

Subject: TAG

Grade: 4th

Note: TAG instruction occurs one day a week for each student. These plans are meant to replace the time that would be spent on core learning activities (reading, ELA/writing, math, social studies/science) for that one day each week. Students should still complete activities for specials classes (art, music, PE) on their TAG day.

Week 6: Sept. 21-25

Standard	S4E2. Obtain, evaluate, and communicate information to model the effects of the position and motion of the Earth and the moon in relation to the sun as observed from the Earth. c. Construct an explanation of how the Earth’s orbit, with its consistent tilt, affects seasonal changes.
Brief Description	Students will learn about Earth’s seasonal changes as it relates to orbit and tilt. Students will complete a Questivities and Project Activity.

Student Directions:

- Complete the Brain Booster: “Space, the Final Frontier.”
- Read, “What Causes the Seasons” from <https://spaceplace.nasa.gov/seasons/en/>
- Complete SCAMPER for Seasons.
- Complete Seasons Questivities.
- Be sure to turn in all completed work to your TAG teacher.

Name _____

Space, the Final Frontier

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Imagine that NASA has just picked you to command the first space colony! The colony will be near the Omega galaxy frontier. You know this is a tough job, full of danger. But you're ready for the challenge.

Before you leave, you have to do some planning. Complete the form to set up your crew.

Omega Galaxy Mission

Commander: _____
Star Date: _____ Rank: _____

As the commander, you must select a crew. List some skills the crew will need. Explain why each skill is so important.

Skill	Reason
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

Now, list four people to serve with you on this important mission. Explain why you chose each person.

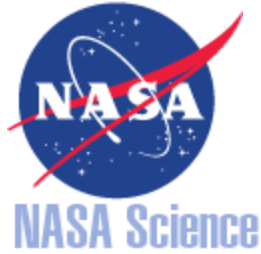
Person	Reason
_____	_____
_____	_____
_____	_____
_____	_____



Try This!

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Want Ad Use the information on your form to write a want ad for a crew member.



Search

What Causes the Seasons?

The Short Answer:

Earth's tilted axis causes the seasons. Throughout the year, different parts of Earth receive the Sun's most direct rays. So, when the North Pole tilts toward the Sun, it's summer in the Northern Hemisphere. And when the South Pole tilts toward the Sun, it's winter in the Northern Hemisphere.

It's all about Earth's tilt!

Many people believe that Earth is closer to the sun in the summer and that is why it is hotter. And, likewise, they think Earth is farthest from the sun in the winter.

Although this idea makes sense, it is **incorrect**.

It is true that Earth's orbit is not a perfect circle. It is a bit lop-sided. During part of the year, Earth is closer to the sun than at other times. However, in the Northern Hemisphere, we are having winter when Earth is closest to the sun and summer when it is farthest away! Compared with how far away the sun is, this change in Earth's distance throughout the year does not make much difference to our weather.

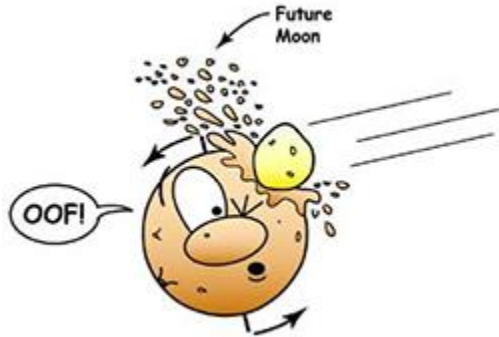
There is a different reason for Earth's seasons.

Earth's axis is an imaginary pole going right through the center of Earth from "top" to "bottom." Earth spins around this pole, making one complete turn each day. That is why we have day and night, and why every part of Earth's surface gets some of each.

Earth has seasons because its axis doesn't stand up straight.

But what caused Earth to tilt?

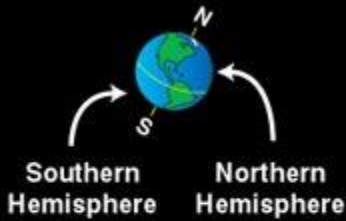
Long, long ago, when Earth was young, it is thought that something big hit Earth and knocked it off-kilter. So instead of rotating with its axis straight up and down, it leans over a bit.



By the way, that big thing that hit Earth is called Theia. It also blasted a big hole in the surface. That big hit sent a huge amount of dust and rubble into orbit. Most scientists think that that rubble, in time, became our Moon.

As Earth orbits the sun, its tilted axis always points in the same direction. So, throughout the year, different parts of Earth get the sun's direct rays.

Earth has seasons because its axis is tilted. Earth rotates on its axis as it orbits the Sun, but the axis always points in the same direction.



December:
Summer south of the equator, winter north of the equator. The Sun shines directly on the Southern Hemisphere and indirectly on the Northern Hemisphere



March:
Fall south of the equator, spring north of the equator. The Sun shines equally on the Southern and Northern Hemispheres



June:
Winter south of the equator, summer north of the equator. The Sun shines directly on the Northern Hemisphere and indirectly on the Southern Hemisphere



September:
Spring south of the equator, fall north of the equator. The Sun shines equally on the Southern and Northern Hemispheres

Sometimes it is the North Pole tilting toward the sun (around June) and sometimes it is the South Pole tilting toward the sun (around December).

It is summer in June in the Northern Hemisphere because the sun's rays hit that part of Earth more directly than at any other time of the year. It is winter in December in the Northern Hemisphere, because that is when it is the South Pole's turn to be tilted toward the sun.

Related Resources for Educators

[Seasons \(Educator Guide to go with Seasons Spotlight video\)](#)

[Seasons \(Nearpod Lesson to go with Seasons Spotlight video\)](#)

[Our World: Sun's Position](#)

[Sun's Position \(Educator Guide to go with Sun's Position Spotlight video\)](#)

[Sun's Position \(Nearpod Lesson to go with Sun's Position Spotlight video\)](#)

article last updated May 29, 2020

Earth's lopsided orbit

Earth's perihelion (point closest to Sun) = 91,400,000 miles from Sun

Earth's aphelion (point farthest from Sun) = 94,500,000 miles from Sun

While that is a difference of over 3 million miles, relative to the entire distance, it isn't much.



And, believe it or not, aphelion (when Earth is farthest from the Sun) occurs in July, and perihelion (when we are closest) occurs in January. For those of us who live in the Northern Hemisphere where it's summer in July and winter in January, that seems backwards, doesn't it? That just goes to prove that Earth's distance from the Sun is not the cause of the seasons.

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SCAMPER for Seasons

S – Substitute – What could the seasons be named instead of Fall, Winter, Spring and Summer?

C – Combine – Could you combine seasons? If so, how, and what would you name them?

A – Adapt – What else is similar to the seasons? How could you change the seasons?

M – Modify – How do you think the seasons might change if there was no tilt or orbit?

P – Put to Other Use – How can seasons help or hurt people? Businesses? Schools?

E – Eliminate – Are there seasons that could be eliminated? Are there places on Earth where there are fewer seasons? If so, where, and what is it like?

R – Rearrange/Reverse – What if the seasons were reversed? What if the seasons were mixed up? What would life be like?

Questivities™ - Seasons

Directions: Answer the Questivities™ Thinking Questions and the Active Question before doing the Project Activity.

Common Core Standards:

S4E2. Obtain, evaluate, and communicate information to model the effects of the position and motion of the Earth and the moon in relation to the sun as observed from the Earth. c. Construct an explanation of how the Earth's orbit, with its consistent tilt, affects seasonal changes.

Assessment Mini-Rubric for the Project Activity:

1. Drawing or 3D model has been researched and is accurate for each hemisphere and quadrant.
2. Drawing or 3D model is colorful.
3. Explanation includes the Sun's location for each season in each quadrant.
4. Seasons and weather are described.
5. Project includes the sources used to find the information researched.

Project Questions (Essential Questions answered through the Project Activity):

Why do we have seasons? How do seasons change? How are seasons different in different parts of the world. Why are seasons important?

Questivities™ Thinking Questions:

1. List the seasons.
2. Compare/Contrast the seasons in the 4 quadrants of the Earth.
3. What would happen if the seasons did not change? What would happen if some seasons were combined?
4. Would you rather have a year long winter, summer, spring or fall? Why?
5. How would you feel if you could only have 2 seasons, but the seasons were chosen for you?
6. Why do we need seasons?
7. How are you going to create a drawing or 3D model of the seasons in each quadrant? What will make it unique? What will make it interesting?

Active Question: Make a list of questions the Earth might ask the Sun.

Project Activity

Research the Earth's orbit and tilt in the Northern, Southern, Eastern and Western Hemispheres/Quadrants of Earth. Create a drawing or 3D model of the Earth's orbit and tilt for each Season for each quadrant of the Earth. Explain the sun's location for each season in each quadrant. Describe the seasons in each quadrant and how they differ from each other. (i.e. Is one more extreme than the other?)