

Survivor! Teacher Guide

Grade 3

Needham Science Center 8/2019

A special thanks to the NPS grade 3 teachers who wrote and piloted the Grade 3 Survivor unit!

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Introduction Grade 3 Survivor!



The survivor curriculum is designed to be an inquiry- based unit that helps build students' budding scientific skills. This unit is designed to have students exploring living things through open-ended experiences. They use isopods as a main focus, in order to make observations and collect data about how the population changes over time. They learn about the adaptations isopods and other animals have to survive in their habitats, and consider how changes to habitats could affect them. The unit then switches focus to have students explore ancient habitats and learn about how scientists have used fossils to learn about animals and their adaptations. Finally, they use their experiences and concepts about survival, habitats and adaptations to design their own imaginary animal.

This unit supports the theory that "young children are active and native science learners who, with the encouragement and support from adults, will eagerly explore, experiment with, and learn about the natural, physical, and social world around them" (National Research Council, 2001).

Questioning, exploring, investigating, manipulating, problem solving, communicating and reinventing understanding: these are the hallmarks of childhood and the process of scientific inquiry...As students focus on the process of doing investigations, they develop the ability to ask scientific questions and investigate aspects of the world around them. **The teacher's role is to guide the students to use their data to construct reasonable explanations,** and not to provide information or facts. (From Taking Inquiry Outdoors)

The lessons in this unit are structured to guide students through questioning, making observations and building observations. You as the teacher should encourage students to think about questions in each lesson and consistently return to the list of students' questions throughout the unit in order to build cohesiveness to the unit and to build students' understanding.

In order to do so, it is crucial for students to be able to share ideas with their peers regularly, as professional scientists do, which are referred to as 'Science Talks'. (See tips for Science Talks on page 3 of this guide).

Tips for teaching this unit

When to teach the unit: This unit is designed to be taught in fifteen, 60-minute sessions, but can be broken up into smaller or longer lessons if need be. It can take place at any time of the year, but works well in the fall or spring so students can go outside to experience the woodlands first hand. The last lesson (lesson

16) is a project based performance assessment and can take several 45-minute sessions. You as the teacher can decide how much time to devote to this project. **Taking students outside:** Lesson 3 calls for students to go outdoors to investigate the woodlands habitat. Consider asking for extra help to manage time spent outside and to allow students to work in small groups.

Why study isopods, adaptations and habitats?

In this unit, students observe isopods and fossils in order to work on science and engineering practices, which are outlined in the Massachusetts standards for Science/Engineering and Technology. Some examples of specific skills students should develop include

- 1. Ask and/or identify questions that can be asked in an investigation
- 2. Use observations to describe patterns and/or relationships in the natural world
- 3. Use information from observations to construct an evidence-based account of nature
- 4. Distinguish between opinions and evidence in one's own explanation
- 5. Listen actively to others to indicate agreement or disagreement based on evidence
- 6. Obtain evidence using various texts or other media to answer a question

A large focus of this unit builds students ability to **use observations and make claims based on evidence**. This is especially important practice for paleontologists who must use evidence from fossils to make claims about life that existed long before humans were on earth.

In addition, this unit helps students build concepts about big ideas in science. It helps build understanding of **adaptations and structure and function** in Grade 4 Insects unit and Ecosystems in grade 5. This unit will also help lay the foundation for later understanding of natural selection in middle school, as well as concepts about Earth's history and geologic time scales.

For more detailed information and a list of standards, essential questions and assessment, refer to the Unit Overview (in this Teacher Guide).

What is a Science Talk?

The ability to put one's ideas into words, support them with evidence and argue them in debate is essential for scientific literacy. Science talks allow the children to do this, verbally explaining their observations and explanations. Science talks insure that the learner is listening to the ideas of others and learning to check explanations against past experiences, scientific knowledge and observations made. It helps them recognize what constitutes evidence, fact from opinion and relevance of detail.

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Teacher tips for Science Talks:

- 1. Give your students a common event or experience with a scientific phenomenon (e.g. observing the vibrations of a rubber band, a tuning fork in water, observations of changing shadows throughout the day) Have an open-ended discussion about the experience. Helpful questions: *What did you notice? Why do you think that happened? What is your evidence? Did anyone notice something different? Why do you think that is? Do you agree with that idea? Why or why not?* Encourage students to support what they say with evidence (see figure on page 4).
- 2. As your students share thoughts, listen to what they say. Your job is to understand the possible meanings of what they say, rather than teaching them the "right" answer.
- 3. Take notes so you can come back to students' ideas later in the conversation. This also helps to keep track of who is participating.
- 4. Encourage your students to talk to one another as well as to you. They can use hand signals to show their thoughts on their peers' ideas, for example, "I agree, I disagree, I agree and I'm not sure". Consider having students use the language "I agree with _____because..."
- 5. When a student says something you don't understand, don't assume he/she is wrong or confused. Assume they are making sense and that it is your job to make the connection. **Think of the class as building meaning together.**
- 6. Some students might struggle to listen for an extended period of time. Use strategies to involve all learners (think-pair-shares, quick shares with all students, using dipsticks, have students paraphrase other's ideas, etc).
- 7. When preparing for the talk, consider making a list of possible questions you might want to ask and ideas that students might have. (For example, students might think that a sound can be made without a vibration. For that discussion, you might want to ask: *What have we seen that vibrates? Have we seen any objects that don't vibrate making sound? How could we test out this theory? What evidence do we have?*) It is helpful to have student materials available during a science talk so students can go back and try out ideas and/or use them to demonstrate what they saw to other students.

SCIENTIFIC EXPLANATIONS



- · A one-sentence answer to the guestion you investigated.
- It answers, what can you conclude?
- · It should not start with yes or no.
- It should describe the relationship between dependent and independent variables.



Evidence must be:

- Sufficient Use enough evidence to support the claim.
- Appropriate Use data that support your claim. Leave out information that doesn't support the claim.
- · Qualitative (Using the senses), or Quantitative (numerical), or a combination of both.

REASONING Ties together the claim and the evidence

- . Shows how or why the data count as evidence to support the claim.
- Provides the justification for why this evidence is important to this claim.
- · Includes one or more scientific principles that are important to the claim and evidence.

*Remember: Read what you've written to be sure it makes sense as a whole explanation.

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Grade 3 Survivor! Unit Overview (Understanding By Design) Standards, Learning Goals, Essential Questions

Title of Unit	Survivor!	Grade Level	3
Curriculum Area	Life Science	Time Frame	10 weeks (assuming 2 days a week. 60 minutes a lesson for most lessons) NOTE: lesson 3 involves outdoor exploration- plan ahead and consider asking SC staff to help!
Developed By	Needham Science Center		
Identify Desired Results (Stage 1)			
Content Standards			

Massachusetts Science & Technology/Engineering Standards:

3-LS4-2. Use evidence to construct an explanation for how the variations in characteristics among individuals within the same species may provide advantages to these individuals in their survival and reproduction.

3-LS4-3. Construct an argument with evidence that in a particular environment some organisms can survive well, some survive less well, and some cannot survive.

3-LS4-4. Analyze and interpret given data about changes in a habitat and describe how the changes may affect the ability of organisms that live in that habita to survive and reproduce.

3-LS4-5. Provide evidence to support a claim that the survival of a population is dependent upon reproduction.

3-LS4-1. Use fossils to describe types of organisms and their environments that existed long ago and compare those to living organisms and their environments. Recognize that

most kinds of plants and animals that once lived on Earth are no longer found anywhere.

Science & Engineering Practices:

1. Asking questions (for science) and defining problems (for engineering)

- 2. Developing and using models
- 3. Planning and carrying out investigations
- 4. Analyzing and interpreting data
- 5. Using mathematics and computational thinking
- 6. Constructing explanations (for science) and designing solutions (for engineering
- 7. Engaging in argument from evidence

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8. Obtaining, evaluating, and communicating information

Understandings	Essential Questions
 Students will understand that: all plants and animals have adaptations(characteristics) that help them survive all plants and animals live in habitats for which they are suited/adapted changes to habitats affects animals' and plants' ability to survive fossils are evidence of life and habitats long ago (not just dinosaurs) scientists group animals according to their characteristics in order for organisms to exist on earth over time, they must reproduce our scientific understanding of life long ago is based on evidence 	 How do animals and plants survive? What are characteristics that help animals survive in their current habitats? What makes a good habitat? How do habitats change? How do changes in habitats affect
Related Misconceptions	organisms that live there?
 all bones you find are fossils of a dinosaur all fossils are dinosaurs fossils are only found far away from Massachusetts a habitat is just a shelter adaptations happen quickly animals choose their adaptations pill bugs and other invertebrates are gross the Earth has always been the same exotic animals live in Massachusetts (crocodiles, hedgehogs) only dinosaurs have become extinct humans are the only cause of extinction/humans never cause extinction 	 How do we know about the long ago (before people were on earth)? How can we classify living things? Why do some living things go extinct? How do scientists find answers to their questions? What happens to organisms when they cannot meet their needs?
Knowledge Students will know	Skills Students will be able to…

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1.	shelter, air (usually) and appropriate students excited to learn about isopods and habitats and to form questions		
Stude	ents will know:	Lesson 1: Isopod Observation.	Students observe and ask questions
Big	ideas	Activities	
Learning Plan (Stage 3)			
•	Students complete science notebook pages, in	cluding assessment about fossils	(after lesson 14)
Other Evidence			
 the habitat. They write/show/explain how the organism is suited to their environment and help it survive. Students write and/or discuss how a change in the environment would affect their invented organisms' ability to survive. 			
•	Students design a living thing for a certain hab	itat. They choose body parts and I	pehaviors that are adaptations to match
Perfo	rmance Task Description	(= tot.ge)	
	Assess	ment Evidence (Stage 2)	
			or written form work cooperatively in groups
			communicate information in oral
reptile	e, survive, vertebrate		predictions
inverte	ebrate, isopod, mammal, organism, paleontolog	ist. population, reproduce.	 make predictions plan investigations to test
Voor	wary Torme: adaptation, classify, events later	ovtingt fossil habitat	be answered by an investigation
8.	Many animals and plants that once lived on ea	rth are now extinct.	 ask or identify questions that can
7.	Fossils provide evidence or clues of life long a		evidence)
5. 6	If the habitat changes, it affects animals' and n	er inan olners. Jants' ability to survive	based on other's ideas or
4.	Animals have characteristics to help them surv	rive in their habitat.	 listen actively to others opinions and evidence(revise thinking
	reptiles & amphibians, fish, birds, invertebrates	5)	evidence
3.	Animals are classified into groups and can give	e examples of group (mammals,	 construct an argument, based on
2.	For long term survival of organisms, they need	to reproduce	observations
1.	Habitat is a place that provides food, water, sh	eiter, air (usually) and	 clearly and accurately record
A	I labitat la a place that provides feed water al	alter air (usuallu) and	

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temperature range for organisms.	that will be answered later in the unit.
2. Animals have characteristic/adaptations to	REMINDER: Lesson 3 involves outdoor exploration- plan ahead and
help them survive in their habitat.	consider asking SC staff to help.
 3. our scientific understanding of life is based on evidence (life long ago not addressed in this lesson, but rather that scientists use evidence to base their ideas) Vocabulary: characteristic, habitat, adaptation, survive Students will be able to: 	 Lesson 2: Habitat creation. Students read about isopods in order to answer questions about roly polies from Lesson 1. Then they work in groups to design/plan mini-habitats for isopods in their classrooms and make predictions about how their population might change. Lesson 3: Outdoor Woodlands Exploration. Students explore a woods habitat. They record temperature, humidity and observations of isopods in their natural environment. Note: If you would like extra support with this
 clearly and accurately record observations construct an argument, based on evidence 	exploration is not an option work for you, use the video provided by the SC
Approximate time: 5 class periods (lessons 1-5)	Lesson 4: Habitat Research Jigsaw. Students work in five separate groups to learn about five different habitats: Arctic, Desert, Rainforest, Oceans, and Freshwater using Brainpop Jr videos. Students act as experts to share information about their habitat with other students. After (or sometime earlier in the day) students work with their partners to count and record the number of isopods in their population.
	Lesson 5: Adaptation Stations. Students rotate through 5 stations with activities to demonstrate animal adaptations (blubber, feathers, opposable thumbs, camouflage, ear shape). They discuss what they observed. Consider asking for extra adult to help with this lesson. * You will need to prepare ice ahead of time.
 Students will know: 1. Animals are classified into groups and can give examples of group (mammals, reptiles & amphibians, fish, birds, invertebrates) 2. Animals have characteristics to help them survive in their habitat. 	Lesson 6: Animal classification exploration. Students sort animal cards based on their characteristics. The teacher explains, using a google slide show, how animals are classified according to scientists. Students then resort their animals based on scientific classification.

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 Students will be able to: clearly and accurately record observations communicate information in oral or written form work cooperatively in groups Approximate time: 1 class periods (lesson 6) Students will know: Some animals within a population survive better than others. 	Lesson 7: Observing Isopod Habitats. Students observe isopod habitats they built in lesson 2 and make inferences about how the isopods' ability to survive may be affected by the habitat. They use their ideas to make
If the habitat changes, it affects animals' and plants' ability to survive	changes to their habitats.
Students will be able to:	
 communicate information in oral or written form 	
work cooperatively in groups Approximate time: 1 class period (lesson 7)	
Students wil know:	Lesson 8: Modeling Changes to Habitats. Teacher reads aloud a section of <i>World of Change</i> by Dona Herweck Rice, to reinforce the concent that a
better than others.	change in habitats can affect an organism's ability to survive. There is a
2. If the habitat changes, it affects animals' and	second optional activity in which students sort cards based on
plants' ability to survive	environmental changes that affect habitats: Change in Climate, Reduction
need to reproduce	in Acsources, Eandorn Change, and Disease.
Students will be able to:	Lesson 9: Isopod Survivor! Students play a game to model what
 clearly and accurately record observations construct an argument, based on evidence listen actively to others' opinions and evidence make predictions Time: 2 class periods (lesson 8 & 9) 	happens to populations in a habitat as resources change. *This lesson works best in a large open space, such as a field or gym that you will to plan for. This is the last lesson involving isopods. (Students will not be looking at the isopods again- you can release the isopods to the outdoors or send them back to the SC).

Students will know:	Lesson 10: Mystery Science: Where can you find whales in a desert?
1. Fossils provide evidence or clues of life long	Students watch Mystery Science video about changes in ancient habitats
ago	and the fossil evidence they leave behind. Students discuss the video and
2. our scientific understanding of life long ago	complete an activity in their science notebook matching pictures of ancient
changes based on evidence	animals to animals alive on earth today.
Students will be able to:	Remember to request SC program (lesson 14) at least two
clearly and accurately record observations	
construct an argument based on evidence	Lesson 11: How do Fossils form? Bone y fossil. Students watch a
	video about how fossils form. Students rotate through 12 stations
Time: 4 class periods (lesson 10-13)	observing fossils and other natural artifacts (bones and shells). They work
	as paleontologists to observe and notice evidence and determine which
	ones might be fossils.
	Lesson 12: Mystery Science: How do we know what dinosaurs looked
	IKe ? Students watch and discuss a Mystery Science video. They learn
	about their skeleton. They make inferences about animal skulls and how
	they are evidence to what animals eat. There is an optional activity in
	which students observe pictures of plant and animal fossils and match
	them to ancient habitats.
	Lesson 13. Fossil Observations. Students work in groups to observe
	and describe real animal and plant fossils and model fossils. They then
	compare the tossils to pictures of organisms alive on earth today and
Studente will known	discuss their ideas, supporting their ideas with evidence.
Students will know:	Lesson 14: Mystery Fossil. (SC Program) Students act as
	about a mystery animal. Students collect evidence by traveling through 4
4 Many animals and plants that once lived on	stations (lab rooms) and compare evidence of mystery fossil to modern day
earth are now extinct	birds and rentiles. During the wrap-up, students share their evidence and
	make a claim about the mystery animal's characteristics.
Students will be able to:	Request this program at least two weeks in advance
 clearly and accurately record observations 	

construct an argument, based on evidence	Fossil Assessment (optional): Students observe a fossil and describe it in their science notebook. They compare it to animals alive on earth now
Timing: 2 class sessions (1 15 minutes for SC	
program) and 1 hour (lesson 15)	Lesson 15: Animal extinctions. Students watch a short Brainpop video
	about extinct and endangered animals. They discuss the video and
	complete reflection questions in their science notebook. Teacher note:
	Some of the content regarding extinction is very upsetting to
	students.
Performance Based Assessment	Lesson 16: Assessment- Creature Feature Design Project. Students
Time: 2-3 class periods (lesson 16)	apply what they have learned about animals, adaptations, animal
	classification, and changes to habitats. They design their own imaginary
	animal and share their designs. They are then given a change to the
	habitat and must determine what will happen. Teachers can choose how
	much time to spend on the project and what the final product will be (e.g.
	drawing, poster, presentation, green screen).
Other resources	Related Books:
	Bizarre Animals, Timothy Bradley
	The Penguin, Beatrice Fontanel
	A Strange Place to Call Home, Marilyn Singer
	Billions of Years, Amazing Changes, Steve Jenkins
	Adaptation, Melanie Waldron
	Adaptation and Survival Richard Spilsbury
	Dry in the Desert, Gerry Bailey
	Alone in the Arctic, Gerry Bailey
	Extreme Animals, Nicola Davies

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Background Knowledge for Teachers

Students will observe, handle and create habitats for isopods in order to learn about adaptations, habitats, and changes to habitats.

What are isopods?

Isopods are **invertebrates**, which means that they do not have a backbone. They are **arthropods** (a scientific group that includes insects), and are in the same scientific class of crustaceans (which includes crabs and shrimp). Students will mostly be observing roly polies (also called the wood louse or pill bugs), which



are one kind of isopod. The roly poly is a small isopod that can roll into a tiny ball for protection.

Anatomy: Isopods are covered by a hard outer skeleton called an **exoskeleton**. They are not insects, but they have three body parts: the head, the thorax (made up of 7 segments), and the abdomen. Pill bugs have 7 pairs of jointed legs and 2 pairs of antennae. One pair of antennae is very difficult for people to see. The antennae, mouth and eyes are located on the head. The 7 pairs of legs are located on the thorax.

Life Cycle: Isopods begin their life as a tiny egg. The young isopod looks almost like a miniature adult. As it grows, it molts (sheds its exoskeleton) 4 to 5 times.

Diet: Isopods eat decaying plants and animals and some living plants.

Where can you find isopods? Isopods live in many different places around the world, including rainforests, grasslands, and forests. They prefer moist areas, often living in soil and under decaying leaves, rocks, and dead logs.

How are isopods adapted to their environments?

Like all animals, isopods are well suited to their habitats. In other words, they have **adaptations** (characteristics that help them survive in their environment, often that they are born with).

For example:

- Isopods that live on land have special adaptations allowing them to live on land. They do not live in water, but have gills that allow them to breathe. These must be kept moist, which is why they live in damp, humid places such as under rocks and logs.

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- Pill bugs also often have survival adaptations that enable them to maintain adequate water levels. They are often nocturnal, which helps them survive, as nighttime air also isn't as dry.
- In times of extremely arid weather, pill bugs also cope through huddling their bodies together. Doing this minimizes moisture loss via the skin. Without sufficient moisture, pill bugs can quickly die.
- Many pillbugs are capable of warding off predators by curling their tiny bodies up into balls. They react to annoyance and fearful situations by immediately rolling into a ball. It stops a lot of their predators -- such as the praying mantis -- from being able to successfully get through their shells, which are extremely hard.

Caring for Isopods

Care:

Isopods are generally easy to care for and easy to handle, which makes them excellent animals to have in the classroom. To help care for them:

- · Keep them in a plastic container with a slightly vented lid.
- Use a substrate of damp soil.
- Provide decaying organic material (wood, leaves, compost, etc) which will provide them with food.
- Mist the habitat about three times a week to keep it humid.
- Keep the terrarium in a dimly lit or dark area of the room (or students can cover them with dark paper)

*Humidity must be maintained to help the pill bugs breathe. However, too much humidity can cause mold to grow in the terrariums. If mold becomes a problem, increase the ventilation or reduce the amount of misting.

What are other adaptations?

Adaptations are body parts or behaviors that help a living thing (organism) survive in an environment.

Physical adaptations are special body parts that help an organisms survive in an environment. For example, giraffes' long necks are a physical adaptation that help them reach food other animals cannot.

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Can you spot the animal in the picture? Believe it or not, there is a gecko - a type of lizard - sitting on this log. This gecko is using a physical adaptation called camouflage to blend in with the log and hide from other animals. Camouflage is an animal's coloring that allows it to match its surroundings. Camouflage lets an animal hide from predators or sneak up on prey.



All **organisms** have adaptations to help them survive (live and grow) in different areas. For example, plants that live in a desert have many ways to store water in their stems or leaves to survive with limited water.

Behavioral adaptations are actions plants and animals take to survive. One example of behavioral adaptation is how emperor penguins in Antarctica crowd together to share their warmth in the middle of winter. Another example is how plants can turn toward the light of the sun.

Evolutionary adaptation is the adjustment of organisms to their environment in order to improve their chances at survival in that environment. In evolutionary theory, adaptation is the biological mechanism by which organisms adjust to new environments or to changes in their current environment. This unit does not focus on evolutionary adaptation, as it is a process that can take millions of years and can be challenging for elementary students to grasp. For more information on evolutionary adaptation, check out National Geographic Resource Library.

Adaptations and Habitats

Adaptations are special features that allow a plant or animal to live in a particular place or **habitat**. A habitat is a place where plants and animals live. It provides the animal with food, water and shelter. There are many different sorts of habitats around the world from forests to grasslands and from mountain slopes to deserts.

Different habitats are home to

different animals and other organisms. For more information on habitats, check out Kids National Geographic: <u>Habitats</u>

Adaptations that organisms have for their habitat might make it very difficult for the to survive in a different place. This explains why certain plants and animals are found in one area, but not in another.

What happens when habitats change?

If the habitat changes, it may no longer be suitable for the animals and plants that live there. Because of the complex links between the plants and animals this can have many different effects. One example of a significant habitat change is an increase in temperature. Climate change can make some habitats warmer and cause many animal species are moving to cooler areas. However some species are not able to move and the populations are getting smaller. As of 2019, scientists think that 10% of species may become extinct because of these changes. Other habitats have been cleared to make them into farm land or for developments. In Australia for example, 80% of the eucalyptus forests have been cleared for farming over the last 210 years. This is threatening the survival of forest animals such as the koala.

Temperature Change in the Last 50 Years (2014-2018 Average vs 1951-1980 Baseline)

Average global temperatures from 2014 to 2018 compared to a baseline average from 1951 to 1980, according to NASA's Goddard Institute for Space Studies.

For more information about climate change, check out American Museum of Natural History Ology page: Climate Change.

Find out more about how people can help <u>help plants</u>, <u>animals</u>, <u>and</u> <u>ecosystems deal with climate change</u>.

How have habitats changed over time? What evidence do scientists have?

Habitats change over time. This may be due to a violent event such as the eruption of a volcano, an earthquake, a tsunami, a wildfire or a change in oceanic currents; or the change may be more gradual over millennia with changes in the climate, as ice sheets and glaciers advance and retreat, and as different weather patterns bring changes of precipitation and solar radiation.

There have been significant changes in climate over Earth's 4.5 billion year history. Over the history of the Earth there have been times when the Earth's climate has cooled



Underwater habitat approximately 440 million years ago

considerably. During these times the ice caps, or glaciers, covering the North Pole has grown to encompass much of the northern hemisphere.

Scientists called **paleoclimatologists** look for clues in Earth's natural environmental records. Clues about the past climate are buried in sediments at the bottom of the oceans, locked away in coral reefs, frozen in glaciers and ice caps, and preserved in

Grade 3 Survivor Teacher Guide Background Knowledge for Teachers September 2019 the rings of trees. Each of these natural recorders provides scientists with information about temperature, precipitation, and more. Many of these have some type of layers, bands, or rings that represent a fixed amount of time, often a year or growing season. The layers vary in thickness, color, chemical composition, and more, which allows scientists to gain information about the climate at the time each layer formed.

How do scientists learn about animals and other organisms no longer alive on earth?

In addition to studying Earth's ancient climate, scientists also use evidence to learn about living things that are now extinct.

Paleontology is the study of fossils of living things from long ago and their evolutionary relationships. It depends on basic sciences such as zoology, botany and historical geology. A **fossil** is any kind of life that is more

than ten thousand years old and preserved in any form that we can study today Fossils can include footprints, teeth, eggs, nests, and yes – even dung! These other clues can help paleontologists



determine what they ate, their habitats, their migration patterns, and even their unique animal behaviors.

The word fossil is taken from the Latin word *fossilis*, which literally translates to "dug up." This is because the fossils that paleontologists excavate are usually taken from sedimentary rock layers where they've been preserved through the years. When a dinosaur or other organism dies, its body more or less stays in place. As the earth changes and as soil, mud, and other debris are layered over it, it slowly gets buried under the dirt. Because its death happened millions of years ago, you can just image how much earth has been piled up on top of its body! This is why paleontologists need to dig in order to find fossil remains. The oldest fossil ever discovered was that of a cyanobacteria in Archaen rocks excavated in western Australia. It is said to be at least 3.5 billion years old!

Fossilization isn't the only way that fossils form. Petrification is another common way that prehistoric remains have been preserved. Usually, prehistoric wood is found petrified. The main difference between petrification and fossilization is that the

former means that components of the original object were replaced by minerals and thus preserved, while the second means the original object was lost, but its shape, size, and structure were embedded into a stone.

The fossil record is always incomplete, and later discoveries will help scientists learn more and change their thinking about previous theories.

For more information, check out American Museum of Natural History: **Paleontology**

How do paleontologists and other scientists build knowledge?

Scientific ideas are likely to be true than because they're based on **evidence.** Coming up with new scientific ideas is all about gathering that evidence. For example, we used to think that all dinosaurs were covered in scales. But in the past 20 years, new evidence has led scientists to believe that many meat eating dinosaurs had fuzz or feathers.



Scientific ideas come from evidence, but it takes brilliant thinking to imagine them. New ideas come from collecting evidence and looking at it to figure it out, but often it isn't as simple as it sounds. Some of the biggest scientific leaps in history were made by people who looked at the same evidence and drew conclusions that nobody else had thought of.

Lesson 1: Isopod Observation

Summary: Students observe and ask questions about live rollie pollies.	
This in an introductory lesson to get students excited to learn about isopods	
and habitats and to form questions that will be answered later in the unit.	Time: 60 minutes; may be divided into
REMINDER: Lesson 3 involves outdoor exploration- plan ahead and consider asking SC staff to help.	2 parts.

Key Resources/Materials Used:

Science notebook page: Lesson 1: Isopod Observation

Date	
	Lesson 1: Isopod Observation
	Sketch one isopod
What do you observe?	
What questions do you have?	

*denotes material provided by teacher

Links and outlines to each lesson in the unit can be found on these google slides.		
Science safety agreement (also found at end of lesson plan)	petri dishes (12)	
Pill bug video or this link	vocabulary cards: survive, habitat, adaptation	
24 isopods	24 magnifying lenses	
smartboard/projector*	chart paper*	
Caring for Isopods care sheet (also found at end of lesson plan)		

Stage 1 – Desired Results

Key Standards:

3-LS4-3. Construct an argument with evidence that in a particular environment some organisms can survive well, some survive less well, and some cannot survive. (beginning understanding)

Meaning Making: Students will understand and keep considering			
Understandings: Students will understand that	Essential Questions (Long Term and Topical):		
 all plants and animals have adaptations (characteristics) that help them survive (beginning understanding) 	 What are characteristics that help animals survive in their current habitats? What makes a good habitat? 		

Knowledge and Skills

Students will know:

- Animals have characteristics/adaptations to help them survive in their habitat (beginning knowledge)
- Our scientific understanding of life long ago is based on evidence (life long ago not addressed in this lesson, but rather that scientists use evidence to base their ideas) (beginning knowledge)

Skills/Performance: Students will be able to ...

- clearly and accurately record observations
- ask questions

Stage 2 – Assessment Evidence

Performance Task or Other Key Evidence of learning (What will students understand and/or be able to do?)

- Students record observations in their science notebooks
- Students participate in a science talk (actively listen and share their observations and ideas)

Stage 3 - Learning Activity

Prior to the lesson:

-Determine if/how you would like to use the science safety contract. You can have students sign and keep their own copies, or make a large one for the class for students to sign and keep posted throughout the unit.

- Distribute 1-2 isopods in each petri dish for this lesson

Part 1	: (30 min)	Teacher Tips:
1.	Ask- what do you think it means to survive? After discussion, post the	
	vocabulary word: survive.	_
2.	Additional pre-assessment questions:	Encourage
	What animals live in the woods in Massachusetts?	students to use the
	What do you think helps them survive?	magnifying lenses
3.	Introduce the isopods - Explain that we will observe some local	to locate details
	animals from the woods habitat to help learn about how animals	about the isopod's
	survive.	body as they
4.	Show a container of pill bugs and ask students what they know about	sketch.
	them (accept all answers).	
5.	You can choose to review the science safety contract and have	
	students sign it.	
6.	Distribute the petri dishes with 1-2 rollie polies and magnifying lenses.	
	Students work in pairs to observe them, with hand lenses.	
7.	Distribut science notebooks. You can point out the features of the	
	science notebook- including the glossary at the end of the notebook	
	that has vocabulary for the unit.	
8.	Students sketch their isopods and record questions. Remind students	
	to sketch and label in detail.	
9.	Record students' guestions/observations on anchor chart. Save the	
	chart to review in future lessons.	
10	. If time allows, students can share their drawings with another peer.	
	How are the drawings similar, how are they different?	Prior to showing
11	Ask students what characteristics might help the isopod survive in its	video viewing, you
	environment.	can ask students to
Part 2	2: (30 min)	characteristics about
1.	Review the guestions students created in part 1.	nill hugs What do
2.	Show short video (Pill bug video or this link) on isopods and their	they notice? What
	characteristics, stopping to review any questions the video answered	did they learn that
	and to introduce adaptations (include plants).	they didn't know
3.	Post vocabulary card: adaptation. Explain that this is a characteristic	before?
	that helps a living thing (like an animal or plant, to survive.)	
4.	Wrap-up: Students share observations and responses to pre-video	
	questions. What questions were answered? What questions still	
	remain?	

Considerations for Including All Learners:

Modifications (changes to the Core standard(s) and level of proficiency expected):	Accommodations (supports or instructional adjustments):
Futopoiopou	
Extensions:	



Description:

Terrestrial Isopods are land-dwelling crustaceans, commonly known as sow bugs, pill bugs, rollie polies and woodlice (no relation to body lice.) They make excellent subjects for study and require very little care.

They inhabit cool, damp places under rocks, rotting wood and other decaying vegetation.

Pill bugs (also called rollie polies) can curl up into a tight ball for protection (other isopods cannot).

Care:

- Pill bugs make be kept in a plastic container with a slightly vented lid.
- Use a substrate of damp soil.
- Provide decaying organic material (wood, leaves, compost, etc) which will provide them with food.
- Mist the habitat about three times a week to keep it humid.
- Keep the terrarum in a dimly lit or dark area of the room (or students can cover them with dark paper)

*Humidity must be maintained to help the pill bugs breathe. However, too much humidity can cause mold to grow in the terrariums. If mold becomes a problem, increase the ventilation or reduc the amount of misting.

Science Safety Contract



- 1. I will listen carefully and follow teacher's directions.
- 2. I will care for all materials and living things responsibly.
- 3. I will keep all materials where they belong during experiments.
- 4. I will not touch anything without permission.
- 5. I will wash my hands after using science materials.
- 6. I will work hard to keep myself and friends safe.

Signed: _____

Date:_____

Lesson 2: Habitat Creation

Summary : Students complete a short reading in order to answer questions about rollie polies from lesson 1. Then they work in groups to design/plan mini-habitats for isopods in their classrooms and make predictions about how their population might change.	Time: 60 minutes, may be divided into 2 parts.
--	--

Key Resources/Materials Used:

Lesson 2:	Isopod Fac	ts	
Meet the Pill Bug The pill bug (also called the word louise or the roy-poly bug) is a tiny land creature that can roll into a tiny ball for protection. The pill bug belongs to a large family of creatures called isspods. I sopods are invertebrates, which means that they do not have a backbone. Where can you find isopods? I sopods live in many different places around the world, incluing rainforests, grasslands, and forests. They prefer moist areas, of ten living in soil and under decaying leaves, rocks, and dead to be attent. To conde an example, and have been detarted to be a soft of a soil and land under decaying leaves, rocks, and dead the soft	rem minute insum i	Plan of same two Plan of same	
Anatomy: Isopods are covered by a har are NOT insects, but they have three b 7 segments), and the abdomen. Pill bugs antennae. One pair of antennae is very o mouth and eyes are located on the head therax.	d, outer skeleton ody parts: the he have 7 pairs of j lifficult for peop . The 7 pairs of h	called an exost ad, the thorax ointed legs and le to see. The a egs are located	keleton. They (made up of 2 pairs of antennae, on the
Life Cycle: Isopods begin their life as a a miniature adult. As it grows, it molts (tiny egg. The yo sheds its exoske	ung isopod look leton) 4 to 5 tir	s almost like nes.
Diet: Isopods eat decaying plants and ar	imals and some li	iving plants.	
Predators: Many animals eat isopods. In frogs, toads, spiders, and birds. The pill protects itself by rolling up into a ball.	New England, co bug is a unique †	mmon predator ype of isopod b	s include ecause
Needham Science Center Gr. 3 Survivo	r Notebook	2019-2020	2

(Date
	Lesson 2. Design an Isopod Habitat
1.	Circle the materials you want to use inside the habitat:
Mule	ch Gravel er Tawels Leaves
Cons	struction Paper Water
I pr	redict that
3. W four I wi	Vhat changes will you make to ensure the isopod's survival over the next r weeks? II
_	
4. N	lumber of isopods in your habitat (aka population size):

Science notebook pages: *Lesson 2: Isopod facts and Design an Isopod Habitat*

*denotes material provided by teacher

<u>Design a habitat materials:</u> 8 isopods per pair of students	Anchor chart with student questions about isopods from lesson 1
9 terrariums 9 petri dishes black and white construction paper	Vocabulary cards: adaptation, habitat, population
9 cups for water water*	<i>Optional Extension: Roly Poly Pill bug</i> reading and student worksheet (optional)
9 pipettes gravel, mulch, soil, leaves, etc. paper towels* plastic spoons	

Stage 1 – Desired Results

Key Standards:

3-LS4-2. Use evidence to construct an explanation for how the variations in characteristics among individuals within the same species may provide advantages to these individuals in their survival and reproduction. *

3-LS4-3. Construct an argument with evidence that in a particular environment some organisms can survive well, some survive less well, and some cannot survive. *

*beginning

Meaning Making: Students will understand and keep considering			
Understandings: Students will understand that	Essential Questions (Long Term and Topical):		
 All plants and animals have adaptations (characteristics) that help them survive* *(beginning) All plants and animals live in habitats for which they are suited/adapted Changes to habitats affects animals' and plants' ability to survive (beginning) 	 What are characteristics that help animals survive in their current habitats? How do scientists find answers to their questions? 		

Knowledge and Skills

Skills/Performance: Students will be able to ...

- listen actively to others' opinions and evidence(revise thinking based on other's ideas or evidence)
- ask or identify questions that can be answered by an investigation
- make predictions
- plan investigations to test predictions

Stage 2 – Assessment Evidence

Performance Task or Other Key Evidence of learning (What will students understand and/or be able to do?)

• Student discussion

Stage 3 - Learning Activity

Prior to the lesson:

- Prepare petri dishes before the lesson so they are ready with 8 isopods in each.
- Determine groupings so students work in groups of 3
- Place habitat materials in areas in your room that students can easily access
- Note- This can get messy! make sure you protect desks and be prepared for spills of soil/gravel, etc.
- Determine how you would like students to collect materials that will reduce spills and mess. (Consider having one student from each group collect materials, and limit the number of students collecting materials at one time)
- * Lesson 3 involves an outdoor exploration- you will need to choose an area ahead of time and check weather conditions for students to go outside. Also consider asking for extra

adult help	
 Part 1: (30 min) 1. Review student questions about isopods from lesson 1. Explain- Now that we know a little more about isopods and their 	Teacher Tips:
adaptations, we are going to gather more data to find answers to our questions- this time using a reading.	
 Students read <i>Isopod Facts</i> in notebook or read as a whole class. Post vocabulary <u>habitat -</u> the natural home or environment of an animal, plant or organism that provides what it needs to survive. (Again, you can point out the student glossary at the end of the student notbook that defines terms used in the unit). 	
 4. Discuss and reflect facts about isopods. e.g. What questions were you able to answer? What do isopods need to survive? (a dark, moist environment, decaying matter to eat, etc) How can we create a habitat to help the isopods survive? 	
5. Students work in pairs to plan mini habitats for isopods using materials provided (terrariums, soil, gravel, mulch, soil, leaves, paper). You can display "design an isopod habitat" page from the student notebook so students can see the list of possible materials. Brainstorm ideas of some possible habitats.	Remind students that they need to work together to design and create the habitats, but can
 Part 2: (30 minutes) 1. Check students' designs/plans prior to passing out isopods. Ensure they are clear on types/guantities of materials they will need. 	predictions in their notebook.
 Students collect materials and create habitats in their terrariums and place the isopods into the terrariums. 	You can also plan with students how
 Students record their predictions on science notebook page Design an Isopod Habitat. You can introduce the vocabulary term: population 	they will make sure that all of their isopods are placed
 4. Pass out isopods to each group in the petri dishes. 5. Students record how many isopods are in their "current population" in their notebook (students will review "numbers" in lesson 4 and 7. 	in the habitats carefully.
) 6. Wrap-up: Students share their observations and predictions about their habitat designs.	Reinforce the idea that scientists make predictions all the
NOTE: This is the last lesson that includes written isopod observation before Lesson 4. Make sure to monitor the habitats and add water if needed to keep the habitat moist for isopods.	time and results often don't match. That is okay! Results that are different than
Consider spraying the terrariums twice a week and feel the soil- it should be moist but not soggy.	predictions are not wrong and actually help scientists ask more questions.

Considerations for Including All Learners:

Modifications (changes to the Core standard(s) and level of proficiency expected):	Accommodations (supports or instructional adjustments):

Extensions:

Optional extension: Roly Poly Pill Bugs and student worksheet (included at end of the lesson)

Name:

Roly-Poly Pill Bugs

by Cynthia Sherwood



Some people are afraid of bugs such as spiders or beetles. But there is one bug that just about everybody likes—pill bugs. If you ever pick one up, you know why its nickname is "roly-poly." A pill bug rolls up into a tight little ball to protect itself. This bug is scared of you, not the other way around!

These little gray or brown bugs can be found almost everywhere in the United States except the desert. That is because they need to stay moist. But they can live in dry places like California thanks to lawn sprinklers. One of their favorite hang-outs is under damp flower pots.

Did you know that pill bugs have something in common with kangaroos? After her eggs hatch, the mother pill bug carries her young in a pouch under her belly. The little pill bugs stay there until they are big enough to be on their own. Pill bugs also have something in common with snakes. Just as snakes shed their skin when it gets too small, pill bugs do too. This is called "molting." A pill bug molts about five times until it is full-grown.

Pill bugs are a little like owls, too. Pill bugs are nocturnal, meaning they are most active at night. That is when they most like to wander around and look for food. And just like earthworms, pill bugs help break down plants in the soil. Pill bugs aren't just nice bugs. They are also interesting ones!



Super Teacher Worksheets - www.superteacherworksheets.com

Grade 3 Survivor Lesson 2: Habitat Creation Draft 2019-2020 Needham Science Center



Lesson 3: Outdoor Woodlands Exploration

Summary: Students explore a woodland habitat. They record temperature, humidity and observations of isopods in their natural environment. Check the area before you go and make sure there are a few living things under the logs. Works best in one 60 minute period with 15 minutes extra for read aloud. Note: If you would like extra support with this lesson, consider asking Science Center staff for help. If an outdoor exploration is not an option work for you, use the virtual woodland video provided.	Time: 60 minutes + 15 minute read aloud
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Key Resources/Materials Used:

Science notebook page(optional):	Outdoor Woodlands
<i>Exploration</i> , p.4	

*denotes material provided by teacher

Record observations	from your trip to	o the woodlands	(optional)
leedham Science Center	Gr. 3 Survivor Notebook	2019-2020	4

Lesson 3: Outdoor Woodlands Exploration

Links and outlines to each lesson in the unit can be found on these google slides.			
12 laminated data sheets for outdoor data collection	A Logs Life by Wendy Pfeffer		
online interactive thermometer (optional)	Virtual <u>video</u> of woodland (optional)		
12 thermometers	12 dry erase markers*		
24 hand lenses (optional)	12 clipboards (optional)*		
Parent/Guardian letter (optional)	vocabulary cards: habitat		

Stage 1 – Desired Results

Key Standards:

3-LS4-2. Use evidence to construct an explanation for how the variations in characteristics among individuals within the same species may provide advantages to these individuals in their survival and reproduction. 3-LS4-3. Construct an argument with evidence that in a particular environment some organisms can survive well, some survive less well, and some cannot survive.

Meaning Making: Students will understand and keep considering				
Understandings: Students will understand that	Essential Questions (Long Term and Topical):			
 All plants and animals have adaptations(characteristics) that help them survive All plants and animals live in habitats for which they are suited/adapted Habitat is a place that provides food, water, shelter, air (usually) and appropriate temperature range for organisms. 	 What makes a good habitat? How do scientists find answers to their questions? 			

Knowledge and Skills

Skills/Performance: Students will be able to ...

- clearly and accurately record observations
- listen actively to others' opinions and evidence (revise thinking based on other's ideas or evidence)
- communicate information in oral or written form

 Stage 2 – Assessment Evidence

 Performance Task or Other Key Evidence of learning (What will students understand and/or be able to do?)

- Students record observations during the trip using laminated data sheet
- Student record observations using science notebook page (optional)

Stage 3 - Learning Activity

Prior to the lesson:

* Check the area before you go and make sure there are a few living things under the logs and the area is free of poison ivy. (Poison Ivy identification guide can be found at the end of this lesson) You can ask for Science Center staff and or other adults for extra support.

If you choose, you can make a copy of the attached parent/guardian template and share this letter with your students and their families.

Part 1: 10 minutes Teacher tip: Re- introduce the concept of habitat (the natural home or environment of an animal, plant or organism that provides what Check the area before it needs to survive.) 2. Possible guestions: What are some habitats in the world? you go and make sure there are a few living Massachusetts? Isopods live in a woodland habitat. Could we find this habitat near our school? things under the logs. 3. Introduce student data collection sheet, how to collect If you have your own temperature using demo thermometer. Pass out thermometers. 4. Students practice using the thermometers.(e.g. don't hold onto thermometer for your class you can use that the bulb, wait one minute for the temperature to record, etc). Grade 3 Survivor

	Some of the thermometers may not show the exact same	to model.
5.	Temperature, but that is okay. Draw a thermometer on the board or use the (online)	
6.	interactive thermometer. Review soil humidity- students will observe and record the soil humidity by touching or squeezing a clump of soil and seeing	
7.	Review safety guidelines for outdoors (e.g. when outside students should use all their senses to observe, walking feet, boundaries of exploration, return anything they way you found it, etc)	
8.	Consider tucking pants into socks to prevent ticks.	
Part 2 1. 2. 3. 4. 5.	 (40 min.) Outdoor exploration Lead students in outdoor exploration of wooded area. Review expected behavior (walking feet, boundaries of exploration, return anything they way you found it, etc) Ask- Where could we find isopods in this habitat? (Where it is dark, wet, etc?) You can roll over a log or rocks and students observe. Students work in pairs to collect data about the habitat (record written observations, air temperature, soil temperature, different species of animals). Students work in groups to roll over other logs looking for isopods. Instruct the students to roll the logs back over to their original position when they are done. 	Students might get competitive trying to get all of the organisms on their data sheet. Remind them to only record what they see (like scientists!)
Altern 1.	ative plan for outside exploration: If you are not able to take your class outdoors, there is an optional <u>video</u> of life in the woods from the Needham Science Center.	
Part 3 1. 2. 3. F a Part 4 1.	 (10 min.) inside classroom Students "Turn and Talk" to share data with peers. Lead a science talk What did you notice about this habitat? Why do you think we found isopods here? How does the habitat help them meet their needs? Guide student to understand that Isopods' needs for water, shelter and food are all met in their habitat-this is crucial learning for later in the unit. Perform a quick tick check and encourage students to check gain for ticks at home Read A Log's Life by Wendy Pfeffer- (or before lesson) Discuss How is the tree is a habitat for many different 	
	- How is the lifeens a habitat for many different organisms/animals? - Why were they all living there?	
Grada	3 Survivor	

Grade 3 Survivor Lesson 03: Outdoor Woodlands Exploration Draft 2019-2020 Needham Science Center

- What did the tree provide for them? (shelter, sometimes food and water)	

Considerations for Including All Learners:

Modifications (changes to the Core standard(s) and level of proficiency expected):	Accommodations (supports or instructional adjustments):

Extensions:

PARENT/GUARDIAN OUTDOOR EXPLORATION LETTER TEMPLATE

Date

Grade 3 Survivor Lesson 03: Outdoor Woodlands Exploration Draft 2019-2020 Needham Science Center Dear Parent or Guardian,

As part of our third grade study of animals and habitats, we will be going outside on our school grounds to explore the woodland habitat. Our outdoor excursion will take place on

Please ensure your child is prepared. This means:

- 1. Long sleeves and long pants (protect from scratches, ticks, insect bites and poison ivy)
- 2. Closed toed, closed heeled shoes (Open-toed sandals and clogs expose feet to ticks, insect bites and poison ivy and can come off in muddy areas.)
- 3. Ankle high socks

Needham Public School employees are not allowed to apply sunscreen products or insect repellant to students. If you choose to protect your child in this manner, you must apply it at home. <u>Neither sunscreen nor insect repellant may be brought to school and applied by your child.</u>

Thank you,

Teacher name School name
identifying poison ivy

.:leaves:.

Look for three leaves, usually but not always jagged. When jagged, the central leaf is more or less symmetrical; if you were to fold it in half (but please, don't) the edges would more or less line up. The two side leaves, though, tend to be more jagged on the outer edge than on the inner edge. If the leaves are nearly or entirely smooth, the same principle applies in a way; the central leaf is generally symmetrical, with the main leaf vein running down the center of the leaf, whereas in the two side leaves, the main leaf vein isn't centered; there is more leaf surface on the outside edge.



Where the leaf stems come together, there is usually a slightly reddish coloration.

The thin leaf stem arises from a thicker, woodier vine, which can manifest as a ground cover, a small shrub or can climb trees.



dimbing ivy

ground cover

bush

compiled by herbalist jim mcdonald

www.herbcraft.org/poisonivy.html

Poison Ivy Identification Guide

Grade 3 Survivor Lesson 03: Outdoor Woodlands Exploration Draft 2019-2020 Needham Science Center

Lesson 4: Habitat Research Jigsaw

Summary: Students work in five separate groups to learn about different		
habitats: Arctic, Desert, Rainforest, Oceans, and Freshwater using Brainpop Jr		
videos. Students act as experts to share information about their habitat with	Time: 60 + minutes	
other students. After (or sometime earlier in the day) students work with their		
partners to count and record the number of isopods in their population.		

Key Resources/Materials Used:

Science notebook pages: Lesson 4 Habitat Research and Isopod Count

Less	on 4. Habitat Research	
Circle your habitat:		Check Lesson 2 to 1
Arctic Desert	Ocean Freshwater	
Rainforest		Date
Watch the video and a	swan the questions	 (Lesson 2)
watch the video and ar	swer the questions.	(Today)
1. What are the characteris	tics of your habitat?	
		 Today, the populat
2. What are some animals in	your habitat?	 Transaction
		 Increased
		 3. Can you explain y
3. What adaptations do your	animals have?	the same?)
		 I think that
4. What wonderings or quest	ions do you have?	

Date	Number of Isopods	in your Habitat (population size)		
(Lesson 2)				
(Today)				
Increased	Decreased	Stayed the Same		
 Can you explain your results? (Why did the population go up, go down, stay the same?) 				

*denotes material provided by teacher

Links and outlines to each lesson in the unit can be found on these google slides.			
(5) ipads or chromebooks*	BrainpopJr <u>Habitats</u>		
12 Terrariums/isopod habitats (from lesson 2)	spoons (24) and other materials for observing isopods (e.g. petri dishes, plastic bins)		

Stage 1 – Desired Results

Key Standards:

3-LS4-2. Use evidence to construct an explanation for how the variations in characteristics among individuals within the same species may provide advantages to these individuals in their survival and reproduction.

3-LS4-3. Construct an argument with evidence that in a particular environment some organisms can survive well, some survive less well, and some cannot survive.

3-LS4-4. Analyze and interpret given data about changes in a habitat and describe how the changes may affect the ability of organisms that live in that habitat to survive and reproduce.

Grade 3 Survivor Lesson 04: Habitat Research Jigsaw Draft 2019 - 2020 Needham Science Center

Meaning Making: Students will understand and keep considering			
 Understandings: Students will understand that 1. All plants and animals have adaptations(characteristics) that help them survive 2. All plants and animals live in habitats for which they are suited/adapted 3. Habitat is a place that provides food, water, shelter, air (usually) and appropriate temperature rapae for organisme 	 Essential Questions (Long Term and Topical): What are other habitats that animals and plants live in besides forest floor? How do animals/plants survive there? 		
range for organisms:			

Knowledge and Skills

Skills/Performance: Students will be able to ...

- clearly and accurately record observations •
- listen actively to others' opinions and evidence (revise thinking based on other's ideas or evidence) •
- communicate information in oral or written form

Stage 2 – Assessment Evidence Performance Task or Other Key Evidence of learning (What will *students understand and/or be able to do?*)

Students record details about different habitats and share results with their peers

Stage 3 - Learning Activity

Prior to the lesson:

- For part 1, set up chromebooks or tablets so students will be able to access BrainPop Jr videos in groups.
- Determine how you want to split up students to do the research and jigsaw.
- For part 3, students will observe and count their isopods in their terrariums. They will need to work with the partner from lesson 02 and have a space and materials for counting their isopod population. Consider using morning work time if possible.
- Note-Lesson 5 requires ice or a tub of frozen water for the blubber mitt station. Make sure that you freeze water after this lesson.

Part 1	1: (30 min)	Teacher Tips:
1.	Connect to lesson 2 and explain that students will learn about	Teacher tip- You will
	other habitats in the world in addition to the woodlands habitat.	need to make several
2.	Post vocabulary word - Habitat -a feature or quality belonging	trays of ice cubes or a
	typically to a person, place, or thing and helps to identify it (You	large block of ice (you
	can point out the glossary at the end of the science notebook.)	can freeze a large tub of
	You can also discuss how adaptations are characteristics that	water) for lesson 5
	animals have to survive in their habitats.	(adaptation stations).
3.	Explain that students will learn about one habitat and become	Make sure to do at least
	experts in order to help other students learn.	one day in advance.
4.	Students work in live separate expert groups to learn about	
	Freebwater	
5	Fach group watches a Brainpop. Ir. movie about their babitat	
0.	and answers six questions in their notebooks, focusing on	
	animals and habitat descriptions (They will not be responsible	
	for human or plant adaptations.) After each group watches the	
	video, the "Expert" group agrees on answers to the questions.	
6.	Post vocabulary word - Adaptation - something an organism	
	has to help it survive- it is often something they are born with.	
Part 2	!: (30 min)	
1.	Students form groups with a mixed group of "experts" (with	
	students who researched the four other habitats). Each student	
	teaches their group about their individual habitat they	
	researched.	
2.	Review	
	-Did you learn anything interesting or surprising?	
	-Did you notice anything in common between all of your	
	habitats and adaptations?	
	-Why do you think some animals or plants are only found in one	
	type of nabitat?	
Part 3	: (15 minutes) Can be done prior to parts 1 and 2 or afterwards.	
1.	Students work with their groups from lesson 2 to observe their	
	terrariums and record how many isopods are in the population.	
	They record if their population has changed and come up with	
	possible explanations for their data.	

Modifications (changes to the Core standard(s) and level of proficiency expected):	Accommodations (supports or instructional adjustments):

Extensions:

Lesson 5: Adaptation Stations

Summary: Students rotate through 5 stations with activities to demonstrate animal adaptations (blubber, feathers, opposable thumbs, camouflage, ear shape). They discuss what they observed. Consider asking for extra adult to help with this lesson. * You will need to prepare ice ahead of time.

Time: 60 minutes

Key Resources/Materials Used:

Science notebook pages: Adaptation stations 1-5

Lesson 5. Adaptation Stations Station 1. Blubber INSTRUCTONS: Search Station 2. Station	feath 1 . Add a A. What do you no	Lesson 5. Adaptation Station Station 2. Feathers INSTRUCTIONS: . Look is a feather under the magnifying lense. . Using a pipotic cardialy put ONE droo of water on the . What do you deserve? mother 1 or 2 drops of water on the feather. tice about the feather?	Lesson 5 Adaptation Stations Station 3. Opposable thumbs INSTRUCTIONS: Put your hand inside the glove. A. With your hand inside the glove, write your name: B. With your hand inside the glove, try these challenges:
B. How does having blubber help marine mammals survive in their habitats?	B. What do you obs	erve about the feather with water?	Pick up a coin Tie your shee Seal a ziplock bag C. How do you think opposable thumbs help primates (humans, apes and some monkeys) survive?
C. Bonus Question - Can you name some animals that have a layer of fat or blubber? Needram Science Center Gr. 3 Servicer Natebook 2019-2020 7	C. Based on this ev	sidence, how do you think feathers help a bird survive?	Niecham Science Center Gr. 3 Survivor Notebook 2009-2020 9
Lesson 5 Adaptation : Station 4. Natating INSTRUCTION Listen to your partner talk in a quiet voic Now cup your hands behind your ears, making flaps face your friend while they talk. A. Did your partner's voice sound different you cupped your hands behind your ears? Expl 	Stations Ears S. e. our ear when in. ears help it survive? n you are done watching.	Lesson 5 Adaptation Stations Station 5. Camouflage Watch the video on your chromebook about camouflage A. Give an example of an animal who is camouflaged in its habitat. B. How does the animal's color or shape help it survers What wonderings or questions do you have?	

Links and outlines to each lesson in the unit can be found on these google slides	S .
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Station 1: Pre- made "Blubber mitt" and non blubber mit" * Blubber mitts should be placed in the freezer when your kit arrives to help preserve them. Also have paper towels nearby * to clean up spills. Large bucket of ice/frozen water.	Station 4: 2 ipads/chromebooks with <u>camouflage video,</u> 5 headphones
Station 2 : 5 Feathers (plus extras), 5 pipettes, magnifying lenses, 5 small trays, 1 jar of water*	Station 5: 2 Chromebooks with <u>fox ear video</u> , 5 crayons*
Station 3 : Opposable thumbs materials: 5 pre- made gloves, pencil, shoe with shoelaces, coin, cup, plastic ziplock bag, other items to grasp/hold	Adaptation station review slide show
vocabulary cards: adaptation, blubber	

Stage 1 – Desired Results

Key Standards:

3-LS4-2. Use evidence to construct an explanation for how the variations in characteristics among individuals within the same species may provide advantages to these individuals in their survival and reproduction. 3-LS4-3. Construct an argument with evidence that in a particular environment some organisms can survive well, some survive less well, and some cannot survive.

Meaning Making: Students will understand and keep considering				
Understandings: Students will understand that	Essential Questions (Long Term and Topical):			
 Habitat is a place that provides food, water, shelter, air (usually) and appropriate temperature range for organisms. Animals have characteristics to help them survive in their habitat. If the habitat changes, it affects animals' and plants' ability to survive 	 How do animals and plants survive? What are characteristics that help animals survive in their current habitats? What makes a good habitat? How do habitats change? How do changes in habitats affect organisms that live there? 			

Knowledge and Skills

Skills/Performance: Students will be able to...

- clearly and accurately record observations
- listen actively to others' opinions and evidence(revise thinking based on other's ideas or evidence)
- ask or identify questions that can be answered by an investigation
- communicate information in oral or written form

Stage 2 – Assessment Evidence

Performance Task or Other Key Evidence of learning (What will students understand and/or be able to do?)

• Students answer questions in science notebook

Grade 3 Survivor Lesson 05: Adaptation Stations Draft 2019-2020 Needham Science Center

Prior to the lesson:

- Make several trays of ice or a large frozen bucket of ice (you can freeze a tub of water) and remove it from the freezer just before the lesson.
- Remove the blubber mitts from the freezer a few hours before the lesson. Please return them to the freezer at the end of the lesson to help preserve them.
- Prepare five stations (see materials section). Allow additional set-up time.
- Decide how you want to put students into five groups.
- Consider asking for extra adult help for this lesson to help monitor students, especially with hands on materials and water.
- *At some point this day or the day before, make sure students have time to observe terrariums.

Part 1: (30 min)	Teacher Tips:
 Explain that today students will learn about animals in different habitats and the adaptations they have to survive there. Introduce the stations: Students will complete short activities to learn more about adaptations. 	
Station 1: Blubber Mitt: There are two ziploc bags. One of the bags has nothing in it. The other bag has Crisco(inside another ziploc bag). Students take turns putting hands in the bags and then placing in hands in cold water, with and without a glove. They will observe which hand feels warmer.	Consider staying at station 1 to ensure the water does not go over the lip of the mitt. Put ice/water bucket in the
Station 2: Feathers for protection. Students test different ways that water interacts with teachers (feathers act as if they are waterproof). They can observe the barbs of a feather under magnifying lenses. As students work, guide them to notice the barbs of a feather that seal the feather together.	sink if possible to avoid big spills.
Station 3: Opposable Thumb : Students put one hand in a glove with only 4 fingers. Their thumb should be against their palm inside the glove, with their 4 fingers sticking out Students do a variety of activities(tying their shoes, writing their names, etc). deciding if the activity took longer or was more difficult to do without thumbs.	
Station 4: Rotating Ears - Students experiment with cupping ears and how it affects their hearing. They watch a short video about how a fox turns its ears and think about how ear shape might help an animal survive.	
Experiment 5: Camouflage - Students watch a short video showing ten different animals with amazing camouflage and answer questions in notebook.	
3. Students work in groups of 4-5 to move through stations,	

spending about 5 minutes at each station.	
Part 2: (30 min)	
 Review the stations to assess student understanding. You can use this basic <u>slide show</u> with images with animals that have those adaptations Discuss: What did you shoop of these adaptations 	
2. Discuss: what did you observe? How do these adaptations help animals survive in their habitats? Talk about animals that have these adaptationse.g whales, seals, polar bears have blubber, apes, opossums have opposable thumbs. Additional time to discuss may be helpful the following day.	

Modifications (changes to the Core standard(s) and level of proficiency expected):	Accommodations (supports or instructional adjustments):

Extensions:

Four corners Game: Students match the habitat to the adaptation an animal would need to survive there. Designate an area of the room that corresponds to each habitat. Teacher names the adaptations (blubber, waterproof feathers, white fur, brown fur, etc) and students have to move to the designated area. They can also explain why they think that adaptation fits that habitat.

Opposable thumb lesson

Animal Adaptations video from Study Jams. Includes links to quizzes.

Grade 3 Survivor Lesson 05: Adaptation Stations Draft 2019-2020 Needham Science Center

Lesson 6: Animal Classification

Summary : Students sort animal cards based on their characteristics. The teacher explains, using a google slide show, how animals are classifed according to scientists. Students then re-sort their animals based on scientific classification.	Time: 60 minutes
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Key Resources/Materials Used:

Science notebook pages: How Scientists Classify Animals and Classifications (optional)



 Links and outlines to each lesson in the unit can be found on these google slides.

 8 sets of 22 animal cards (e.g.elephant, flamingo, fish, frog, iguana, scorpion,etc.)
 Google slide: animal classification

 vocabulary cards (optional): classify, adaptation, characteristic, invertebrate, arthropod, amphibian, fish, reptile, birds, mammals

Stage 1 – Desired Results

Key Standards:

3-LS4-2. Use evidence to construct an explanation for how the variations in characteristics among individuals within the same species may provide advantages to these individuals in their survival and reproduction. 3-LS4-3. Construct an argument with evidence that in a particular environment some organisms can survive well, some survive less well, and some cannot survive.

Meaning Making: Students will understand and keep considering			
Understandings: Students will understand that	Essential Questions (Long Term and Topical):		
 Animals are classified into groups and can give examples of group (mammals, reptiles & amphibians, fish, birds, invertebrates) Animals have characteristics to help them survive in their habitat. 	 How can we classify living things? 		

Knowledge and Skills

Skills/Performance: Students will be able to ...

- differentiate between several animals classification groups(e.g. mammal, bird) and the characteristics of those aroups.
- clearly and accurately record observations
- communicate information in oral or written form
- work cooperatively in groups

 Stage 2 – Assessment Evidence

 Performance Task or Other Key Evidence of learning (What will students understand and/or be able to do?)

Students classify animal cards into groups a second time based on scientific classification.

Stage 3 - Learning Activity

Prior to the lesson:

- Determine groups of students to make 8 groups or less.
- Review the google slide show and revew the explanation
- Determine the amount of challenge you want to offer for the card sorting activity. You can remove several cards from each bag to make it somewhat easier for some or all grops. You can set them aside and offer them as a challenge to some groups or not use them at all. *Make sure to keep at least one animal in each category and include the isopod card
- Review the animal classification slide show and plan how you want to present the information so it is clear and accessible to students.

Part 1	(30 min)	Teacher Tips:
1	Poview Lesson 5. What did you learn about adaptation of	
1.	animals in their habitats?	You can lead a short,
2.	Introduce today's activity - Plants and animals have adaptations, and today we are focusing on animals. Today we will think about how we can sort all the animals based on their	introductory activity about sorting students based on their
-	adaptations.	characteristics. i.e
3.	Explain that students will work in teams to put all of the animals cards in some type of classification (groupings). You can post the classification vocabulary card and refer to glossary in	based on our observable
4.	Encourage students to just use observations of the pictures, and try not to use background knowledge to classify their animals. You can tell them they will explain why they put these animals	start with 2 groups- brown eyes, and non brown eyes Now from
_	together based only on physical adaptations.	here we will break into
5.	Students work in groups of three. They classify pictures of 22 animals without necessarily putting animals in correct "scientific" classifications (students often sort based on the animals'	smaller groups- (e.g. hair color, sneakers v. non sneakers). And
	habitat). The only requirement is that they will be able to give a	from here we could
0	reason why they classified them the way they did.	keep sorting that's
0.	that was similar to other groups? different? How do you think	they classify organisms
	scientists might do this activity? (5 min)	
7.	Explain that scientists do the same process, using observations	
	of adaptations and characteristics that animals have to make	*At some point this day or
o	their groups.	students have time to
0.	explain the categories based on what scientists observe	observe terrariums.
	Explain that it is like a big sorting activity, starting with bigger	
	groups and getting to more specific groups. You can use the	*You can post vocabulary
_	following outline to go through the slides.	cards as they come up in
9.	a. Scientists have observed that some animals have backbones,	the discussion to help
	1 Of those animals that have a backbone (vertebrate)	support students
	- a. Some are cold blooded (cannot make their own heat)	Students may have
	i. Those that are cold blooded, some live in water. These	misconceptions about
	are Fish (backbone cold blooded, mostly lay eggs,	what it means to be cold blooded'- which is
	scales) ii. Those that are cold blooded, and lay eggs in water	confusing as the blood of
	are amphibians (backbone, cold blooded, lav eggs.	these animals is not
	moist skin)	actually cold! Consider
	iii. Those that are cold blooded, and lay eggs on land are	explanation/examples to
	reptiles (backbone, cold blooded, lay eggs, have	help support their
	Scales) b. Somo make their own best (worm blooded	learning.
	i. Those that are warm blooded and lav eggs are	
	birds (backbone, warm blooded, lay eggs, feathers)	
	ii. Finally some make their own heat and have fur/hair -	
	these are mammals (backbone, warm blooded, live	

Gr. 3 Survivor Lesson 06: Animal Classification Draft 2019-2020 Needham Science Center

babies, fur or hair)	
10. You can review the dichotomous key that students have in their notebook (slide 3 and 13) <i>How scientists classify animals</i>	
<u>Part 2- (30 min)</u>	
 Post the dichotomous key from students' notebook (slide 3 and 13) Review the classification groups that scientists use to sort animals based on their characteristics (invertebrates, amphibians, reptiles, fish, birds, mammals). Students work in their groups to resort their cards, based on the categories. Encourage them to work together and ask questions if they are not sure. The following is a key: 	
Invertebrates-centipede, tarantula, scorpion, isopod, monarch butterfly, ant Fish- great white shark, clown fish, barracuda Amphibians- red eyed tree frog, red dart Frog, red backed salamander	
Reptiles- nile crocodile, painted turtle Birds- loon, emperor penguin, snowy owl, flamingo Mammals- leopard, zebra, african elephant	This card sorting can be challenging as students will likely not have some
 Review the correct categories- What was hard? What was easy? Why? What did you learn about classifying? What did you learn about science? Explain that they will continue to refer to this classification as they learn more about animals and the adaptations and the habitats they live in. If time allows, play the game "The Cold Wind Blows" to review. Using one set of cards, pass out one animal to each student. The person in the middle of the circle says"the cold wind blows for animals that" and name a characteristic for classification. (e.g. have a backbone, lay eggs, have hair, etc.) 	background knowledge to sort. You can decrease the challenge for some or all groups by removing some cards ahead of time.

Modifications (changes to the Core standard(s) and level of proficiency expected):	Accommodations (supports or instructional adjustments):

Extensions:

Lesson 7: Observing Isopod Habitats

	· · · · · · · · · · · · · · · · · · ·
Summary: Students observe isopod habitats they built in lesson 2 and make	
inferences about how the isopods' ability to survive may be affected by the	Time: 30 minutes
habitat. They use their ideas to make changes to their habitats.	Time. So minutes

Key Resources/Materials Used:

Science notebook page: Lesson 7: Isopod count and Observing isopod habitats

Check Lesson 4 to be	en you fill out this chart		
Date	Isoped Popule	tion in your Habitat	
(Lesson 2)	250000000	inon in your ridonar	
(Lesson 4)			
(Today)			
Increased 3. Can you explain yo	Decreased ur results? (Why did the	Stayed the Same 2 population go up, go	down, sta
Increased 3. Can you explain yo the same?) T think that	Decreased ur results? (Why did the	Stayed the Same e population go up, go o	down, sto
Increased 3. Can you explain yo the same?) I think that	Decreased ur results? (Why did the	Stayed the Same e population go up, go o	down, sto
Increased 3. Can you explain yo the same?) I think that	Decreased ur results? (Why did the	Stayed the Same	down, sto
Increased 3. Can you explain yo the same?) I think that	Decreased ur results? (Why did the	Stayed the Same	down, sta

Date		
Lesson 7.Observing Isopod Habitats		
1. What changes did you see in your l	habitat over time?	
I noticed that		
2. Should you make any changes to your	habitat?	
Yes. I want to change	No. I don't need to make any changes because	

*denotes

material provided by teacher

Links and outlines to each lesson in the unit can be found on these google slides.		
isopod terrariums (from lesson 2)	large bins in which to empty habitats	
newspaper	materials for changing habitats -soil -gravel - leaves -water - pipettes -black construction paper -mulch	

Stage 1 – Desired Results

Key Standards:

3-LS4-3. Construct an argument with evidence that in a particular environment some organisms can survive well, some survive less well, and some cannot survive.

3-LS4-4. Analyze and interpret given data about changes in a habitat and describe how the changes may affect the ability of organisms that live in that habitat to survive and reproduce.

Meaning Making: Students will understand and keep considering		
Understandings: Students will understand that	Essential Questions (Long Term and Topical):	
 Some animals within a population survive better than others. If the habitat changes, it affects animals' and plants' ability to survive 	 How do habitats change? How do changes in habitats affect organisms that live there? 	

Knowledge and Skills

Skills/Performance: Students will be able to...

- explain that if the habitat changes, it affects animals' and plants' ability to survive
- clearly and accurately record observations
 - construct an argument, based on evidence

Stage 2 – Assessment Evidence

Performance Task or Other Key Evidence of learning (What will students understand and/or be able to do?)

• Students record their results and explain their data in their science notebook

Stage 3 - Learning Activity

Prior to the lesson:

- This lesson can get messy! Set up terrarium material (e.g. soil, leaves, mulch) so students can easily access them.
- Put newspaper down to help manage spills.
- Consider asking another adult to help monitor the students.

Part 1: (15 min)	Teacher Tins:
 Part 1: (15 min.) 1. Refer to lesson 6- how are isopods classified?(invertebrates/ arthropods). Why is that? (no vertebrae, jointed legs, cold blooded). How might these characteristics help them survive in their habitats? Today, we will observe the isopod habitats and see if they are affecting the isopods ability to survive. 2. Students observe the terrariums, noting changes and observations in their science notebook. They can empty the contents of the habitat into the large bin and count how many isopods there are. Alternatively, they sort through the habitats, using spoons to count the isopods that are there (this is a less messy option). 3. Students record the number in their student notebook (lesson 7: <i>lsopod count</i> and <i>Observing isopod habitats</i>) They should also refer to lesson 4 in their science notebook and record the number of isopods they observe in lessons 2 and 4. 4. Facilitate science talk: What did you notice? What did you notice? What is different? (Note: students may notice that some isopods did not survive OR that they reproduced that is okay!) Ask, based on what you observed- should we make any changes to the habitat? Why? How could changes in the habitat help isopods survive? 4. Students can record changes they would like to make to their habitats. You can check these before sending any students to collect materials. 	Teacher Tips: **This lesson can get messy- Make sure you have enough time for clean up *There is not necesarilly one right way to create habitat for the isopods. Students just need to ensure that they have limited light, enough water and sufficient food (dead leaves or mulch)
Part 2: (15 min)	
1. Students work in groups to make changes to their habitats (if they choose to)	

Modifications (changes to the Core standard(s) and level of proficiency expected):	Accommodations (supports or instructional adjustments):

Extensions:

Lesson 8: Modelling Changes to Habitats (Part 2 optional)

Summary : Teacher reads aloud a section of <i>World of Change</i> by Dona Herweck Rice, to reinforce the concept that a change in habitats can affect an	Time: 30- 60
organism's ability to survive. There is a second optional activity in which	minutos
students sort cards based on environmental changes that affect habitats:	minutes
Change in Climate, Reduction in Resources, Landform Change, and Disease.	

Key Resources/Materials Used:

Science notebook pages: Lesson 8: Changes to habitats, parts 1 and 2

Date	
Lesson 8. Changes to Habitats	Lesson 8. Changes to Habitats
Sometimes a change to a habitat can prevent an organism (living plant or animal) from surviving.	Pick one animal that lives in a forest habitat. Pick one habitat change. What would happen to that animal? Could the animal find a way to
What events can you think of that could change a forest habitat?	survive?
	Forest animal:
	What changed the forest habitat?
•	What happened to the animal when the habitat changed?
•	
·	
What wonderings or questions do you have?	
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*denotes material provided by teacher

Links and outlines to each lesson in the unit can be found on these google slides.		
World of Change by Dona Herweck Rice8 sets of climate cause cards (optional)		
document camera (optional)	8 sets of cards (optional)	
white boards (24)* (optional)		

Stage 1 – Desired Results

Key Standards:

3-LS4-3. Construct an argument with evidence that in a particular environment some organisms can survive well, some survive less well, and some cannot survive.

Grade 3 Survivor Lesson 08: Modelling Changes to Habitats Draft 2019-2020 Needham Science Center

Meaning Making: Students will understand and keep considering		
Understandings: Students will understand that	Essential Questions (Long Term and Topical):	
 Some animals within a population survive better than others. If the habitat changes, it affects animals' and plants' ability to survive 	 How do changes in habitats affect organisms that live there? What happens to organisms when they cannot meet their needs? 	

Knowledge and Skills

Skills/Performance: Students will be able to...

• give examples of changes to habitats and explain how they affect an organims' ability to survive.

Stage 2 – Assessment Evidence

Performance Task or Other Key Evidence of learning (What will students understand and/or be able to do?)

• Students respond to questions in their science notebook

Stage 3 - Learning Activity

Prior to the lesson:

- Determine how you would like to facilitate the read aloud, and if you would like to display the book on the document camera
- Determine how you like to check for understanding during the read aloud
- Determine if you would like to play the sorting game and read through the cards ahead of time.

*At some point this day or the day before, make sure students have time to observe terrariums.

• Note- Lesson 9 involves a game that works well in a large open space such as a gym or field. Consider finding/reserving the space ahead of time.

<u>Part 1: (30 min)</u>	Teacher Tips:
 Review lesson 7 and how changes to the isopod habitat affected its ability to survive. Ask: What might be some other changes to habitats that could affect the animals and plants that live there? Read pages 18-25 in <i>Environment: A World of Change</i> by Dona Herwick Rice. Skip page 21adaptation over time is to be avoided Check for understanding during the reading. You can use whiteboards or other methods to ask students to jot down ideas from the books. For example, can you name: 3-4 things a habitat provides all organisms 1-2 examples of a habitat change 1-2 examples of an adaptation from the book 1-2 examples of endangered/extinct animals Students complete notebook page <i>Changes to Habitats</i>, parts 1. and 2. 	*At some point this day or the day before, make sure students have time to observe terrariums.
Part 2: (optional)	
 Ask students if they can give examples of ways that habitats can change- Explain that they are going to continue to explore this idea with a card sorting game. You can show the Organism and Environment <u>cards</u>, with short blurbs about situations in which there was an environmental change. and read one of the examples. Show the <u>cards with four categories of environmental change</u> (Change in Climate, Reduction in Resources, Landform Change, and Disease) and explain that they will try to match the blurbs with the types of environmental change. Review - climate is the overall weather patterns for a locationeg. the arctic is generally cold, the rainforest is generally warm and wet. Distribute a set of 15 cards and environmental change cards. Students work in groups of three to sort the blurbs into four. 	
Students work in groups of three to sort the blurbs into four categories.	
4. As students work, emphasize the idea that there is no "correct" answer, and that they should be using evidence to back up their arguments.	
5. Students share/explain their choices to the class. Again, students can support their ideas with evidence, but there can be many different ways to interpret the ideas.	

Modifications (changes to the Core standard(s) and level of proficiency expected):	Accommodations (supports or instructional adjustments):

Extensions:

<u>Article</u> about climate change affecting Lobster migration--with interactive graph showing the relationship between temperature and lobster population



Lesson 9: Game: Isopod Survivor!

Summary: Students play a game to model what happens to populations in a habitat as resources change. *This lesson works best in a large open space, such as a field or gym. Consider scheduling the space ahead of time. This is the last lesson involving isopods. (Students will not be looking at the isopods again- you can release the isopods to the outdoors or send them back	Time: 45+ minutes
to the SC)	

Key Resources/Materials Used:

Science notebook page: Lesson 9: Isopod Survivor

5016				
	Lesson 9. Isopod Survivor!			
1.	What changed with	each round of the isopod	survivor game?	
2.	What did you learn b	y playing the game?		
Needho	im Science Center	Gr. 3 Survivor Notebook	2019-2020	18

*denotes material provided by teacher

Links and outlines to each lesson in the unit can be found on these google slides.		
4 sets of different colored basic need markers: (e.g. popsicle sticks) 48 food, 48 water, 48 shelter, 48 air	*whiteboard or chart paper	
vocabulary cards(optional): reproduce, population		

Stage 1 – Desired Results

Key Standards:

3-LS4-2. Use evidence to construct an explanation for how the variations in characteristics among individuals within the same species may provide advantages to these individuals in their survival and reproduction. 3-LS4-3. Construct an argument with evidence that in a particular environment some organisms can survive well,

some survive less well, and some cannot survive.

Meaning Making: Students will understand and keep considering			
 Understandings: Students will understand that all plants and animals live in habitats for which they are suited/adapted changes to habitats affects animals' and plants' ability to survive in order for organisms to exist on earth over time, they must reproduce 	 Essential Questions (Long Term and Topical): How do changes in habitats affect organisms that live there? What happens to organisms when they cannot meet their needs? 		

Knowledge and Skills

Skills/Performance: Students will be able to...

- explain how changes in the individuals can help them survive better in an environment with less water.
- model population changes in isopods
- Students make predictions and graph changes in the isopod population

Stage 2 – Assessment Evidence

Performance Task or Other Key Evidence of learning (What will students understand and/or be able to do?)

students complete science notebook page

Stage 3 - Learning Activity

Prior to the lesson:

Preparation:

For 24 students

- Select an area where students will have plenty of space and where you can place the markers so they don't bump into each other (such as outdoor field, gym or cafeteria). Delineate a space/line that will serve as "home".
- If you cannot find a large space, you can play a modified version of the game in the classroom (see instructions at end of the lesson).
- Create a way to display the data from each round (whiteboard, chart paper). If you are playing four rounds you will need 1-2 data charts per round. You should choose a way to chart the data that is easy for students to see/understand (ie. pie chart, fraction bar)
- For the reproduction round plan to trade different children in and out of this game so that everyone has a chance to participate.

Part 1: (30 min)	Teacher Tips:
 Connect to lesson 8. Explain to students that they will be playing a game to model what happens to populations in a habitat. You can review what a model is (a representation of an idea) and 	Prior to playing the game, review classroom behavior expectations.
 that scientists use models to help understand things that are too big/small/complicated to see. 2. Explain that in the game, each student will be one isopod. Their goal it is to get what they need to survive. You can review the four basic needs of all organisms (food, water, shelter, air). 	Students might get VERY excited and it can be competitive- consider making rules for what to do is
Round 1: Reproduction Rounds (3 rounds) 3. Line up 8 students at "home." Put out 30 of each resource	students don't survive and how to keep the game safe.
(water, shelter, food, air). Show the students the basic need markers. Explain that their goal will be to collect two of each marker (i.e. Two air markers, two water markers, two shelter markers, two air markers) and then return to "home". If they get all of the basic needs (8 total), they come back home, if not, they "die" and will stay in the game area.	If you cannot find a large space you can play a mini version of game in the class (at the end of this lesson).
 Review expected behavior and how to keep everyone safe. (You may want to ask your "isopods" to crawl - as an isopod would - or walk to get their basic needs. This will avoid racing and crashing.) 	*At some point this day or the day before, make sure students have time to observe terrariums.
5. Play one round.	
6. After the round, notice how many survived and how many resources are left in the playing area. (Ideally everyone survives in this round) Record on the chart. Ask: In this round, there is more than enough resources, so all isopods will survive and there should be extra resources left over. Why did all the isopods survive?	
 Explain the surviving isopods will reproduce. (You can show the vocabulary card) Reproduce means when an organism creates new organisms of its kind. For example, elephants make baby elephants, plants make new plants. 	
8. For every two isopods that survived, one isopod "baby" should join the population. Now you should have 12 isopods. What do you think will happen to the isopods this round? What do you think will happen to the resources?	
9. Put out 30 of each resource (water, shelter, food, air) and <u>run</u>	
the game again.	
10. After the round, notice how many survived and how many	
resources are left in the playing area. Record on the chart. In	
this round, there continues to be more than enough resources,	

Grade 3 Survivor Lesson 09: Game: Isopod Survivor! Draft 2019 - 2020 Needham Science Center

	so all isopods will survive and there should be extra resources	
	left over. Discuss. Why did all the isopods survive? What did	
	you notice about the remaining resources compared to last	
	round?	
11	. For every two isopods that survived, one isopod "baby" should	
	join the population. Now you should have 18 isopods. You can	
	ask: What do you think will happen to the isopods this round?	
	What do you think will happen to the resources?	
12	Run the game one more time	
13	After the round, notice how many survived and how many	
	resources are left in the playing area. Record on the chart.	
	Discuss. Why didn't all the isopods survive? What did you notice	
	about the remaining resources compared to last round? Why did	
	this happen?	
14	. Discuss. What happened to the number of resources as the	
	isopods continued to reproduce? Why did this happen?	
Round	d 2: Habitat Havoc rounds (2 rounds) In the second section of	
the ga	me, we will be focusing on changes in habitat.	
1.	Explain that this time, something has happened to the habitat	
	(drought, a dam was built, etc.) so there is less water. Ask them	
	to make predictions about what will happen.	
2.	Spread out the markers, (water, shelter, food, air) only using	
	half as many water markers.	
3.	Line up the 18 students at "home." Run the game.	
4.	Run the game. After a minute or so, gather students attention.	
	Show them the chart and record how many isopods survived.	
	Explain that this means that the next generation there would be	
	fewer isopods. You can have them discuss if this is like what	
	happens in the real habitat (often in a real habitat there is not	
	enough so that everyone survives).	
5.	The surviving isopods reproduce (e.g if 6 survived, there will be	
	9) and come to the line.	
6.	Explain that this time, something else has happened to the	
	habitat (forest fire) so there is less food to eat and less shelter	
	available.	
7.	Spread out the markers, only using half as many food markers	
	and shelter markers. Ask them to make predictions about what	
	will happen.	
8.	Run the game.	
9.	Gather students' attention. Have students count how many	
	isopods of each kind survived. Chart the two numbers on the	
	chart paper. Students discuss results.	

10. Bring the class back inside for a wrap up	
Part 2: Wrap up (15 minutes)	
 Part 2: Wrap up (15 minutes) 1. Students record what changed in each round and what their learned in their science notebook- <i>Isopod Survivor</i> 2. Lead a science talk: What was fun about the game? What was challenging? Is there a way we could improve the game? What did you notice about the populations of isopods in the game? What changes to their environment affected the isopods ability to survive? Can you think of other changes in the habitat that could affect isopods? How is the game a model of what happens in the real world? How is it not a model? 	

Isopod Survivor classroom modification:

If you cannot find a large space for this game or prefer not to- you can play in the classroom.

- Students sit/stand in one area of the room and act as observers.
- Designate a few volunteers to act as isopods each round.
- Place markers on tables.
- "Isopods" walk from table to table collecting resource markers in a given amount of time.
- When time is up, "isopods" sit down with their resources.
- Observers share what they noticed about each round.
- Students can take turns acting as isopods each round.

Plan to trade in different children so that everyone can participate in the reproduction round Set up: 30 sticks of each food, water, shelter air		
Round	Outcome	
Round 1: Distribute 30 sticks of each	All survive (chart how many survived and how	
8 kids each pick up 2 of each food, water, shelter and air (some leftover)	much resources are left)	
Round 2: Distribute 30 sticks of each	All survive (chart how many survived and how much resources are left)	
For every 2 isopods that survived, they have 1 baby isopod. 12 isopods each pick up 2 of each food, water, shelter and air (some leftover)		
Round 3: Distribute 30 sticks of each	Some isopods die (chart how many survived	
For every 2 isopods that survived, they have 1 baby isopod. 18 isopods each pick up 2 of each food, water, shelter and air (not enough for all)		
What's the point? Higher population leads to less food/resources to go around to all		

Plan to trade in different children so that everyone can participate in the reproduction round Set up: 48 sticks of each food, water. shelter air Round Outcome Round 1: Distribute 48 sticks of each All survive (chart how many survived and how much resources are left) 24 kids each pick up 2 of each food, water, shelter and air (some leftover) Round 2: Distribute 48 food, shelter and air but only Some isopods die (chart how many survived 24 of water and how many resources are left) Isopods each pick up 2 of each food, water, shelter and air (not enough of everything) **Round 3:** Distribute 30 sticks of each Some isopods die (chart how many survived and how many resources are left (none)) For every 2 isopods that survived, they have 1 baby isopod. 18 isopods each pick up 2 of each food, water, shelter and air (not enough for all)

What's the point? Environmental changes leads to less food/resources to go around to all

Modifications (changes to the Core standard(s) and level of proficiency expected):	Accommodations (supports or instructional adjustments):

Extensions:

Grade 3 Survivor Lesson 09: Game: Isopod Survivor! Draft 2019 - 2020 Needham Science Center

Lesson 10: Mystery Science: Where can you find whales in a desert?

Summary: Students watch Mystery Science video about changes in ancient	
habitats and the fossil evidence they leave behind. Students discuss the video	Time: 20.45 minutes
and complete an activity in their science notebook matching pictures of	nme: 30-45 minutes
ancient animals to animals alive on earth today.	

Key Resources/Materials Used:

Student notebook pages:

Lesson 10.Mystery Science: Where can you find whales in a desert? What Habitat Was Here? Name Date: -What Habitat Was Here? This fossil was found in Arizona, USA 1 This fossil was found in Nebraska, USA 5. TC This fossil This fossil was found in was found in Alaska, USA: Germany: This fossil was found in the Sahara Africa 2019-2020 20

*denotes material provided by

teacher

Links and outlines to each lesson in the unit can be found on these google slides.		
Mystery Science: Where can you find whales in a desert? login: sciencecenter@needham.k12.ma.us password: Sciencecenter		

Stage 1 – Desired Results

Key Standards:

3-LS4-1. Use fossils to describe types of organisms and their environments that existed long ago and compare those to living organisms and their environments. Recognize that most kinds of plants and animals that once lived on Earth are no longer found anywhere.(Not met)

Meaning Making: Students will understand and keep considering		
Understandings: Students will understand that	Essential Questions (Long Term and Topical):	
 changes to habitats affects animals' and plants' ability to survive 	 How do habitats change? How do changes in habitats affect organisms that live there? How do we know about life long ago (before people were on earth)? 	

Knowledge and Skills

Skills/Performance: Students will be able to ...

- explain how fossils provide evidence or clues of life long ago
- give examples of changes to habitats
- identify how our scientific understanding of life long ago changes based on evidence
- construct an argument, based on evidence

Stage 2 – Assessment Evidence Performance Task or Other Key Evidence of learning (What will *students understand and/or be able to do?*)

- students complete science notebook page comparing ancient fossils to animals alive on earth today •
- students participate in discussion

Stage 3 - Learning Activity

Prior to the lesson:

Preview all parts of the mystery science video and the activity. You can show parts 1-3 and have students to the activity. OR you can continue after the activity and show the rest (parts 4-8)

1.	Refer to previous lessons- What have you learned about how	Teacher Tips:
	nabitats change? what are examples of ways that habitats	
	change? How might habitats have changed since 100 years	
_	ago? 1000 years ago?	
2.	Explain that we will watch a video about Illinois - has anybody	
	ever been there? Today Illinois has miles and miles of	
	grassland. Do you think it looked like this before people were	
	around?	
3.	Students watch Mystery Science video showing fossils of ocean	
	animals in quarry in Illinois. Stop video after each section and	
	students discuss questions. Make sure to show at least parts 1-	
	4 of the video.	
4.	Students complete student notebook entries at end, making	
	inferences about what ancient animals lived in habitats long	
	ago.	
5.	You can show more of the video or wrap up the lesson here.	
6.	Possible wrap up questions:	
	- How have habitats changed in the past? How have	
	habitats changed over millions of years? How do you	
	think that affected the animals and plants that lived	
	there?	
7 Y	You can explain that students will continue to explore fossils and	
، . ، ام	oserve real fossils in the next lesson	
0		

Modifications (changes to the Core standard(s) and level of proficiency expected):	Accommodations (supports or instructional adjustments):

Extensions:

Lesson 11: How do fossils form?

Summary: Students watch a video about how fossils form. Students rotate through 12 stations observing fossils and other natural artifacts (bones and shells). They work as paleontologists to observe and notice evidence and determine which ones might be fossils.

Time: 60 minutes

Key Resources/Materials Used:

Student notebook pages: Lesson 11: How do fossils form (2 pages) and Fossil sort

Date	Lesson 11 (cont). How do fossils form?	Lesson 11 (cont). Fossil Sort
Lesson 11. How do fossils form?		A. These artifacts were found at a dig site. Some are bones and shells and some are foreiled plants and animals. Circle the area way thick are foreils:
	What evidence do scientists have that something is a fossil?	yosais of points and animals , circle the ones you think are tossis-
A. How do you think scientists learn about life that existed before there were humans on	5	
Earth?		1 2 3
	•	
	•	
	•	
	•	
	•	7 8 9
B. How does rock form in the exact shape of bones over millions of years?		
	What wandanings an quartiens do you have?	
	what wonderings or questions do you have?	
		10 11 12
		B. How did you deride which ones are fassils?
		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
Needham Science Center Gr. 3 Survivar Notebook 2019-2020 21	Needham Science Center Gr. 3 Survivor Notebook 2019-2020 22	Needhon Science Center Gr. 3 Survivor Notebook 2019-2020 23

*denotes material provided by teacher

Links and outlines to each lesson in the unit can be found on these google slides.			
Video: <u>What is a fossil?</u> from <u>DinoDays</u>	Related Resource: Generation Genius <u>Changing Earth's</u> <u>landscapes and Formation of Fossils</u> log in: <u>Sciencecenter@needham.k12.ma.us</u> password: Sciencecenter		
 12 bones and fossils 1. fossil shells 2. shell 3. fossil shell 4. plant fossil 5. shark tooth fossil 6. mammal skull 7. mammal vertebra 8. fossilized bone 9. mammal jaw 10. petrified wood 11. seashell 12. fossilized egg shell 	<i>Fossils Tell of Long ago</i> by Aliki (optional) Bill Nye: <u>Dinosaurs</u> (app. 23 min) (optional extension)		
magnifying lenses (24) optional	white board or chart paper* (optional)		
vocabulary card(optional): fossil,			

Grade 3 Survivor Lesson 11: How do fossils form? Draft 2019 - 2020 **Needham Science Center**

Stage 1 – Desired Results

Key Standards:

3-LS4-1. Use fossils to describe types of organisms and their environments that existed long ago and compare those to living organisms and their environments. Recognize that most kinds of plants and animals that once lived on Earth are no longer found anywhere.

Meaning Making: Students will understand and keep considering		
Understandings: Students will understand that	Essential Questions (Long Term and Topical):	
 fossils are evidence of life and habitats long ago (not just dinosaurs) our scientific understanding of life long ago is based on evidence 	 How do we know about life long ago (before people were on earth)? 	

Knowledge and Skills

Skills/Performance: Students will be able to ...

- Fossils provide evidence or clues of life long ago
- Fossils are preserved remains of ancient plants and animals (not bones)
- Fossils formed over millions over years (beginning knowledge)

Stage 2 – Assessment Evidence

Performance Task or Other Key Evidence of learning (What will students understand and/or be able to do?)

- Students respond to questions in their science notebook
- Students discuss their observations, using evidence

Stage 3 - Learning Activity

Prior to the lesson:

- Preview the <u>video</u>- What is a fossil?
- Set up 12 stations in the room where students will be able to access and observe the artifacts and fossils
- Place the artifacts and fossils at the stations, with magnifying lenses (optional)
- Label the stations 1-12 (optional)

 Part 1: (30 minutes) Review lesson 10- What do we know about fossils? What questions do we have? Do we know how fossils can form? Show the <u>video</u>- What is a fossil? Discuss with the class how fossils form. After the video, you can post the vocabulary card fossil. You can create a list (on white board or smart board)- what evidence do scientists have that something is a fossil(e.g. it looks old, has turned to stone, has large footprints, etc.) (optional) Student can write notes in science notebook <i>How do fossils form</i>? (optional) Students and write notes in science notebook <i>How do fossils form</i>? (optional) Students work in pairs to rotate through 12 stations observing artifacts from plants and animals. They determine if it is a fossil or something else and record it in their science notebooks. Part 2: (30 minutes) Reviews the stations, remind students that fossils are millions of years. Lead a science taik: You can ask students which ones they thought were actual fossil. Students share what they noticed and what might be evidence of the animal and how they might elsismelt forssils (13, 4, 5, 8, 10, 12) together and students dn't agree on the 'correct' answer, and important to emphasize using evidence to support their claims. You can collect all of the fossils (10, 4, 5, 8, 10, 12) together and students dn't agrees on the 'correct' answer, and important to emphasize using all socialis are offen made of store, feet heavy, are also collect the bones (6, 7, 9) adn have them notice what is similar (fossils are offen made of store, 4et) <i>Qu</i> yue an also collect the bones (6, 7, 9) adn have them notice what is similar (fossils Tell of Long Ago by Aliki Wrap up: What have you can explain that in the next lesson, we will be exploring more about fossils and direct and what night be exploring more about fossils and have they can give us about animals and plants that were on earth long before humans. 		
 Review lesson 10- What do we know how foosils? What questions do we have? Do we know how fossils or more filed in white board or smart board) what evideo. What is a fossil? Discuss with the class how fossils form. After the video, you can post the vocabulary card fossil. You can create a list (on white board or smart board)- what evidence do scientists have that something is a fossile (.g. it looks old, has turned to stone, has large footprints, etc.) (optional) Student can write notes in science notebook <i>How do fossils form</i>? (optional) Explain that students will be observing artifacts from animals that were once alive. Some are these artifacts are millions of years old? Their job is to work as paleontologists to observe and notice evidence and determine which ones might be fossils. Students work in pairs to rotate through 12 stations observing artifacts from plants and animals. They determine if it is a fossil or something else and record it in their science notebooks. Part 2: (30 minutes) Reviews the stations, remind students that fossils are millions of years. Lead a science talk: You can ask students which ones they thought were actual fossil. It is OKAY if students don't agree on the "correct" answer, and important to emphasize using vidence to support their claims. You can notice what is similar (fossils are often made of stone, feel heavy, are anis/plants were filled in with minerals and stoudents and stoudents is similar (they are often light colored, smooth, etc) If time allows, you can also show the Related Resource: Generation Genius <u>Changing Earth's landscapes and Formation of Fossils or learts of <i>Fossils Tell of Long Ago</i> by Alkii</u> Wrap up: What have you learned about how fossils form? What questions do you have? You can explain that in the ext lesson, we will be exploring more about fossils and what clues they can give us about animals and plants that were on earth long before humans. 	Part 1: (30 minutes)	Teacher Tips:
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Grade 3 Survivor Lesson 11: How do fossils form? Draft 2019 - 2020 Needham Science Center

Modifications (changes to the Core standard(s) and level of proficiency expected):	Accommodations (supports or instructional adjustments):

Extensions:

Optional extension- Bill Nye Dinosaurs

Lesson 12: Mystery Science. How do we know what dinosaurs looked like?

Key Resources/Materials Used:

Science notebook pages: Lesson 12: *Mystery Science: How do we know what dinosaurs looked like?*



*denotes material provided by teacher

Links and outlines to each lesson in the unit can be found on these google slides.			
Mystery Science: How do we know what dinosaurs looked like?	Ancient Habitat memory game cards- 8 sets (optional)		
login: sciencecenter@needham.k12.ma.us password: Sciencecenter	habitats (optional)		

Stage 1 – Desired Results

Key Standards:

3-LS4-1. Use fossils to describe types of organisms and their environments that existed long ago and compare those to living organisms and their environments. *Recognize that most kinds of plants and animals that once lived on Earth are no longer found anywhere.(not met)*

Meaning Making: Students will understand and keep considering...

Grade 3 Survivor Lesson 12: Mystery Science. How do we know what dinos looked like? Draft 2019 - 2020 Needham Science Center

Understandings: Students will understand that	Essential Questions (Long Term and Topical):
 scientists group animals according to their characteristics our scientific understanding of life long ago is based on evidence 	 How do we know about life long ago (before people were on earth)

Knowledge and Skills

Skills/Performance: Students will be able to ...

- explain how fossils provide evidence or clues of life long ago
- identify our scientific understanding of life long ago changes based on evidence
- explain how animals are classified into groups and can give examples of group (mammals, reptiles & amphibians, fish, birds, invertebrates)
- construct an argument, based on evidence

 Stage 2 – Assessment Evidence

 Performance Task or Other Key Evidence of learning (What will students understand and/or be able to do?)

science notebook page Mystery Science: Habitats Changing Over Time

Stage 3 - Learning Activity

Prior to the lesson:

preview all nine parts of the mystery science video and the activity -

 Part 1: (45 min) 1. Review lesson 11- What did we learn about how fossils form? How did we use fossils as clues? How can we know what animals and plants that left fossils really looked like if people were never there to see them? 	Teacher Tips:
 Shows Mystery Science- How do we know what dinosaurs looked like? (show all nine parts of the mystery). Stop the video at discussion points. Here are other possible discussion questions: Part 1: Why do we think dinosaurs look like reptiles and lizards? Who can recall what we learned about reptiles and lizards from lesson 6? How are they different from mammals? Part 3: What else does the video say about the difference between reptiles and mammals? How is this helpful evidence for looking at fossils? Part 6: What did scientists find besides fossil bones that was evidence? How does more evidence help scientists? Students complete science notebook page <i>Mystery Science:</i> <i>How do we know what dinosaurs looked like</i>? (part 9 of the 	
activity)

4. Review the answers to the sheet. What did you observe about the skulls? Which ones did you say were meat eaters/carnivores? herbivores? why? It is OKAY if students don't get the answers correct- the goal is for them to begin to use evidence to make their arguments.

5. Wrap up: Was there ever a time when we didn't know about dinosaurs? (yes! 200 years ago) What could you learn about animals that lived long ago by looking that their fossils? You can explain that in the next few lessons, students will look at more real fossils and be able to use what they learned today to infer about the animals and plants that lived long ago.

Part 2 (15 min) Optional

- 1. Explain that when a paleontologist finds a fossil they might have quesitons about other characteristics besides what it was covered with or what it ate. They can frequently determine what habitat it lived in by using clues and comparing the organism to those that are on earth today.
- 2. Pass out the cards and explain that students will work like paleontologists to match the cards to their habitat. (Each ancient habitat has two fossil cards that belong in that habitat)
- 3. Students work in groups of three to discuss and determine what habitat goes with which fossil. There are four possible ancient habitats to choose from - Meadow, Forest, Freshwater and Ocean.
- 3. Optional challenge. If the students find the matching easy you may then use the cards to play a memory game. Give each group a set of cards to put face down on their desks. They must turn over two cards at a time and try to match a fossil with its ancient habitat. Students take turns. The students may discuss with each other if they think the turn taker has made a poor choice in habitats. If the two cards they turned over do not go together they turn them back over in the same place. If the two cards match the student takes them out and sets them aside, but does not go again. The play continues to the next person.
- 4. When all the cards are matched students discuss one pair of cards they found interesting.
- 5. For teacher background and further discussion you can look at: google slide presentation - what do fossils tell us about habitats
- 6. For wrap up you can ask What could you learn about an area if you found a few fossils together? What can a paleontologist tell about the animals, plants, soil and even climate that existed in that area long ago. Lead students to understand that one thing fossils can tell us is:

a.Was there water nearby

b.Was it warm or cold (climate)

c. Is the soil sandy, fertile (dark colored), clay-like (looks like pottery) d. Did large or small animals lived there e. What plants lived there	

Modifications (changes to the Core standard(s) and level of proficiency expected):	Accommodations (supports or instructional adjustments):

Extensions:

Lesson 13: Fossil observations

Summary: Students work in groups to observe and describe real animal and	
plant fossils and model fossils. They then compare the fossils to pictures of	Time: 60 minutes
organisms alive on earth today and discuss their ideas, supporting their ideas	
with evidence.	

Key Resources/Materials Used:

Science notebook pages: Lesson 13: Observing Fossils and Fossil models for clues



*denotes material provided by teacher

Links and outlines to each lesson in the unit can be found on these google slides.				
sets of fossils & model fossils- (dig site 1: fern, Site 2: frog Site 3: trilobites, Dig site 4: fish, Dig site 5:ammonite, dig site 6: dinos),	Dig pictures with animals to match (chicken skeleton, frog skeleton, fish skeleton, crocodile skeleton, nautilus shell, horseshoe crab, mammal skeleton, isopod, fern, pine leaves),			
pictures for 'dig site' stations				
vocabulary card (optional) paleontologist				

Stage 1 – Desired Results

Key Standards:

3-LS4-1. Use fossils to describe types of organisms and their environments that existed long ago and compare those to living organisms and their environments. *Recognize that most kinds of plants and animals that once lived on Earth are no longer found anywhere. (not met)*

Grade 3 Survivor Lesson 13: Fossil Observations Draft 2019-2020 Needham Science Center

Meaning Making: Students will understand and keep considering				
Understandings: <i>Students will understand that</i> Essential Questions (Long Term and Topical):				
 our scientific understanding of life long ago is based on evidence fossils are evidence of life and habitats long ago (not just dinosaurs) 	 How do we know about life long ago (before people were on earth?) 			

Knowledge and Skills

Skills/Performance: Students will be able to ...

- Explain that fossils provide evidence or clues of life long ago (and begin to see that our scientific understanding of life long ago changes based on evidence)
- clearly and accurately record observations of fossils
- compare fossils to organisms alive on Earth today
- construct an argument, based on evidence

Stage 2 – Assessment Evidence Performance Task or Other Key Evidence of learning (What will *students understand and/or be able to do?*)

- complete observations in science notebook page
- discuss observations and compare fossils to current animals on earth

Stage 3 - Learning Activity

Prior to the lesson:

Set up 6 stations/dig sites that students will rotate through. Each station will have a picture of the dig site and real or model fossils.

Part 1 1. 2	: 30 minutes Review lesson 12. How do scientists compare fossils to animals alive on earth today? How did looking at skulls of current animals help them make conclusions about ancient animals? Explain that today's goal is to work like paleontologist to	Teacher Tips: Before and during activity, emphasize the
2. 3. 4. 5.	observe actual fossils and continue to think about how we can use clues from fossils to learn about animals and plants that are no longer on earth. Point out the six "dig sites" placed around the room of places where plant and animal fossils have been found. Each dig site includes pictures of actual sites where paleontologists are working and real or model fossils from those dig sites. Put students into groups of 4. Students move to different "dig sites", observe fossils from the	importance of handling the fossils and artifacts carefully. Some break easily and are difficult to replace.
Part 2	site and record what they notice.	

Grade 3 Survivor Lesson 13: Fossil Observations Draft 2019-2020 Needham Science Center

1.	Review the dig sites. What did you notice about the fossils and model fossils? What evidence did you see? What else could we do to figure out information about these animals or plants that are no longer on earth? (compare them to current animals and plants!)	
2.	Pass out images of different animals and plants that are currently on Earth (8 images: chicken skeleton, frog skeleton, fish skeleton, crocodile skeleton, nautilus shell, horseshoe crab, mammal skeleton, isopod, fern, pine leaves) to each group. Explain that not all pictures will match the fossils they saw.	
3.	Students observe and discuss the images. They work to match them to the living things from different dig sites (not all animals and plants will have a match). You can remind students that it is okay to discuss and disagree, as long as you are respectful and provide evidence for your ideas.	
4.	Gather the group in a circle with their materials. Lead a science talk: Do any of these match? How did you use your observations to base your ideas? Can we agree on any of the matches? What questions do you still have? Allow for discussion and disagreement, and encourage students to use evidence to base their ideas.	
5.	To wrap up, you can ask how is what you did today similar to how paleontologists work? different? You can also explain that in the next lesson, students will use the skills from today to identify a mystery fossil.	

Modifications (changes to the Core standard(s) and level of proficiency expected):	Accommodations (supports or instructional adjustments):

Extensions:

Lesson 14: Mystery Fossil (SC Program)

Summary: Students act as paleontologists and try to figure out as many characteristics as they can about a mystery animal. Students collect evidence by traveling through 4 stations (lab rooms) and compare evidence of mystery fossil to modern day birds and reptiles. During the wrap-up, students share their evidence and make a claim about the mystery animal's characteristics.
 Request this program at least two weeks in advance
 There is also an optional written assessment about fossils in the science notebook that can take place sometime after this lesson.

Key Resources/Materials Used:

Science notebook pages: Lesson 14: Mystery Fossil: Science Center program (4 pages) and optional written assessment

		Date				
Lesson 14: Mystery F	Fossil - Science Center Program		Lob 2: Numon		Lab 3: Hatchery	
Lab 1: Mystery Fossil Trackway		Clue: The mystery with fossilized eggs.	animal fossil was dis	covered on a nest	Clue: Paleontologies found fossilized eggs from the mystery animal in a nest. Most reptile eggs are soft and a little wrinkled.	Sous -
footprints 75 million years	ago.	1. Watch the 2 videos.			Bird eggs are hard and smooth. Most bird eggs have one narrow end.	Wystery animal's fossiliz in their nest.
1. Use the model trackway to figure below.	ure out the questions	Look at the picture of the mystery animal's fossilized ne	Baby sea turtle	all alone. Mother bird with her babies.	 Look at the model of a whole tossilized mystery animal egg. 	
A Measure one of the anim	nal's footnrints	A. Do bird parents care for th Circle one: Yes or N	eir young?		 Look at a piece of the real mystery animal fossilized egg under the magiscope. 	
Measure one of your feet.	Mystery animal trackware	What is your evidence?	•		 Look at the real bird egg and reptile egg. What do you notice about the fossilized mystery egg? 	
How long is your foot?	inches				. What do you house about the lossinged mystery egg :	
How long is the mystery anir	nal's foot? inches					
B. What do the mystery trac Circle your answer for quest	ks tell you? ion 1 and 2:	B. Do turtle parents care for What is your evidence?	their young? Circle one:	Yes or No	B. Circle one: The mystery animal egg is more like a	
1 Mystery anim was taller that	al Mystery animal an - or - was shorter				Chicken Egg Snake Egg	
you are	than you are	C. Look at the picture of th animal raised its young the w	e mystery animal's nest. ay birds do, or the way tur	Do you think the mystery tles do? Explain.	C. Explain your thinking for question B.	
2 Mystery anima walked on 2 fe	Mystery animal et - or - walked on 4 feet					
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			ı			
	Lab 4: Animal Coverings:	· Draw		Choose ONE	Fossil Assessment- DRAFT 8.2019	
	Clue: Paleontologists have a tiny piece of th mystery animal's skin covering they can see under a microscope.			a. <u>Describe</u> i description.	it wth details. You can also draw and label if it helps your	
	 Touch and look at the real animal coverings under the magiscopes. 	Mystery animal's skin covering (seen under microsope)				
	 Look at the picture of the mystery animal's real skin covering under the microscope. 					
	Which skin covering do you think the mystery anim Explain your thinking.	al had?				
	Bonus: Make a science sketch.			2. EXPLAIN	How is this fossiil similar to an organism alive on earth?	
				This fossil is	s similar to because	
				Bonus Question today?	n- Why do scientists compare fossils to animals alive on earth	
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				la contra de		

Grade 3 Survivor Lesson 14: Mystery Fossil (SC Program) Draft 2019-2020 Needham Science Center

Links and outlines to each lesson in the unit can be found on these google slides.			
Materials for Intro	Wrap Up		
Mystery Fossil Google Slides* https://docs.google.com/presentation/d/1fOwarjwMNBf NO5DdAQJYCqXMepasR2ipv47a0fy FpQg/edit#slide=id.p Bell for switching stations	Materials: 12 envelopes containing information about the mystery animal (to be distributed at conclusion)		
Room 1- MYSTERY FOSSIL TRACKWAY (Footprint Visual) Activity: Students observe a fossil trackway of mystery animal . Students measure their own foot and compare to mystery animal. Students can have time to freely explore the trackway and see what else they can figure out about the animal – was it running or walking, did it drag a tail, how tall might it have been, etc. Materials: Trackway of mystery animal Measuring tape and rulers Bird Foot Mystery animal foot photos Magnifier Duct tape (to secure trackway to floor)	Room 2: NURSERY Activity: Students observe videos of sea turtles hatching and birds caring for young in the nest Materials: Tablet/Chromebook with Turtle Egg Video Tablet/Chromebook with Bird Egg Video 4 turtle life cycle models Fossil nest photo 2 Bird nests Back-up materials: pictures of turtles leaving eggs and bird care (in case video does not load)TO MAKE Baby Birds http://viewpure.com/pGIDnyyR7xs?start=0&end=0 Baby Turtles http://viewpure.com/w82xpBR_Z4A?start=0&end=0		
Room 3: HATCHERY Activity: Students observe various reptile and bird eggs and compare them to the mystery egg fossil Materials: Magisope(2) Loupe Egg suitcase Snake egg Chicken eggs Real mystery animal egg fossil (2 pieces) Model of complete mystery animal egg fossil	Room 4: ANIMAL COVERINGS Activity: Students observe a photo of a feathered dinosaur tail encased in amber. Students compare different animal coverings and consider what covering mystery animal might have had Materials: Magiscopes(6) and hand lenses turkey feathers boa constrictor skin ball python shed rabbit fur 2 photos of feathered dinosaur tail in amber		

Grade 3 Survivor Lesson 14: Mystery Fossil (SC Program) Draft 2019-2020 Needham Science Center

Stage 1 – Desired Results

Key Standards:

3- LS 4-1 Use fossils to describe types of organisms and their environments that existed long ago and compare those to living organisms and their environments(addressed in program) *Recognize that most kinds of plants and animals that once lived on Earth are no longer found anywhere.(not addressed)*

Meaning Making: Students will understand and keep considering				
Understandings: Students will understand that	Essential Questions (Long Term and Topical):			
 Scientists use evidence to make claims and build their understanding of animals that lived long ago Birds, reptiles and dinosaurs have many similar characteristics Fossils are evidence of life long ago 	 How are birds and reptiles similar or different How can we use fossil evidence to learn about animals from the past? Why do scientists look at living organisms to learn about animals that lived long ago? 			

Knowledge and Skills

Skills/Performance: Students will be able to ...

- Students will be able to compare common characteristics of birds and reptiles to ancient animals
- · Ask questions about birds and reptiles and dinosaurs
- Record observations of evidence about birds, reptiles and fossils
- Discuss (by comparing and contrasting) birds, reptile and dinosaur characteristics
- Using evidence to back up their claim, students will discuss their hypothesis of the mystery animal

Stage 2 – Assessment Evidence

Performance Task or Other Key Evidence of learning (What will students understand and/or be able to do?)

- Students record observations of evidence of the mystery fossil
- Students participate in a science discussion about their observations

Stage 3 - Learning Activity

Prior to the lesson:

 For science center staff: This program has a lot of materials and requires about 20 minutes of set up time. In advance of the program, check with the teacher to see if there are any concerns with WiFi. This program can be done in an auditorium if Google Slide show can be displayed.

Dart 1	: Introduction (20 minutes)	Teacher Tins:
1	Explain or ask students what they have been learning about in	redener rips.
	science in the survivor unit. Explain that you will continue to learn about adaptations/organisms/ fossils that lived long ago in today's program.	- Set the room up with 3 stations at tables and one on the floor.
2. 3.	Review expected behavior (using google slides and poster) When discussing what it means to do science, explain today's goals- Use evidence to describe the characteristics of a mystery animal and Work like a paleontologist to observe and	- Before and during activity, emphasize the importance of handling
4.	Ask students, "How do Scientists know about life long ago?"	carefully. Some break
5.	Explain today's purpose – Students get a real life taste of what it's like to work as paleontologists. You will be researchers in a Paleontologist Laboratory trying to figure out characteristics about a mystery animal that was found at a dig site.	replace
6.	Scientists found the mystery fossil in Mongolia (in the Gobi Desert). They sent us pictures from the dig site and other artifacts to investigate. Your job is to compare the pieces of fossils and pictures of the mystery fossil to animals that are alive	
7.	We have set up 4 lab rooms. Your job is to spend a few minutes in each lab room, look at the evidence, and record your data the mystery fossil data recording sheets. Your teacher will assign you to your first lab room. Once you are assigned to a room, stay in that room until a teacher instructs you where to go pert	
8.	Review the location of each lab room and any rules about that room:	
Statio myste trackw many Static one al begini Statio shell - sampl	n 1; Trackway. Student's job is to measure their foot and the ry animal foot. After you do this, what else can you do at the way? Figure out animal's height, speed, weight, tail dragging, how animals, walk on 2 feet or 4 feet, etc. on 2: Nursery. Make sure to see both videos, one about birds and bout reptiles. If necessary, please scroll the cursor back to the ning of the show. n 3: Hatchery. We have 2 real pieces of the mystery animal egg - be sure to look at these under a Magiscope. We also have be bird egg pieces that you can look at under a magiscope. Use a	
hand myste	lens to examine the reptile eggs and the model of a complete ry animal egg. Keep all closed containers closed.	

Station 4: Animal Coverings. Look at a photo that shows a piece of the mystery animal's tail preserved in amber, which is a hardened liquid produced by a pine tree. Compare this photo to the real samples of animal coverings – scales, feathers, and fur. Which covering of an animal from today do you think most closely resembles the mystery animal's body covering?

1. Ask for any questions. Remind students that when they go to a station, they are to turn to the page on the data sheet that matches their station number.

Investigation of Lab Rooms (25 min.)

 Students visit each lab room and collect evidence for about 7 minutes per room. At each room, students fill out worksheet. Try to give students a 2 minute warning before the room switch.

Part 3: Wrap up (20 min.)

- 1. Have students sit in a circle.
- 2. Use Slide 9 (what did the clues tell you?) as a prompt to discuss evidence and observations from the laboratory rooms. ask students to make a claim. What are the characteristics of the mystery animal? What is your evidence?
- 3. If time allows, you can ask why did we learn about reptiles and birds? What is the relation to dinosaurs? Is it possible scientists ideas about dinosaurs will change? Why or why not?
- 4. Discuss whether this activity is similar to being a real paleontologist why/not.
- 5. Hand out mystery envelopes and let students read what scientists think about Oviraptor. They can discuss in pairs what they noticed and how their claims were similar/different to the scientists' claims.
- 6. Review today's goal and ask students to share a way they used evidence or something they learned.

Modifications (changes to the Core standard(s) and level of proficiency expected):	Accommodations (supports or instructional adjustments):

Extensions:

There is an optional written assessment for students to complete after this lesson to assess their ability to describe fossils and compare them to living things on earth today.

Lesson 15: Animal extinctions

Summary: Students watch a short Brainpop video about extinct and
endangered animals. They discuss the video and complete reflectionTime: 30-45 minutesquestions in their science notebook.Time: 30-45 minutes

Key Resources/Materials Used:

Science notebook pages: Lesson 15: Extinct and endangered animals and Wooly Mammoth (optional)

Lesson 15. Extinct and Endangered Animals:	Animal Extinctions: Wooly Mammoth (Optional extension)	Date
1. What does extinct mean?		Do you think it's a good idea to bring back the wooly mammoth? Why or why not?
2. What does endangered mean?		
	Wooly Mammoth (extinct) Elephant	
3. Why does it matter if an organism goes extinct?	This might sound like a science fiction story, but it's true. Scientists at Harvard are trying to bring the wooly mammoth back to life. The wooly mammoth is an extinct relative of the modern elephant. Wooly mammoths became extinct about 10,000 years ago.	Do you think a park in Siberia is a good habitat for the new wooly mammoths? Explain your thinking.
	With their thick, shaggy fur, wooly mammoths had adaptations for	
	living in cold areas. A huge change in their habitat, the end of the Ice Age, is partly responsible for the end of wooly mammoths. Wooly mammoths also went extinct because humans hunted them.	
4. How can humans help animals that are endangered?	Scientists want to use a procedure called cloning to allow elephants to have wooly mammoth babies. The new woolly mammoths will live in a park in Siberia, Russia.	
	Why Siberia? That's where scientists found many wooly mammoth remains under the ice. Modern day Siberia is very cold, and it has grasslands and forests. Scientists believe that ancient wooly mammoths ate grass and leaves.	
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*denotes material provided by teacher

Links and outlines to each lesson in the unit can be found on these google slides.					
Brainpop Video: Extinct and Endangered Animals Optional video (33 min) of how scientists know about asteroid impact					
Vocabulary card(optional): extinct					

Stage 1 – Desired Results

Key Standards:

3-LS4-1. Use fossils to describe types of organisms and their environments that existed long ago and compare those to living organisms and their environments. *Recognize that most kinds of plants and animals that once lived on Earth are no longer found anywhere.* (Not met)

Grade 3 Survivor Lesson 15: Animal extinctions Drafts 2019 - 2020 Needham Science Center

Meaning Making: Students will understand and keep considering				
Understandings: Students will understand that Essential Questions (Long Term and Topical):				
 all plants and animals live in habitats for which they are suited/adapted changes to habitats affects animals' and plants' ability to survive 	 Why do some living things go extinct? What happens to organisms when they cannot meet their needs? How do changes in habitats affect organisms that live there? 			

Knowledge and Skills

Skills/Performance: Students will be able to ...

- identify that fossils provide evidence or clues of life long ago •
- explain that many animals and plants that once lived on earth are now extinct.

 Stage 2 – Assessment Evidence

 Performance Task or Other Key Evidence of learning (What will students understand and/or be able to do?)

science notebook page Extinct and Endangered Animals •

Stage 3 - Learning Activity

Prior to the lesson:

preview the video and any optional videos _

1.	Refer to Lesson 14. Explain that the mystery animal(oviraptor) no longer exists on Earth, which is called extinct. You can show the vocabulary card and refer students to the glossary at the end of th student tnoebook.	Teacher Tips: Before showing the video,
2.	You can ask: are there other animals or plants you know that went extinct? (e.g dinosaurs, saber toothed tiger, wooly mammoth) Why do you think they went extinct?	consider discussing with students how the thought
3.	Show the video: Brainpop Video: Extinct and Endangered Animals	upsetting, especially when
4.	Consider stopping the video at 2 min 15 second and review what students noticed and questions they might have about extinction.	caused by people.
5.	During or after the end of the video, review- What does the video have to do with what we learned about changing habitats? Why is it important to know about extinction and endangered animals? Is there anything people can to do prevent extinction of animals?	
6.	Students can complete their science notebook page: <i>Extinct</i>	
7.	To wrap up the lesson, you can talk about how students will continue to think about how changes to habitats may affect the	

organisms that live there. They will be designing an imaginary animal and think about how they are adapted to the habitat. You can also talk about animals that have NOT gone extinct why is that? (.e.g. isopods have been on Earth for millions of years, despite changes to habitats. Why do you think they have survived and not gone extinct?)	
survived and not gone extinct?)	
	organisms that live there. They will be designing an imaginary animal and think about how they are adapted to the habitat. You can also talk about animals that have NOT gone extinct why is that? (.e.g. isopods have been on Earth for millions of years, despite changes to habitats. Why do you think they have survived and not gone extinct?)

Modifications (changes to the Core standard(s) and level of proficiency expected):	Accommodations (supports or instructional adjustments):

Extensions:

- World Wild Life Fund has an extensive <u>teacher resource</u> on endangered animals.

Students can read about various endangered animals and kid friendly steps they can take to help them

- Reading and writing reflection in science notebook: Animal Extinctions: *Wooly mammoth*
- Optional video (33 min) of how scientists know about asteroid impact

Lesson 16: Assessment- Design an animal

Summary: Students apply what they have learned about animals, adaptations, animal classification, and changes to habitats. They design their own imaginary animal and share their designs. They are then given a change to the habitat and must determine what will happen to their imaginary animal. Teachers can choose how much time to spend on the project and what the final product will be (e.g.drawing, poster, presentation, green screen).

Time: 2-6 30 minutes sesssions, depending on teacher choice

Key Resources/Materials Used:

Science notebook pages: *Lesson 16: Design an animal* (7 pages) and Habitat Change assessments (optional)







Brainstorming Questions						
1.	My organism is about the same size as a:					
2.	What will your organism eat?					
3.	How will it survive the winter?					
4.	How will it survive the summer?					
Does your animal fit into one or more of these categories? Circle Yes or No Mammal Bird Invertebrate Fish Reptile Amphibians for if use circle which one from should and evolution why:						
Ма 6а.	mmal Bird Invertebrate Fish Reptile Amphibians					
6a. 6b.	mmal Bird Invertebrate Fish Reptile Amphibians If yes, circle which one from above and explain why					
Ma 6a. 6b. 7.	mmal Bird Invertebrate Fish Reptile Amphibians If yes, circle which one from above and explain why					

Grade 3 Survivor Lesson 16: Assessment. Design an animal Draft 2019 - 2020 Needham Science Center



*denotes material provided by teacher

- Habitat backdrop posters (tropical rainforest, temperate forest, ocean, freshwater, arctic, desert)			
 paper/drawing tools for students to create project or technology (such as green screen) 	Habitat Change cards (lesson 8)		

Stage 1 – Desired Results

Key Standards:

3-LS4-2. Use evidence to construct an explanation for how the variations in characteristics among individuals within the same species may provide advantages to these individuals in their survival and reproduction. 3-LS4-3. Construct an argument with evidence that in a particular environment some organisms can survive well,

some survive less well, and some cannot survive.

3-LS4-4. Analyze and interpret given data about changes in a habitat and describe how the changes may affect the ability of organisms that live in that habitat to survive and reproduce.

Meaning Making: Students will understand and keep considering					
Understandings: Students will understand that	Essential Questions (Long Term and Topical):				
 all plants and animals have adaptations(characteristics) that help them survive all plants and animals live in habitats for which they are suited/adapted changes to habitats affects animals' and plants' ability to survive 	 How do animals and plants survive? What are characteristics that help animals survive in their current habitats? How do habitats change? How do changes in habitats affect organisms that live there How can we classify living things? 				

Grade 3 Survivor Lesson 16: Assessment. Design an animal Draft 2019 - 2020 Needham Science Center

Knowledge and Skills

Skills/Performance: Students will be able to ...

- · create an animal that has adaptations to survive in a specific habitat
- explain how the animal fits into a certain classification (e.g. mammal, bird, fish, etc)
- identify how a change to the habitat will affect the animal

Stage 2 – Assessment Evidence Performance Task or Other Key Evidence of learning (What will students understand and/or be able to do?)

- Students design an animal for a certain habitat. They choose body parts and behaviors to act as adaptations to match the habitat. They write/show/explain how the organism is suited to their environment and help it survive.
- Students discuss how a change in the environment would affect their invented organisms' ability to survive.

Stage 3 - Learning Activity

Prior to the lesson:

Choose if you would like students to work independently or in groups to design an animal on _ the performance task.

Part 1	: 30 minutes	Teacher Tips:
1.	Explain that students will now apply what they have learned about animal adaptations, basic animal classification, habitats and how changes in a habitat can affect organisms that live there.	
2.	Students observe their science notebook and/or post the page "Design an Animal" overview. Explain that students will be able to decide certain characteristics of an animal that would be alive on earth today. They can determine -its habitat -its adaptations for the habitat	
	-other adaptations	
3.	You can show the posters for the habitats and the brainstorming questions (e.g. what will it eat? how will it survive the seasons? What is the animal's classification?)	
4.	Emphasize that students must be thinking like scientists and only creating parts of an animal that will help it survive. You can give some examples of animals that wouldn't survive in their habitat (e.g. a flying bird with a pointy spike that lives in the ocean) or have students think of some examples.	
5. 6.	You can assign habitats or have students choose them. Students work on the brainstorm sheet and record adaptations for the animal. (Students are given a menu of characteristics (e.g. body covering, number of legs, cold blooded, etc). You can decide if you want to limit their choices to this menu or let them choose other adaptations.	

Part 2: 30-45 minutes	
1. Check in with students on the animals they are thinking about. Note:	
Guide them to be scientific in their decisions- they have to create an	
animal that exists on earth today and would be able to survive in the	
habitat.	
2. Students continue working on designing their animal and plan for the	
final product	
Part 3: 30-45 minutes	
1. Students work on project. Continue to check in with them to provide	
guidance.	
Part 4: 30-45 minutes	
1. Students share their project. Students can form groups with other	
students who had the same habitat and do a quick presentation of	
their animals. They can put their pictures onto habitat backdrop as	
they present.	
Part 5: 30-45 minutes	
1. Explain that as we learned in this unit, many times there can be	
changes to an animal's habitat that will affect their ability to survive!	
-Option 1: Show students the habitat cards from Lesson 8. You can	
choose a card for them, or they can choose at random.	
Students discuss what would happen to organism, either in small	
groups or in a large group.	
-Option 2: Pass out copies of "Who will survive?" Students choose an	
environmental change(drought, blizzard, flooding) and describe how	
their organisms may or may not survive.	

Modifications (changes to the Core standard(s) and level of proficiency expected):	Accommodations (supports or instructional adjustments):

Extensions: