Jupiter Inlet Lighthouse
Outstanding Natural Area (ONA)

Palm Beach County School District
Field Research Ranger Program
Grades 6-8

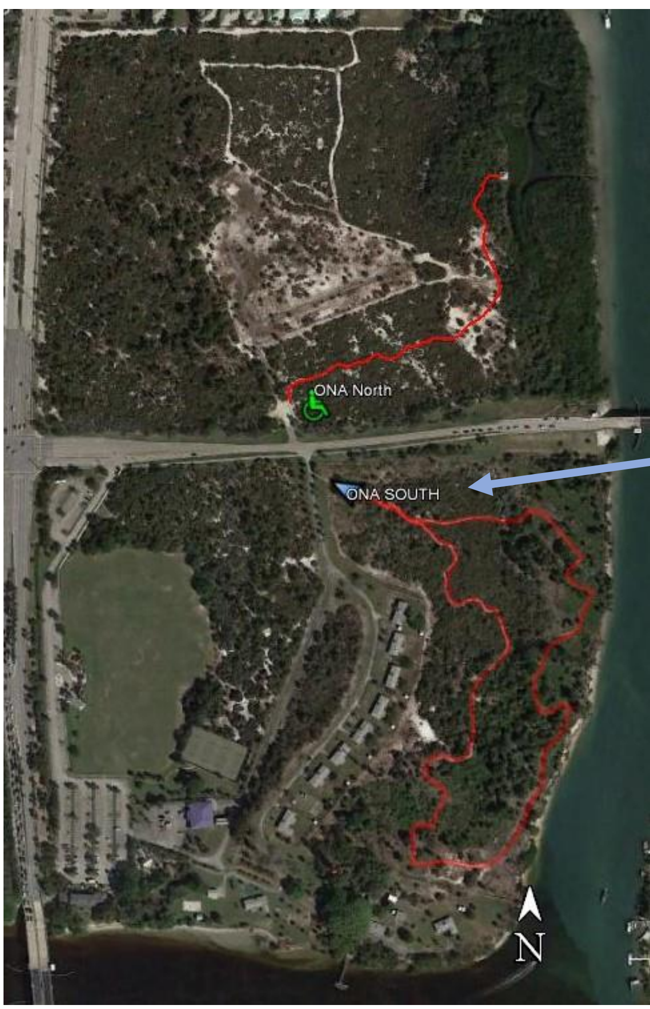
This activity is to be completed with a partner (a collaborative effort). Working with others in a "collaboration" has the following benefits: it is safer, more fun, provides more input and helps in answering questions. In this activity, you and you partner (friend, parent or other adult) will make observations on the ONA, record those observations (data) and analyze or interpret that data to answer questions about the ONA environment and its living and non-living parts.

DO NOT TOUCH OR TASTE ANYTHING, THERE ARE POISONOUS PLANTS ON THE ONA.

Make your observations (collect data) on one or both ONA trails.

The **"North Side Trail"** is a half mile round trip ADA concrete trail leading to a boardwalk and a covered pavilion overlooking a tidal lagoon. The parking lot area is located on the north side of State Road 707 at the following coordinates: 26° 57´ 09.31" N, 80° 04´ 53.25" W.

The **"South Side Loop Trail"** is a one mile mulched loop trail with an elevation change of about 30 feet. The trail head is located on the south side of State Road 707 at the following coordinates:
26° 57´ 07.22" N, 80° 04´ 55.04" W. (see map below)



***RECOMMENDATION:**

The "South Side Loop Trail" is recommended for this activity as it has signs that may help with observations and understanding.

Background Information:

There are two important concept one needs to understand for this activity:

1. ***Energy*** is needed for life to exist on Earth and the ***Sun*** provides this energy. Many organisms need the Sun's energy to be converted into a usable form because they cannot survive on just sunlight.

2. Carbon compounds form the basis for all known life on Earth. Elemental Carbon (symbol C on the Periodic table) must be converted in some way or be in an organic form to be usable by most living organisms. The most well-known way Carbon is converted into a usable compound for living organisms is by the process of ***photosynthesis.***

Activity Instructions:

With your partner, use the words in the word bank to complete items below. After you have completed the items below, take a walk on one of the ONA trails and complete your ***Observation Data Sheet***. Your observations/data will help you analyze and understand ***the transfer of energy in an ecosystem***.

Remember to stay on the trail and be careful, do not touch or taste anything, some plants are poisonous.
You will need to stop in the Jupiter Inlet Lighthouse & Museum after you complete this activity to get your "Field Research Ranger Passport" stamped.

Let's get started:

Use the word bank to complete the paragraph below before you start your walk.

the Earth icy/frost water air/vapor life/living things heterotrophs autotrophs

energy Sun chlorophyll trophic levels Photosynthesis Decomposers

The Earth is a system of interrelated parts called spheres and they are categorized by their main feature using the following prefixes: match the feature to the prefix (Hydro = _________), (Atmo = _____________),

(Geo = __________), (Bio = ________________), and (Cryo = _____________).

$$6CO_2 + 6H_2O \xrightarrow{\text{Light}} C_6H_{12}O_6 + 6O_2$$

The above formula shows the chemical process of _____________________. The Carbon Dioxide (CO_2) comes from the A**tmosphere** and the water (H_2O) comes from the **Geosphere** (the earth) through the roots into green plants. These plants use light ____________ from the _______ in the presence of __________________ to convert these two compounds into two new compounds of glucose ($C_6H_{12}O_6$) a sugar and oxygen (O_2). The glucose/sugar provides the energy for the plant to live. Because a green plant can make their own food, they are called ____________________ and therefore, green plants are the **producers** in an ecosystem making them the base of the _______________________.

Consumers are above the **Producers** on the **trophic levels** in an ecosystem because they cannot make their own food, they must eat something else, for this reason they would be called ____________________.

_________________________ are organisms that get their food by breaking down dead or decaying matter.

Discuss your answers with your partner so everyone understands these concepts.

Now go to the trail and make your observations. Don't forget your "Observation Data Sheet".

6-8 Observation Data Sheet

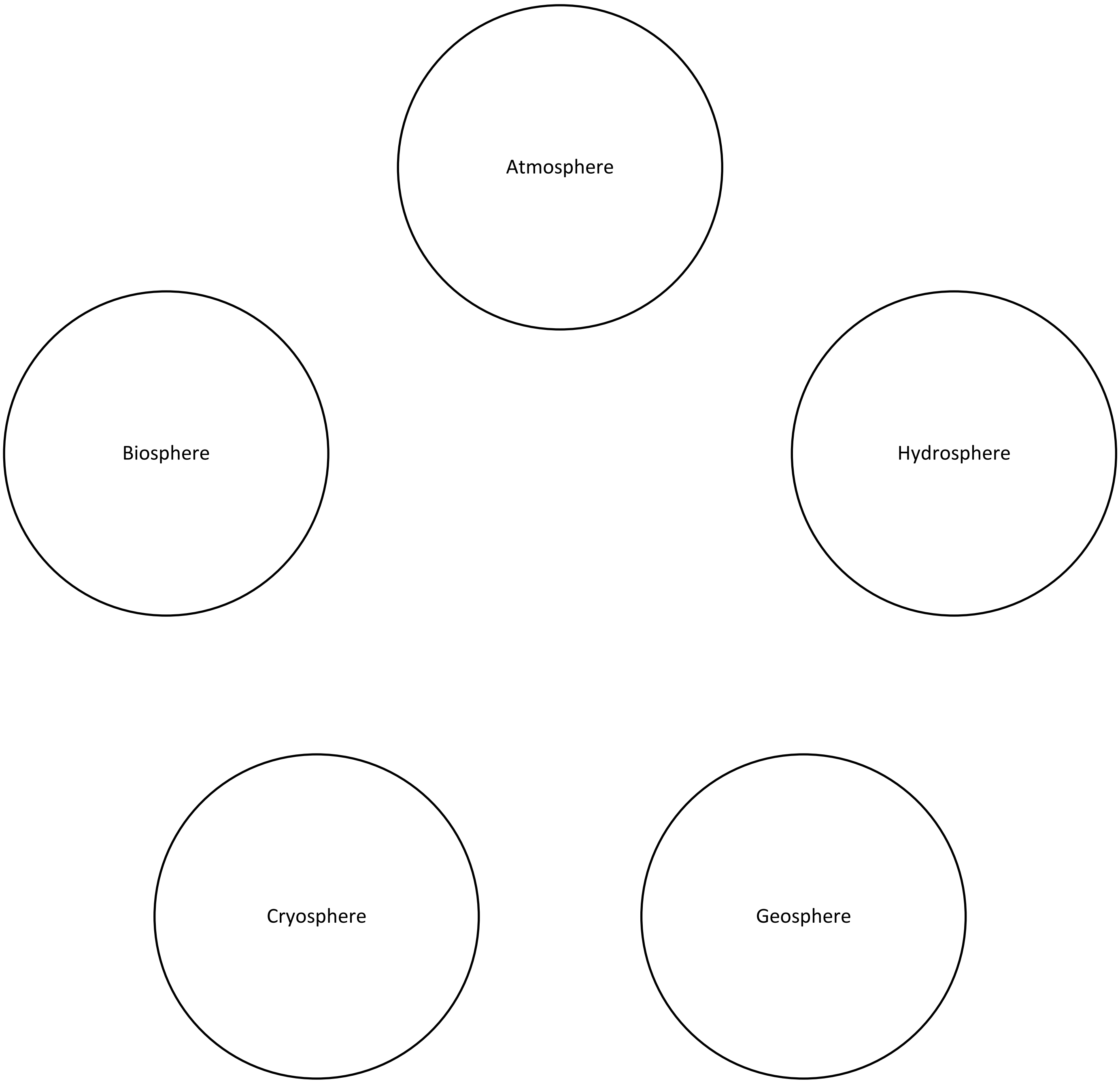
Name: ____ date: __________

Time of Observation	**Location of Observation**
start time __________ end time __________	North Trail _______ *South Trail ______
Weather Observations	
Wind speed ______ mph Wind Direction ______ Temperature _____º___ Rain fall _______	
Weather conditions above were: measured ____ estimated ___ taken from weather station____ (check one)	

Identify 1 or 2 features, objects or organisms on the ONA that represent the characteristics of each of the items listed in column 1 and write your observations in column 2. In column 3, describe any interactions or interrelationships you observe between both the "spheres" and the trophic levels.

Column 1	2-Features/characteristics	3- Observed interactions & Interrelationships
Geosphere		
Biosphere		
Atmosphere		
Hydrosphere		
Cryosphere		
Consumers		
Producers		
Decomposers		
Secondary consumers		
Tertiary consumers		

Using the information from your observations, write the names or types of organisms or features you observed for each "sphere" then draw lines from "sphere" to "sphere" to show the interactions or interrelations between "spheres". Label the arrows with the type of relationship or interaction (examples: **wind** from atmosphere **damaged tree** in biosphere or **water** from hyrdosphere **eroded soil** from Geosphere) If nothing is observed in a "sphere" label it "Not Observed".



Below, draw the basic energy source that provides energy to the Biosphere:

ANSWERS:

The Earth is a system of interrelated parts called spheres and they are categorized by their main feature using the following prefixes match the feature to the prefix: (Hydro = _water_), (Atmo = air/vapor), (Geo = _the Earth_), (Bio = _life/living things_), and (Cryo = icy/frost).

$$6CO_2 + 6H_2O \xrightarrow{\text{Light}} C_6H_{12}O_6 + 6O_2$$

The above formula shows the chemical process of _photosynthesis_. The Carbon Dioxide (CO_2) comes from the Atmosphere and the water (H_2O) comes from the atmosphere through the **Geosphere** (the earth) into green plants. These plants use light _energy_ from the _Sun_ in the presence of _chlorophyll_ to convert these two compounds into two new compounds of glucose ($C_6H_{12}O_6$), a sugar and oxygen (O_2). The glucose/sugar provides the energy for the plant to live. Because a green plant can make their own food, they are called _autotrophs_ and therefore, green plants are the **producers** in an ecosystem making them the base of the _trophic_ _levels_.

Consumers are above the **Producers** on the **trophic levels** in an ecosystem because they cannot make their own food, (they must eat something else), for this reason they would be called _heterotrophs_.

Decomposers are organisms that get their food by breaking down dead or decaying matter.

OBSERVATION DATA SHEET: (see attached sheet)

The observations and follow-up answers will vary depending on what is on the trail at the time.
For the weather observations, the information may be measured if you have the equipment, it can be estimated just a guess or the information can be taken from a weather report. Place a check mark on the line indicating which of the three ways the weather data was observed.

Possible answers for the observations are too numerous to list on an answer key. Those shown on the answer key are possible examples for reference only. Student answers will vary and may be totally correct.

Please understand that age, experience and ability will determine the details and completeness of both observations and recording of those observations. The goal is to have a positive interaction with young people in the field, observing and learning about the world around them.

Associated SSS Benchmarks: SC. 6.E.7.4, SC.7.L.17.1, SC.8.L.18.1

ONA website:
https://www.blm.gov/programs/national-conservation-lands/eastern-states/jupiter-inlet-lighthouse
ONA Phone Number: 561-295-5953

6-8 Observation Data Sheet

Names of Partners: ____ date: __________

Time of Observation	**Location of Observation**
start time __________ end time __________	North Trail _______ *South Trail ______

Weather Observations

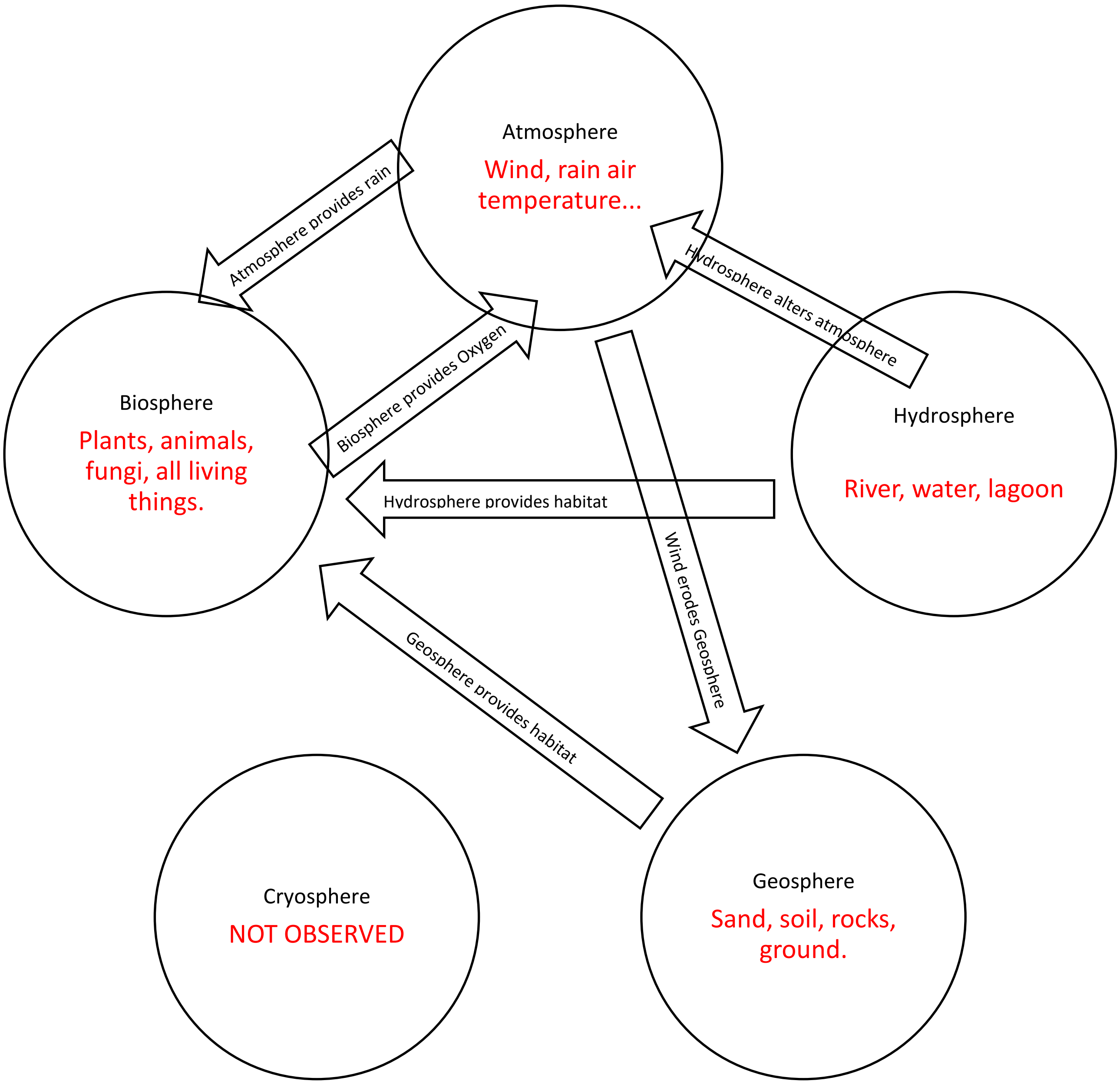
Wind speed ______ mph Wind Direction ______ Temperature _____°___ Rain fall _______

Weather conditions above were: measured _____ estimated _____ taken from weather station _____ (check one)

Identify 1 or 2 features, objects or organisms on the ONA that represent the characteristics of each of the items listed in column 1 and write your observations in column 2. In column 3, describe any interactions or interrelationships you observe between both the "spheres" and the trophic levels.

Column 1	2-Features/characteristics	3- Observed interactions & Interrelationships
Geosphere	Soil types, sand, mud, rocks Dunes, erosion, cliffs	Wind & water eroded soil. Soil not suitable for plant growth. Sand too dry. Sandy soil good for burrowing animals.
Biosphere	Plants, animals, fungi. (Any & all living things)	Animals living & feeding in the Geosphere (ground) and Hyrdosphere (water). Flying in the Atmosphere. Rain from the Atmosphere providing water for plants and animals.
Atmosphere	Wind, rain, air (senses can't observe directly but we know it is there because we can breathe.) Temperature	See above. Also, wind and rain may alter the Geosphere and Biosphere. Temperature may alter the Hydrosphere and Biosphere.
Hydrosphere	River, ocean, lagoon/estuary No lakes or ponds are on the ONA.	Provides living habitat for animals and other organisms. Shapes the Geosphere. Interacts with the Atmosphere to create weather. Isolates living space for plants and some animals.
Cryosphere	Not Observed	Not Observed - No ice or frost in Florida.
Consumers	Any visible animal. Birds, tortoises, Most insects.	Lives in the hydrosphere, Geosphere or biosphere (bushes or trees). Travel in the Atmosphere and Geosphere and hyrdosphere.
Producers	Any green plant. Grass, shrubs, trees, …	Producers live in or on the geosphere, some (algae) live in the hyrdosphere. Get sunlight and water (rain) from the atmosphere. (Sunlight comes from outside our atmosphere but travels through it to reach us).
Decomposers	Bacteria (can't see them), fungi, Lichens, worms, some molds…	Decomposers live in the Geosphere and hyrdosphere. Some break down parts of the geosphere. They recycle nutrients in the biosphere.
Secondary consumers	Animals that eat animals that have eaten other animals. 2nd level Birds, rats, snakes, raccoons …	Live in the hydrosphere & geosphere. Functioning part of the biosphere. Respond to atmosphere conditions.
Tertiary consumers	Animals that eat secondary consumers. Birds of prey (Osprey) Snakes, foxes, raccoons, humans…	Same as secondary consumers.

Using the information from your observations, write the names or types of organisms or features you observed for each "sphere" then draw lines from "sphere" to "sphere" to show the interactions or interrelations between "spheres". Label the arrows with the type of relationship or interaction (examples: **wind** from atmosphere **damaged tree** in biosphere or **water** from hyrdosphere **eroded soil** from Geosphere) If nothing is observed in a "sphere" label it "Not Observed". Answers will depend on observations made above and may include many more.



Below, draw the basic energy source that provides energy to the Biosphere:

Any picture of the Sun will work.

Glossary of terms for Grades K-8 Field Research Ranger Program

air/vapor	The parts of the atmosphere that the prefix "Atmo" represents.
autotrophs	Organisms that can make their own food.
basic needs	Water, Air, space and shelter, things that all living things need to survive.
chlorophyll	Basically, the green compound in plants that together with sunlight allow plants to make their own food.
community	A group of different species living together in a specific habitat.
Decomposers	An organism that breaks down dead matter.
Ecosystem	A system that includes all living and non-living factors functioning together as a unit.
endangered species	Any species that is in danger of becoming extinct.
energy	Useable power transferred between parts of as system in the production of a physical change.
environment	The general place where plants and animals live.
extinct	No longer existing, gone.
feathers	Characteristic covering on the skin of birds.
flower	Characteristic reproductive part of a plant, usually bright in color.
fruit	Characteristic fleshy product of a plant that contains seeds.
fur	Characteristic hairy covering on the skin of mammals.
Habitat	The natural home of a plant, animal or other living organism.
heterotrophs	An organism that requires organic compounds for its principal source of food, cannot make their own food.
icy/frost	The parts represented by the prefix "Cryo" in the term Cryosphere.
investigation	The systematic examination or research of something.
leaf	Characteristic, flattened, blade-like part of a plant, usually green in color.
life/living things	Components that the prefix "Bio" in the word Biology represents.
nonliving	Inorganic objects that do not need the basic needs of live (food, water, space, shelter) to exist.
Photosynthesis	The process by which green plants turn sunlight into energy.
pollution	Anything in the environment that is harmful or poisonous.
population	A group of one species living in the same area.
scales	Characteristic thin plates covering the skin of fish and reptiles.
seeds	The part of the plant that, under appropriate conditions, grows into a new plant.
senses	One of the faculties of sight, smell, hearing, taste or touch.
species	A group living organisms of similar individuals. A basic unit of biological classification and taxonomic rank.
survive	Continue to live or exist.
the Earth	The solid parts of the planet, represented by the prefix "Geo" in the term Geosphere.
trophic levels	Levels in an ecosystem, comprised of organisms that share the same function in the food chain.
water	A basic need of living things represented by the prefix "Hydro" in the term Hyrdosphere.