Science Learning Packet
Grade 1 Reader
Spinning Earth:
Patterns of Earth and Space

Suggested science learning activities for SPS students during the COVID-19 school closure.

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Patterns of Earth and Space
by John Erickson
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Observing Patterns

The beads on this bracelet make a **pattern**. The colors are in the same order over and over again.

To see the pattern, you can’t just look at one bead. You have to **observe** many beads.
Here is another pattern. If the traffic light is red, the cars are stopped. If the traffic light is green, the cars are moving.

It happens the same way, over and over again. Any time the light is red, the cars are stopped. Any time the light is green, the cars are moving. That is a pattern.
Patterns in Time

The traffic light makes a pattern in time. If you look at the light just once, you will not see the pattern.

If you observe it over time, what pattern do you see?

1 2 3 4 5 6 7

These pictures show a tree over time. Do you see a pattern?

1 2 3 4 5
Patterns of Earth’s Movement

These pictures show Earth from far away. The pictures were taken every two hours. Each picture shows Earth two hours later than the one before it. The white swirls are clouds. The blue is water. The brown shapes are land. Look closely at the brown land. What do you notice?
Patterns of Daytime and Nighttime

There are patterns to when we see things in the sky. In the daytime, we see the sun. In the nighttime, we see the stars.

In the daytime, the sky is bright. It is bright in the daytime because of light from the sun. In the nighttime, when there is no light from the sun, the sky is dark and we can see the stars.
Patterns of Sleeping and Waking

Different animals are awake at different times. Some animals are usually awake in the daytime. In the nighttime, they are usually asleep. That is their pattern of sleeping and waking.

Humans and many other animals are awake during the daytime. They sleep in the nighttime.
Other animals have a different pattern of sleeping and waking. These animals are usually awake in the nighttime and asleep in the daytime. Animals with this pattern are called **nocturnal**.

These nocturnal animals are awake during the nighttime. They rest during the daytime.
Patterns of Seasons

The **seasons** are winter, spring, summer, and fall. Some places have different kinds of weather in different seasons.

Massachusetts in January

Massachusetts in April

New Zealand in January

New Zealand in April
In different places, the seasons may happen during different times of year. What is the pattern of seasons where you live?

Massachusetts in July  
Massachusetts in October  
New Zealand in July  
New Zealand in October
Patterns of Sunlight on Earth

Each row of pictures shows a **day** in a different **season**.

**A full day in winter**
- midnight
- 3:00 a.m.
- 6:00 a.m.
- 9:00 a.m.

**A full day in spring**
- midnight
- 3:00 a.m.
- 6:00 a.m.
- 9:00 a.m.

**A full day in summer**
- midnight
- 3:00 a.m.
- 6:00 a.m.
- 9:00 a.m.

**A full day in fall**
- midnight
- 3:00 a.m.
- 6:00 a.m.
- 9:00 a.m.
Patterns of Where We See the Sun

These pictures show where we see the sun at 5:00 p.m. At the same time of day, we see the sun in different places in the sky during different seasons.

5:00 p.m in January

5:00 p.m in April
5:00 p.m in July

5:00 p.m in October
Patterns of Animal Activity

Animals may be active during different seasons. Some animals are active in spring, summer, and fall, but sleep for most of the winter.

These animals rest during the winter.
Other animals are active during the winter and all the other seasons, too.

Humans and many other animals are active during the winter.
Patterns of Moon Phases

The **Moon** is always round, like a ball, but on different **days** it seems to have different shapes. These shapes are called **phases**.

1. Crescent moon
2. First quarter moon
3. Gibbous moon
4. Last quarter moon
In these pictures you can see the phase of the Moon on different days. Each picture shows the Moon just after it has risen above the horizon. You can see the pattern of phases as the days go by.

- **3** gibbous moon
- **4** full moon
- **7** crescent moon
- **8** The new moon is up when the sun is up, but we can’t see it.
Patterns of Where We See the Moon

These pictures show the sky at different times on the same day. In the first two pictures, it is daytime. In the next two pictures, it is nighttime.

3:00 p.m.  
6:00 p.m.
Even on the same day, we can see the **Moon** in different places. Sometimes the Moon is high in the sky. Sometimes it is near the **horizon**.

This picture shows the pattern of where we saw the Moon at different times on one day.
Groups of Stars

The sky has so many stars, and they look a lot alike. To notice patterns, it helps to look for stars in groups that you can recognize. Here are a few.

This group of stars is called Orion. You can recognize it by the three stars in a row.

This group of stars is called Leo. Some people think part of it looks like a backward question mark, like this: §
This group of stars is called Scorpius. It has stars that make a hook shape.

This group of stars is called Pegasus. It has four stars in the middle that make a shape like a square.
Patterns of Where We See the Stars

Stars don’t always appear in the same places in the sky. They seem to move in a pattern over time.

When people observe stars for a long time, they notice patterns.
These pictures show some of the stars in the sky during one night in December. Each picture shows a different time on the same night.

9:00 p.m.

midnight

3:00 a.m.
Different Star Patterns at Different Times of Year

The next page shows stars we see in the summer. We see different stars in the summer than we do in the spring, fall, or winter. (To see the winter sky, turn back to page 29.)

At all times of year, the stars we see seem to move in a pattern over time.
These pictures show some of the stars in the sky during one night in June. Each picture shows a different time on the same night.

9:00 p.m.

midnight

3:00 a.m.
Patterns on Other Planets

When we observe other planets from Earth, we find more patterns. Here are pictures of the planets Jupiter and Mars.

**Jupiter**

Jupiter is the largest planet in our solar system. If you look closely, you might see the Great Red Spot. It is a storm on Jupiter. The Great Red Spot is bigger than the whole Earth!

**Mars**

Mars is one of the closest planets to Earth. Scientists have sent rovers to explore the surface of Mars.
The pictures show the planets at different times. Do you notice patterns?
Glossary

**day**: a length of time that includes one full daytime and one full nighttime

**daytime**: the part of the day when the sky is bright

**Earth**: the planet we live on

**horizon**: the line where Earth and the sky look like they come together

**Moon**: the round object in space that sometimes looks like it has another shape

**nighttime**: the part of the day when the sky is dark

**nocturnal**: active during the nighttime

**observe**: to use any of the five senses (sight, hearing, smell, taste, touch) to learn more about something
**pattern:** something we observe to be similar over and over again

**phase:** a shape that the Moon can seem to have

**planet:** a round object in space like Earth, Mars, Venus, Jupiter, or Saturn

**seasons:** times of year that have different patterns of daytime and nighttime

**stars:** objects in space that look like dots of light in the night sky

**sun:** the bright object in space that gives us light in the daytime
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Books for *Spinning Earth*:

After Sunset
What Spins?
Nighttime Investigation
A Walk Through the Seasons
Patterns of Earth and Space

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Photographs: Cover, Pages 1, 8–9: NASA/JPL; Pages 4–7, 10–12, 13 (tl, bl, br), 14–17, 20 (br), 21: Shutterstock; Page 13 (tr): Tom McHugh/Science Source; Page 20: (t) Dr. John Brackenbury/Science Source; (bl) Leonard Lee Rue III/Science Source; Pages 22–25 (moon phases): NASA/Goddard Space Flight Center Scientific Visualization Studio; Page 28: David Nunuk/Science Source; Pages 32 (tl, tr), 33 (tl, tm, tr): NASA/JPL/Space Science Institute; Pages 32 (bl, br), 33 (bl, bm, br): NASA/JPL/Malin Space Science Systems
If you look around, you will find patterns.

To see patterns, sometimes we have to look at things from far away or watch them for a long time. Looking at Earth from far away, we can see the pattern of how it spins. Watching the sky for many nights, we can see how the stars seem to move. There are all kinds of interesting patterns to see on Earth and in space!