



# Grade 3 Science



Earth and Space

**Solar System**

**Weather**

Life Science

**Plants**

Physical Science

**Sound**

**Energy**

Technology

**Flying Structures**

**Technology changes**

# **Grade 3 Teacher Guide**

## **Solar System**

### **Strand**

Earth + Space Science: 13, 14, 15

### **Resources**

Scott Foresman Science Book-Chapters 15 and 16  
Plus Scholastic Kit-Solar System

#### **Leveled readers (Reading)**

Grade 3-Elk Hunters (Below)

Pictures in the Sky (On)

Star Tracks (Above)

Grade 4-Day for Night (Below)

Darkness into Light (On)

Orbiting the Sun (Above)

### **Essential Questions**

- What patterns do the Earth, Sun, Moon and Stars show?
- What patterns repeat every day?
- What patterns repeat every year?
- Why does the Moon's shape change?
- What are star patterns?
- What are the parts of the Solar System?
- What are the characteristics of Earth, Moon, and our Sun?

### **Vocabulary**

- Orbit-a path that an object takes
- Revolve-to travel around an object (The Earth revolves or orbits the Sun)
- Rotate-to spin on an axis
- Axis-an imaginary line that goes from the North Pole to the South Pole
- Gravity-an invisible force that pulls objects toward the center. This keeps our Earth in an orbit around the Sun and prevents objects on Earth from floating into space. This also keeps our moon in orbit about the Earth. (Read pages 336-337 on gravity)
- Horizon-where the land and sky meet
- Constellations-a group of stars that make a pattern
- Star-a giant ball of hot, glowing gases
- Planet-a large body that revolves, or travels around the sun
- Atmosphere-the blanket of air and gases that surround the Earth

- Phase-the way the moon looks due to the amount of the lit side that can be seen from Earth
- Lunar Eclipse-Earth's shadow moves across the moon
- Telescope-a tool that gathers light and then magnifies objects to see them better
- Solar System-the sun, 8 planets, their moon and other objects that revolve around the sun
- Asteroid-a small chunk of rock that orbits around the sun

## Concepts

- Earth takes 24 hours to rotate. This gives us day and night.
- Earth takes 365  $\frac{1}{4}$  days to revolve around the sun. This is an Earth year.
- Earth's moon takes about 28 days to revolve around Earth (about a month).
- Earth's moon also rotates at the same time as it takes to revolve which is why we see the same side of the moon at a full moon.
- Earth is on a tilt. Earth's tilt and revolution around the sun gives the Earth seasons. Parts of Earth that are tilted toward the sun have more sunlight and more heat (summer).
- The Equator is an imaginary line at the center of Earth that receives more even temperatures.
- Earth is one of 8 planets that revolve around the Sun. (Pluto-dwarf planet).
- Earth is the third planet from the sun and the only one to support life.
- Earth has an atmosphere that protects us from the sun's rays and allows us to be able to survive.
- Earth is the only planet known to have liquid water and mild temperatures.
- The Sun is a star made of hot, glowing gases. It gives Earth heat and light.
- There are millions of stars in the sky but our Sun is closest to us.
- Moon has no light source of its own but shows light that is reflected from the sun.
- There are different "phases" or changes of moonlight that we see.  
Full moon-all of moon is lit. New moon-all of moon is dark. Crescent-a sliver of light is shown. Quarter moon-we see  $\frac{1}{2}$  of the moon with light.
- The Sun and Moon look about the same size in the sky but the moon is much smaller and much closer to Earth.
- The Earth rotates from west to east, which makes it seem like the sun rises in the east and sets in the west.

- Shadows allow us to know where the sun is in the sky and can help tell time. The longest shadows are early and late in the day when the sun is lower in the sky. The shortest shadow is at noontime.
- Objects hitting the moon created craters on the moon. We also have craters on Earth.
- Earth's moon is made of rocks and dust. There is no weather on the moon so the surface does not change unless something hits it.
- Planets that are further from the sun (ex-Uranus) have longer orbits and are colder.
- The planets are divided into two groups. The inner planets are Mercury, Venus, Earth and Mars. The outer planets are Jupiter, Saturn, Uranus and Neptune. An asteroid belt separates them. (Know order from Sun)
- The inner planets have rocky surfaces while the outer planets are made of mostly gasses.
- Jupiter has a Giant Red spot which is actually a huge storm.
- Constellations are groups of stars that make a pattern. Two of the most common are the Big Dipper and the Little Dipper.

## **Assessment**

Teacher made assessment or Chapter 15 and 16 tests

## **Web sites**

Space                      Interactive space games  
<http://www.apples4theteacher.com/starwarp2.html>

Kids Astronomy              Lots of information and facts  
[http://www.kidsastronomy.com/solar\\_system.htm](http://www.kidsastronomy.com/solar_system.htm)

Space Games from NASA  
<http://spaceplace.nasa.gov/en/kids/games.shtml>

Mars Games  
[http://mars.jpl.nasa.gov/funzone\\_flash.html](http://mars.jpl.nasa.gov/funzone_flash.html)

Windows to the Universe    Lots of facts, pictures and games  
<http://www.windows.ucar.edu/>

Animation for explaining the phases of the moon.  
<http://www.wonderville.ca/v1/activities/phases/phases.html>

# **Grade 3 Teacher Guide**

## **Weather**

### **Strand**

Earth and Space #6

### **Resources**

Scott Foresman Science Book- Chapter 6 (pages 170-192)

### **Leveled Readers-(Reading)**

Measuring the Weather (Grade 3-below level)

### **Essential Questions**

- How does weather follow patterns?
- How can people measure and predict weather and what tools do they need?
- What are some dangerous storms and how do people stay safe from them?

### **Vocabulary**

- Atmosphere-the blanket of air and gases that surround the Earth
- Weather-what it is like outside on a daily basis including temperature, wind, clouds and precipitation
- Hurricane-a huge storm that forms over the ocean
- Tornado-a rotary column of air that touches the ground and causes damage with it's high winds
- Blizzard-a winter storm with very low temperatures, strong winds, heavy snowfall and blowing snow
- Climate-kind of weather a location has over time
- Barometer-measures air pressure
- Anemometer-measures wind speed
- Wind vane-measures the direction of the wind
- Hygrometer-measures how much water is in the air
- Rain gauge-measures how much rain has fallen

## **Concepts**

- Weather changes all the time
- Weather consists of clouds, temperature, precipitation, and wind
- Air pressure effects weather (High air pressure means that the sky will be clear. Low air pressure means that the weather will be cloudy or rainy.)
- Measuring weather helps people to predict weather
- Special tools are needed to measure weather
- Air quality is affected by pollution in the air (smog and ozone). This can be dangerous to people.
- Changes in weather follow patterns depending on where you live.
- The water cycle continually provides precipitation in various forms.  
(pages 180-181)

## **Assessment**

Chapter 6 test

## **Web Sites**

Water Cycle and more (Click on weather)

<http://www.iknowthat.com/com/L3?Area=Science+Lab&COOK>

Slide show of the weather instruments

[http://www.nebo.edu/misc/learning\\_resources/ppt/k-5/weathertools.ppt](http://www.nebo.edu/misc/learning_resources/ppt/k-5/weathertools.ppt)

Matching game of weather terms

<http://www.quia.com/mc/320232.html>

# **Grade 3 Teacher Guide**

## **Plants**

### **Strand**

Life Science 2

### **Resources**

Scott Foresman Science Book Chapter 1

Pages 22-25 are informational not essential.

Insights teacher manual-content information 257-260

Plus Insights Kit

Leveled Readers-Grade 3

Growing Vegetables (Below)

Our Garden (On)

Gardening with Grandpa (Below)

### **Essential Questions**

- How do the different parts of a plant help it live and grow?
- What are the two types of trees?
- How are seeds scattered?
- What parts of plants do people eat?
- Why is photosynthesis essential for plants?

### **Vocabulary**

- System-a set of parts that interacts with one another
- Deciduous tree-loses its leaves in the fall and grows new ones in the spring
- Coniferous tree-does not lose its needle-like leaves in the fall
- Pollinate-move pollen from one part of a flower that makes pollen to the part of the flower that makes seeds
- Seed leaf-part of the seed that has stored food (cotyledon)
- Germinate-begins to grow
- Seedling-a new, small plant that grows from a seed
- Root hairs-hairlike outgrowths from roots that draw water and minerals from the soil
- Seed coat-the outer layer of a seed that protects the seed

- Chlorophyll (FYI)-The substance that makes the plant green. This is used to capture energy from the sun.

## Concepts

- Deciduous trees-oak, maple, dogwood, etc.
- Coniferous trees-pine, spruce, hemlock, fir, (have cones instead of flowers to make the seeds)
- Four main parts of a plant
  - Leaves-flat, generally green part that grows from the stem or branch.  
This is important in photosynthesis.
  - Roots-Absorb water and nutrients from the soil and transport them to the stem. It also helps to anchor the plant and stores food for the plant.
  - Stems-tubes that carry water and minerals to other parts of the plant
  - Fruit-The flower or food produced from the plant.
- Plants need three things to grow Food, Air (light source) and Water
- Seeds are scattered by
  - Wind
  - Water
  - Carried by animals
  - Eaten by animals
- What we eat
  - Roots that we eat-carrots/turnips/ beets
  - Fruit that we eat-strawberries, apples, squash, etc.
  - Stems that we eat-celery, broccoli, cauliflower
  - Leaves that we eat-lettuce, spinach, cabbage
  - Seeds that we eat-strawberry, peanuts, coconut
- Pollination-done by bees, other animals, and the wind
- Photosynthesis-A series of complex chemical reactions. Green plants combine water from the soil and carbon dioxide from the air while using energy from the sun. This reaction produces oxygen gas, which is released into the air and food (usually in the form of carbohydrates, such as sugar and starch) which is stored in various plant parts.

- Life cycle of a plant (see teacher and student books)

## **Assessment**

Teacher created test

## **Web Sites**

[My First Garden](http://www.urbanext.uiuc.edu/firstgarden/fundamentals/index.html)      Basic gardening for children  
<http://www.urbanext.uiuc.edu/firstgarden/fundamentals/index.html>

[The Great Plant Escape](http://www.urbanext.uiuc.edu/gpe/)      Explores plant life (older grades)  
<http://www.urbanext.uiuc.edu/gpe/>

[Plants for Kids](http://www.kathimitchell.com/plants.html)      Many sites on a variety of plants  
<http://www.kathimitchell.com/plants.html>

<http://www.sparta.k12.il.us/SID/plantunit/growthofbeanseed.htm>  
Life Cycle of a Bean Plant

<http://www.hhmi.org/coolscience/vegquiz/plantparts.html>  
Parts of Plants We Eat

# **Grade 3 Teacher Guide**

## **Sound**

### **Stand**

Physical Science 11

### **Resources**

Scott Foresman Science Book Chapter 14

Supplemental pages 359, 364-365 (energy)

Plus Foss Kit

Leveled Readers (Reading)

Echolocation (Grade 4-Above)

### **Essential Questions**

- How does energy produce the sounds that we hear?
- What causes sounds?
- How does sound travel?

### **Vocabulary**

- Vibration-a very quick back and forth movement
- Pitch-how high or low a sound is
- Compression wave-particles of matter are squeezed together. Sound waves are compression waves.
- Sound discrimination-ability to hear different sounds
- Volume-amount of space that matter takes up
- Sound Receiver-what collects the sound

### **Concepts**

- Vibrations in matter cause sounds
- Sound waves travel (Compression waves)

- Sound is measured from the center of one compression to the center of the next compression
- Frequency-how fast vibration goes
  - High Frequency-fast vibration
  - Low frequency-slow vibration
- Pitch-Differences in pitch are caused by the rate in which the object vibrates
  - Long objects vibrate slowly and have a low pitch
  - Short objects vibrate quickly and have a high pitch
- Tension
  - More tension-vibration is faster and pitch is higher
  - Less tension-vibration is slower and pitch is lower
- Ear receives waves and send signals to brain to be able to hear the sounds
- Outer ears are designed to gather sound energy
- The eardrum is a thin skin-like layer that stretches across the inside of the ear. When sound hits this, it begins to vibrate.
- The middle ear is made of three small bones. These vibrate when the eardrum vibrates.
- Inner ear is shaped like a shell filled with liquid. The tiny hairs in the liquid send signals to the brain. This is how we hear.
- People have vocal cords in the throat that vibrate to make sounds. The tighter they get, the higher pitch your voice becomes.
- Sound travels through matter
  - Solid (wood/metal)
  - Liquid (water)
  - Gas (air)
- Sound vibrations move rapidly and efficiently through dense substances (where molecules are closer together). Solids are generally denser than liquids. Liquids are denser than gases. As a result, sounds travel faster and seem louder when we hear them through a solid or liquid than when we hear them through the air.
- The medium that sound passes through affects its volume and the distance over which it can be heard.
- Sound does not travel in space as there is no matter between the planets and stars.
- The loudness of a sound depends on the strength of the vibrations.
- Echo is when sound waves strike an object and bounce back.
- Light travels faster than sound. (Example-fireworks or a thunder and lightening storm)
- Sound energy can be directed

- Instruments
  - Percussion instruments make sound when they are hit. The lighter you tap-the softer the sound. The harder you hit, the more the drumhead moves back and forth and the vibration is stronger.
  - String instruments make sound when they are plucked or a bow runs across the strings. The pitch of the sound depends on the length, thickness and how tight the string is. The short, thin, and tight strings make faster vibrations so they have higher pitches.
  - Wind instruments make sounds when air inside them vibrates. The pitch can change by how the lips vibrate or by moving valves or keys. Some wind instruments have a reed (a thin wooden strip). The vibration of the reed helps to make the sounds.

**Concept Web** (from pg 385)

Sound	
Matter Vibrates	
Sound waves travel	
Ear receives waves and sends signals to brain	
Brain hears sound	
Loudnes	Pitch
s	

**Assessment**

Chapter 14 test

**Web Sites**

<http://edu.larc.nasa.gov/connect/machine.html> (Can make sounds at different frequencies)

<http://www.stomponline.com/percuss2.html>  
From the show Stomp. Lessons and activities to understand sound.

# **Grade 3 Teacher Guide**

## **Technology**

### **Strand**

Technology 1 and 2

### **Resources**

Scott Foresman Science Book-Chapter 17

### **Essential Questions**

- How does technology affect our lives?
- What are some new technologies?
- How does technology help us get energy?

### **Vocabulary**

- Tool-an object used to do work
- Technology-the use of science knowledge to invent tools and new ways of doing things
- Invention-something that has been made for the first time
- Computer-tool which stores, processes, and gets electronic information

### **Concepts**

- Inventions are usually based on the solution to a problem or a way to make life easier.
- Technology works together to help systems work (examples-house, car).
- Technology continues to change the way we live.
- Space satellites have helped to advance technology (GPS, cameras, etc.).
- Computer technology is everywhere not just in computers (examples-IPODS, digital cameras, cell phones, even cars).
- Optical fibers (small thin fibers that carry information by using light)
- Roads help us move and carry items. We also travel and move materials by planes, boats and trains.

- The first transportation system in the US was rivers.
- The microwave was invented by accident. A scientist was experimenting with radar and learned that the “waves” cooked food faster.
- Televisions have changed from glass tubes to LCD technology.
- Wind power and waterpower were the earliest forms of electricity. We still continue to use these today plus more!
- Today we get electricity by hydroelectric power, power plants run on coal, oil or natural gas, solar energy (from the sun) and wind power. Many people like the last two because they (like water) are renewable (come from natural sources).
- Pollution is a concern with some forms of energy and inventions.
- See timeline on pages 496-497.

## **Assessment**

Chapter 17 test

## **Web Sites**

<http://www.eia.doe.gov/kids/energyfacts/index.html>

Site has games, facts, history and activities about energy

<http://www.energyhog.org/childrens.htm>

An energy website with fun games about saving energy

<http://www.clpgh.org/kids/fun/technology.html>

Resource for different kid friendly technology sites

<http://www.uspto.gov/go/kids/>

Invention information, games and more for kids

<http://teacher.scholastic.com/lessonrepro/lessonplans/theme/inventions.htm>

Scholastic has mini lesson for teachers on inventions