  Recommended Use: Introduce set with this engaging video to “hook” students’ interests about the Solar System.  **650L *Planets of My Solar System***  Author: Dina Anastasio  Genre: Nonfiction, poetry  Length: 15 pages  Synopsis: A brief overview of the objects found in the Solar System and how the planets move are included in this article. Includes information about the Earth’s rotation causing day and night. Audio is available, but opens to a page without the print article.  Citation: *Planets of My Solar System*. Reading A-Z. Retrieved from <https://www.raz-plus.com/book.php?id=1172&lang=English>  Recommended Student Activity: Wonderings  **640L**  ***National Geographic Readers: Planets***  Author: Elizabeth Carney  Genre: Nonfiction children’s book  Length: 32 pages  Synopsis: This book taps into children's natural curiosity about the vast world of space. This “level two” reader, (written in simple language that is easy for young readers to understand), introduces children to our Solar System, including all of the planets and dwarf planets and includes many fascinating facts.  Citation: Carney, E. (2012). *Planets*. Washington, D.C.: National Geographic.  Recommended Student Activity: A Picture of Knowledge  **N/A Study Jams: The Universe**  Author: Scholastic Study Jams  Genre: Video  Length: 3:39  Synopsis: Information about universe, galaxy and solar system presented in this animated and narrated video.  Citation: Study Jams: Our Universe. Retrieved November 27, 2016 from <http://studyjams.scholastic.com/studyjams/jams/science/solar-system/universe.htm>  Recommended Use: Students will watch this video to reinforce learned knowledge about the Solar System and raise student curiosity about space, our galaxy and the universe.  **650L *Our Solar System*** (excerpt, pages 3-22)  Author: Bruce D. Cooper  Genre: Nonfiction  Length: 20 pages  Synopsis: This book compares and contrasts the planets in our solar system.  Citation: *Our Solar System*. Reading A-Z. Retrieved from <https://www.raz-plus.com/books/leveled-books/book/?id=220&lang=English>  Recommended Student Activity: Quiz Maker  **530L *Leap Year Birthday***  Author: Brad Bolchunos  Genre: Book (Leveled Reader)  Length: 261 words  Synopsis: Students love celebrating their birthdays! But what if their birthday came only once every four years? *Leap Year Birthday* tells the story of Leroy, a boy whose birthday falls on February 29. Leroy wants to learn more about leap day and why it happens only once every four years. Detailed illustrations and engaging text will help students learn about the scientific principles behind leap day.  Citation: *Leap Year Birthday*. Reading A to Z. <https://www.readinga-z.com/books/leveled-books/book/?id=2622&lang=English>  Recommended Use: Wonderings |

**Supports for Struggling Students**

By design, the **gradation of complexity** within each Expert Pack is a technique that provides struggling readers the opportunity to read more complex texts. Listed below are other measures of support that can be used when necessary.

* Provide a brief **student-friendly glossary** of some of the academic vocabulary (tier 2) and domain vocabulary (tier 3) essential to understanding the text
* Download the Wordsmyth widget to classroom computers/tablets for students to access student-friendly definitions for unknown words. <http://www.wordsmyth.net/?mode=widget>
* Provide brief **student friendly explanations** of necessary background knowledge
* Include **pictures or videos** related to the topic within and in addition to the set of resources in the pack
* Select a small number of texts to **read aloud** with some discussion about vocabulary work and background knowledge
* Provide **audio recordings** of the texts being read by a strong reader (teacher, parent, etc.)
* **Chunk the text** and provide brief questions for each chunk of text to be answered *before* students go on to the next chunk of text
* Pre-reading activities that focus on the **structure and graphic elements** of the text
* Provide **volunteer helpers** from the school community during independent reading time.
* Use Expert Packs as the **resources for Guided Reading** with a small group of students

Why Text Sets Support English Language Learners

Those acquiring English as a second language have to learn many words in English to catch up with their English-only peers. Vocabulary builds at a much quicker pace when reading a set of connected texts. Text sets are an adaptable resource perfect for building knowledge and vocabulary. Student use of text sets can vary in terms of independence or teacher supports based on the individual needs of the students in the room. Activities found within the text set resources reflect several best practices for English Language Learner instruction including:

* Providing brief, engaging texts that provide a high volume of reading on a topic.
* Providing web-based resources and/or videos that are tied to the content of the texts students are reading.
* Providing opportunities for students to learn new vocabulary through the use of student-friendly definitions in resource-specific glossaries.
* Allowing for options to reinforce newly learned vocabulary and/or content through graphic organizers.
* Providing opportunities for students to reinforce new vocabulary through multi-modal activities including written work, group discussion, viewing visual content, and reading texts that feature the vocabulary.

Teachers of ELLs may use the protocols on the following pages to provide additional support to students who are struggling to access the content within text sets because they are new to English.

ELL Text Set Protocol Grades K-2

The protocol below assumes that students will be engaged in reading text sets with the support of the teacher and/or another adult staff member. This can be done full class, or in small groups, but will likely require adult support in this grade band.

Please note that this protocol includes options for teachers. This includes the order in which various activities (steps) take place. Individual decisions should be made considering the needs of the students and the demands of the content, keeping in mind that the goal of each scaffold is to allow students to meaningfully access each text and move toward independent, knowledge-building reading.

**Step one: Build knowledge and vocabulary as you build student interest and engagement in the topic.**

Introduce students to the overall topic/content of the text set, including knowledge demands needed to engage in the content, and domain-specific vocabulary necessary for comprehension. This should be done prior to engaging with the texts themselves – time allotted to this activity should reflect student needs (anywhere from 5 minutes prior to reading, to a full day’s lesson is appropriate).

*Options for this step include:*

* Engage students in reading and discussing auxiliary texts and resources (illustrations, photographs, video clips) on the topic of the text set.
* Pre-teach a few key content-specific terms prior to students engaging with a text set. (Ideas for text-focused vocabulary instruction can be found [here](https://achievethecore.org/content/upload/Selecting%20and%20Using%20Academic%20Vocabulary%20in%20Instruction.pdf).)
* Provide a student-friendly glossary prior to reading each text, with picture support where possible.

If pairing the text set with a [Read Aloud lesson](https://achievethecore.org/category/411/ela-literacy-lessons?filter_cat=788), giving students access to the resources in the text set can help build their knowledge and vocabulary prior to engaging with the anchor or primary text, as can access to the resources alongside subsequent reads of the anchor text. The “juicy sentence” discussion is a strategy developed by Dr. Lily Wong Fillmore to help students learn to deconstruct and reconstruct sentences, and to understand how different language features contribute to meaning. Teachers should use the [juicy sentence guidance](https://achievethecore.org/page/3160/juicy-sentence-guidance) to dig deeply into a sentence or phrase within the read aloud book, to build vocabulary, deepen content knowledge, and support understanding of syntax and grammar. Juicy sentence work should not be done for the other texts in the text set, since the purpose is for students to work rapidly through a high-volume of reading to build knowledge.

**Step two: Read text orally.**

Focusing on one resource at a time, allow students to listen to a fluent read of the resource.

*Options for this step include:*

* Have the teacher model the first read of a text or resource.
* Use recordings of the text to provide additional opportunities to hear expert reading.

**Step three: Engage in group discussion about the content.**

Allow students time in partnerships or small groups to discuss the content of the resource.

*Options for this step include:*

* + Allow for discussion/conversation (in the students’ home language if possible) with a small group of students reading the same text set prior to writing orprovide heterogeneous language groupings to talk about content and discuss what students are learning.
  + Provide opportunities to practice using newly acquired vocabulary in the context of discussion.
  + Have students refer to the student-friendly glossary included with each passage to identify meanings for new vocabulary necessary for comprehension.

**Step four: Write about what was read.**

*Options for this step include:*

* Use the “Rolling Knowledge Journal” and/or “Rolling Vocabulary Journal” as a shared writing routine.
* Have students complete the “Rolling Knowledge Journal” and/or “Rolling Vocabulary Journal” as independent graphic organizers that help to scaffold the writing process and capture student knowledge over time. Encourage students to use a combination of writing and drawing.
* Provide students with several supports to help students engage in writing/drawing about what they read:
  + Use mentor texts about which students can pattern their writing.
  + Allow them to write collaboratively.
  + Show students visual resources as prompts, etc.
  + Provide language supports such as strategically chosen sentence starters.

**Repeat steps one through four with each resource in the text set as appropriate.**

ELL Text Set Protocol Grades 3-12

The goal of text sets is to help students build knowledge through a volume of independent reading, and it is important that educators provide scaffolds to allow English Language Learners to be successful in engaging meaningfully with the texts, even as students are still developing English language skills. The protocol below can be used for teaching with text set resources as a full class. Students can also be trained on the protocol so that they can utilize text sets in small groups or partnerships as a resource for independent or reciprocal reading and study.

Please note that this protocol includes options for teachers. Individual decisions should be made considering the needs of the students and the demands of the content, keeping in mind that the goal of each scaffold is to allow students to meaningfully access the text and move toward independent, knowledge-building reading.

**Step one: Build knowledge and vocabulary.**

Introduce students to the overall topic/content of the text set, including knowledge demands needed to engage in the content, and domain-specific vocabulary necessary for comprehension. This should be done prior to engaging with the texts themselves; time allotted to this activity should reflect student needs (anywhere from 5 minutes prior to reading, to a full day’s lesson is appropriate).

*Options for this step include:*

* Engage students in reading and discussing auxiliary texts (of lesser complexity) and resources (illustrations, photographs, video clips) on the topic of the text set.
* Pre-teach a few key content-specific terms prior to students engaging with a text set. (Ideas for text-focused vocabulary instruction can be found [here](https://achievethecore.org/content/upload/Selecting%20and%20Using%20Academic%20Vocabulary%20in%20Instruction.pdf).)
* Provide the student-friendly glossary included in the text set prior to reading each text.
* When possible, allow students to read texts in their home language about the topic under study.

**Step two: Read text orally.**

Focusing on one resource at a time, allow students to listen to a fluent read of the resource, while following along with their own copy of the text.

*Options for this step include:*

* Have a fluent reader model the first read of a text or resource.
* Have students engage in a buddy/partner read.
* Use recordings of the text to provide additional opportunities to hear expert reading.

**Step three: Engage in group discussion about the content.**

Allow students time in partnerships or small groups to discuss the content of the resource.

*Options for this step include:*

* + Allow for discussion/conversation (in the students’ home language if possible) with a small group of students reading the same text set prior to writing or provide heterogeneous language groupings to talk about content and discuss what students are learning.
  + Have students refer to the student-friendly glossary included with each text set to identify meanings for new vocabulary necessary for comprehension.

**Step four: Write about what was read.**

*Options for this step include:*

* Use the “Rolling Knowledge Journal” and/or “Rolling Vocabulary Journal” as a shared writing routine/ graphic organizer to help to scaffold the writing process and capture student knowledge over time.
* Provide students with several supports to help students engage in writing/drawing about what they read:
  + Use mentor texts about which students can pattern their writing.
  + Allow them to write collaboratively.
  + Show students visual resources as prompts, etc.
  + Provide language supports such as strategically chosen sentence starters.

**Repeat steps one through four with each resource in the text set as appropriate.**

**Expert Pack: Our Solar System**

**Learning Worth Remembering**

**Cumulative Activities** – The following activities should be completed and updated after reading each resource in the set. The purpose of these activities is to capture knowledge building from one resource to the next, and to provide a holistic snapshot of central ideas of the content covered in the expert pack. *It is recommended that students are* ***required*** *to complete one of the Cumulative Activities (Rolling Knowledge Journal or Rolling Vocabulary) for this Expert Pack.*

1. **Rolling Knowledge Journal**

* Read each selection in the set, one at a time.
* After you read *each* resource, stop and think what the big learning was. What did you learn that was new *and important* about the topic from *this* resource? Write, draw, or list what you learned from the text about (topic).
* Then write, draw, and/or list how this new resource added to what you learned from the last resource(s).

**Sample Student Response**

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| **Title** | **Write, Draw, or List** | |
|  | **New and important learning about the topic** | **How does this resource add to what I learned already?** |
| 1. Turtle Diary: Solar System | Solar System is defined and planets are named. The Solar System is made up of one star, planets, moons, asteroids and comets. |  |
| 1. *Planets of My Solar System* | Each planet in our solar system is unique. | Our solar system has eight planets that orbit the sun. The sun is a star. |
| 1. *National Geographic Readers: Planets* | There are dwarf planets in our Solar System. | There are planets and dwarf planets. |
| 1. Study Jams: The Universe | The universe is everything that is in space. A solar system is part of a galaxy and there are many galaxies in the universe. | Our solar system is in a galaxy and the galaxy is part of the universe. Another word like revolve is orbit. |
| 1. *Our Solar System* | Mercury, Venus, Earth, and Mars are rocky planets. Jupiter, Saturn, Uranus, and Neptune are made mostly of gas and are much bigger than Earth. | Some of our planets are similar to each other, and some are different. |
| 1. *Leap Year Birthday* | It really takes 6 hours more than 365 days for the Earth to orbit around the sun. So, every four years there is a Leap Year with an extra day, leap day. | I understand better about the Earth’s rotation around the sun and how that makes a year and I learned about Leap Year. |

1. **Rolling Vocabulary: “Fantastic Four”**

* Read each resource then determine the 4 words from each text that most exemplify the central idea of the text.
* Next use your 4 words to write about the most important idea of the text. You should have as many sentences as you do words.
* Continue this activity with EACH selection in the Expert Pack.
* After reading all the selections in the Expert Pack, go back and review your words.
* Now select the “Fantastic Four” words from ALL the word lists.
* Use the “Fantastic Four” words to summarize the most important learning from this Expert Pack.

**Sample Student Response**

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| **Title** | **Four Vocabulary Words & Sentences** |
| Turtle Diary: Solar System | Words: solar system, body, gravity, force   1. The solar system is made up of one star, planets, moons, asteroids, and comets. 2. A planet is a body that moves in the solar system. 3. Gravity is what keeps the planets revolving around the sun instead of floating in space. 4. Gravity is a force that pulls things toward larger objects and bodies in space. |
| *Planets of My Solar System* | Words: center, orbit, planets, atmosphere   1. The sun is at the center of our solar system. 2. Eight planets orbit the sun. 3. Earth and Venus are planets. 4. The atmosphere on most planets is poisonous to humans. |
| *National Geographic Readers: Planets* | Words: planet, rings, gas, dwarf   1. Each planet is unique. 2. Some planets have rings made of rocks and other debris. 3. Some planets are made of gas, like Jupiter, Saturn, and Uranus. 4. Pluto is different because it is a dwarf planet. |
| Study Jams: The Universe | Words: galaxy, universe, solar system, orbit   1. We are in the Milky Way galaxy. 2. Everything that exists in space makes the universe. 3. There are 8 planets in the Solar System. 4. The sun and the bodies that move in orbit around it. |
| *Our Solar System* | Words: rocky, gas, energy, star   1. The first four planets are rocky. 2. The outer four planets are made of gas. 3. The sun sends energy to planets. 4. The sun is a star. |
| *Leap Year Birthday* | Words: Leap day, loop, Leap year, beam   1. Leap day is February 29th, the extra day that occurs in the calendar every four years. 2. Every day, he also moved a little bit in his big loop around the sun. 3. Leap year is every fourth year with an extra day, February 29th; this is why leap years have 366 days. 4. Mom beamed at Leroy like the sun beams at the Earth. |
| **Fantastic Four** | Words: planets, solar system, orbit, universe  Our **Solar System** is made up of one star (the sun), eight **planets**, some dwarf planets, many moons, asteroids, and comets. These objects **orbit** the sun. There are many, many solar systems in the **universe**. |

**Student Copy**

**1. Rolling Knowledge Journal**

* Read each selection in the set, one at a time.
* After you read *each* resource, stop and think what the big learning was. What did you learn that was new *and important* about the topic from *this* resource? Write, draw, or list what you learned from the text.
* Then write, draw, or list how this new resource added to what you learned from the last resource(s).

**Sample Response**

|  |  |  |
| --- | --- | --- |
| **Title** | **Write, Draw, or List** | |
| **New and important learning about the topic** | **How does this resource add to what I learned already?** |
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**2. Rolling Vocabulary: “Fabulous Four”**

* Read each resource then determine the 4 words from each text that most exemplify the central idea of the text.
* Next use your 4 words to write about the most important idea of the text. You should have as many sentences as you do words.
* Continue this activity with EACH selection in the Expert Pack.
* After reading all the selections in the Expert Pack, go back and review your words.
* Now select the “Fabulous Four” words from ALL the word lists.
* Use the “Fabulous Four” words to summarize the most important learning from this Expert Pack.

**Sample Response**

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| **Title:** | **Six Vocabulary Words & Sentences** |
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| **Fabulous Four** | Words: |

**Learning Worth Remembering**

**Singular Activities** – the following activities can be assigned for each resource in the set. The purpose of these activities is to check for understanding, capture knowledge gained, and provide variety of ways for students to interact with each individual resource. Students may complete some or none of the suggested singular activities for each text. Singular activities are assigned at the discretion of the teacher.

1. **Quiz Maker** (Recommended for *Our Solar System*)

* Make a list of # questions that would make sure another student understood the information.
* Your classmates should be able to find the answer to the question from the resource.
* Include answers for each question.
* Include where you can find the answer in the resource.

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| --- | --- |
| **Question** | **Answer** |
| 1. |  |
| 2. |  |
| 3. |  |

1. **Wonderings** (Recommended for *Planets of My Solar System* and *Leap Year Birthday*)

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| --- | --- |
| I’m a little confused about: | This made me wonder: |
| On the left, track things you don’t understand from the video and the article.  **I am confused about or do not understand….** | On the right side, list some things you still wonder (or wonder now) about this topic.  **I wonder or would like to learn more about….** |

1. **A Picture of Knowledge** (Recommended for *National Geographic Readers: Planets*)

* Take a piece of paper and fold it two times: once across and once top to bottom so that it is divided into 4 quadrants.
* Draw these shapes in the corner of each quadrant.

1. Square
2. Triangle
3. Circle
4. Question Mark

**?**

* Write!

Square: What one thing did you read that was interesting to you?

Triangle: What one thing did you read that taught you something new?

Circle: What did you read that made you want to learn more?

Question Mark: What is still confusing to you? What do you still wonder about?

* Find at least one classmate who has read [selection] and talk to each other about what you put in each quadrant.

**Expert Pack:** Our Solar System

Expert Pack Glossary

**Turtle Diary: Solar System**

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| *Word* | *Student-Friendly Definition* |
| solar system | A solar system includes a star and all of the matter which orbits that star, including planets and their moons.  *The solar system is made up of one star (the sun), eight planets, some dwarf planets, moons, and many asteroids and comets.* |
| body | The physical parts that make up something.  *A planet is a body that moves in the solar system.* |
| gravity | The force by which all objects are attracted to each other.  *Gravity is what keeps the planets revolving around the sun instead of floating in space.* |
| force | Attracts all objects to each other is called gravity.  *Gravity is a force that pulls things toward larger objects and bodies in space.* |

***Planets of My Solar System***

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| *Word* | *Student-Friendly Definition* |
| atmosphere | A layer of gases surrounding a planet, star, or moon.  *The atmosphere on most planets is poisonous to humans.* |
| center | The part of something in the middle  *The sun is at the center of our solar system.* |
| moon | An object that circles around a planet  *Earth has one moon*. |
| orbit | The curved path in which a planet, satellite, or spacecraft moves in a circle around another body  *Planets orbit or go around the sun.* |
| planets | A large object in outer space that moves around the sun or another star  *Earth and Venus are planets.* |
| spaceship | A vehicle designed to carry people and things in outer space  *The astronauts flew in a spaceship to the space center.* |
| tilted | To lean to one side; slant  *The Earth is tilted, so sometimes it is slanted towards the sun and sometimes it is slanted away from the sun.* |

***National Geographic Reader: Planets***

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| *Word* | *Student-Friendly Definition* |
| dwarf | Very small.  *Pluto is a dwarf planet because it is much smaller than the other planets.* |
| rings | A round-shaped object.  *The planet Jupiter has a ring around it made of small rocks, dust, and asteroids.* |
| gas | Matter that does not keep its shape and cannot be seen.  *The air around us is actually filled with gas, like oxygen, to help us breathe.* |

**Study Jams: The Universe**

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| *Word* | *Student-Friendly Definition* |
| universe | Everything that exists in space.  *The universe is made up of everything that exists In space.* |
| galaxy | Large group of stars and planets.  *Our Solar System is part of the Milky Way Galaxy.* |
| orbit | The curved path in which a planet, satellite, or spacecraft moves in a circle around another body.  *Planets orbit or go around the sun.* |

***Our Solar System* by Bruce D. Cooper**

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| --- | --- |
| *Word* | *Student-Friendly Definition* |
| atmosphere | A layer of gases surrounding a planet, star, or moon.  *The atmosphere on most planets is poisonous to humans.* |
| energy | The ability to have force or power work.  *The sun sends energy to planets.* |
| gas | A form of matter that is neither liquid nor solid.  *The outer four planets are made of gas.* |
| orbits | To revolve around another object.  *The Earth orbits the sun, and the moon orbits the Earth.* |
| rocky | Made of rocks.  *The first four planets are rocky.* |
| star | A ball of gas; a fixed luminous point in the night sky.  *The sun is a star.* |

***Leap Year Birthday***

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| *Word* | *Student-Friendly Definition* |
| leap day | Leap day isFebruary 29th, the extra day that occurs in the calendar every four years  *It was Leap day, February 29.* |
| solar system | Large group of stars and planets  *Our solar system is part of the Milky Way Galaxy.* |
| loop | Loop can be another word for “orbit”.  *Planets loop or go around the sun in an orbit.* |
| beam | A beam is a bright light.  *Mom beamed at Leroy like the sun beams at the Earth.* |

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