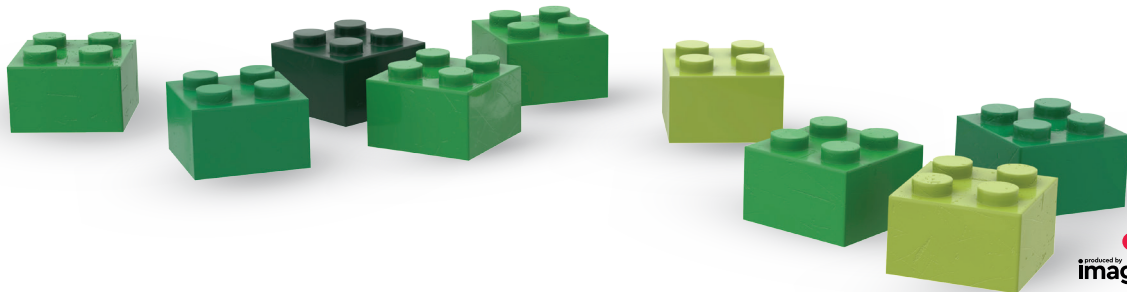




Sean Kenney's
**NATURE
CONNECTS**®
Made with LEGO® bricks



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exhibitions

Educator Guide



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Introduction to the Exhibition

Sean Kenney's Nature Connects Made With LEGO® Bricks focuses on the gentle beauty of nature, its interconnections, and the network of relationships that bind plants, insects, animals, and their natural environments. Some of these relationships are mutually beneficial, or symbiotic, and some are for the survival of individual species which makes this a great starting off point to discuss many science topics. Animals have connections with their families just like we do, and people, as animals, have a connection with nature and play a role in shaping it. In this exhibition, students will see that they are a part of nature and that they make an impact on the natural world.

Sean Kenney's Nature Connects Made With LEGO® Bricks helps students appreciate nature and inspires them to create something wonderful. Sean Kenney's Nature Connects Made With LEGO® Bricks is both artistic and educational, aiming to draw attention to nature and the world around us in a way that is true to artist Sean Kenney and to the essence of the subject matter.



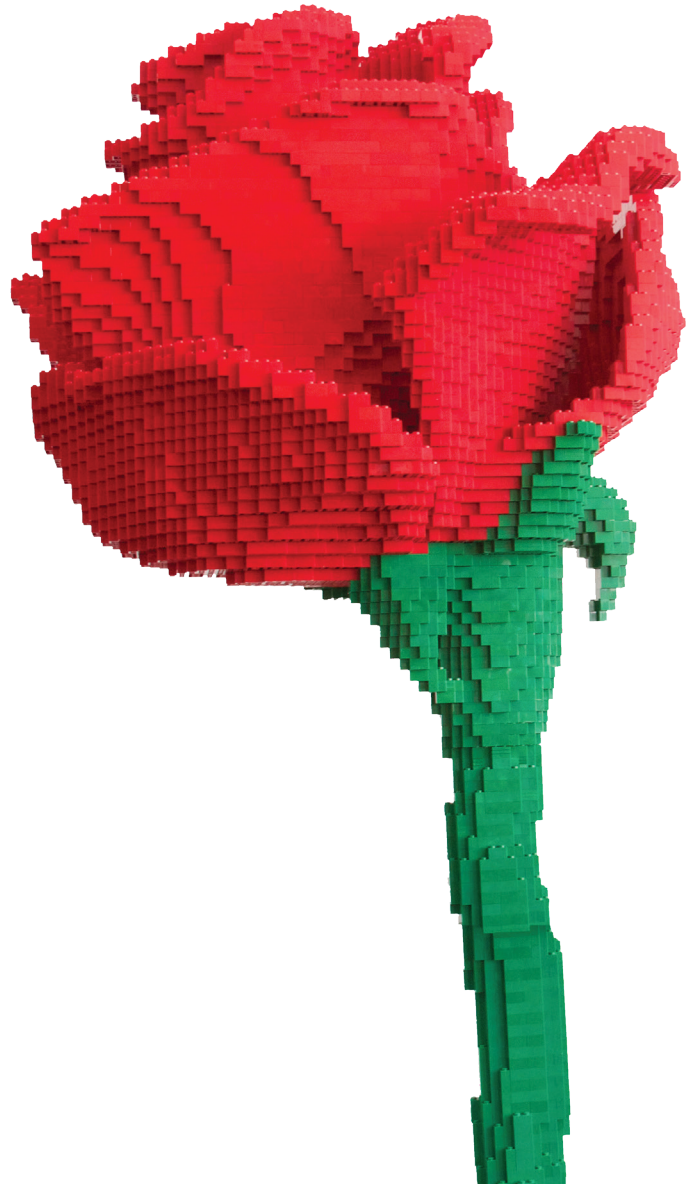
About this Guide

The guide is composed of ten activities including two design challenges that embody the ideals of STEAM and are aligned with the Next Generation Science Standards. These lessons and activities bridge the learning from the exhibition to the classroom.

Five of the activities cover a variety of 3rd to 5th grade performance expectations and five of the activities cover a variety of 6th to 8th grade performance expectations, so teachers can choose which activities are best aligned with their curriculum and which best fit their students' needs and interests.

Activities

There is a 3rd to 5th grade and a middle school activity for each of the main sections in the exhibition. Some of the activities should be done at the exhibition, but most are either an introductory or follow-up activity designed to enhance and expand students' experience with Sean Kenney's Nature Connects Made With LEGO® Bricks.





Endangered Animals

Activity: Way of the Dodo? NO! Students participate in an activity where they learn how to fish sustainably so they can help prevent future extinctions.

Grade Level: 4th

NGSS Standard: 3-LS4-4 Make a claim about the merit of a solution to a problem caused when the environment changes and the types of plants and animals that live there may change.

Materials:

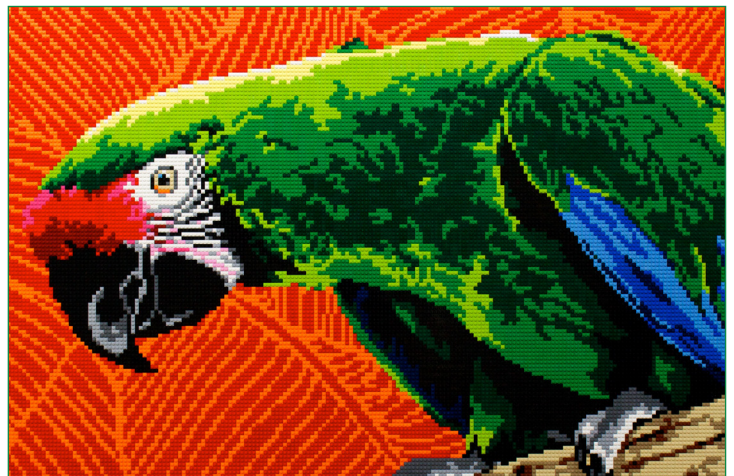
- ✓ One sandwich-sized bag of plain popped popcorn per group
- ✓ One sandwich-sized bag of oyster crackers per group
- ✓ One sandwich-sized bag of Goldfish® crackers per group
- ✓ Small cups, one per student
- ✓ Large mixing bowls, one per group
- ✓ Plastic or metal teaspoons, one per student
- ✓ Ladle, one per group
- ✓ Tongs or chopsticks, one set per group

Description

1. In the endangered species section of **Sean Kenney's Nature Connects Made With LEGO® Bricks**, students will learn about how certain animals were hunted to extinction. When you return to your classroom, discuss with students why those animals went extinct, if there was anything people could have done differently, and if people are still hunting animals to extinction.
2. Tell students that they are going to pretend to catch fish to feed their families.
3. Divide the class into five groups. Each group will fish one of the oceans (Arctic, Atlantic, Indian, Pacific, or Southern).
4. Give each group one bowl. Give each student one cup and one spoon. In each bowl, pour 60 Goldfish® crackers, 40 pieces of popcorn, and 40 oyster crackers. These represent ocean life. The target fish are the Goldfish® crackers; other fish catch are the popcorn; and the oyster crackers are the by-catch such as sea turtles.



5. Tell students that they will have 20 seconds to fish by using their spoons to catch fish out of the bowl and place in their cups. They should try to catch only as many of the target fish as they can, but they do not need to avoid catching the other fish in the bowl. When they are all ready, say, “Commence fishing,” and start a 20-second timer.
6. Have each student record the number of each type of fish they caught: target fish, other fish, and by-catch. Ask them to subtract that number from the original amount in the ocean to determine how many fish remain. Have them replenish the ocean (bowl) by adding in one of each type of cracker for all the crackers that remain in the ocean. This represents a reproduction cycle.
7. Repeat Steps 5 and 6, but give a ladle to one student in each group to use for fishing.
8. Repeat Steps 5 and 6 one more time and give tongs to one student in each group to use for fishing.
9. Discuss the results as a class. How many of each type of fish are left? How many fish do they need to feed their families? What will they do with the remaining fish? Ask them what they might do differently to prevent the oceans from being depleted.
10. Have each group brainstorm ideas on how they can all fairly and equitably fish the oceans for year and years.
11. Restock the oceans with 60 Goldfish® crackers, 40 pieces of popcorn and 40 oyster crackers, and have students go through the activity again, but this time they should avoid overfishing, so the oceans remain stocked with fish.
12. As a class, discuss the ideas that groups tried and the results. Ask students to discuss how this may or may not apply to fishing in the real world.





Endangered Animals

Activity: Saving the Species In groups, students choose an endangered species and create an ad campaign that explains what is causing the animal to go extinct and what steps we can take to help prevent their extinction.

Grade Level: 6th to 8th

NGSS Standard: MS-LS2-5 Evaluate competing design solutions for maintaining biodiversity and ecosystem services.

Materials:

- ✓ Internet connection
- ✓ Art supplies (markers, glue, colored paper, etc.)

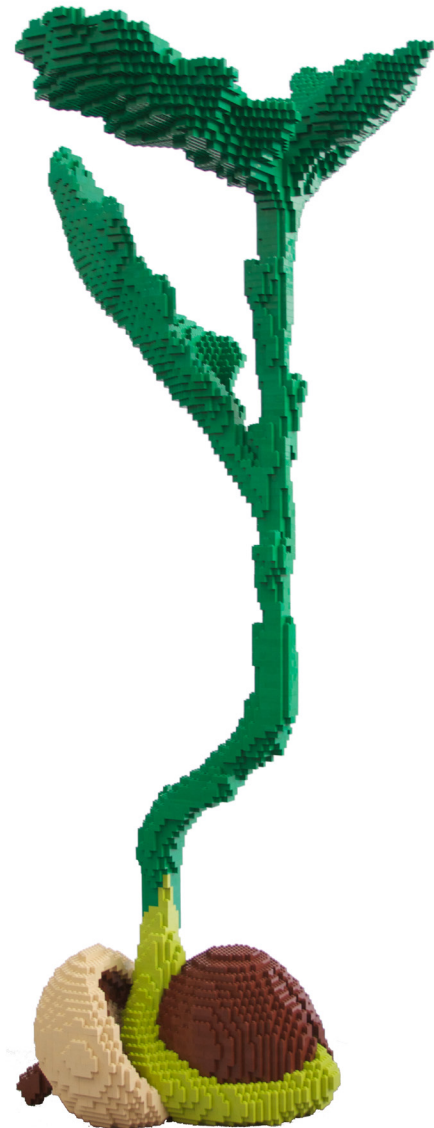
Description

1. Before visiting **Sean Kenney's Nature Connects Made With LEGO® Bricks**, ask students what animals have gone extinct and why. Ask them what animals are currently endangered and why. Write responses on the board. Record and save responses.
2. After visiting the Endangered Species section of **Sean Kenney's Nature Connects Made With LEGO® Bricks**, ask students what they learned about endangered species. Add in the new details to the recorded responses from the board, focusing on causes and solutions.
3. Put students in groups, and tell them they are each going to research one of the 10 most endangered species on Earth and make a campaign that informs the public about this animal and what the public can do to help.





4. Have groups choose one of the following animals to research:
 - Tiger
 - Polar bear
 - Pacific walrus
 - Magellanic penguin
 - Leatherback turtle
 - Bluefin tuna
 - Mountain gorilla
 - Javan rhinoceros
 - Giant panda
 - Monarch butterfly
5. Tell groups they need to identify the following aspects about their animals:
 - Population
 - Where it lives
 - What it eats
 - Reason it is endangered
 - What steps we can take to stop them from becoming endangered
6. Each group then creates a presentation (it can be a poster, play, video, sculpture, or anything that addresses the criteria).
7. After all the presentations, have groups discuss if there were any actions that overlapped. As a class, come up with a plan for what you are going to do to help these animals.





Endangered Animals

Activity: Climate Effects on Animals Students create animals that are perfectly suited for one climate and then make predictions about how that animal would survive in a different climate.

Grade Level: 3rd

NGSS Standard: 3-LS4-3. Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all.

Materials:

- ✓ Images of animals living in different habitats (one for each group). For example, an image of animals living in the desert or in the tundra or in the rainforest.
- ✓ Coloring materials, paper, and scissors.

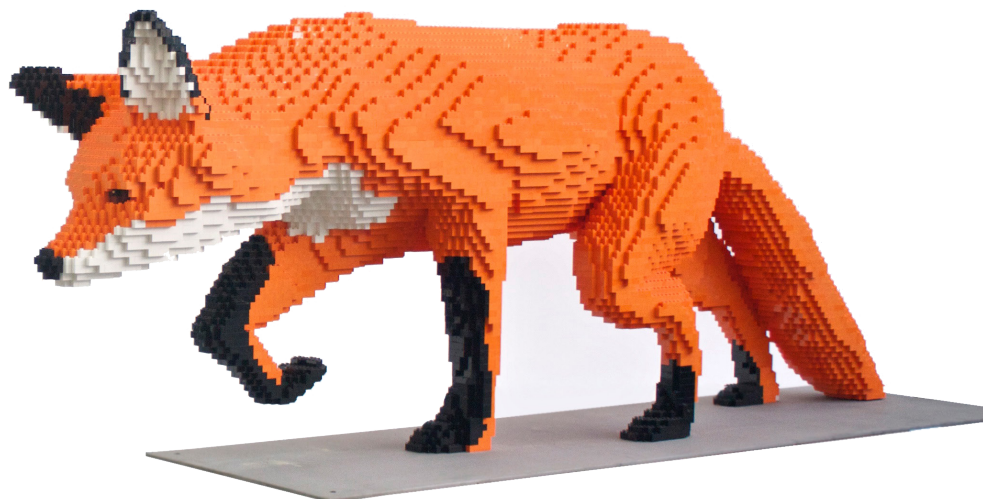
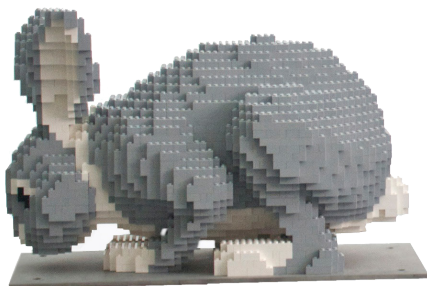
Description

1. In the endangered species section of **Sean Kenney's Nature Connects Made With LEGO® Bricks** have students look for the causes of why species go extinct. When you return to class, discuss some of the causes of extinction.
2. Ask students to discuss why certain animals live in certain areas. To get them thinking, ask them why polar bears don't live in the rain forest. List their answers on the board. Encourage them to think of things like the temperature, the types of food available, and how animals are camouflaged with the environment.





3. Have students draw, color, and cut out a creature that is ideal for their environment based on their completed tables. On the back of their creature drawings, they should write in other details about the animal like what it eats.
4. Have students trade their images with another group and place their creature in that habitat. Have students discuss how well their creature would survive. Be sure students read the table on the back of the image for more information. Does the creature have food to eat? Is it camouflaged in that environment? Have groups discuss what features of their creature would or would not fit in well with the new environment.
5. As a class, have students discuss their observations. Were there any creatures that would survive in different habitats? Why or why not?
6. Ask the class what climate change means and how it relates to this activity. Discuss with students that due to changing temperature, the habitats of various animals are changing, and they are no longer able to survive. This is causing many species to become endangered and extinct.
7. Discuss with students ways they can mitigate the effects of climate change.





Endangered Animals

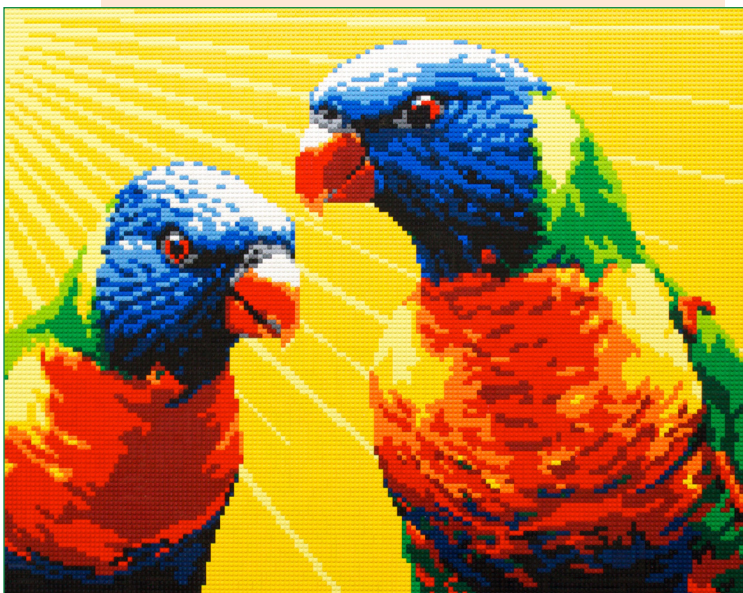
Activity: Building the Perfect Habitat Students design and draw a poster of a habitat that is best suited for a specific animal. Students try to determine which animals are the best fit for each environment.

Grade Level: 6th to 8th

NGSS Standard: MS-LS2-1 Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem.

Materials:

- ✓ Internet connection
- ✓ Art supplies (markers, glue, colored paper, etc.)
- ✓ Sticky notes



Description

1. While visiting Sean Kenney's Nature Connects Made With LEGO® Bricks, ask students to look for the different features in different habitats. For example, what are the difference between where various animals live? Are the plants or temperatures the same?
2. Ask students to describe what is required for an animal to live. What do they need to eat, what kind of shelter do they need, what are the other factors that they need to survive?
3. Assign each student one of the following animals (or choose four of your own). There should be four to five students per animal.
 - Bald eagle
 - Brown bear
 - Fox
 - Alligator



4. Tell students that they are going to design a habitat that is perfect for their animal, but first they need to research exactly what that animal needs to thrive. Have students research their animal and create a list of all the conditions that are perfect for them.
5. Have each student design and draw a poster of the ideal habitat for their animal. The poster should be as detailed as possible without using any words.
6. As a class, make a chart on the board with a column for each of the four animals (bald eagle, brown bear, fox, and alligator). Ask each of the students who researched the bald eagle to list one characteristic of a habitat that is perfect for bald eagles, and write it on the chart. Repeat the same process for the other animals.
7. Have students put their posters up randomly around the room and pass out four sticky notes to each student. Have the students write the name of each of the animals on the sticky notes.
8. Have students walk around the room and put a sticky note on the poster they think is best suited for that animal based on their prior knowledge and the information on the board.
9. Have students collect their posters, and put students in groups based on the animal they had (for example, all of the brown bears are together) and have them discuss their results. Why was one poster chosen more than others? Why were other animals chosen or not to live in the environment?
10. Come back together as a class, and discuss the group's findings. What were the similarities and difference in the habitats? Were there some animals that could live in multiple habitats but others that couldn't? Have this lead into a discussion on ecosystems and how all the parts of an ecosystem are dependent on each other.



Balance of Ecosystems

Activity: Balancing Predators and Prey Students simulate how the population of predators and prey are interconnected.

Grade Level: 3rd

NGSS Standard: 3-LS4-3 Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all.

Materials:

- ✓ Large poster board
- ✓ Magic marker
- ✓ Graph paper



Description

1. When visiting Sean Kenney's Nature Connects Made With LEGO® Bricks, have students spend extra time in the Balance of Ecosystems section. While in this section, ask them what an ecosystem is and what it means to have a balanced ecosystem. Have students read through the exhibition for information.
2. After returning to school, ask students to share what they know about ecosystems and balanced ecosystems. Write responses on the board.
3. Ask students what the terms "predator" and "prey" mean, and ask for some examples. Ask students if and how the populations of these animals are connected. Tell students they are going to go outside and simulate what it's like in the wild!



4. Count students off from One to Four. Separate the Ones from the Twos, Threes, and Fours and have them line up facing each other about 20 yards apart. Tell the Ones that they are the wolves, or predators, and the Twos, Threes, and Fours are the deer, or prey.
5. On a large poster, record the number of prey and predators.
6. The goal for the deer is to run to the side where the wolves are without getting tagged. The goal for the wolves is to tag the deer. Tell students to be careful then have the wolves try to tag the deer before they get to the other side.
7. If a deer is tagged, it is considered eaten by a predator then that student becomes a wolf for the next round. If a wolf does not tag a deer, it has starved to death and becomes a deer in the next round.
8. Repeat this process for five or six rounds, recording the populations each time.
9. Go back to class, and have students graph the data from the poster.
10. Discuss the trends, and ask students why the populations of both deer and wolves were always going up and down. If the deer population got too high, then more wolves would survive and bring the deer population back down. Talk to students about how this is an example of a balanced ecosystem where one species needs to stay in balance with another for its own survival.



Balance of Ecosystems

Activity: Balancing a Web Students compare and contrast a food web to a food chain to see how the diversity of plants and animals create a balanced ecosystem.

Grade Level: Middle School

NGSS Standard: MS-LS1-6 Construct a scientific explanation based on evidence for the role of photosynthesis in the cycling of matter and flow of energy into and out of organisms.

Materials:

- ✓ One arm's length of yarn per student
- ✓ Computer access (optional)

Description

1. Before visiting Sean Kenney's Nature Connects Made With LEGO® Bricks, ask students to define these terms: ecosystem, balanced ecosystem, food web, and food chain. Write and save their responses.
2. While visiting the exhibition, ask students to think about their definition of a balanced ecosystem and see if there are any clues in the exhibition that confirm or enhance their understanding of the term.
3. When you've returned to your class, have students share their new ideas.





4. Ask students to describe a food chain. Ask for an example with three links in it, plants and animals, for example: grass → rabbit → fox. Use any food chain that you think your students will understand. Remind students that in a food chain, the flow of energy from one organism to another must always be followed. Have three students volunteer to be the food chain by lining up in a row and holding the yarn between them to show the flow of energy. One piece of yarn will connect the grass to the rabbit, and one piece will connect the rabbit to the fox.
 5. Have the student who is the rabbit leave the chain, and ask students what happens to the grass and fox when all the rabbits die? Students will say things like the foxes will also die or they will need to find something else to eat. Ask students what else the fox could eat, and when a student answers, ask that student to go to the front of the room and connect the yarn from where that animal gets its energy to where its energy goes. For example, a student could say foxes also eat birds, so that student would go to the front of the room as a bird and connect with a new piece of yarn to the fox.
- You would then ask what the bird eats, and ask a volunteer to come up as, for example, a worm. They would connect to the bird with a new piece of yarn. The rabbit can rejoin the web and link back to the fox and the grass.
6. Ask students to think of other plants and animals that either eat or are eaten by the plants and animals in the food web so far. As more students join the web, they will attach to the web with new pieces of yarn. Challenge the class to have everyone join the web by thinking of a plant or animal that is connected to this food web. Ask probing questions like what eats a fox or from where does the grass get its energy.
 7. Once everyone in the class has joined the web, have the student who is a rabbit step away again, and ask what happens to the food web. Ask if this web seems more stable than the original food chain.
 8. Discuss with students how diversity in ecosystems helps keep the ecosystem strong, and ask students to enhance their definition of a balanced ecosystem.



Our Connection to Nature

Activity: Stopping the Runoff! Students will model where runoff drains and will evaluate how to mitigate the effects of pollution.

Grade Level: 3rd to 5th

NGSS Standard: Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.

Materials:

- ✓ Two sheets of plain scrap paper per student
- ✓ Spray water bottle
- ✓ Water-based markers (blue, brown, red, green, and black)
- ✓ Green permanent markers
- ✓ Paper clips, clay, or aluminum foil

Description

1. While in the Our Connection to Nature section of **Sean Kenney's Nature Connects Made With LEGO® Bricks**, have students try to identify the impacts and the relationship between humans and the environment.
2. After returning to school, ask students how humans use the environment. After students respond, ask what effect those practices have on the environment.
3. Tell students that they are all now going to model how humans impact our water supply. Have students loosely crumple up one piece of paper each and then flatten it out on their desk. This paper will be their map of a beautiful countryside.
4. Have students draw, with the blue marker, where they think the low points are on the crumpled sheet. This is where the water will drain when it rains, and it will represent our rivers. Have them trace the high points with the green permanent marker. Then have them use the green permanent marker to draw trees and grass as their countryside.





5. Tell students they need to build farms for food. Students should draw a handful of farms on the map with the brown marker.
6. Tell students that with all this food, they'll need a landfill, factories, and houses. Have the students draw in factories and landfills in red and houses in black.
7. Ask the students to predict what's going to happen when it rains. Take the spray bottle, and spray each map. Have students observe and describe what they see.
8. Discuss as class what happened to the water supply. Why is it so contaminated with other colors? Why didn't the green get into the water?
9. Have students crumple up their second paper and flatten it back out. Tell them that they are going to redo this experiment, but this time they need to try to keep all the pollution out of the water.
10. Give students additional tools like paper clips, clay, or aluminum foil and have them discuss how to use these to reduce pollution in their watershed. Students should also focus on where they are putting the farms and factories.
11. Spray the new maps with water and have students compare the results from the first maps.





Our Connection to Nature

Activity: Green Space Redesign Challenge Students brainstorm ways in which they can increase the biodiversity of their schoolyard that will also improve how they enjoy the space.

Grade Level: Middle School

NGSS Standard: MS-LS2-5 Evaluate competing design solutions for maintaining biodiversity and ecosystem services.

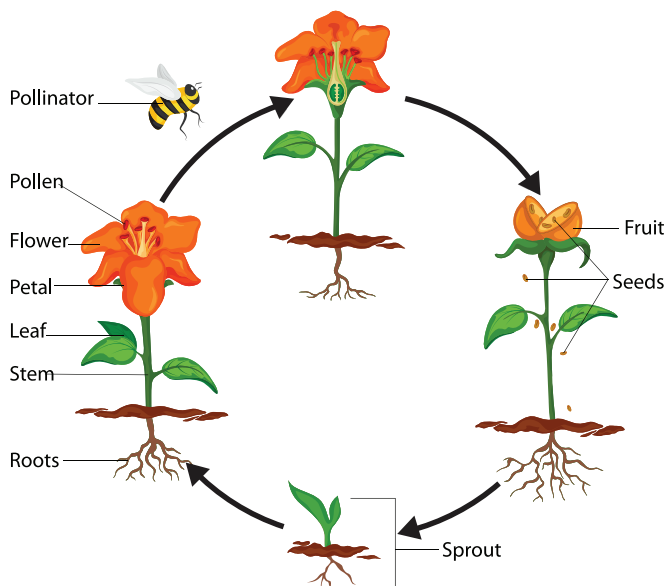
Materials:

- ✓ Art supplies (paper, glue, markers, toilet paper rolls, pipe cleaners, etc.)
- ✓ Computer (optional)

Description

1. While in the Our Connection to Nature section of **Sean Kenney's Nature Connects Made With LEGO® Bricks**, have students identify the relationship between humans and the environment and the impacts of that relationship.
2. Ask students to brainstorm things that make an ecosystem thrive. Be sure to discuss the role of both biotic and abiotic factors and the importance of biodiversity on the health of an ecosystem.
3. Ask students to share what they like about nature and being outside.
4. Tell students that often people are concerned about the negative impacts humans have on the environment, but humans are a part of the ecosystem. We can take steps to support the ecosystem while also cultivating a space that will be more enjoyable for us.

Pollination





5. Each group needs to come up with at least five new features that will both increase biodiversity and make the space more fun for students. Some ideas to share with students to get them thinking could be planting a garden. This increases the types of plants and attracts pollinators while also providing hands-on learning activities and fresh food for students. Adding in bird feeders will attract more types of birds and also allow students to learn the different types of birds that visit the feeder. Students can be as creative as they want, but each group needs to come up with at least five ideas and explain how they are both increasing biodiversity and the students' quality of life.
6. Once groups have come up with their five ideas, have them make a model of their schoolyard redesign using the art supplies.
7. Have each group present their models to the class, and as a class, pick a handful of ideas that are plausible, and implement them at your school.

