

INTRODUCTION TO SNAPS LABS

A SNAPS laboratory includes station activities designed to develop students' science skills with hands-on activities and thought-proving exercises. The labs require students to use science, math, literacy, problem-solving and engineering skills so to expand their understanding scientific ideas and apply scientific concepts to the real world.

Science Skills Station

Students explore a concept using science and math skills. The skills may be procedural that a student must physically do. The skills may be mathematical or require scientific thinking and reasoning.

Narrative Station

Students employ literacy skills important to understanding scientific text as well as illustrations, tables and graphs. In many labs, students will explore multimedia sources, such as videos, audio files or animations.

Assessment Station

Students answer multiple choice questions, short answer questions and/or open-ended, thought-provoking questions. The questions progressively get "harder" and require students to employ lower, mid and higher order thinking.

Problem-Solving Station

Students utilize the engineering design process and problem-solving skills so to identify problems, test solutions and/or make improvements to solutions.

Synthesis Station

Students compose a CER report as a lab conclusion so to relate the observations, data and other information gathered in the lab to the objective(s) of the lab.

Synthesis Project

Students complete an activity or project that helps summarize information studied and learned in the lab. This facilitates "bringing it all together" while getting students to think harder and deeper about a concept.

SNAPs LAB STATIONS ACTIVITY

The screenshot shows a web browser window displaying a PDF document titled "MS-ESS1-3 Solar System Trends Stations Lab.pdf". The document is a multi-page lab activity with various stations including Science Skills, Narrative Station, Alternative Station, Assessment Station, Problem-Solving Station, Synthesis Station, and Synthesis Project. It includes data tables, diagrams, and text boxes for student work.

Science Skills Station: Includes a table with columns for Planet, Distance from Sun (AU), Diameter (km), Mass (Earth masses), and Density (g/cm³). The table lists data for Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, and Neptune.

Narrative Station: Contains text boxes for students to describe the characteristics of the planets and their orbits.

Alternative Station: Includes a diagram of the solar system and text boxes for students to compare and contrast the inner and outer planets.

Assessment Station: Contains a table with columns for Planet, Distance from Sun (AU), Diameter (km), Mass (Earth masses), and Density (g/cm³). The table lists data for Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, and Neptune.

Problem-Solving Station: Includes a diagram of the solar system and text boxes for students to solve problems related to the planets.

Synthesis Station: Includes a diagram of the solar system and text boxes for students to synthesize information from the lab.

Synthesis Project: Includes a diagram of the solar system and text boxes for students to complete a project related to the lab.

Features:

- ✓ Connects Science, Math, ELA & Engineering (Problem-Solving) Skills
- ✓ Requires easy-to-get and inexpensive materials
- ✓ **Printable lab** for traditional classrooms included
- ✓ Student Recording Sheets, Teacher Guide and Answer Key included

Printable Lab downloaded as a PDF file. Teacher Guide and Key not shown.

DIGITAL SNAPs LAB STATIONS ACTIVITY

MS-ESS-3 Solar System Trends Digital Lab — Saved to my Mac

Home Insert Draw Design Transitions Animations Slide Show Review View Recording Acrobat Tell me

Comments Share

Slide 17 of 17 English (United States) Accessibility: Investigate 66%

Features:

- ✓ **Digital lab** for distance learning and paper-free classrooms included
- ✓ Fillable slides (pptx file) compatible with both Microsoft PP and Google Slides
- ✓ Assessment station available as self-grading Google Form (via force copy link)

EDITABLE SNAPs LAB STATIONS ACTIVITY

AutoSave OFF Home Insert Draw Design Layout References Mailings Review View Grammarly Acrobat Picture Format Tell me Comments Editing Share

MS-ESS1-3 Solar System Trends Editable Lab Stations

Name: _____ **Date:** _____

Objective:

- Determine relationships between a planet's distance from the Sun and its period of revolution.
- Determine relationships between a planet's mass with its gravitational attraction.
- Identify and describe the internal structure of the planets and gas giants.
- Evaluate the use of space probes to gather information about the planets of the solar system.

WISSE Science or Engineering Practices

Developing and using models (Practice 2)
Analyzing and interpreting data (Practice 4)
Using mathematics and computational thinking (Practice 5)
Constructing explanations and designing solutions (Practice 6)

Science Skills Station

Students will plot solar system trends. They will complete two graphing activities to study the relationships between a planet's distance from the Sun and its period of revolution as well as the mass of a planet and its gravitational attraction. Students will consider other solar system trends as well.

Assessment Station

At this station, students will answer questions about key terms and those relating to solar system trends. Students must employ lower-order thinking skills to answer these questions.

Problem Solving Station

Students will develop a model that illustrates the interior of the terrestrial planets and gas giants. The model will show the relative size of the planets, the thickness of the internal layers of the planet and the state of matter in the layers of the planets.

MS-ESS1-3 Solar System Trends © Stephanie D'Amico

Name: _____ **Date:** _____

Objective:

- Read through the Lab Overview.
- Create a new entry for Solar System Trends in the table of contents in your lab journal and determine the page of your lab entry. Complete the following steps on the first page of the entry.
- Write the following items in your lab journal:
 - General information
 - Period of revolution (orbital period)
 - Gravity
 - Space probe
- Write a 6-sentence summary about what you will do in the laboratory.

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MS-ESS1-3 Solar System Trends © Stephanie D'Amico

Science Skills Station

Objective(s):

- Explain how a planet's orbital period depends on its distance from the Sun.
- Describe the relationship between a planet's size and its period of rotation.
- Describe the relationship between a planet's mass and its gravitational attraction.

Activity:

This lab is presented with a table that contains information about the planets of the solar system. Students will create a new entry for Solar System Trends in the table of contents in your lab journal to make one complete rotation and revolution around the Sun as well as each planet's gravity, its distance from the Sun, and its gravitational attraction.

Follow the directions following the data in this table. Then answer the questions.

Directions: Create two line graphs for the following order:

- Distance from the Sun and a planet's period of revolution (in years)
- Mass of a planet and its gravitational attraction.

Questions:

- Is there a general relationship between a planet's period of revolution (orbital period) and its distance from the Sun? Explain.
- Why don't we make sure that a relationship exists (or doesn't exist) between a planet's orbital period and its distance from the Sun?
- Is there a general relationship between a planet's mass and its gravitational attraction? Explain.
- How would you explain weight concepts on Earth, Saturn and Jupiter? How would weight change on a planet?
- Can you use a planet's density to predict to what other information would you need?
- What factors in the table would impact the average surface temperature of a planet? Could anything else affect a planet's average surface temperature? Explain.

MS-ESS1-3 Solar System Trends © Stephanie D'Amico

Planet	Distance from Sun (AU)	Period of Revolution (years)	Mass (Earth masses)	Surface Gravity (Earth gravities)
Mercury	0.387	0.241	0.055	0.38
Venus	0.723	0.619	0.815	0.90
Earth	1.000	1.000	1.000	1.00
Mars	1.524	1.877	0.339	0.38
Jupiter	5.203	11.862	317.8	2.53
Saturn	9.537	29.457	95.2	1.07
Uranus	19.191	84.013	45.9	0.89
Neptune	30.054	164.789	17.1	1.14

Problem Solving Station

Objective:

Students will compare the interior of terrestrial planets and gas giants.

Directions:

The size, structure and composition of the inner terrestrial planets is much different than the outer gas giants. At this station, you will conduct research about the planets and create a model that illustrates the interior of the planets of the solar system. Your model must meet the following criteria:

- The model should be able to show the size of the planets relative to each other
- The model should indicate the internal layers that make up the interiors of the planets
- The model should consider the state of matter in the layers of the planets

At this station, you will provide a claim statement. You will use evidence from the lab and scientific reasoning to write a claim statement (page length is optional).

Claim:

The claim is a statement that answers a testable question. It usually is one sentence and often addresses the relationship between two variables. In this activity, you will be provided with the claim statement.

Evidence:

Evidence is scientific data used to support the claim. Evidence can be quantitative, qualitative or a combination of both. You can use data from observations, measurements, tables, graphs or research as evidence to support the claim.

Reasoning:

Reasoning is the logical explanation that connects the claim and the evidence. It establishes how and why the evidence supports the claim. The reasoning should include scientific principles or ideas that are important to the claim and evidence.

Claim:

1. A planet's interior from the Sun shows the planets' period of revolution versus its mass.

Directions:

- On the template, the evidence from the science skills, variables and/or problem solving station that supports the claim above. Use your ruler and pencil.
- On the template, the logical explanation and scientific principles that explain how and why the evidence supports the claim above. Use your ruler and pencil.

MS-ESS1-3 Solar System Trends © Stephanie D'Amico

Objective:

Read concepts, terms and ideas relating to trends in the solar system.

WISSE Unit:

- Explains a **scientific**
- Operates **scientific**
- List and write **scientific**
- Interprets or analyzes **scientific**
- Compares and **scientific**

Assessment Station:

- Answer the following questions. Write your answers on the recording sheet.
- There are two bonus questions. If time allows, try to answer these questions.
- Use the table with solar system data to help you answer your questions.

MS-ESS1-3 Solar System Trends © Stephanie D'Amico

Question #1

How is Earth a unique planet in our solar system?

Question #2

Compare and contrast the size and composition of the inner planets (Mercury, Venus, Earth and Mars) to the outer planets (Jupiter, Saturn, Uranus and Neptune).

Question #3

What is the relationship between the distance from the Sun and the average temperature of a planet? Why does the model work?

Question #4

What feature of a planet would help you determine whether the planet is mostly composed of rock or gas? Explain.

Question #5

Scientists have considered building a colony on a planet in our solar system. Based on the data in the table, what planet would be best to colonize? Which planet would be most difficult to colonize? What information would be important in choosing the best planet? Justify your answer.

WISSE Question #7

How would a planet's gravity impact our ability to land or launch a spacecraft that explores space beyond Earth. Evaluate the benefits and limitations in using space probes to explore planets, moons and other celestial objects in our solar system.

WISSE Question #8

A space probe is a robotic spacecraft that explores space beyond Earth. Evaluate the benefits and limitations in using space probes to explore planets, moons and other celestial objects in our solar system.

MS-ESS1-3 Solar System Trends © Stephanie D'Amico

Objective:

Students will compare the interior of terrestrial planets and gas giants.

Directions:

The size, structure and composition of the inner terrestrial planets is much different than the outer gas giants. At this station, you will conduct research about the planets and create a model that illustrates the interior of the planets of the solar system. Your model must meet the following criteria:

- The model should be able to show the size of the planets relative to each other
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MS-ESS1-3 Solar System Trends © Stephanie D'Amico

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WISSE Unit:

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Assessment Station:

- Answer the following questions. Write your answers on the recording sheet.
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- Use the table with solar system data to help you answer your questions.

MS-ESS1-3 Solar System Trends © Stephanie D'Amico

- Features:
- ✓ **100% Editable** stations downloaded as a docx file
 - ✓ Necessary diagrams, tables and graphs included
 - ✓ Illustrative graphics and clipart NOT included

TEACHER GUIDE

PRINTABLE LAB SETUP AND PREPARATION

Each “traditional PDF file” includes directions and questions for each station. Print one copy of these materials for each station. Place copies of the letter-sized directions questions in sheet protectors or use self-laminating sheets to protect the documents. Position the materials at each station with the general supplies of that station.

TEACHING DURATION

Most SNAPs lab activities require **two class periods** or **90 to 120 minutes**. However, the time needed to require one lab can vary with grade level, student autonomy and difficulty of content. Allowing two class periods allows ample time – regardless of these factors – for students to finish the four in-class stations.

Suggestions for shortening the lab:

1. Assign the Narrative Station as pre-lab work. By doing this, you ensure your students have first-order knowledge of the concepts and ideas explored in the lab. If you are using this lab to introduce new concepts, using the narrative station as a pre-lab will increase student success at the other lab stations.
2. Assign the Assessment Station as post-lab work. By doing this, you ensure your students are evaluated on the concepts and ideas in this lab after completing ALL stations.

DOCUMENT DISTRIBUTION

1. Distribute student copies of the lab overview and pre-lab assignment the night before the laboratory. The pre-lab is a ½ page assignment. Staple the pre-lab to the lab overview before distributing these documents.
2. Distribute student copies of the recording sheet at the beginning of the laboratory.
3. Distribute copies of the post-lab, synthesis station and synthesis project at the end of the lab. The post-lab is a ½ page assignment. Staple the post-lab to the synthesis station and project before distributing these documents.
4. Assign a due date for the synthesis project. The post-lab reflection is a formative assessment and should not require a formal “due date.”

TEACHER GUIDE

DIGITAL VERSION OF SNAPs LAB ACTIVITIES

This download includes a digital lab/fillable slides that allow students to complete the laboratory on a computer or tablet. This file was created to work with a variety of online platforms and secure file-sharing platforms. The digital lab has been modified so students record answers directly following questions rather than in a student packet.

Important Notes

- The answer key is removed from the digital lab.
- The answer key is included in the traditional PDF file.
- The digital laboratory CANNOT be edited; only fillable areas can be manipulated.
- When applicable, videos are included to help students create digital graphs.

The digital laboratory can be used a variety of ways:

- Distribute paper-free laboratories as part of regular instruction
- Use to assign at-home work as part of a remote or distance learning plan
- Send work to acutely or chronically absent students
- Support tutoring or at-home instruction for homebound students

How can you distribute and share the digital laboratory with your students?

- The laboratory CAN be distributed directly to students through email.
- The laboratory CAN be distributed or assigned with Google Classrooms, Microsoft Teams, Blackboard, Canvas, Schoology and other like platforms that are password-protected or require a code to enroll.
- The laboratory CAN be distributed with secure file sharing platforms like Google Drive, OneDrive and DropBox that are password-protected or shared only with students with their email or student account.
- Printable SNAPs labs can be shared or distributed just like the digital labs.

TEACHER GUIDE

To use the digital laboratory with Microsoft Teams:

1. Upload an assignment to your One Drive.
2. Create a new assignment. Add the file as a "resource."
3. Assign to the appropriate class or students.

To use the digital laboratory with Google Classrooms:

1. Upload the assignment to your Google Drive. Add the file using the upload tool in a web browser or drag and drop the file into your Drive. Watch a demonstration of the process: <https://safesha.re/3h6n>
2. Create a new assignment and add the digital lab to it. Make a copy for each student.
3. Assign to the appropriate class or students.

GOOGLE FORM ASSESSMENT

To better support digital classrooms, I created a Google Form version of the assessment station. There are two ways the Google Form assessment station can be used:

1. If using the digital lab, you can remove slides for the assessment station and use the Google Form assessment station instead. This makes the assessment station "more formal" since it is separate from the rest of the lab station activities.
2. If looking for a way to shorten the in-class lab, remove the assessment station – including the assessment station student recording pages – and assign the Google Form assessment station as an at-home assessment. Alternatively, you can use the Google Form assessment station as an in-class quiz if students have their own digital personal learning device.

TEACHER GUIDE

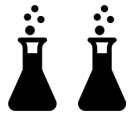
DISTANCE – INDEPENDENT LEARNING COMPATIBILITY

SNAPs lab activities are rated for their ease with distance – independent learning. Some lab activities are very hands-on and require a lot of materials whereas other lab activities are more thought-provoking and require minimal – or no – additional materials.

This lab has been rated the following:



The lab requires no modification to the required materials for distance – independent learning. All materials important to the lab are included in the digital lab. A calculator, colored pencils or a ruler may be needed.



The lab requires some modification to the required materials for distance – independent learning. Students can use household items, if needed, to complete hands-on activities.



The lab requires significant modification. Teacher should demonstrate or perform activities in a live session or prerecorded video and/or provide materials needed for the science skills or problem-solving station.

Suggestions

- This lab includes a hands-on activity at the problem-solving station. Students will create a physical model of the rocky and gas planets. Students need various arts and crafts materials for this activity. Students can use any materials available for this project. Alternatively, students can create a digital model using photos, graphics, shapes and the drawing tool.

TEACHER GUIDE

EDITABLE COMPONENTS OF SNAPs LAB ACTIVITIES

This download includes an editable word document of all lab components. The stations are available as fully editable DOCX files., Diagrams, illustrations, tables and/or graphs that are essential to lab activities are included in the editable document. Illustrative clipart is NOT included in the editable document.

Some labs have a directed synthesis project. When applicable, the directed synthesis project is available as an editable word document as well. Editable documents and rubrics important to standard synthesis projects are included in the [SNAPs Lab Stations Setup Guide](#).

There are three important reasons for creating editable versions of these stations:

1. Most lab station activities utilize five or more stations with relatively simple and short activities. However, my SNAPs lab activities include four comprehensive stations. The science skills station and problem-solving station could be used independently as single class period laboratories. To better allow for this option, I have made these stations editable. Teachers can use the narrative station as "pre-lab" work and the assessment station as "post-lab" work.
2. The science skills and problem-solving stations are the only stations that will require materials other than computers or calculators. By providing these stations in an editable format, you can manipulate the materials required and/or the directions so the activities work for your classroom.
3. By making the science and problem-solving station editable, you can alter the scope of the activities to suit your students' needs. You can also edit the questions so to evaluate your students in a manner that is best for you and your classroom.

MAKE SURE YOU DOWNLOAD the FREE [SNAPs Lab Stations Setup Guide](#) for SIGNAGE, BEST PRACTICES & EDITABLE DOCUMENTS (<https://www.teacherspayteachers.com/Product/SNAPs-Lab-Stations-Guide-2953726>)