7.1 Integrated: What Makes Up Earth's Natural Resources?

SAMPLE STORYLINE: Learning Set 1 **Module Overview**	
Anchoring Phenomenon:	This module begins with a discussion of natural resources and what makes them *natural* and *resources*. The atmosphere (or air) is one of the resources that will be listed, and it is the first resource that will be studied in the module. During the discussion of natural resources, students (Ss) encounter the initial phenomenon: They begin to smell a strong (hidden) odor that the teacher has purposefully introduced. Ss use this shared phenomenon of smelling an unseen odor to recall their own experiences smelling something they couldn't actually see.
Driving Question	**DQ: What Makes Up Earth's Natural Resources?**
Module Goal	This module integrates Earth and physical science content, as well as engineering standards. Students first consider what makes something on Earth a *natural resource*, and then engage in investigations that enable students to figure out that all of Earth's natural resources are made up of particles; the particles are atoms and molecules; atoms of a single type make up each element; everything on Earth is made up of a relatively small number of elements; and atoms can combine in various ways to form molecules, which make up all natural resources and, indeed, all matter in the form of solids, liquids, and gases. In addition, every material can change from one state of matter to another in a process called *phase change*. By the end of this module, students will be able to provide an answer to the DQ at the molecular level, explaining the particle nature of *all* matter. This understanding is foundational to all of science and is imperative for deep understanding of subsequent modules.
Learning Set 1 Lessons 1-5 (19 class periods)	**Learning Set Question: What Makes Up Air and Water?** **Learning Goals:** Students will: ● Develop and use models to explain their initial ideas about (a) what an odor is made up of and (b) how an odor moves from a source to their noses. ● Generate questions about and odors and how they travel from a source to their nose. ● Develop explanatory models to describe and predict entities and interactions that cannot be seen. ● Construct an evidence-based explanation to answer the Learning Set question.

Learning Set 2 Lessons 6-7 (10 class periods)	**Learning Set Question: What Makes Up Rocks, Minerals, and Metals?** **Learning Goals:** Students will: ● Observe patterns in rock and mineral samples, and patterns in properties of metals, and use those patterns to consider the composition of different earth materials. ● Revise their models to include evidence that arrangement of atoms explains why one material is different from another. ● Construct an evidence-based explanation to answer the Learning Set question.
Learning Set 3 Lessons 8-11 (18 class periods)	**Learning Set Question: How Do Natural Resources Change?** **Learning Goals:** Students will: ● Apply the particle model to predict and explain states of matter, phase changes, and the relationship between temperature and movement of the particles in each state of matter. ● Construct an evidence-based explanation to answer the question of how materials can change. ● Construct an evidence-based explanation to answer the Driving Question (at the molecular level).

Lesson Overview

Learning Set 1: What Makes Up Air and Water? (Lessons 1-5)

Lesson 1 – What Are Natural Resources? (Three 50-minute class periods)
After considering what makes something a natural resource, students begin by looking most closely at the air they breathe and that surrounds them. Students investigate air and conclude that, based on it properties, it is comprised of molecules (made up of atoms). They then investigate other natural resources, such as water and rocks, and have evidence to conclude that all natural resources are matter, and all matter is composed of atoms and molecules. In Lesson 1, students begin the kind of thinking that will enable them to develop a particle model for the structure of matter. Early in Lesson 1, all ideas are acceptable, as they represent each student's starting point, regardless of how close or far they are from the eventual target. Students address what natural resources are and use a theme of natural resources to address the particle nature of all matter.

MS-ESS3-1 Construct a scientific explanation based on evidence for how the uneven distributions of Earth's mineral, energy, and groundwater resources are the result of past and current geoscience processes.
ESS3.A: Natural Resources

- Humans depend on Earth's land, ocean, atmosphere, and biosphere for many different resources. Minerals, freshwater, and biosphere resources are limited, and many are not renewable or replaceable over human lifetimes. These resources are distributed unevenly around the planet as a result of past geologic processes. (MS-ESS3-1)

MS- PS1-1 Develop models to describe the atomic composition of simple molecules and extended structures.

PS1.A: Structure and Properties of Matter

- Substances are made from different types of atoms, which combine with one another in various ways. Atoms form molecules that range in size from two to thousands of atoms. (MS-PS1-1)

Environmental Principle I The continuation and health of individual human lives and of human communities and societies depend on the health of the natural systems that provide essential goods and ecosystem services.

- **Concept C:** The quality, quantity, and reliability of the goods and ecosystem services provided by natural systems are directly affected by the health of those systems

Environmental Principle II The long-term functioning and health of terrestrial, freshwater, coastal, and marine ecosystems are influenced by their relationships with human societies.

- **Concept C:** The expansion and operation of human communities influence the geographic extent, composition, biological diversity, and viability of natural systems.

The following columns apply throughout the Storyline document.

Activity	Phenomenon	What Students (Ss) DO in this Activity	What Students (Ss) have FIGURED OUT by the end of the Activity	Suggested Additions to the Word Wall and Driving Question Board (DQB)	Assessing Ss Thinking	What Do We Still Have to Figure Out?
	(What Ss experience to figure out the question in the last column of the previous lesson or activity, and to ask new questions.)	<u>Science and Engineering practices</u> are underlined Crosscutting Concepts are highlighted in green Environmental Principles are highlighted in orange	(Scientific Principles are numbered and **bolded**)	(WW words suggestions are *italicized*) (Others may be added at your discretion.)	(Suggested ways you might assess what Ss have figured out. Discussion questions in the TE, and any questions in the SE may also be used for assessment purposes.)	(This is what Ss will investigate next. Most often, this is framed as a "Bridging Question" to provide lesson-to-lesson and activity-to-activity coherence.)
Activity	**Phenomenon**	**What Ss DO**	**What Ss figure out**	***WW* and DQB suggestions**	**Assessments**	**Bridging Question**

7.1 Integrated: What Makes Up Earth's Natural Resources?

Activity	Phenomenon	What Ss DO	What Ss figure out	*WW* and DQB suggestions	Assessments	Bridging Question
A.1.1	Ss smell a strong (hidden) odor (e.g. vinegar, an orange, rubbing alcohol or peppermint oil) in the room.	Discuss natural resources, and ask questions about them. Ss smell a strong (natural) odor to contextualize the learning goals for this module and to begin to consider the resource that is the air around them. Ss develop an initial model of what they think is happening--at a level that they cannot see--when they smell an odor. *Reading One – Does This Smell Good to You?* The reading personalizes the phenomenon of odors that people like or don't like. Ss ask questions that arise from obtaining information in the reading and from their observations in class.	Ss recognize that some*thing* very small is going from the jar to Ss noses, and proximity matters when smelling odors. Asking Questions; Developing and Using Models Scale, Proportion, and Quantity; Matter and Energy Principle I, Concept C; Principle II, Concept C	*natural resource/recurso natural* See *IQWST Overview* yellow booklet (pp 41-42) for more ideas for vocabulary building, language support, and Word Wall development. The DQB is a space that accounts for Ss ongoing questions and developing understandings as they investigate the Driving Question. See *IQWST Overview* (pp 70-72) for support for developing, maintaining, and using the DQB. The DQB for this module is set up across Activity 1.1 and 1.2. Add to the DQB the class list of Natural Resources.	Use the Making Sense questions for Activity 1.1 and class discussion to assess Ss thinking early on.	How well do the models we drew help us explain the phenomenon of how we smell odors when we aren't near them?

A.1.2	Revisiting the phenomenon of smelling odors from a distance, and sharing models.	The class develops criteria for evaluating models, and uses those criteria to evaluate their initial models. Ss post questions to the DQB. *Reading Two – How Can I Model the Things Gases Do?* Ss read about and the class discusses everyday examples of gases being added to closed containers (e.g., propane tanks for grilling, scuba tanks). Developing and Using Models Scale, Proportion, and Quantity; Matter and Energy Principle I, Concept C; Principle II, Concept C	Phenomena can be observed at various scales using models to study systems that are too small to observe. Ss models should include an odor source, a nose, odor, and air, although there may be different ideas about how they interact. Revisit the DQB often to answer posted questions, add artifacts that helped the class answer those questions, and add new questions as they arise. Keep the DQB central to Ss investigations and developing understandings throughout the module.	*model/modelo, scale/escala* In order to reinforce listening while using the DQB, Ss who want to add to the DQB should connect their new question to another Ss question. See *IQWST Overview* (pp 70-72) for support for initial development of the DQB. Post student models of different types on the DQB. Ss original questions (on sticky notes) should be posted by the end of Lesson 1.	Use the DQB with Ss sticky note questions to determine what Ss are curious about (see next column - What will we figure out next) and use the structure of the DQB (i.e. the Learning Set questions) to anticipate when Ss might be able to answer their specific questions.	How does an odor get into the air?***** **Whenever possible, use Ss questions from the DQB that are **similar** to those listed in this column to launch the next activity, indicating, "Here's a question it might make sense to address next" or another way to segue.*

Lesson 2 – What Makes Up Gases? (Three 50- minute class periods)
As they investigate air, students learn two characteristics of gases in general: Gases can be added to or subtracted from a rigid container, and can also "fill" and take the shape of a container. Based on evidence from their investigations, students develop a model of gases, and use it to explain that the building blocks of gases are tiny, invisible particles (molecules) in constant motion.

MS- ESS3-1 Construct a scientific explanation based on evidence for how the uneven distributions of Earth's mineral, energy, and groundwater resources are the result of past and current geoscience processes.
ESS3.A: Natural Resources

- Humans depend on Earth's land, ocean, atmosphere, and biosphere for many different resources. Minerals, freshwater, and biosphere resources are limited, and many are not renewable or replaceable over human lifetimes. These resources are distributed unevenly around the planet as a result of past geologic processes.(MS- ESS3-1)

MS- PS1-1 Develop models to describe the atomic composition of simple molecules and extended structures.

PS1.A: Structure and Properties of Matter

- Substances are made from different types of atoms, which combine with one another in various ways. Atoms form molecules that range in size from two to thousands of atoms. Solids may be formed from molecules, or they may be extended structures with repeating subunits (e.g., crystals).(MS- PS1-1)

MS- PS1-4 Develop a model that predicts and describes changes in particle motion, temperature, and state of a pure substance when thermal energy is added or removed.

PS1.A: Structures and Properties of Matter

- The changes of state that occur with variations in temperature or pressure can be described and predicted using these models of matter. (MS-PS1-4)

Environmental Principle I The continuation and health of individual human lives and of human communities and societies depend on the health of the natural systems that provide essential goods and ecosystem services.

- **Concept C:** The quality, quantity, and reliability of the goods and ecosystem services provided by natural systems are directly affected by the health of those systems

Environmental Principle II The long-term functioning and health of terrestrial, freshwater, coastal, and marine ecosystems are influenced by their relationships with human societies.

- **Concept B:** The methods used to extract, harvest, transport and consume natural resources influence the geographic extent, composition, biological diversity, and viability of natural systems.
- **Concept C:** The expansion and operation of human communities influence the geographic extent, composition, biological diversity, and viability of natural systems.

Activity	Phenomenon	What Ss DO	What Ss figure out	*WW* and DQB suggestions	Assessments	Bridging Question
A.2.1	Ss participate in a teacher-led demo: Using a hand pump to remove air from a flask, and to add air to a full flask.	Ss develop and use models to explain how gases can be added to and subtracted from a closed container, and how more can be added to a "full" container. Ss argue from evidence that air is or is not matter.	Ss use their models to explain how gases can be added to and subtracted from a closed container and how more can be added to a "full" container. Our models represent something too small to see. Scientific Principles:	*matter/materia, mass/masa, volume/volumen* See *IQWST Overview* for more about using the DQB as a teaching and learning tool. See Differentiation and Other Strategies section of TE (pg 8).	Ss flask models. Making Sense questions in SE 2.1 Questions in Reading One	Is there anything else unique that gases can do?

		Developing and Using Models; Engaging in Argument from Evidence Scale, Proportion, and Quantity; Matter and Energy Principle I, Concept C; Principle II, Concepts B&C	**1. Matter is anything that has mass and volume.** **2. Air has mass and volume.** **3. Gas does not have a definite shape or volume and can be added and removed from a container.** **4. All Earth's natural resources are matter.** Introduce Scientific Principles as "our best understanding, supported by evidence." See *IQWST Overview* (pp 31-32) for support for developing Scientific Principles.	A drawing or photo of the flask with the pump will help students recall the investigation as well as what they learned doing it. Summarize what was learned in a sentence (perhaps the Scientific Principle) and post it alongside the drawing, photo, or other artifact in any lesson. After any modeling activity, post a student model or two.		

Lesson 3 – What Makes Up Gases? (Four 50- minute class periods)

Students saw in Lesson 2 that air can be added to and subtracted from a container. Now they will investigate two more characteristics of air: expansion and compression. This will help students develop a conceptual understanding that these behaviors are possible because there is empty space between particles of a gas. Students develop a consensus model to explain all four characteristics of air as one of the natural resources they use daily and as representative of all gases.

MS-PS1-1 Develop models to describe the atomic composition of simple molecules and extended structures.

PS1.A: Structure and Properties of Matter

- Substances are made from different types of atoms, which combine with one another in various ways. Atoms form molecules that range in size from two to thousands of atoms. Solids may be formed from molecules, or they may be extended structures with repeating subunits (e.g.,crystals).(MS-PS1-1)

MS-PS1-4 Develop a model that predicts and describes changes in particle motion, temperature, and state of a pure substance when thermal energy is added or removed.

PS1.A: Structure and Properties of Matter

- The changes of state that occur with variations in temperature or pressure can be described and predicted using these models of matter. (MS-PS1-4)

Activity	Phenomenon	What Ss DO	What Ss figure out	*WW* and DQB	Assessments	Bridging

				suggestions		Question
A.3.1	Ss manipulate a large syringe with air inside, to observe behaviors of air.	Ss investigate compression and expansion of air using syringes, and discuss in terms of an open or closed system. During discussion, Ss develop mental models of air inside the syringe under two conditions: compression and expansion. (Depending on class time and discussion, Ss may begin 3.2 models.) Scale, Proportion, and Quantity; Matter and Energy; System and System Models	Ss use their models to explain the subtraction, addition, compression, and expansion of a gas inside a container as they open and close the system. All gases have these two properties—the ability to compress into a smaller volume and the ability to expand into a larger volume. The movement of particles becomes clearer through this investigation and the next. Developing and Using Models; Engaging in Argument from Evidence	*compression/compresión, expansion/espansión* Tape a syringe to the DQB. Add any new questions that have arisen.		How can matter can be compressed? If there were more pieces, and they were all packed in tightly, then how could they get squished together even more?
Activity	**Phenomenon**	**What Ss DO**	**What Ss figure out**	***WW* and DQB suggestions**	**Assessments**	**Bridging Question**

A.3.2	Ss revisit the syringe investigation, and develop and share models of what is happening inside the syringe.	Ss model air as it compresses and expands inside a syringe. *Reading One:How Can I Model the Things Gases Do?* Reading helps Ss to make sense of in-class investigations and why only a particle model accounts for all the behaviors of gases. Developing and Using Models; Engaging in Argument from Evidence	Ss develop and use a model to explain the subtraction, addition, compression, and expansion of a gas in a closed container. All gases have these two properties—the ability to compress into a smaller volume and to expand into a larger volume. Scale, Proportion, and Quantity; Matter and Energy; System and System Models	Add any new questions that have arisen. Add models labeled *compression* and *expansion*.	Use Ss models to assess whether they hold a particulate model of matter yet, or continue to hold another model of gases. Making Sense questions for A.3.2.	Does each model (one by one) show that air can expand? Be compressed? Be added to or subtracted from a container? Can we develop one model that we can all agree on?
A.3.3	Continuing with syringes and models.	Develop a consensus model after discussion of the four characteristics of gases (can be added or taken out of a container, expanded, or compressed) Developing and Using Models; Engaging in Argument from Evidence Scale, Proportion, and Quantity; Matter and Energy; System and System Models.	Ss use the consensus model to explain the subtraction, addition, compression, and expansion of a gas in a closed container. Scientific Principles: **5. Gases can be compressed and expanded.** **6. Gases are made up of particles with empty spaces between them.** **7. All matter is made of particles.**	*consensus/consenso* Post the consensus model. Add a picture of a natural gas tank to make the link to Lesson 1, where students learned about mercaptan being added to natural gas, which is a natural resource.	Ask questions to help Ss come to a particulate understanding, perhaps focusing on: "What is between this dot and this dot in your model?"	Are the same behaviors true of other matter, or just gases? Does our model of gases fit liquids, for example?
Lesson 4 – What Makes Paper Change Color? (Five 50- minute class periods)						

7.1 Integrated: What Makes Up Earth's Natural Resources?

Students developed a model in the last lesson that helped them see that gas is made of particles with empty space between them. Now students will be looking at acetic acid and ammonia to see that particles are moving in straight lines in all directions until they collide with another particle or bounce off the side of a container. They also learn that the particles that make up a liquid can change to a gas. This leads to the next part of the lesson about how the particles are called atoms and they make up natural resources such as air and water. The next lesson builds understanding of atoms and molecules as students develop and use physical models to explain air as a mixture of gases.

MS- PS1-1 Develop models to describe the atomic composition of simple molecules and extended structures.

PS1.A: Structure and Properties of Matter

- Substances are made from different types of atoms, which combine with one another in various ways. Atoms form molecules that range in size from two to thousands of atoms. Solids may be formed from molecules, or they may be extended structures with repeating subunits (e.g.,crystals).(MS- PS1-1)

MS- ESS3-1 Construct a scientific explanation based on evidence for how the uneven distributions of Earth's mineral, energy, and groundwater resources are the result of past and current geoscience processes.

ESS3.A: Natural Resources

- Humans depend on Earth's land, ocean, atmosphere, and biosphere for many different resources. Minerals, freshwater, and biosphere resources are limited, and many are not renewable or replaceable over human lifetimes. These resources are distributed unevenly around the planet as a result of past geologic processes. (MS- ESS3-1)

Environmental Principle I The continuation and health of individual human lives and of human communities and societies depend on the health of the natural systems that provide essential goods and ecosystem services.

- **Concept C:** The quality, quantity, and reliability of the goods and ecosystem services provided by natural systems are directly affected by the health of those systems

Environmental Principle II The long-term functioning and health of terrestrial, freshwater, coastal, and marine ecosystems are influenced by their relationships with human societies.

- **Concept C:** The expansion and operation of human communities influence the geographic extent, composition, biological diversity, and viability of natural systems.

Activity	Phenomenon	What Ss DO	What Ss figure out	*WW* and DQB suggestions	Assessments	Bridging Question
A.4.1	An indicator paper suspended over a liquid (not touching the liquid) changes color.	Observe a teacher demo of two flasks containing known liquids (acetic acid, ammonia) that look alike but can be distinguished in that they turn indicator paper different colors. Observe a third flask containing an	Ss develop and use <u>models</u> of the particle nature of gases to <u>explain</u> the presence (thus movement) of molecules from a liquid substance on an indicator suspended above that substance. They	*Here or in 4.2, as the words arise: evaporation/evaporación, molecules/molécula* Post a photo or drawing of the setup of the lab with indicator paper of different colors.	Making Sense questions in A.4.1 Last question in Reading One. Ask: How is this (demo) similar to	How does what we have learned about molecules so far affect our model of how we can smell odors?

		unknown liquid for comparison. *Reading One: How Do People Use Detectors? An understanding of particles is important for developing others types of detectors (e.g., carbon monoxide), as well, connecting in-class science with real-world applications.* Environmental Principles: Principle I, Concept C; Principle II, Concept C	observe the indicator changing colors even when it does not touch the substance, evidence that particles are moving from the liquid to the gaseous state and then touching the paper. Developing and Using Models; Engaging in Argument from Evidence Scale, Proportion, and Quantity; Matter and Energy		what happens when you hang up a wet towel from your shower or bath and it dries?	
Activity	**Phenomenon**	**What Ss DO**	**What Ss figure out**	***WW* and DQB suggestions**	**Assessments**	**Bridging Question**
A.4.2	Revisiting of previous investigations and revising Ss initial models of how odors travel to develop a consensus model. Simulation or human modeling of particle movement.	Students investigate particle movement: Either human modeling of molecular movement (planning what they would need to do to "act" as molecules in a liquid and gas) and/or they view or manipulate a simulation, and/or create a flipbook that can illustrate particle movement.They interpret observational data from 4.1 and these activities, and synthesize info as evidence for developing a	Ss use their models to explain why indicator paper changes color and how matter in the form of an odor travels. A consensus model is the outcome of engaging in argument from evidence. Scientific Principles: **8. Particles in a gaseous state move in a straight line in all directions until they collide with another particle or bounce off the side of the container.**	*atom/átomo* Post a photo or drawing of the setup of the lab with the indicator paper with different colors. Post the consensus model. Add the idea that air particles *move*. Post any new questions that arise. Revisit the DQB often to determine whether any	Making Sense questions in A.4.2 Last question in reading. See Assessing Learning section for explanation task related to how a person can smell a cup of coffee.	What does it mean to say that something is "made up of" particles? Or that odors are "in" air?

		consensus model. *Reading Two: Are All Types of Matter Made of Particles?* Ss confirm in-class conclusions as they read that solids, liquids, and gases are each made up of particles, thus all of Earth's natural resources must be made up of particles. Environmental Principles: Principle I, Concept C; Principle II, Concept C	Scale, Proportion, and Quantity; Matter and Energy Planning and Carrying Out Investigations; Analyzing and Interpreting Data; Developing and Using Models; Engaging in Argument from Evidence	sticky-note questions can be answered. (Ask Ss who wrote a question to answer it and share with the class, or have groups answer different questions that you take down from the DQB and assign to them, or have the class collaborate to answer orally.)		

Lesson 5 – What Does It Mean That Odors Are "in" the Air? (Four 50- minute class periods

This lesson builds understanding of atoms and molecules as students develop and use physical models to explain air as a mixture of gases. Students also explore ammonia and water as 3- D representations so they can see that both gases and liquids are made of atoms that join together to make up molecules. This leads to the next lesson, in which rocks and minerals, both solids at room temperature and additional natural resources, are also found to be made of atoms.

MS- ESS3-1 Construct a scientific explanation based on evidence for how the uneven distributions of Earth's mineral, energy, and groundwater resources are the result of past and current geoscience processes.

ESS3.A: Natural Resources

- Humans depend on Earth's land, ocean, atmosphere, and biosphere for many different resources. Minerals, freshwater, and biosphere resources are limited, and many are not renewable or replaceable over human lifetimes. These resources are distributed unevenly around the planet as a result of past geologic processes. (MS- ESS3- 1)

MS- PS1-1 Develop models to describe the atomic composition of simple molecules and extended structures.

PS1.A: Structure and Properties of Matter

- Substances are made from different types of atoms, which combine with one another in various ways. Atoms form molecules that range in size from two to thousands of atoms. Solids may be formed from molecules, or they may be extended structures with repeating subunits (e.g., crystals). (MS- PS1- 1)

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Environmental Principle II The long-term functioning and health of terrestrial, freshwater, coastal, and marine ecosystems are influenced by their relationships with human societies.

- **Concept C:** The expansion and operation of human communities influence the geographic extent, composition, biological diversity, and viability of natural systems.

Activity	Phenomenon	What Ss DO	What Ss figure out	*WW* and DQB suggestions	Assessments	Bridging Question
A.5.1	Teacher demo of a 3D ammonia model, linking 4 different representations of ammonia. Ss make other ball and stick models.	Ss develop ball-and-stick models of oxygen, carbon dioxide, nitrogen, and water and use those models to investigate air at the molecular level (as a mixture of gases). *Reading One: What Kinds of Particles Do I Breathe, and What Are They Made Of?* Ss read about air as a mixture, and consider whether is pure or is a mixture. Developing and Using Models; Engaging in Argument from Evidence	Ss develop and use physical models to explain the relationship between atoms and molecules, substances, and mixtures. Scale, Proportion, and Quantity; Matter and Energy Principle I, Concept C; Principle II, Concept C	substance/substancia, mixture/mezcla, atom/átomo Representations of ammonia (3-D, 2-D, word *ammonia*, and chemical symbol) to support students in connecting the representations. Affix the 3-D model of air in a plastic bag.	Making Sense questions Lesson 5 Reading One: Ss explain whether water in a water bottle is a pure substance or a mixture and why. Last discussion question in TE: How would the bag-of-air model change after a shower (as a result of evaporation).	How does our understanding of atoms and molecules affect our consensus model?
Activity	**Phenomenon**	**What Ss DO**	**What Ss figure out**	***WW* and DQB suggestions**	**Assessments**	**Bridging Question**

A.5.2	Analyze strengths and weaknesses of various models. Revisit and revise models of air and odors.	Ss consider the benefits of different models for different purposes. Developing and Using Models; Engaging in Argument from Evidence Scale, Proportion, and Quantity; Matter and Energy Principle I, Concept C; Principle II, Concept C	Ss develop and use physical models to explain the relationship between atoms and molecules, substances, and mixtures. Scientific Principles: **9. Molecules can be made of the same type of atoms or different types of atoms.** **10. Air is a mixture of different types of molecules.**	Add that air particles can be identified as particular molecules that make up air: primarily nitrogen, oxygen, carbon dioxide, and water in different proportions, and including small amounts of other molecules (including those that make up odors).	Construct an explanation to answer the Learning Set question: "What Makes Up Air and Water?" This could require a model plus written explanation, using data from the activities as evidence, and incorporating scientific principles the class has developed.	Turn to natural resources list: We've said that all natural resources are made of atoms and molecules, and we've investigated gases and liquids; do the behaviors of gases and liquids that we've seen also apply to those natural resources that are solids?

Learning Set 2: What Makes Up Rocks, Minerals and Metals? (Lessons 6-7)
Learning Set 3: How Do Natural Resources Change? (Lessons 8-11)