

Sample Pages from

Teacher Created Materials
PUBLISHING

Created *by* Teachers *for* Teachers and Students

Thanks for checking us out. Please call us at 800-858-7339 with questions or feedback, or to order this product. You can also order this product online at www.tcmpub.com.

For correlations to State Standards, please visit
www.tcmpub.com/administrators/correlations

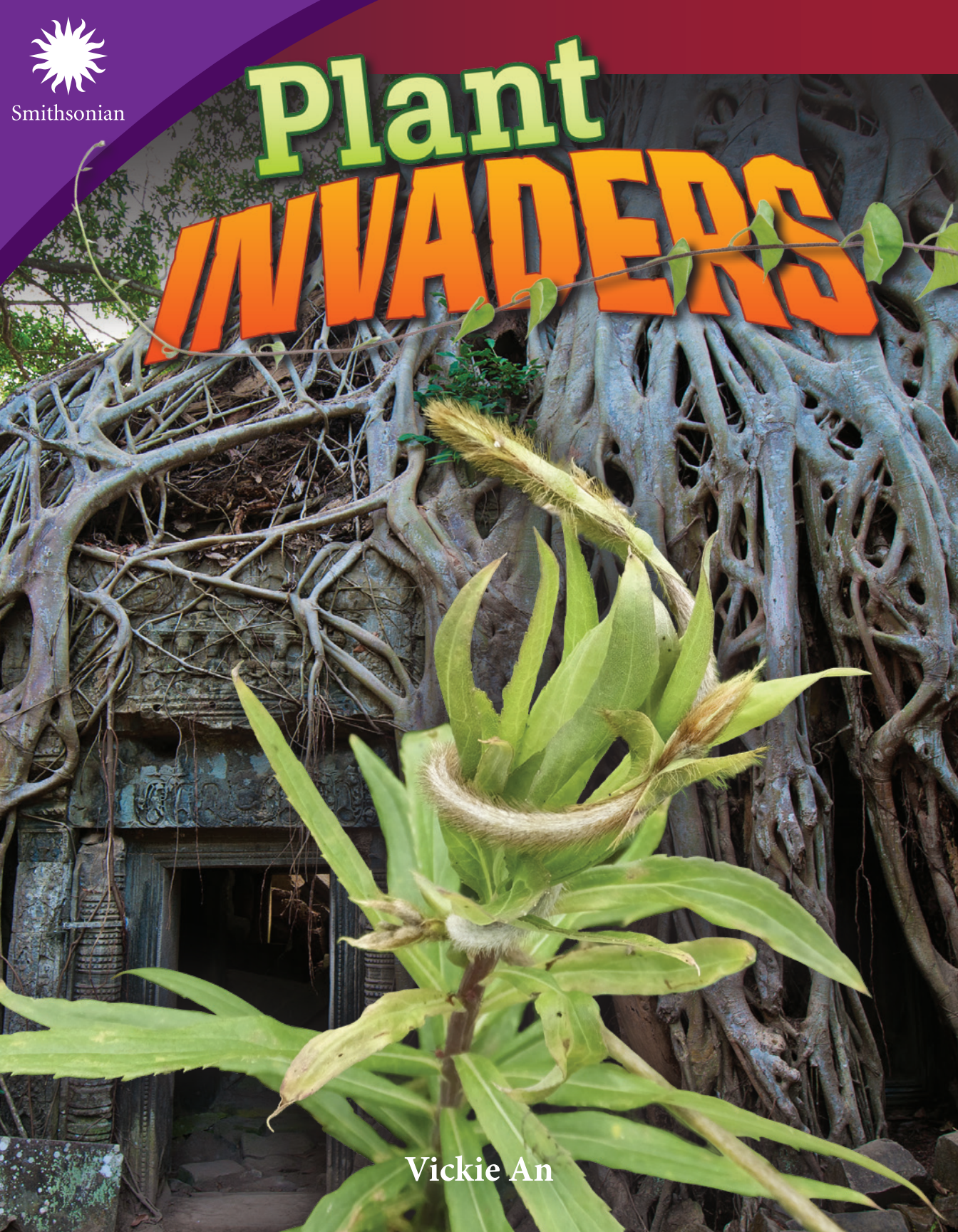
To Create a World ⁱⁿ which
Children Love to Learn!

800-858-7339 • www.tcmpub.com



Smithsonian

Plant INVADERS



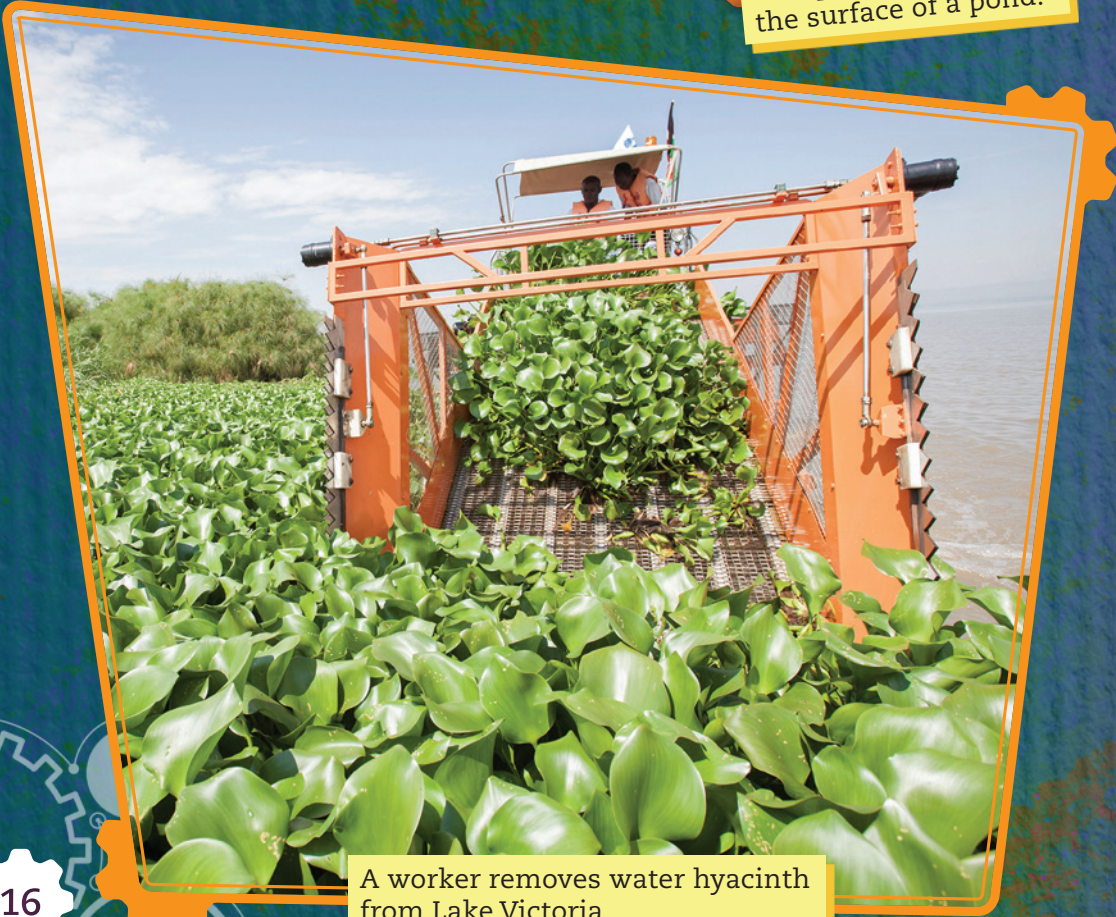
Vickie An

In addition to harming food webs and spreading wildfires, some invasive species clog rivers and canals too. These floating plants form a thick layer on the surface of water. If left unchecked, waterways can become blocked, which affects people who rely on these sources of water.

Thick blankets of water hyacinths also attract insects. Certain insects, such as mosquitos, can't **breed** in fast-moving streams and rivers. Water hyacinths slow the flow of water. This gives insects the perfect place to lay eggs. And mosquitoes do more than bite. They also spread harmful diseases. More of these bugs mean more mosquito-borne illnesses.



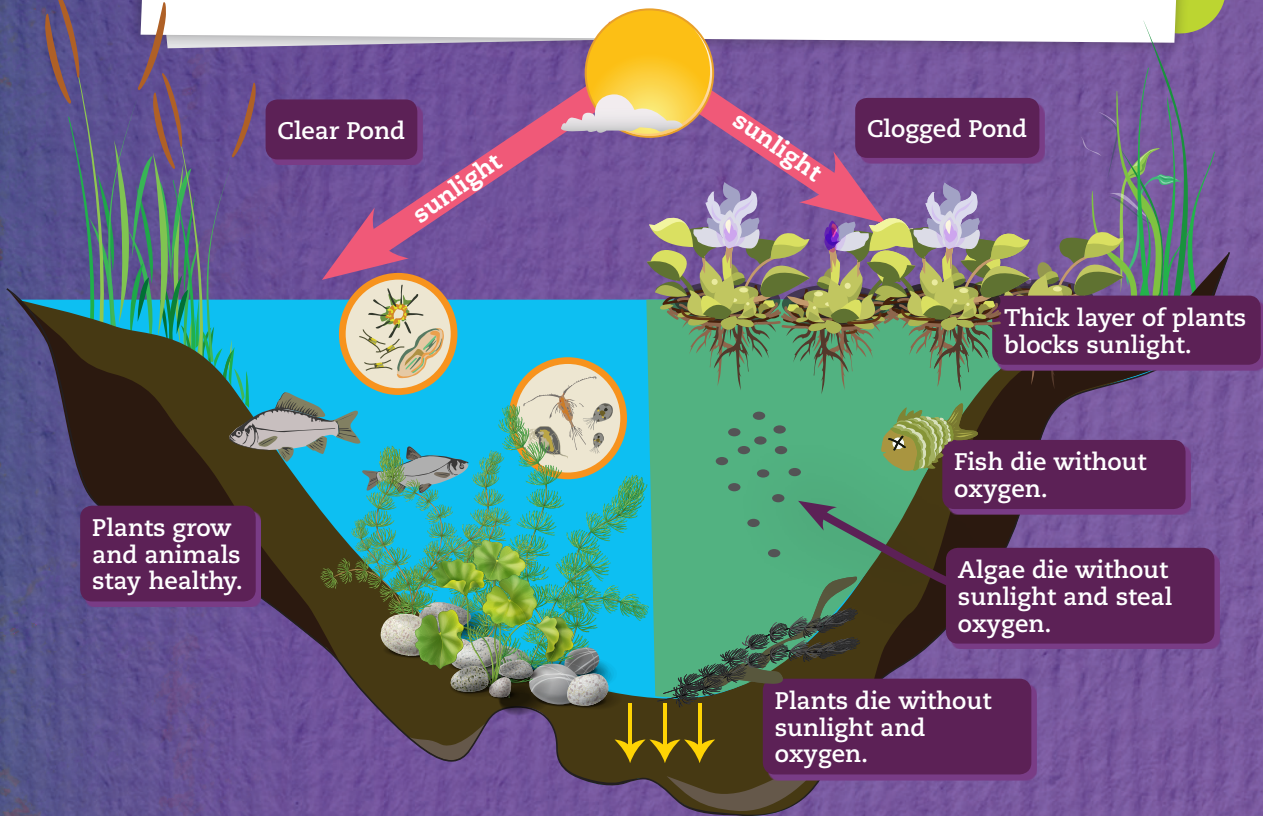
Mosquito eggs float on the surface of a pond.



A worker removes water hyacinth from Lake Victoria.

Heavy growth affects environments below the surface as well. As a plant spreads, it blocks sunlight and causes plants beneath it to die. The decaying process of dead plants removes oxygen from water. All living things need oxygen to live. So without it, fish and other water animals die.

Water hyacinths are pretty, but they can be a **menace**. And, as with most invasive species, they are difficult to get rid of. How so? You can't kill a water hyacinth by cutting it into pieces—each part will just reproduce into a new plant!



MATHEMATICS

Predicting Invasions

Fighting invasive plants is pricey. In the United States, the cost can add up to more than \$120 billion each year! Luckily, scientists have built a plan to help save money. They can use **data** to predict how a new species will fit in an ecosystem. Knowing that, future invasions can be managed or even stopped.



Fighting Back


Luckily, people are becoming more aware of invasive species. And they are fighting back! One way people can help is by joining local groups that teach the public about the harmful effects of certain plants. Volunteers are taught how to spot enemy weeds in their communities. This can be a tough task, though. Some invasive species can look very much like native **flora**. So, it is important to pay close attention!

People can also help by learning how to control the growth of invasive plants. Removal can be tricky. Sometimes, mowing can be enough. Other times, pulling plants from their roots is the only way to get rid of them. **Herbicides** (UHR-buh-sides) can also work in some cases. But with any method, people have to be careful. If people don't do it correctly, they can end up spreading more seeds.


The list of invasive plants gets longer every day. There is a lot of work to be done. But many people are making a difference in their neighborhoods. Volunteers pull thousands of pounds of invasive plants from their areas each month. They plant native species to take their place.



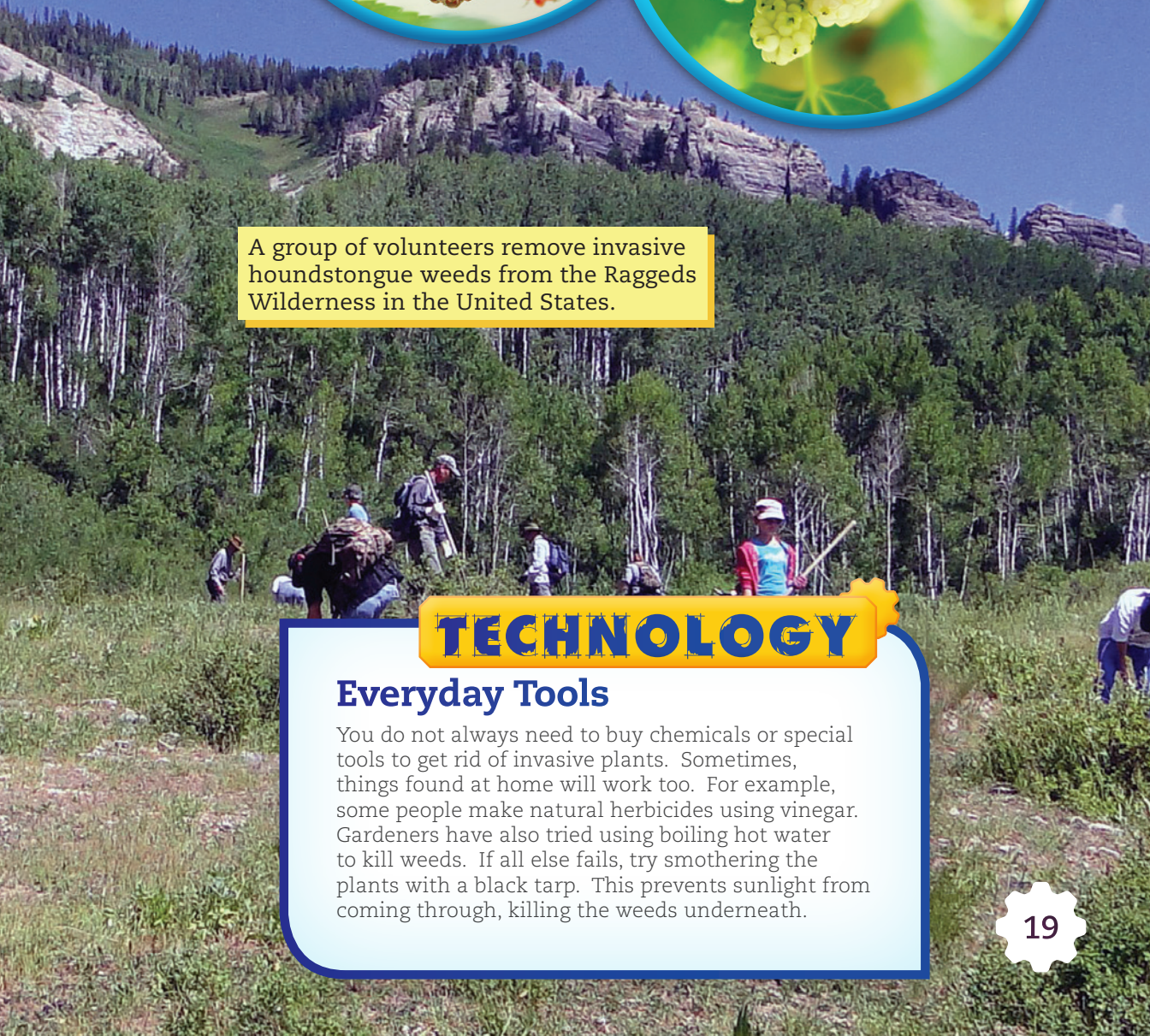
Scientists study and record data about an invasive plant.



U.S. native
red mulberry



U.S. invasive
white mulberry



A group of volunteers remove invasive houndstongue weeds from the Raggeds Wilderness in the United States.

TECHNOLOGY

Everyday Tools

You do not always need to buy chemicals or special tools to get rid of invasive plants. Sometimes, things found at home will work too. For example, some people make natural herbicides using vinegar. Gardeners have also tried using boiling hot water to kill weeds. If all else fails, try smothering the plants with a black tarp. This prevents sunlight from coming through, killing the weeds underneath.



STEAM CHALLENGE

Define the Problem

The invasive flowering vine Japanese honeysuckle has started to appear along the edge of a forest ecosystem. By taking over vital resources, including sunlight, space, water, and nutrients, the plant is a growing threat to native species. Scientists are removing the vine but want to use it to create sun shades for people to use when it is hot outside. Your task is to design and build a model of a sun shade for two people.



Constraints: Your design must be made using only plant materials.



Criteria: A successful model will be able to shade two people while one person uses a handle to hold up the shade.





Research and Brainstorm

Why are scientists concerned about invasive species? What are some fun and original uses of plants people have discovered?



Design and Build

Sketch your sun shade. What purpose will each part serve? Where will the handle go? Build the model.



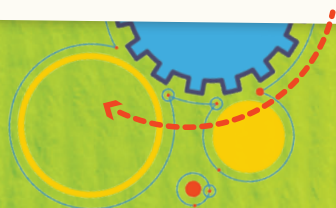
Test and Improve

Have two people stand underneath the sun shade. One person must use the handle to hold the shade for at least one minute. Did it work? How can you improve it? Modify your design and try again.



Reflect and Share

What did you discover about your team's design during the testing phase? Can you use your sun shade for another purpose? How would you modify your sun shade to shade more people?



CAREER ADVICE

from Smithsonian



Do you want to fight invasive species?
Here are some tips to get you started.

“My passion for botany came from my parents who were also botanists. I began gardening, first with vegetables and moving on to exotic species, before studying botany and biochemistry as a college student. If you love being outside and working in dirt, botany is a great science to study. It can even take you around the world to unexplored or remote places.” —*Kenneth Wurdack, Research Botanist*



“When I was younger, I loved to go camping and to observe all of the plants and animals around me. If you enjoy nature and being outside, then this is the field for you. I earned a college degree in ecology, because I found the interactions between plants and insects fascinating.” —*Gary Krupnick, Botanist*