

LEARNING SET 1 INTRODUCTION

Learning Set 1

What Makes One Rice Different from Another?

◀ 5½ class periods *

Students investigate variation in traits in rice plants to identify traits that will meet the criteria of the challenge, to develop a rice plant that produces more rice and more nutritious rice.

Overview

Students are challenged to create recommendations for how to develop a variety of rice that will give rice farmers around the world a higher yield of rice with greater nutritional value than rice varieties currently available. They identify the criteria and constraints of the challenge based on what they know about rice farmers’ needs and what they know about rice. Then they measure the variation in some traits among rice samples and determine whether there are several varieties of rice or only one variety, developing a sense of how traits vary from one individual to the next and how they vary from one variety or breed to the next. First they measure the length and width of rice grains from different samples and see that the variation between grains from one sample is much smaller than the variation between grains from different samples. Then, they measure the amount of starch in powdered grains from the different samples, discovering that the variation in starch levels is also smaller within the samples than between the samples. From this, they also see that some varieties of rice have much more starch, an important nutrient, than other varieties. They then create explanations, supporting claims about whether there are several varieties of rice or only one.

Looking Ahead
In this *Learning Set*, students will determine whether there are several varieties of rice or only one.

*A class period is considered to be one 40 to 50 minute class.

Targeted Concepts, Skills, and Nature of Science	Section
Scientists must keep accurate and descriptive records of what they do so they can share their work with others and consider what they did, why they did it, and what they want to do next.	1.1, 1.3
Scientific knowledge is developed through observations, recording and analysis of data, and development of explanations based on evidence.	1.1, 1.2, 1.3

LEARNING SET 1 IMPLEMENTATION

◀ 5½ class periods*




Learning Set 1

What Makes One Rice Different from Another?

In this Unit, you will make recommendations about developing a new rice plant. You already recorded a set of criteria and constraints to help you address this challenge. The rice plant you help develop must produce more rice and more nutritious rice than the plants the farmers are now using.

You might think all rice and rice plants are the same; they are not. Scientists are trying to develop new plants that will grow rice under a variety of conditions. This way, farmers will be able to harvest enough rice even when the weather is bad. With a better rice plant, they will be able to feed their families and have extra to sell in the market. Your next step is to investigate differences in organisms and discover what causes these differences.

Begin by reading the announcement from the research institute.

 <p>Research Announcement</p> <p>To: All Collaborating Scientists</p> <p>From: The Rice for a Better World Institute (RBWI)</p> <p>Subject: Research Update</p> <p>The scientists at the Rice for a Better World Institute suggest that you begin your research by looking at what makes one type of rice different from another. In our databank, we have stored grains of many different types of rice. All the grains look different so we can see that they have a variety of traits.</p>	<p>To develop a better rice plant, we need to understand more about their differences. Some, for example, might be more nutritious. Some might require lots of water. Some might require hot weather. Others might grow in dry or cold temperatures. We would like to find out what makes each type of rice different from the others.</p> <p>We are looking forward to hearing about your investigations of traits among different types of rice. The farmers working on this project can help you by running experiments in the field. They will follow the procedures you describe and send you the results to analyze.</p> <p>Data from the investigations in the lab and in the field will help you answer any questions you have.</p>
--	---

GEN 13

GENETICS

Learning Set 1

What Makes One Rice Different from Another?

5 min.

Introduce the question of the Learning Set:

What makes one rice different from another?

Engage

Begin by reading the announcement from RBWI with the class. Then discuss the major points of the announcement. Students should understand that there are many different types of rice. The first step is to find out what the differences are between the types of rice that RBWI already has.

TEACHER TALK

“So the scientists at RBWI say they have grains from many different types of rice stored. So, if we want to develop a new rice plant with traits that will make it produce more rice and more nutritious rice, it makes sense that we’d want to know about the traits that different rice plants have, right? Maybe the types of rice already have some of the characteristics we want.”

*A class period is considered to be one 40 to 50 minute class.