Here's your FREE lesson!

We hope you enjoy it!

Get full access to all of our lessons, join our membership at www.onthemarkcurriculum.com

We give you the lessons, so you can do what you love! TEACH!

Join Now!

Systems in Action

Learning Intention:

Students will learn about various types of systems, their purposes, and components.

Success Criteria:

- identify various types of systems and describe the components
- determine the input, process, output, and feedback loops of a familiar system, and for an existing system in our society
- discuss the economic, environmental, and social factors that influence the evolution of a system
- assess and debate alternative ways an existing system could meet the needs of individuals and society as a whole

Materials Needed:

- a copy of "What's in a System?" Worksheet 1 and 2 for each student
- a copy of "System Investigation – Part One" Worksheet 3 and 4 for each student
- a copy of "System Investigation – Part Two" Worksheet 5 and 6 for each student
- assorted mechanical systems such as an alarm clock, bicycle, calculator, hair dryer, etc.
- pencils, pencil crayons, markers, chart paper, access to the internet (optional)

Procedure:

***This can be done as one long lesson, or as three shorter lessons.**

1. Give students Worksheets 1 and 2. Read through and discuss the concept of a system and its components to ensure students' understanding. As a large group, brainstorm some examples of systems, simple and complex. Record the ideas on chart paper.
2. Explain to students that they will determine the components of a familiar system. Using the pressurized systems they constructed in the last lesson, students will complete Worksheets 3 and 4.
3. Next, give students Worksheets 5 and 6. They will investigate an existing system in our society to determine the input, process, output, and feedback loop. (Having assorted mechanical systems available for students to investigate would be helpful). At the end of this activity, students will work in partners to discuss economic, environmental, or social factors that influence the evolution of a system. Come back as a large group, record students' ideas on chart paper.
4. Choose a system previously listed on the chart paper at the start of the lesson. Organize students so that they can assess and debate ***alternative ways*** this existing system could meet the needs of individuals and society as a whole. For example, a school year is a system that traditionally runs from September to June, with a summer break in July and August. What would be the impact on individuals, society, and the environment to have year-round schooling instead of having everyone on vacation in the summer months?

Teaching option for this activity: Students could write a persuasive essay to express the point of view that they argued in the debate

Differentiation:

Slower learners may benefit by working in a small group with teacher direction to complete the system investigation on Worksheets 5 and 6. Using a system that students can see and touch may be of benefit for the kinesthetic/tactile learners. **For enrichment,** faster learners could create a power point presentation that displays their point of view taken during the debate.

OTM-2151 ISBN: 9781770788657

Worksheet 1 Name: _____

What's in a System?

There are various types of systems in our world. Some are small and simple such as a hand tool like an electric mixer or power drill, and some are large like a city transit system or a health care system.

The components of systems are similar. They all have purposes, inputs, processes, and outputs, which allow them to perform a function. These parts work together for a common goal.

A vegetable garden is an example of a simple system.

Purpose of this garden system: to grow vegetables to eat

Input:
soil, seeds, water, fertilizer

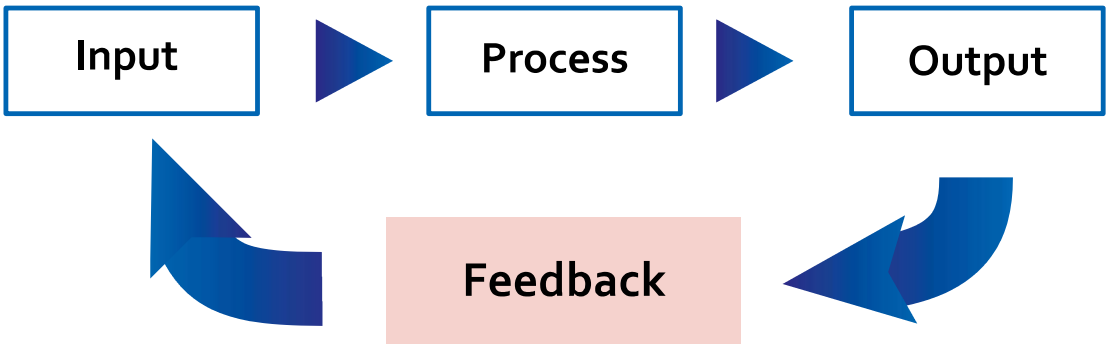
Process:
frequent watering, weeding, sunlight for growth

Output:
food to eat

OTM-2151 ISBN: 9781770788657

Worksheet 2 Name: _____

Some systems in our world are more complex, and require regular maintenance or improvements in order to functioning efficiently, and stay current. Such systems benefit from periodic system analysis. System analysis helps to connect input to a consequence in the process that is producing the output to a feedback loop. Feedback allows for system maintenance or improvement before another cycle begins.



Let's look at the system of organic vegetable production. Through system analysis, feedback is gathered from consumers who buy produce. Interest in buying organically grown vegetables can be determined, so grocery stores and markets make it available for purchase.

If consumers buy organic produce rather than regular produce that has been exposed to pesticides, farmers may be inclined to supply this demand and grow vegetables organically on a larger scale. This would drive the prices of organically grown vegetables down to become more affordable than the regular produce that has been exposed to pesticides.

OTM-2151 ISBN: 9781770788657

Worksheet 3

Name: _____

System Investigation – Part One

Perform your own system investigation by revisiting the pressurized system that you constructed in the last lesson!

Let's Get on Task!

Your task is to explain the input, process, output, and possible feedback loop involved in your pressurized system. Consulting your plan page, test results, inspection report, and video clips will be important as you explain and analyze your system.

Input: (written descriptions or diagrams)

Process: (written descriptions or diagrams)

OTM-2151 ISBN: 9781770788657

Worksheet 4

Name: _____

Output: (written descriptions or diagrams)

Feedback Loop: _____

_____

_____

_____

_____

_____

_____

_____

_____

_____

In your opinion, what are the benefits of this system investigation?

_____

_____

_____

_____

_____

_____

Worksheet 5

Name: _____

System Investigation – Part Two

Your task now is to choose a system to investigate. Explain the inputs, processes, outputs, and possible feedback loops involved. Your system investigation can be a "hands on activity" that leads you to look at the system working inside a mechanical tool, or it can be more research based where you use the internet to uncover a system used in our society, like the workings of a transportation system.

Let's Get on Task!

The _____ System

Input: (written descriptions or diagrams)

Process: (written descriptions or diagrams)

OTM-2151 ISBN: 9781770788657

Worksheet 6

Name: _____

Output: (written descriptions or diagrams)

Feedback Loop: _____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

With a partner, discuss economic, environmental, or social factors that influence the evolution of a system.

Physical Science Curriculum Map

The experiments in this module fall under eleven topics that relate to three aspects of physical science:

1. Fluids and Dynamics
2. Systems in Action
3. Light and Optical Systems

In each section you will find teacher notes designed to provide you guidance with the learning intention, the success criteria, materials needed, a lesson outline, as well as provide some insight on what results to expect when the experiments are conducted.

Suggestions for differentiation are also included so that all students can be successful in the learning environment.

Introduction:

- At a GlanceTM – List of Learning Expectations and Skills
- Introduction
- Table of Contents
- Teacher Assessment Rubric
- Student Self-Assessment Rubric

Lesson Topics:

Lesson 1 - Solutions and Mixtures - The Particle Theory
Lesson 2 - Mass, Volume, Density
Lesson 3 - Viscosity
Lesson 4 - Under Pressure as Related to Pascal's Law
Lesson 5 - Systems in Action
Lesson 6 - The Relationship Between Work, Force, and Distance Moved
Lesson 7 - Mechanical Working Advantage
Lesson 8 - Behavior of Light
Lesson 9 - Transmission of Light
Lesson 10 - On the Spectrum
Lesson 11 - Optical Spectrums