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AGRICULTURE IN ACTION: SEED ID

Agriculture is the science of farming. It is a massive industry that literally keeps the world fed and which we couldn't do without! The seed industry involves seed markets, costs and prices, regulation, plant breeding and more. It has evolved as the demand to feed the world's population has grown. Identifying and classifying organisms is important and useful in both scientific and real-world settings. Farmers need to be able to identify seeds and be able to eliminate as many weeds as possible to ensure the greatest crop yield and to harvest only the intended plant. They must also be able to identify an **invasive species**, an organism that has a tendency to spread to a degree that causes harm to the environment. Knowing how to identify the plants in the field, and the seeds themselves, helps farmers eliminate any unwanted weeds, including **noxious weeds** which are injurious to agricultural or horticultural crops, natural habitats, humans, or livestock. Scientists and farmers may use a **dichotomous key** to help identify an organism by looking at characteristics such as size, shape, texture and color and choosing between alternative characteristics.

THE GOAL: In this activity you will identify unknown seeds by observing their characteristics and create your own key to classify objects.

WHAT YOU NEED:

- Dichotomous Key
- Envelope of unidentified seeds
- Ruler
- Pencil and paper
- Tweezers (optional but helpful to handle small seeds)
- Hand lens or magnifying glass (optional)



GETTING STARTED:

"Di" is Greek prefix meaning two. A dichotomous key gives pairs an "either-or" choice that either directs the user to the next pair of choices or to the point of identification. Keys usually start with very broad choices and get more specific as they go down the list. For example, a key about birds might ask if the bird can fly and may then continue to ask about the size of the bird, shape of its beak, color of feathers, where it lives, etc. Here is a quick example to get you started: Observe characteristics of the birds on the next page and answer the questions to make an identification. You will go through the key for each bird.





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Size: about 5-9 feet
Flight? No



Size: about 5-6 inches
Flight? Yes



Size: about 1.8-2.6 feet
Flight? Yes

- 1A. Can the bird fly? If yes, go to 2. If no, then it is an ostrich!
2A. Is the bird smaller than one foot in size? If yes, then it is a downy woodpecker!
2B. Is the bird larger than one foot in size? If yes, then it is a raven!

Most dichotomous keys are much more extensive than this example, but this should give you an idea of how to look at characteristics of the organism and answer a series of questions to identify it.

INSTRUCTIONS:

First you'll need to sort the seeds. It will be helpful to sort them on a blank piece of paper or a paper plate. You might want to divide your paper or plate into sections to keep the seeds from getting mixed up. Look closely at each seed and observe its characteristics. Sort them according to size, color, shape, and texture. Some seeds of the same type may be a slightly different color. Once all seeds are sorted, use the dichotomous key included in this activity to help identify which seed types they are. Examine the seeds closely and read the key carefully as some seeds look very similar to others. Follow the questions on the dichotomous key for each seed type until you've identified it. Repeat the process until every seed type has been identified. Now that you have experience identifying and classifying objects, you can create your own dichotomous key. Using seeds from the grocery store such as peas, beans, sunflower seeds, etc. you can create your own key for others to follow. Or, you can create a key to classify objects around your house or in your backyard. You can create a dichotomous key for just about anything you'd like to identify and classify, such as trees, insects or even video games!

READ ALL ABOUT IT!

The Story of Seeds: From Mendel's Garden to your Plate, and How There's More of Less to Eat Around the World

by Nancy Castaldo

Botanicum
by K.J. Willis



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MORE TO EXPLORE:

- Turn your seeds into a seed mat for planting. Learn how at <https://www.civiggardencenter.org/school-garden/seed-mats-guide-spring-planting/>
- You can save seeds and create your own garden. Watch this video to learn how: <https://youtu.be/HmzdQBAkx74>

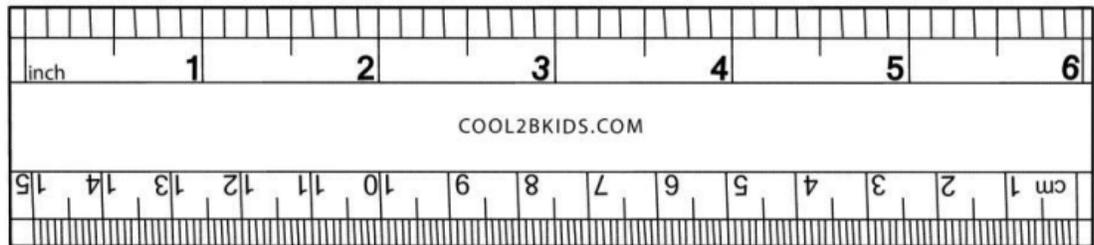
ACADEMIC STANDARDS:

This activity connects to the Oklahoma Academic Standards for Science:

- Crosscutting Concepts: Patterns
- Science and Engineering Practices: Analyzing and Interpreting Data
- Matter and Its Interactions 2.PS1.1, 5.PS1.3, 7.PS1.2

DID YOU KNOW?

Tumbleweeds are an invasive species! They first arrived in South Dakota around 1870, likely in seed form in a batch of flaxseed imported from Russia, and people have been trying to get rid of them ever since!



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<https://tulsastem.org/stem-expo/>

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THIS KIT WAS MADE POSSIBLE BY:

FLIGHT NIGHT

This activity was adapted from lessons by the Civic Garden Center of Greater Cincinnati (<https://www.civiggardencenter.org/assets/Harvesting-Seeds-Grades-7-8-1.pdf>) and National Agriculture in the Classroom (<https://www.agclassroom.org/teacher/matrix/lessonplan.cfm?lpid=620>).

Garden Lesson: Harvesting Seeds

Season: Fall

Grades: 7 & 8

Dichotomous Key

- 1A. Are the seed diameters about 0.5cm? If yes, go to 2A
1B. Are the seed diameters less than 0.5cm? If yes, go to 2B
- 2A. Are the seeds light green or yellow in color? If yes, they are peas!
2B. Are the seeds light or dark brown, black or white in color? If yes go to 3
- 3A. Are the seeds round but rough around the edges (almost spikey)? If yes, they are Swiss Chard!
3B. Are the seeds free of spikes or sharp edges? If yes, go to 4
- 4A. Are the seeds round? If yes, go to 5
4B. Are the seeds flat or almost flat? If yes, go to 6
- 5A. Are the seeds smooth? If yes, go to 7
5B. Are the seeds rough? If yes, go to 8
- 6A. Do the seeds come in black and white varieties? If yes, they are lettuce!
6B. Are the seeds brown and oval shaped? If yes, they are carrots
- 7A. Do the seeds come in multiple shades of the same color? If yes, go to 9
7B. Are the majority of the seeds the same dark (almost black) color? If yes, they are Sorrell!
- 8A. Are the seeds ball shaped with lines? If yes, they are Cilantro!
8B. Are the seeds different shapes, some with points? If yes, they are Spinach!
- 9A. Are the seeds shades of light brown or almost red in color? If yes, they are Radish!
9B. Are the seeds various shades of darker brown? If yes, go to 10
- 10A. Are the seeds 0.1 of an inch or larger? If yes, they are Kale!
10B. Are the seeds less than 0.1 of an inch? If yes, they are Arugula!

