

Saturday Science Teaching Lesson Plan

Ecosystem Exploration

Week 1: Deserts!

1-2

A) LEARNING OBJECTIVES

- Students will be able to describe the different types of deserts
- Students will be able to describe characteristics of animals that live in deserts
- Students will explain how water is stored in a desert

B) MATERIALS

- 24 mason jars
- Sand (enough for 2" per jar)
- 1 small bag of potting soil
- Small pack of succulents (no spines, need to have ones with leaves so there are enough for 24 jars-1 leaf/jar)
- 25 folders with pockets
- 1 pack of white card stock
- 1 pack of white printer paper
- 1 pad of chart paper
- 1 pack of multicolored construction paper
- 24 small Ziploc bags (sandwich or quart is fine)
- 3 apples, 3 slices of bread, 1 bag of chips, a couple of pieces of turkey, (enough so that each group of students has a small piece of each: ex 2 chips per table)
- 6 small lamps
- Markers
- Clay-1 large pack of air dry clay
- Toothpicks-a few for each table
- Popsicle sticks-a few for each table
- Crayons
- Masking tape
- Small bag of pebbles
- Small desert animal plastic toys (to fit 1 in each mason jar)
- 24 copies of the following: Explorer gear worksheet, characteristics of the desert worksheet, Matching up desert animals with their habitat worksheet, world map.
- 12 copies of 'Where's the Water worksheet' and lab guide, Animal Tracks guide.

C) TENTATIVE TIMELINE & DESCRIPTION OF LESSON

9:15-9:35:

As students arrive, each one gets a 'My explorer worksheet' to color in and a folder to write their name on while everyone signs in and gets a nametag. Folders will be held in the classroom each week and students will take them home on the last day of Saturday Science.

9:35-9:50:

Icebreaker! After watching a 4 minute clip of the desert episode of Planet Earth, each table is given 5 minutes to share out their favorite desert animals with their group. Groups then share out their favorite desert animals while the instructors list them on the board.

9:50-10:00:

A large world map drawn on chart paper is hung up on the wall. 'Who can tell us where deserts are' Students share out where deserts are while the instructors color in the map in those areas while highlighting that we also have cold deserts. The instructors also ask the students what pattern they see on the map in regards to the locations of the deserts. This map will be hung up each week and colored in with help from the students to showcase where we have 'explored' ecosystems.

10:00-10:05

Expectations chart for Jr. Explorers! What do all good explorers need to do so they have a fun time on their trip and learn? Students will make this list with the instructors and it will be hung up in the room for each week of Saturday Science.

(Be nice/Respect ourselves and others/Listen/follow directions/Hands to yourself/Don't play with your chairs/Have Fun!!!!)

10:05-10:15

Characteristics of the desert worksheet:

Each table will come up with 4 characteristics of a desert. We'll ask the students to share out the 4 characteristics they came up with. We will list them on the board while discussing and clarifying them. Key ideas: DRY, Temperature extremes - can be hot or cold, little rain, LOW humidity, little vegetations/plants store water/huge variety of (mostly) nocturnal animals-cooler at night -some are sandy, some are mountainous, found on every continent, (subtropical, coastal, interior, polar)

10:15-10:30

Who lives in the desert? Lets talk about animals! [Match them up ditto:](#)

10:30

[Where's the water worksheet!](#) Experiment set up

- Each table has 4 bags
- Label each bag-bread/chips/apple/turkey
- Answer the questions on the worksheet
- Seal the bags and place them under your groups lamp on the back counter-We'll come back to these later!!

10:45

Snack/bathroom break

11:00

[Animal Tracks](#) Look at the animal cards –make your observations-what animal do you think this is? Instructors will pre make animal tracks in the sand for each table (wet the sand, use toothpicks and popsicle sticks to make tracks, leave to dry overnight). The students will have pictures of desert

animals and will be given 10 minutes to figure out whom the tracks belong to. We will then share out as a class and look at the tracks and how to tell them apart.

11:15

Make your own animal track!

-Each table gets a different animal!

-Students will each get a lump of clay in which they can use the tools at the table to make their own animal track (from the desert) to take home with them.

11:25

Check bags! Where's the water

Have each group complete their worksheet. The instructor will tally the results on the board and briefly discuss how water is stored in the desert and how it may not look obvious.

11:35

[Build your own desert ecosystem](#) –You bring it home!

-2inches of sand

-bit of soil

-a few rocks

-a little water

-a succulent leaf

-a desert toy

-Label with your name!

11:50

Color in where we went today on your world map and put back in folder

Next Week we travel to the wetlands!!

Saturday Science Teaching Lesson Plan

Ecosystem Exploration Week 2: Wetlands & Marshes! 1-2

A) LEARNING OBJECTIVES and CRITERIA FOR DETERMINING IF OBJECTIVES ARE MET (minimum of 2/ lesson)

- Students will be able to explain how wetlands are important to birds
- Students will create a model of wetlands/marshes as 'filters'
- Students will design and build a water filter
- Students will understand how pollution affects wetlands
- Students will be able to explain what a food web is

B) MATERIALS

- 36 large paper plates, preferably flatter ones
- 6 tinfoil/plastic pans (3-4" deep)
- 6-12 sponges
- Clay (enough for 6 trays-a large handful per group)
- Leftover potting soil
- 12 beakers
- water (for the wetland in a pan activity)
- oil (enough to fill up ½ of the Dixie cup)
- 25 plastic coated Dixie cups
- pom poms (a few per table)
- Feathers (at least 25)
- Tweezers/clothespins (a few per table)
- One spool of yard
- Index cards
- Tape
- Markers
- cups
- funnels
- sand
- gravel
- coffee filters

C) TENTATIVE TIMELINE & DESCRIPTION OF YOUR LESSON (IN PROGRESS)

9:15-9:35:

Hand out folders and wetland coloring sheet while everyone signs in

9:35-**Head down to the atrium**

Wetland migration game (From Project Wet)-Wetlands are important for bird survival!

Wetlands are stopovers for migrating birds-get food/rest/shelter/space

Nesting...Stopover...Wintering (12 plates at each)

- Students have to flap their arms like birds to go from one to the other

- 2 kids per plate, 1 foot

- Everyone survives round 1

- Round 2, some stopover taken away. No plate, you sit off to the side

- Some wintering plates taken away etc

- As the game is played and birds make it back to nesting ground, students that were out can come back into the game as baby birds.

- more stopover taken away

- nesting taken away

- how many birds left? Not many!! We need to protect wetlands

**Students who are out can help remove bases. Play for at least 2 migration rounds.

10:00

Wetlands are important for birds to migrate and survive! They are also filters to stop flooding and to filter out pollutants from reaching the ocean, a lake, a place where humans/animals get their drinking water etc

[-Wetland in a Pan!](#)

- each pan represents land (the clay) and empty space is a lake (pretend its our clean drinking water)

- What happens if we pour a little water onto the land? Where does it go?

- Place sponge between the 'lake' and the land

- pour a little bit of water on the clay-where does the water go? Squeeze out sponge

- Dump out water

- Now place a little dirt on top of your 'land'

- Place sponge strips at base of land

- pour muddy water over the 'land'

- what happens to the lake/drinking water?

- what did the wetland (sponge) Do?

IT'S A BUFFER

How does the water in the jar look vs what's in your pan?

*If time allows, students can explore how to create a filter system with sponges and try to get clear water in the 'lake'

10:30: Snack break!

10:45:

Build your own water filter (cups, funnels, sand, gravel etc)

- Students (in pairs) get a cup full of muddy water

- They need to use the available materials to create clear water.

- Students will first draw their design and then start building

- We will then discuss as a class what worked best for the filter and what would they change if they could build a second filter.

11:20

[Oil Spill Activity!](#)

- Each pair of students gets a cup of water and oil with a feather in it

How do you clean this up?

Available materials: cotton, sponge (reminder to students - you cant just soak up all the water-we have to leave clean water behind)

-Students then can try to get the oil off of the feather

-Students will discuss their groups their best solution and share out with the class.

11:35:

[Marsh Market!](#)

-Each student will be given an index card with the name of a wetland animal on it to tape to their shirts

-In a large open space, we will create a food web by passing along yarn between the different trophic levels.

11:55

Clean up!

Saturday Science Teaching Lesson Plan

Ecosystem Exploration Week 3: Tundra 1-2

A) LEARNING OBJECTIVES

- Students will be able to describe characteristics of animals that live in the tundra
- Students will be able to describe how animals keep warm in the tundra
- Students will explain how warmer temperatures affect the permafrost in the tundra
- Students will be able to explain why trees adapt to the weather in the tundra
- Students will be able to create their own animal that adapts to the tundra

B) MATERIALS

- Fur
- Feathers
- Crayons
- Markers
- 1 pack of white printer paper
- 1 bag of pipe cleaners
- 1 pack of mutli-colored construction paper
- 1 small bag of potting soil
- 1 bag of biodegradable packing peanuts
- 3 bags of ice
- 25 folders with pockets
- 48 small Ziploc bags (2 packs of sandwich is fine)
- duct-tape
- 1 tub of vegetable shortening
- 4 four-liter buckets
- water

- large fan
- Clay-1 large pack of air dry clay
- Masking tape
- scissors
- 1 pack of round head-fasteners
- 24 copies of the following: Tundra coloring worksheet, 'Animals of the Artic Tundra' worksheet

C) TENTATIVE TIMELINE & DESCRIPTION OF LESSON

9:15-9:40:

As students arrive, each one gets a ['Tundra' coloring worksheet](#) to color in and a folder to write their name on while everyone signs in and gets a nametag. Folders will be held in the classroom each week and students will take them home on the last day of Saturday Science.

9:40-9:45:

A large world map drawn on chart paper is hung up on the wall. 'Who can tell us where tundras are' Students share out where the tundra is while the instructors color in the map in those areas.

9:45-10:00: Groups then share out their favorite tundra animals while the instructors list them on the board. Children share characteristics animals have in order to survive in the tundra.

10:00-10:35: Students design their own animal (or an actual animal) and draw the animal in the tundra environment. Key Ideas: fur and feathers, flippers with blubber will keep animals warm in the tundra land and tundra water environments. Tundra environments have snow or cold permafrost ground.

10:35-10:40: Students discuss necessities people need to stay warm and survive in the tundra. Key Ideas: we need the equivalent of fur-coats and layers to keep us warm.

10:40-11:00

Snack/bathroom break

11:00-11:05:

Students discuss factors that may melt the tundra. Key ideas: An increase of temperature or long summers can melt the permafrost layer in the tundra. It may take longer to freeze the following winter.

11:05-11:10:

Students make observations of frozen soil (frozen packing peanuts and soil mixture) in large tubs before strong lights are turned on to represent warm weather.

11:10-11:35:

Students make their own [blubber mittens](#) to mimic polar bears. Once the blubber mittens are assembled, students place one hand in bucket with water and ice and the other hand with the mitten into a different bucket with water and ice. Students compare the temperatures of both hands. Key ideas: The blubber mitten represent the animal blubber that penguins, whales, and mammals have in the tundra. The blubber insulates their body heat despite the surrounding temperature is really cold.

11:35-11:50:

Instructors pose the question of how plants and trees can survive the strong, cold winds of the tundra. [Students build short shrubs/trees with pipe cleaners and clay](#). Students also build tall trees with pipe cleaners and clay. Students compare which tree moves the most when they blow on the pipe cleaners. Next, students test the stability of their short trees with a strong electrical fan. Key points: Trees adapt to be shorter to survive strong winds in the tundra.

11:50

Color in where we went today on your world map and put back in folder
Next week we travel to the rainforest!

Saturday Science Teaching Lesson Plan

Ecosystem Exploration Week 4: Rainforests! 1-2

A) LEARNING OBJECTIVES and CRITERIA FOR DETERMINING IF OBJECTIVES ARE MET (minimum of 2/ lesson)

- Students will be able to describe characteristics of two carnivorous plants
- Students will be able to explain that humans get many products, like rubber, from trees.
- Students will understand that there are several layers to the rainforest that provide different benefits to different species.
- Students will be able to ID the structures in a flower.

B) MATERIALS

- 50 dixie cups
- viscous liquid-enough for ~1-2inches per cup
- 1 bag of small pom-poms
- Radish seeds (12 per group)
- access to water
- paper towels
- cardboard (1 small piece per student)
- yarn (12" per student)
- straws (2 per students)
- tape
- pack of construction paper
- scissors
- vinegar
- 24 leaves
- 24 flowers

C) TENTATIVE TIMELINE & DESCRIPTION OF YOUR LESSON

Welcome!

We're going to the rainforest today- show a quick clip of Explore the rainforest-ecology for kids
https://www.youtube.com/watch?v=KMdD6TTDZ_g (5min)

-We're going to set up 2 rainforest experiments!

1) Acid rain on leaves (10 min)

-Each kid gets a cup, and a leaf (have students predict what will occur to the leaves)

-Write initials on cups (We'll put on the blue trays and check on them later)

2) [Set up radish seeds](#) (5min)

-Each table pours water in their seed cup and lets them soak at their table for 1 hr.

-The chemistry behind the carnivorous plants: use honey or heavy viscous liquid in a cup and have them drop flies (tiny pom-poms and attempt to take them out with tweezers (or have them come up with a way to get the flies out) Materials needed: cups, viscous liquid, flies (tiny pom-poms). can make their flowers

1) Cut out-(25 min)

-Each table gets a pile of straws, cardboard, construction paper

2) Fly-(10 min)

-Each table gets 2 cups of viscous liquid, some flies, 2 tweezers to share with their partner

BREAK TIME

Ms. Frizzle in the Rainforest: <https://www.dailymotion.com/video/x5viv00>

[Rubber!](#)

-Class discussion on what we get from the rainforest. Instructor will list student ideas on board and expand up on it (rubber, medicine, etc)

-Each table gets 4 popsicle sticks/2 things of water/2 graduated cylinders

-Each students gets a cup of glue

-They mix the pre measured glue and water that they will measure out themselves

-Well come around and add the premade 5ml borax solution when they are done mixing.

-They will then mix again until solid like material on stick

-Each student will knead their rubber on a paper towel until it feels less sticky

-Each student will then take their rubber and place in a Ziploc bag with their name on it.

Radish seeds-set up experiment-20-30 min (Key idea: soil nutrients/nutrient poor soil in RF)

(1 control per table and then each pair can choose 2 variables-5 total)

-Each table gets a handout

-Each table gets 5 cups/tray with a little bit of water in it/paper towels

-They must label the cups with their names

-While they are setting up their cups, the instructor(s) will come around with the variables to put in their cups for them(or let them but well go around with the items)

-Once cups are set up and labeled w variables, they can put them on the back lab bench for next week.

Rainforest cards (10 min) – Key idea: canopy levels

- Each kid gets a canopy layer chart/animal cards
- They can cut out and glue 2 for each layer and put the rest in their folder

Flowers! (15 min)

- Students will dissect 1 flower each
 - tape the pieces of the flower on a piece of paper with tape and label
 - Each kid gets a white piece of paper to stick their flower to
 - Each kid gets a handout of the flowers parts
- Clear Tape (at least 1 per table)

Saturday Science Teaching Lesson Plan

Ecosystem Exploration

Week 5: Coral Reefs & Design your own ecosystem!

1-2

A) LEARNING OBJECTIVES and CRITERIA FOR DETERMINING IF OBJECTIVES ARE MET
(minimum of 2/ lesson)

- Students will understand that coral are animals and that they have a relationship with zooxanthellae
- Students will be able to understand coral bleaching
- Students will be able to describe that there is a negative effect on shelled animals (Calcium carbonate) when the ocean acidity rises.
- Students will build a model describing an animal and how it survives in its environment (food, shelter, predator/prey interactions, temperature, etc)

B) MATERIALS

- 13 pieces of poster board (oak tag)
- feathers
- pipe cleaners
- clay (that the kids can take with them, enough to make 24 small animals)
- sequins
- scrap cardboard
- scrap construction paper
- scrap newspaper
- tp rolls
- tape
- pom pom balls
- mod podge
- glue
- colored pencils
- packing peanuts

- printer paper (50 pieces)
- A chart pad
- chalk (2 pieces per pair of students)
- 12 dixie cups
- 1 bottle of vinegar

C) TENTATIVE TIMELINE & DESCRIPTION OF YOUR LESSON

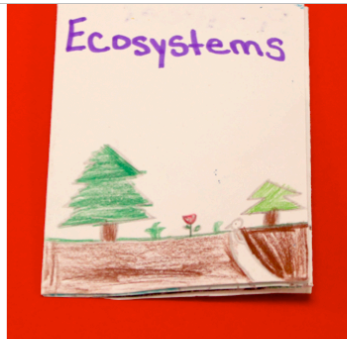
Ecosystem Video: (~3 min)

<http://studyjams.scholastic.com/studyjams/jams/science/ecosystems/ecosystems.htm>

After the video we will have a class discussion on biotic vs abiotic (listed on board).

Accordion book:

Each student gets a piece of card stock to fold into 4s



Set up Coral activity!

Have each table put chalk in a cup with water, and a cup with vinegar- check it later

Talk about acids effects on the leaves from last week Have them predict what happens to chalk (tie in to coral and shelled creatures)

Check at the end of class

Animal Charades:

Each table acts out animals: 2 rounds

Design your own ecosystem:

The animals name

The basic needs-have class call out-list on board

Food/shelter/space/vegetation/temperature/other animals/biotic & abiotic

Where does your animal lives- does it need a new world? What do they need to survive in it?

Students will brainstorm and design it first

Each table will have scissors, glue, and tape. All other materials are on a different table and students may choose a variety of items to build their ecosystems for their animal.

Clean up time! Don't forget your Explorer Folders and your Ecosystem!! 😊