

Plant Hybrids Helping the Planet

Students will invent their own plant hybrid and identify how it can benefit the world, while learning about the wonderful world of horticulture—and the green-collar careers they may someday enjoy!

OBJECTIVE

- ✓ Understand what a plant hybrid is
- ✓ Learn how hybrids can be used to benefit society
- ✓ Learn how to research plant species

TIME REQUIRED

Part A: Approx. 60 min.
Part B: Approx. 20 min.

MATERIALS

Part A

- ✓ The Surprising World of Horticulture poster
- ✓ Make Hybrid Connections activity sheet (optional)
- ✓ Plant Mash-Up contest entry form and rubric

Part B

- ✓ Horticulture careers poster
- ✓ Green-Collar Careers magazine
- ✓ Green Thumb printable board game

PART A: PLANT HYBRIDS

1 Introduce students to the term horticulture: the art, science, technology, and business of growing plants. Ask them why they think horticulture is important and how it relates to them. Answers may include: Plants provide the food we eat, protect the health of our bodies and the environment, and form the landscapes we live and play in. Show and discuss **The Surprising World of Horticulture poster**.

2 Explain that some horticulturists are scientists who create plant hybrids by combining two different plant varieties. The resulting plant offspring has valued trait(s) from each plant. Ask volunteers to guess why plant hybrids are useful. To expand on the topic, offer these facts:

- ✓ Plant hybrids are produced for specific benefits, such as the ability to resist insects or diseases, endure extreme weather, and solve environmental challenges like pollution and erosion.
- ✓ Hybrids can help scientists develop new medicines.
- ✓ Scientists very carefully select plants to cross-pollinate to create a hybrid. They look for traits in one plant that might benefit another. They often pollinate these plants by hand.

3 Have students identify the settings where hybrid plants may be relevant. Answers may include: gardens, deserts, and riverbanks, as well as the medical and construction industries. Point out that biologists and botanists have the opportunity to be inventors, with the goal of developing hybrids that benefit the world. Discuss hybrids that students might want to see in the world using the following prompts: hybrid plants that provide new medicinal solutions, improved air purification, and drought tolerance; attract more pollinators;

or have interesting colors, distinctive scents, or delicious flavors.

4 Optional: Distribute the **Make Hybrid Connections activity sheet**. Tell students they will conduct research to brainstorm their own plant hybrids. Remind them to consult legitimate websites, such as universities, botanical gardens, or government agencies.

5 Distribute the **Plant Mash-Up contest entry form and rubric**. Students will use the plants on the entry form (or their research from step 4 as applicable) to draw and describe their idea for a plant hybrid and briefly explain how it will benefit people. Tell students they have a chance to win \$500! (And their teacher or submitting adult has the chance to win \$1,500!)

6 Provide an opportunity for students to share their hybrids in a physical or digital gallery walk.

PART B: GREEN-COLLAR CAREERS

1 Tell students that horticulture professionals work within the green-collar industry to improve

Enter the Plant Mash-Up Contest!

Chance to win \$1,500! • Deadline: 3/7/22

Upload scans of your class's hybrids at

[scholastic.com/bloom/contest](https://www.scholastic.com/bloom/contest)

or email them to:

scholastic submissions@scholastic.com

or mail them to:

Scholastic Inc.

Attn: Plant Mash-Up Contest—SNP

557 Broadway

New York, NY 10012

For full rules and prize details,

visit [scholastic.com/bloom/contest](https://www.scholastic.com/bloom/contest).

NO PURCHASE NECESSARY TO ENTER OR WIN. Void where prohibited. Eligibility: Contest is open only to students in grades 6–8 in a public, private, or home school in the 50 US (or DC) that is in compliance with the laws and regulations of its state/district and who are residents of the above. Only the student's teacher, youth program leader, or student's parent/legal guardian may submit an entry on the student's behalf. Entry period: Entries must be submitted between 12:01 a.m. EST on 1/3/22, and 11:59 p.m. EST on 3/7/22. To enter digitally: Visit [scholastic.com/bloom](https://www.scholastic.com/bloom). To enter by email: Email the entry to scholastic submissions@scholastic.com. To enter by mail: Mail entries to Scholastic Inc., Attn: Plant Mash-Up Contest—SNP; 557 Broadway, New York, NY 10012. Mailed entries must be postmarked by 3/7/22, and received by 3/18/22. Prizes: Sweepstakes, one (1) randomly selected student will receive a \$100 Visa Gift Card (ARV \$100), their teacher (or submitting adult) will receive a \$500 Visa Gift Card (ARV \$500). One (1) Runner-Up student will receive a \$250 Visa Gift Card (ARV \$250), and their teacher (or submitting adult) will receive a \$1,000 Visa Gift Card (ARV \$1,000). One (1) Grand Prize student will receive a \$500 Visa Gift Card (ARV \$500), and their teacher (or submitting adult) will receive a \$1,500 Visa Gift Card (ARV \$1,500). See Official Rules at: [scholastic.com/bloom/rules](https://www.scholastic.com/bloom/rules).



Plant Hybrids Helping the Planet (cont.)

everyday life and to address problems such as pollution, land erosion, and air quality. Show and discuss the **horticulture careers poster**. Horticulture professionals grow food, beautify our environment and enhance our lives with parks and gardens, improve our physical and emotional health, and support athletics with safer natural playing fields.

② Distribute the **Green-Collar Careers magazine**. After students have digested

the profiles, ask students to discuss in small groups: Which of these horticulture careers appeals to you most? Why? What kind of education would you need for that career? What surprised you most in the magazine?

③ Divide students into small groups. Distribute the **Green Thumb board game**, trivia cards, and instructions. When students are done playing, challenge them to share a few pieces of trivia they learned.



THE SURPRISING WORLD of HORTICULTURE

How plants power our lives in innovative ways

DRONES & ROBOTS
help us **GROW PLANTS**

Technology

People only eat roughly **2.5%** of the edible plants in the world

If we cultivated the others, maybe we could solve world hunger



Beauty

Plant-based cosmetics are one of the fastest-growing segments of the beauty industry



Environment

More Trees - Less Pollution!
1 Tree Can Scrub **48 lbs.** of **CO2** from the air each year

Simply looking at flowers and nature can improve your **MOOD**

Food



Art & Design

Ornamental Horticulture has been proven to:
REDUCE STRESS
IMPROVE MEMORY & CONCENTRATION
and **SPEED HEALING**



Sports

Athletes are **20%** more likely to sustain injuries on artificial turf vs. natural grass



Fashion

More **PLANTS** - more comfort
39% of the World's Clothing is made from cotton plant fibers

MORE NATURAL
SUSTAINABLE COMFORTABLE
than chemical-based synthetics

Science

Spinach is being used in experiments to re-engineer **HUMAN TISSUE**

Plant Scientists are working to solve some of the world's most challenging issues
Goodbye drought, starvation and cancer!



Health & Wellness

1/2 of the top **100 MOST PRESCRIBED MEDICINES** come from **PLANTS!**



Jobs

39% of the annual horticulture job openings are unfilled due to lack of qualified applicants



Economy

Horticulture contributes **\$196 b** to the **U.S. ECONOMY** (annually)



Want to solve unemployment?



©2018 Scholastic. Beauty: "What's Driving the Billion-Dollar Natural Beauty Movement," First Company, "Natural Segment Continues to Outpace the Overall Beauty Market," Global Cosmetics Industry (Cosmetics), Environment: "Carbon & Tree Facts," Arbor Environmental Alliance (Carbon Dioxide), "A Review of the Benefits of Nature Deprivation," US National Library of Medicine National Institutes of Health (Mood, Art & Design), Literature Review of Documented Health and Environmental Benefits Derived from Ornamental Horticulture," Landscape Ontario, Health & Wellness: "Facts and Figures on Biodiversity," IJUN, Economy: "Enriching Lives, Creating Jobs, Building Wealth, Saving Money," National Initiative for Consumer Horticulture, "Join Our Movement," "Seed Your Future," "Employment Opportunities for College Graduates," United States Department of Agriculture, Science: "Using Decellularized Plants as Porous Tissue Engineering Scaffolds," ScienceDirect, Sports: "NFL Leg Injuries More Common on FieldTurf Than Grass," Reuters (Photos), "Maintenance Issues," Sports Field Management Magazine (Plant More Grass), Fashion: "How Much of the World is Made From Cotton," "Live Strong Cotton," "Plants Used for Clothing," "Last TV (Plants), Food: "Plant Facts," Science Jobs, Technology: "10 Ways Technology is Changing Our Food," "TechRepublic," "Ways Drones Are Revolutionizing Agriculture," MIT Technology Review, "Unleashing A Decade of Innovation in Plant Science," Plant Summit.

NAME _____

Make Hybrid Connections

Earth is home to more than 390,000 plant species! They have specific traits, many of which are useful in a plant hybrid. Imagine that you are a horticulture professional traveling the world to research amazing plants and their flowers and fruits. Record the characteristics of four unique plants in the space below.

Plant name:

Region/location:

Climate and habitat:

Characteristics:

How could this plant be used in a hybrid to solve a problem or social need?

Plant name:

Region/location:

Climate and habitat:

Characteristics:

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Plant name:

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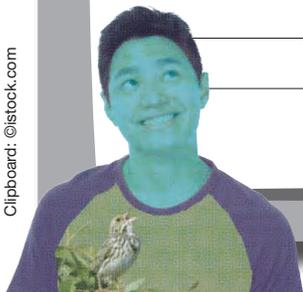
Plant name:

Region/location:

Climate and habitat:

Characteristics:

How could this plant be used in a hybrid to solve a problem or social need?





Plant Mash-Up!

DEADLINE
MARCH 7, 2022



INSTRUCTIONS Consider the characteristics of two existing plants and use them to create your own plant mash-up with new qualities. You can use any plant you can think of, but here are some to get you started. Make sure your final thoughts all fit on this page!



Mint

- * Underground stems help prevent soil erosion
- * Fragrant and tasty leaves contain vitamin A and antioxidants
- * Calms muscles to help treat an upset stomach and aid digestion



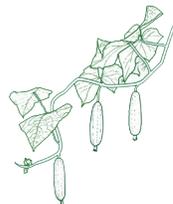
Olive Tree

- * Thrives in hot places; provides shelter for birds and small animals
- * Olive fruits can be cured for tasty eating
- * Consuming olive oil may reduce the risk of heart disease



Anise Hyssop

- * Adapted to dry soils so can tolerate drought
- * Attracts pollinators, especially bees, butterflies, and hummingbirds
- * Tasty leaves have a licorice-like scent and flavor



Cucumber Vine

- * Fast-growing vining plant; grows well in wet soils
- * Cucumber fruit is easy to harvest when the vine is grown on a trellis or support wire
- * A delicious source of nutrition and hydration



Sea Thrift

- * Grows well in infertile, dry, well-drained soils
- * Is adapted to life in saline (salty) conditions, such as coastal areas
- * Excellent for preventing erosion on steep, sandy slopes



Big Blue Stem Grass

- * Tall grasses provide nesting materials for birds and small animals
- * Has beautiful blue-green stems and large pink flowering heads
- * Deep roots help resist drought

Name the two plants you are combining:

1. _____ 2. _____

Name the challenge: _____

Illustrate your hybrid below:

In the space below, describe the features of your hybrid and how it will help your community.

Student Name: _____ Student Grade: _____

Teacher Name: _____ Teacher Email: _____

School Name: _____ School Address: _____

School City/State/Zip: _____



BLOOM!



Green-Collar Careers

Horticulture is the art, science, technology, and business of plants. Look inside to explore this field and the careers it offers.

PLUS: Hear from professionals about what they do and why they love it.



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Horticulture Heroes

Planting Goodness for Communities and for the Planet

Today's job market is an ever-changing place. Tomorrow's will be, too. But certain industries remain healthy and continue to create good jobs. One of these is the green-collar industry, aka horticulture. Plants are all around us, and passionate professionals are needed to keep it that way. This industry promises to provide careers for years to come.



Arborists help care for, protect, and maintain trees.

free—technology to produce food quickly and efficiently. These tech-savvy workers might spend their mornings reprogramming a bank of carefully timed lights and their afternoons delivering fresh food to local chefs. Other 21st-century green-collar pros might be drone specialists who know how to fly a drone to conduct a survey of a field or forest.

Preserving natural habitats is another line of work that will continue to employ green professionals for many years. These pros take care of trees, maintain our landscapes, and even sometimes build entire ecosystems from scratch. They have training in botany, plant sciences, and other similar fields. Forestry experts help manage forests, harvesting and replanting trees when needed. Grassland experts often work in prairies, conducting controlled burns to simulate the ecologically necessary effects of small wildfires. Arborists treat trees for invasive species, striving to save populations of hemlock, pine, and other threatened trees and the many animals and plants that rely on them.

Imagining and designing landscapes is done by professionals such as landscape architects and urban planners. These experts are trained in multiple disciplines. They understand how to integrate the plant world with the built-up world—providing not just beauty to our cities but also greenery that improves our mental health. Landscape architects know

Wait, What?!

Scientists are exploring the use of spinach to grow vascular tissue for human organ replacements.

Seriously?!

Cities with lots of green space may have less crime than cities without.

It takes a lot of work to put food on our tables, and a wide variety of professionals make that happen. Growers plant, tend, and harvest food in many settings, from large farms to cutting-edge greenhouses and even hydroponic labs. Food inspectors—both public and private—make sure food is clean and safe before it reaches our tables. Scientists work to develop plants that are more nutritious and more efficient and easier to grow than in the past.

Growing food is a hot area for innovation in the green-collar industry. Entrepreneurs are developing vertical farms that can be built in cities, delivering fresh food to local families and businesses. Some of these facilities rely on cutting-edge hydroponic—soil-



Botanists research plants to discover their properties and use what they learn to solve problems.

how to choose the right plants for any setting, balancing many priorities, such as beauty, budget, and water use. Urban planners work at a larger scale, using plants to make the city more functional. These experts understand that plants can reduce air pollution, make businesses more appealing to customers, and filter runoff water before it enters the sewer system.

Creating scenes of beauty using flowers is the work of florists. These professionals spend their days designing

flower arrangements of all kinds. Floriculturists, on the other hand, develop new breeds of flowers, using the latest technology. The work of these professionals improves society in many ways. Studies show that the presence of flowers improves people’s mental health and can even help hospital patients recover faster.

Research in plant biology remains a crucial field of work as well. Botanists and other researchers spend their careers solving some of our biggest problems, including how to fight plant diseases and hold off invasive species. Some even travel deep into the world’s jungles to look for plants that might help cure human diseases, such as cancer.

The future is bright for anyone looking to work in the green-collar industry. Whether you want to help save the world—by feeding a growing population, fighting climate change, or protecting nature—or simply want to spend time outside working in the natural world, there is a career waiting for you.

Well, That Makes Sense:

Researchers have found that being around nature lowers stress levels and reduces anxiety. Hospital patients with access to greenery have shorter stays and lower heart rates.

Good to Know!

Urban greenery also helps businesses—improving property values, boosting occupancy rates in rental real estate, and helping to create jobs.



Landscape architects use their knowledge of plants and aesthetics to create both beautiful and functional spaces.

Breaking Ground

We talked to two young professionals who are keepin' it green in horticulture careers

Name: Nicole Sherry

Title: Head Groundskeeper, Baltimore Orioles

Education: B.A. degree in agriculture (with a minor in horticulture); Applied Agricultural Associates degree

Tell us about what you do. My daily routine usually starts with observation, labor, adapting, and learning about grass and soil and weather. It ends with the challenge of facilitating a baseball game through to the finish.

What inspired you to work in horticulture?

The inspiration started by being fascinated by how certain plants could adapt to adverse conditions. For instance, how certain seedpods can only release their seeds to establish new life from fire.

What is your favorite thing about your work? I learn something new



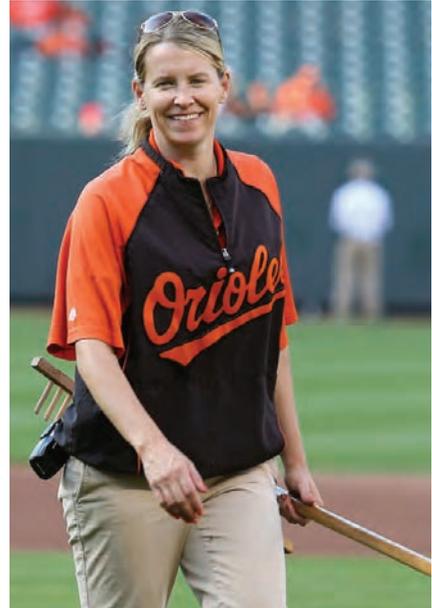
about science, grass, and weather every day. I also get to be a hidden part of the baseball game by providing an optimal surface for our Orioles to play on.

What was the best surprise you encountered in the industry?

The biggest surprise was that my love for plant science and the game of baseball could be combined.

Why do you think horticultural work is important for the world?

Learning about plants can help us in so many aspects of life—



NICOLE SHERRY PHOTOS COURTESY OF TODD OLSZEWSKI, THE BALTIMORE ORIOLES © 2014.

nourishment, mental health, and environmental health.

What advice would you give to someone thinking about entering the profession? Keep an open

mind that is always ready to adjust because science is constantly changing.

In the Field!

Name: Josh Guy

Title: Trials Manager

Education: B.S. degree in Agricultural Sciences

Tell us about what you do. As Trials Manager for Handpicked Vegetables, I work to plan, grow, and test new vegetable varieties. I get to test both in the hydroponics lab and outside in the garden.

What is your favorite thing about your work? No two days are exactly alike. I love the ability to transition between indoor and outdoor work.



What was the best surprise you encountered in the industry? There is a sense of camaraderie and

cooperation. While competition can be fierce, the level of respect and friendliness I've encountered is unmatched.

Why do you think horticultural work is important for the world? Horticulture provides a

great deal of the diversity in food options. A world without the huge array of fruits and vegetables would leave us with some pretty boring dinner plates.

JOSH GUY PHOTO COURTESY OF SEED YOUR FUTURE.

In the Lab

You develop a new hybrid ash tree resistant to beetles.
MOVE AHEAD ONE SPACE.

You spill coffee on your experiment.
MOVE BACK ONE SPACE.

Green Thumb

CAREER CHANGE

You advise a local urban farm on the best vegetables to grow.
MOVE AHEAD ONE SPACE.

You misdiagnose *Botrytis cinerea* (gray mold).
MOVE BACK ONE SPACE.

Green Thumb

The mayor wants more trees in the city and calls you for help!
MOVE AHEAD ONE SPACE.

Green Thumb

An ice storm brings down branches onto power lines.
MOVE BACK ONE SPACE.

A windstorm hits the city, but damage is minimal due to your vigilant pruning.
MOVE AHEAD ONE SPACE.

Green Thumb

A disease strikes the trees along a street. You must remove them.
MOVE BACK ONE SPACE.

CAREER CHANGE

You plant 200 trees in a new city park.
MOVE AHEAD ONE SPACE.

Out in Nature

Green Thumb

You forgot to charge your drone.
MOVE BACK ONE SPACE.

DRONE ENGINEER

You determine which plants were damaged in a thunderstorm.
MOVE AHEAD ONE SPACE.

CAREER CHANGE

URBAN FORESTER

CAREER CHANGE

BOTANIST

You help growers produce more flowers on their plants.
MOVE AHEAD ONE SPACE.

LANDSCAPE ARCHITECT

You save your city a million gallons of water annually by using native plants.
MOVE AHEAD ONE SPACE.

CAREER CHANGE

Green Thumb SCHOLASTIC

You're trending on Twitter as the #CoolPlantDesigner.
MOVE AHEAD ONE SPACE.

The landscape crew forgets to water the new shrubs. They don't survive.
MOVE BACK ONE SPACE.

Green Thumb

Green Thumb

You fail to include an outdoor water feature in your design; your client is not happy.
MOVE BACK ONE SPACE.

CAREER CHANGE

You land the job to design a green roof for the high school.
MOVE AHEAD ONE SPACE.

At the Drawing Board

You identify plants that need more water.
MOVE AHEAD ONE SPACE.

You advise a grower on where pests are infesting his plants.
MOVE AHEAD ONE SPACE.

You let your drone operator license lapse.
MOVE BACK ONE SPACE.

Green Thumb

Behind a Drone

CAREER CHANGE

BLOOM!

Roughly how many plant species are there on earth? (Get within 50,000 species.)

Answer: 400,000

BLOOM!

A scientist who studies plant biology is called a _____.
A. botanist B. zoologist
C. physicist

Answer: A. botanist

BLOOM!

Plants play a major role in keeping the atmosphere in balance by absorbing which gas?

Answer: carbon dioxide

BLOOM!

Horticulture is the art, science, technology, and business of _____.

Answer: growing plants

BLOOM!

Which part of a plant performs most of its photosynthesis?
A. roots B. stem C. leaf

Answer: C. leaf

BLOOM!

Plants help people breathe by releasing which gas?

Answer: oxygen

BLOOM!

Plants hold soil in place, helping to prevent which phenomenon?

Answer: erosion

BLOOM!

Knowing what an arborist does, what do you think is the main feature of an arboretum?

Answer: trees

BLOOM!

The pistil and stamen are contained in which part of a plant?

A. seed B. flower C. stem

Answer: B. flower

BLOOM!

What is the process in which plants convert light into energy?
A. sprouting B. pollination
C. photosynthesis

Answer: C. photosynthesis

BLOOM!

A plant that completes its life cycle in one year or less is called a(n) _____.
A. annual B. perennial C. conifer

Answer: A. annual

BLOOM!

A botanical garden that is open year-round will likely use what kind of building to grow plants in the winter?

Answer: greenhouse

BLOOM!

A landscape architect trying to choose the right tree for rocky soil should consult which professional?

Answer: arborist

BLOOM!

One of the best ways to reduce the amount of carbon dioxide in the atmosphere is to ensure that the planet has healthy _____.

Answer: forests

BLOOM!

Lining waterways with plants helps _____ water pollution.

A. add to B. reduce C. remove

Answer: B. reduce

BLOOM!

Urban foresters often work closely with utility companies because trees sometimes grow into _____.

Answer: power lines

BLOOM!

The part of a plant that is usually belowground is known as the _____.

Answer: root

BLOOM!

A plant that is not native to a region and causes ecological or economical harm is known as a(n) _____.

Answer: invasive species



Board Game Instructions

HOW TO PLAY

Aim: Reach one of the career tiles at the center of the board.

The first person to land a job wins!

Players: 2-4

Materials Required:

- Game board
- Printable trivia cards
- 1 die
- Different place markers for each player (e.g., paper clips, coins, buttons, etc.)

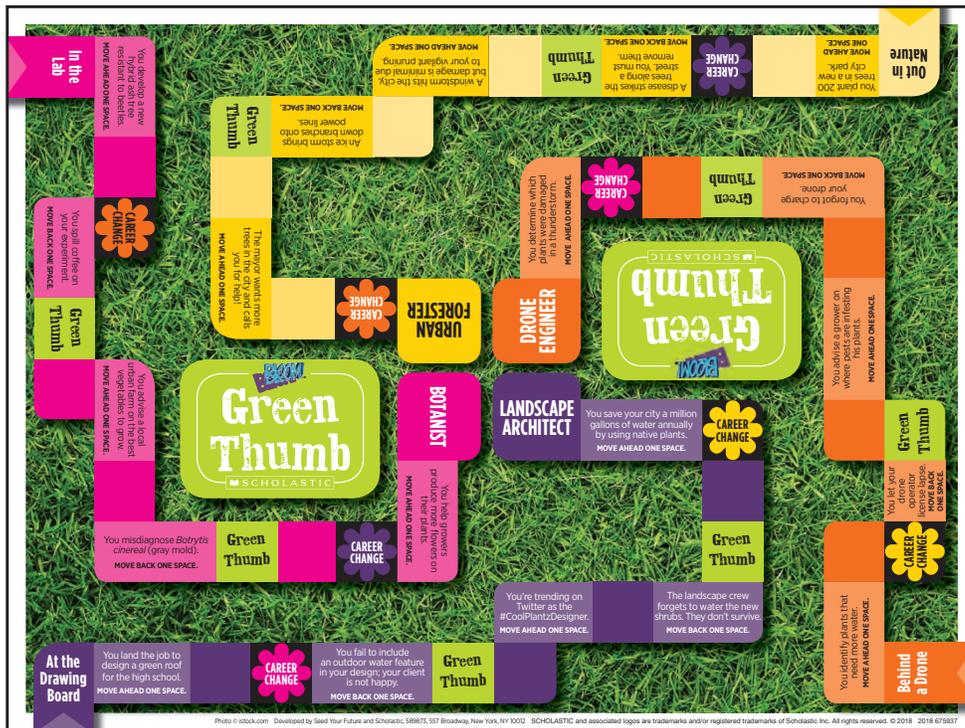
- Download the game board and trivia cards at scholastic.com/bloom

GETTING SET UP

1 Each player begins at one of the four starting spots: **In the Lab**, **Out in Nature**, **At the Drawing Board**, or **Behind a Drone**.

2 Each player rolls the die one time. The player with the highest roll goes first and play continues clockwise.

3 The first player rolls the die and moves her place marker the corresponding number of spaces.



GAME PLAY

- 1 If the player lands on a blank space, she takes no action. The next player rolls.
- 2 If the player lands on a positive action or circumstance related to her career path, she **moves ahead one space**. Once she has moved, the next player rolls.
- 3 If the player lands on a negative action or circumstance related to her career path, she **moves backward one space**. Once she has moved, the next player rolls.
- 4 If the player lands on a **Green**

Thumb, the player to the right will pick up a **Green Thumb** trivia card from the pile and ask the trivia question. If the player gets the question right, she moves forward one space. If the player gets it wrong, she takes no action. After the question is asked, the trivia card can be placed in a discard pile. Once the player has answered the question and moved (if necessary), the next player rolls.

5 If the player lands on a **Career Change**, she moves

her place marker to the starting point that corresponds to the color of the Career Change flower she landed on. For example, if the player lands on a pink Career Change flower, she moves her place marker to the pink starting tile: **In the Lab**.

MOVE TO WIN

Play continues until one person reaches one of the four **career tiles**: Drone Engineer, Landscape Architect, Botanist, or Urban Forester.

