OHIO OIL & GAS JUMPSTART PROGRAM

Ohio Energy Uncovered

Geology, Jobs & Impact

Full Module Storyboard — Instructional Design Portfolio Sample

Entry-Level Workforce Development · Asynchronous Online · Mobile-First

About This Document

This storyboard documents the complete instructional design for Ohio Energy Uncovered: Geology, Jobs & Impact, a 7-section online module developed for the Ohio Oil & Gas Jumpstart Program (OOGJP). It is intended as a portfolio sample demonstrating instructional design decisions across content architecture, video scripting, workbook structure, and assessment design.

Audience: Entry-level adult learners pursuing workforce development in Ohio's oil and gas sector.

Delivery: Asynchronous online, mobile-first design.

Structure: Each section follows a consistent Video → Workbook → Comprehension Check sequence.

Instructional Design Principles

Design Principle	Application in This Course
Mobile-First Layout	Designed for phone use. Minimal scrolling, clear visual hierarchy, infographics in vertical portrait format, slide decks embedded as scrollable image sequences.
Repeatable Structure	Every section follows Video → Workbook → Quick Check. Consistent structure lowers cognitive load and supports stop-and-restart learning for working adults.
Video as Hook	Short videos (30–90 sec) introduce key ideas without dense on-screen text. VO-driven with motion graphics; designed to create curiosity before the workbook explains.
Visual Workbooks	Brief intro text + vertical infographics translate concepts for fast, scannable comprehension. Framing language above/below each visual provides context without over-explaining.
Low-Stakes Assessment	Drag-and-drop activities and short reflection prompts confirm understanding before learners advance. Auto-feedback reveals correct answers; no grade penalty for wrong attempts.

Design Principle	Application in This Course
Workforce Relevance	Every section connects geology and energy science to real Ohio jobs, wages, and communities. The final quiz uses product-to-source chains to reinforce real-world application.

Module Format at a Glance

#	Section Title	Workbook Components	Comprehension Check
1	**Module Intro: Where Is the Oil?**	Intro text + Learning Objectives	—
2	**Big Idea: Oil & Gas Formation Basics**	3 infographics + Key Terms slide deck	Drag & drop (8 terms)
3	**How It Works: 5 Steps to Energy Discovery**	Exploration workflow infographic	Drag & drop + Reflection
4	**Ohio Connection: Utica Shale Boom**	Key Statistics slide deck	9-question quiz (MC + short answer)
5	**Why It Matters: From Well Pad to Wallet**	2 infographics (petroleum products + local impact)	Drag & drop + Reflection
6	**Careers: Your Future in Ohio Energy**	Careers infographic	Match job to task + Reflection
7	**Final Knowledge Check**	—	Product-to-Source Mystery Chain (4 branching chains)

Section 1 Module Intro: Where Is the Oil?

Video (30 sec) · Intro Text · Learning Objectives

Overview

"Oil and gas don't just exist—we have to find them. And finding them takes science, data, and skilled people."

Every drop of oil and every pocket of natural gas has a story—one that started millions of years underground. In this module, learners explore how oil and natural gas form, how geologists and geophysicists use science and data to find them, and why Ohio's Utica Shale region is one of the most significant energy-producing areas in the United States.

Learning Objectives

#	Learning Objective
1	Explain how oil and natural gas form, migrate, and become trapped underground, including the roles of porosity, permeability, reservoirs, and traps.
2	Describe key steps in the oil and natural gas exploration process, including seismic data collection, subsurface analysis, and drilling decisions.
3	Identify why Ohio's Utica Shale is an important energy resource, supporting everyday products, jobs, and the state economy.
4	Recognize and correctly apply foundational geoscience and exploration terms, such as source rock, reservoir, trap, porosity, permeability, and stratigraphy.
5	Match energy careers to their roles in exploration and drilling, including geologists, geophysicists, and drilling engineers.

Note: The 30-second hook video storyboard for this section is provided as a separate document.

Section 2 Big Idea: Uncovering Ohio's Hidden Energy

Oil and Gas Formation Basics · Video (~70 sec) · Workbook · Comprehension Check

Video

What to Watch For	Oil and natural gas are part of everyday life, but the process that creates them happens deep underground and over millions of years. This video introduces how energy forms beneath Ohio and why understanding geology is essential before any exploration or drilling decisions are made.
Video Storyboard	See separate Section 2 storyboard document ("Uncovering Ohio's Hidden Energy: Oil and Gas Formation Basics" — ~70 sec).

Workbook Intro Text: Understanding the Underground

Before a well is ever drilled, geologists and geophysicists must answer a critical exploration question: where are oil and natural gas most likely to be present in the subsurface?

Oil and natural gas are not randomly distributed underground. They form over millions of years from buried organic material, migrate through rock layers, and accumulate only where geological conditions allow them to be stored and sealed. Identifying these locations requires an understanding of rock types, fluid movement, and the structures that create reservoirs and traps.

In this section, learners explore how scientists interpret the underground landscape, why certain rocks can store oil and natural gas while others cannot, and how geological evidence guides informed decisions in energy development. Ohio's Utica Shale provides a real-world example throughout.

Infographics

Element	Framing Text	Image / Visual Description
Earth Layers Infographic	To understand where oil and natural gas are found, it helps to start with the structure of the Earth itself. This diagram provides the geological context needed to understand where energy forms—and where it does not.	Vertical cross-section of Earth: crust, upper mantle, lower mantle, outer core (liquid), inner core (solid). Labels include approximate depths, temperatures, and states. Zoomed inset on crust showing sedimentary shale/reservoir layers relevant to petroleum geology.
How Oil & Gas Form and Become Trapped	Oil and natural gas form within the Earth's upper layers over extremely long periods of time. This diagram shows the complete underground system that allows oil and natural gas to form, move, and collect.	Subsurface cross-section showing: source rock (shale), migration pathways, reservoir, trap, cap rock, and oil/gas/water layering in sequence.
How Oil & Gas Form Over Time	Formation is only part of the story. This timeline provides background on how oil and natural gas form over millions of years. Focus on the overall process rather than memorizing each stage.	Horizontal timeline: (1) Organic plankton/algae die in ancient oceans → (2) Buried under sediment → (3) Heat/pressure at 2–4km creates kerogen (oil window: 90–160°C) → (4) Kerogen

Element	Framing Text	Image / Visual Description
		becomes oil/gas → (5) Migrates upward → (6) Trapped under cap rock in reservoir.

Key Terms Slide Deck

The diagram you just reviewed includes several key geology terms. The slides that follow explain these terms and how they relate to the underground system.

Mobile design note: Embed as a vertical sequence of full-width images with learner text directly below each image. Scroll-based layout minimizes cognitive load and supports vocabulary retention on small screens.

Slide	On-Slide Text	Suggested Visual	Text Below Slide
Slide 1 How Oil & Gas Are Found Underground	Oil and natural gas form deep underground. Rock layers control where energy resources collect.	Full labeled cross-section of underground rock layers (surface to subsurface).	Oil and natural gas are formed and stored deep beneath Earth's surface within specific layers of rock. These underground systems determine where oil and natural gas originate, how they move through rock layers, and where they become concentrated. The terms in this slide deck describe the basic geological processes scientists use to understand and locate these resources.
Slide 2 Shale & Source Rock	Shale Source Rock Oil Window	Bottom layer of cross-section diagram highlighted and labeled "Shale / Source Rock."	Shale is a fine-grained sedimentary rock formed from compacted mud. A source rock is a type of shale that contains abundant organic matter. Over millions of years, heat and pressure transform this material into hydrocarbons within the oil window (approximately 90–160°C). Source rock is where oil and natural gas originate.
Slide 3 Porosity, Permeability & Reservoirs	Porosity Permeability Reservoir	Rock layer with pore spaces and arrows showing fluid movement.	Porosity refers to the amount of open space within a rock—spaces that can hold oil, natural gas, or water. Permeability refers to how easily fluids move through those spaces. A reservoir is a rock layer with enough porosity and permeability to store oil or natural gas in usable amounts.
Slide 4 Migration	Migration: upward movement of oil and gas	Arrows moving upward from source rock toward reservoir layer.	Migration is the movement of oil and natural gas through underground rock layers. After hydrocarbons form in source rock, they move gradually upward through permeable rocks and fractures, because oil and natural gas are lighter than surrounding fluids. Migration continues until the fluids become trapped or can no longer move.
Slide 5 Traps & Cap Rock	Trap Cap Rock	Folded rock layers with a sealed reservoir beneath a	A trap is a geologic feature that prevents oil and natural gas from continuing to migrate. Traps form when rock layers are folded, tilted, or broken in a way that blocks movement. A cap rock is a dense,

Slide	On-Slide Text	Suggested Visual	Text Below Slide
		dense upper cap rock layer.	non-porous rock layer above a reservoir that acts as a seal, allowing oil and gas to accumulate.
Slide 6 Seismic Surveys & Stratigraphy	Seismic Survey Stratigraphy	Surface vibration trucks with reflected wave lines underground; numbered rock layers.	A seismic survey creates images of underground rock layers by sending sound waves into the ground and capturing reflections. Stratigraphy is the study of rock layers and how they are arranged over geologic time. Together, these tools help scientists identify potential locations of oil and natural gas.
Slide 7 Additional Terms	Geophysics Core Sample Subsurface Utica Shale	Core sample photo; depth scale labeled "subsurface"; Ohio map highlighting Utica Shale.	Geophysics uses physics and data analysis to study what is happening beneath Earth's surface. A core sample is a cylindrical piece of rock taken from underground and examined directly. The subsurface refers to all rock layers below Earth's surface. The Utica Shale is a major formation in Ohio central to the state's oil and natural gas development.
Slide 8 Key Takeaways	Oil and gas form in source rock Migration moves fluids upward Reservoirs store energy resources Traps and cap rock hold them in place	Full diagram with all major terms labeled simultaneously.	Oil and natural gas form deep underground within source rock. These resources migrate through rock layers until they collect in reservoir rocks. Traps and cap rock prevent further movement and allow oil and gas to accumulate. Understanding these terms provides a foundation for learning how oil and natural gas are explored, produced, and managed responsibly.

Comprehension Check: Drag & Drop

This activity checks understanding of key terms learners will encounter throughout the course. Match each term to its definition.

#	Question	Answer / Feedback
1	**Porosity**	The amount of open space in a rock that can hold oil, gas, or water.
2	**Permeability**	The ability of a rock to let fluids move through it.
3	**Reservoir**	A rock layer that stores oil or natural gas underground.
4	**Seismic survey**	A method that uses sound waves to create images of underground rock layers.
5	**Shale**	A fine-grained rock that can contain and help generate oil and gas.
6	**Stratigraphy**	The study of rock layers and how they are arranged over time.
7	**Migration**	The movement of oil and gas through underground rock layers.

#	Question	Answer / Feedback
8	**Trap**	A geologic feature that stops oil and gas from moving farther underground.

Auto-feedback: Reveals correct matches on submission.

Section 3 How It Works: Ohio's 5 Steps to Energy Discovery

From Data to Drill · Video (~75 sec) · Workbook · Comprehension Check

Video

What to Watch For	Energy development involves real people, real equipment, and real decisions. As you watch, notice how much planning and coordination are involved before energy is ever produced.
Video Storyboard	See separate Section 3 storyboard document ("Ohio's 5 Steps to Energy Discovery: From Data to Drill" — ~75 sec).

Workbook Intro Text: From Rock to Resource

Exploration teams don't guess where to drill—they follow a precise process using science and technology to guide high-stakes decisions. Each step builds on the last, starting with mapping underground rock layers and ending with a carefully evaluated drilling decision.

In Ohio's Utica Shale, this process allows companies to identify productive areas efficiently, reduce environmental risk, and protect workers and communities. The same workflow is used by geologists, technicians, data analysts, and field crews across the energy sector.

Exploration Workflow Infographic

The infographic below breaks down Ohio's 5-step energy discovery workflow—from early research to the final drilling decision. Each step builds on the last, helping reduce risk, protect workers and the environment, and determine whether drilling makes sense.

Element	Framing Text	Image / Visual Description
Step 1 Research & Planning	Geologists study geology, rock data, and Ohio's Utica Shale to identify promising areas.	Ohio state outline map with Utica Shale highlighted + magnifying glass over rock layers. Largest box in flowchart (sets context).
Step 2 Seismic Surveys	Exploration teams send sound waves underground. Sensors capture echoes to create 3D images of rock layers up to 2 miles deep.	Vibrating truck → sound wave lines → geophone sensors in the ground.
Step 3 Data Analysis	Geologists analyze seismic data, well logs, and core samples to find traps and reservoirs.	Computer screen with 3D seismic image + geologist reviewing colorful rock layer maps. Decision diamond: Viable site? → YES → Next steps.
Step 4 Permitting & Site Prep	Energy companies lease land, get Ohio DNR permits, survey the site, and prepare for safe drilling.	Clipboard with ODNR permit stamp + surveyor with levels + environmental checklist. Note: "Environmental protection required."
Step 5 Drilling Decision	Drilling companies drill a test well to confirm commercial quantities. Ohio produced a record 30M barrels of oil in 2023.	Drilling rig silhouette → oil/gas droplet emerging. Footer: Ohio's precise exploration: Data → Discovery → Energy.

Comprehension Check: Drag & Drop + Reflection

Understanding the exploration workflow helps learners see how data, safety, and planning work together to reduce risk. This check is about knowing how smart decisions are made in real-world energy projects.

Part 1: Sequence the Steps (Drag each to position 1–5)

#	Question	Answer / Feedback
1	**Research rocks and maps for promising areas.**	Step 1 — Research & Planning
2	**Conduct seismic surveys using sound waves to map underground structures.**	Step 2 — Seismic Surveys
3	**Analyze seismic data and geology to pick a drill site.**	Step 3 — Data Analysis
4	**Get permits, lease land, prep site.**	Step 4 — Permitting & Site Prep
5	**Drill test well if the data confirms potential.**	Step 5 — Drilling Decision

Part 2: Reflection

Why do you think drilling happens last in the process?

Sample response: Drilling is expensive and permanent, so companies want to be confident before they start. Using geology, seismic data, and permits first reduces risk and helps protect workers, landowners, and the environment.

Dive Deeper: Exploration in Action

How Geologists Use Subsurface Data	Shows how seismic data, rock layers, and maps are used to locate potential drilling sites. youtube.com/watch?v=CibRqyFxpk8
Shale Depth & Thickness Maps	Maps show how deep shale layers are and how thick they can be, helping geologists narrow down target areas. marcellus.psu.edu/resources/maps-graphics-and-videos
Geologic Cross-Sections	Side-view diagrams show underground rock layers and how vertical and horizontal wells reach oil and gas. geology.com/articles/utica-shale

Section 4 Ohio Connection: Ohio's Utica Shale Boom

Production, Jobs & Economic Power · Video (~72 sec) · Workbook · Comprehension Check

Video

What to Watch For	Pay attention to how Ohio's natural gas and oil resources connect to real equipment, real jobs, and real communities. Notice how production moves from the ground to processing—and how workers are involved at every step.
Video Storyboard	See separate Section 4 storyboard document ("Ohio's Utica Shale Boom: Production, Jobs, and Economic Power" — ~72 sec).

Workbook Intro Text: Turning Potential into Power

Ohio matters because of its Utica Shale production. The state ranks as the 7th-largest U.S. natural gas producer (5% of the national total) and set a record of 30 million barrels of oil in 2023.

Ohio's geology, regulations, skilled workforce, and central location make it attractive for energy development. These advantages have positioned the state as a major player in shale production and driven significant economic activity:

$108B+ Investment	Companies have invested more than $108 billion in Ohio's energy sector since 2012. Intel's $4.5 billion factory represents just about 4% of that total. [p.12]
16,703 Direct Jobs	The industry supports 16,703 direct oil and gas jobs, growing 6.6% in 2023, paying wages nearly 55% higher than the Ohio average. [p.13]
$9.4B Annual GDP	Oil and gas activities contribute $9.4 billion annually to Ohio's economy, including $7.5 billion from extraction alone. [p.12–13]
Community Impact	Carrollton Exempted Village Local Schools is building a $38 million high school using tax revenue from a nearby natural gas plant. [p.18]

Key Statistics Slide Deck

Design note: Embed as a vertical sequence of full-width images with learner text directly below each image.

Slide	On-Slide Text	Suggested Visual	Text Below Slide
Slide 1 Big Picture	Ohio's Utica Shale: Energy, Jobs, and Economic Power • Top-10 U.S. natural gas producer • 30 million barrels of oil in 2023	Simplified Ohio state outline with eastern counties highlighted.	Ohio's energy strength comes from the Utica Shale, a major oil and natural gas formation beneath eastern Ohio that supports production, jobs, and long-term investment.
Slide 2 Where Production Happens	Production Is Highly Concentrated • 99% of Ohio's natural gas • From just 15 counties	County map with Belmont and Jefferson emphasized.	Most of Ohio's natural gas production comes from a small group of counties where the Utica Shale is thick, productive, and well supported by existing infrastructure.

Slide	On-Slide Text	Suggested Visual	Text Below Slide
Slide 3 Oil Production Leaders	Oil Production Hotspots • Carroll County: 33% of Ohio oil • Guernsey County: 31% of Ohio oil	Two side-by-side bars or county callouts showing production share.	Oil production is concentrated where geology makes drilling most efficient, allowing operators to produce more oil with fewer wells.
Slide 4 Jobs in Ohio's Energy Industry	Energy Means Jobs • 16,703 direct oil & gas jobs • 6.6% job growth (2023) • Wages ~55% above state average	Worker silhouettes or helmet/pipe icons with numbers.	Utica Shale development supports thousands of skilled jobs across drilling, production, processing, and support services—many offering family-sustaining wages.
Slide 5 Investment Scale	Energy Investment at Scale • $108 billion energy investment (since 2012) • vs. $4.5 billion Intel plant	Simple scale graphic showing relative size difference between the two figures.	Energy investment in Ohio far exceeds that of even major manufacturing projects, underscoring the importance of oil and gas development to the state's economy.
Slide 6 Why This Matters for Workers	What This Means for You • Long-term career paths • Skilled trades and technical roles • Local economic impact	Worker in PPE with an industrial background.	Understanding where energy production happens and why helps workers see how their skills connect to real operations, real communities, and long-term opportunity.

Comprehension Check: Quiz

These numbers aren't just statistics—they represent jobs, training, and economic opportunity. The questions below ask learners to interpret the data the way employers and policymakers do.

#	Question	Type	Answer / Feedback
1	**What do you think is the most important thing these infographics show about Ohio's energy industry?**	Short answer	Sample: How production concentrates in 15 counties; $108B investments dwarf Intel's $4.5B.
2	**Which two counties produced more than half of Ohio's natural gas in 2023? A) Carroll and Guernsey B) Belmont and Jefferson C) Stark and Mahoning D) Monroe and Noble**	Multiple choice	B. Belmont and Jefferson
3	**About what share of Ohio's natural gas in 2023 came from just 15 counties? A) 25% B) 50% C) 75% D) 99%**	Multiple choice	D. 99%

#	Question	Type	Answer / Feedback
4	**What was the cumulative shale-related investment in Ohio since 2012? A) $10.8B B) $45.4B C) $108.2B D) $208.2B**	Multiple choice	C. $108.2 billion
5	**How many direct oil and gas jobs were there in Ohio in 2023? A) 1,861 B) 16,703 C) 167,224 D) 303**	Multiple choice	B. 16,703
6	**Ohio's oil and gas workers earn wages nearly 55% higher than the state average.**	True / False	True
7	**What does the Intel comparison help illustrate? A) Energy investments are small B) Energy investments are much larger than a major factory C) Intel invested more D) Energy doesn't affect Ohio's economy**	Multiple choice	B. Ohio's energy investments are much larger than a major factory investment
8	**What is one number or statistic that stands out to you? Why?**	Short answer	Sample: 16,703 direct jobs (+6.6%)—stands out for family impact. $9.4B in GDP—huge for Ohio's economy.
9	**Why do you think oil and gas production is concentrated in a small number of counties?**	Short answer	Sample: The Utica Shale is thickest and most productive in eastern Ohio counties, making drilling more efficient and economically viable there.

Auto-feedback: Correct answers revealed for questions 2–7; sample responses shown post-submit for questions 1, 8, and 9.

Section 5 Why It Matters: From Well Pad to Wallet

Ohio Energy's Real Impact · Video (~72 sec) · Workbook · Comprehension Check

Video

What to Watch For	Pay attention to how energy workers describe their role—not just what they do, but how their work connects to everyday life, local communities, and long-term careers. Notice the idea that no single job stands alone in the energy system.
Video Storyboard	See separate Section 5 storyboard document ("From Well Pad to Wallet: Ohio Energy's Real Impact" — ~72 sec).

Workbook Intro Text: Moving Energy Safely

Ohio plays a critical role in America's energy system—and much of that strength comes from the Utica Shale. Developing these resources requires advanced drilling technologies, complex production systems, and a highly trained workforce operating across upstream, midstream, and downstream operations.

The impact goes beyond energy production. Oil and gas development in Ohio contributes to family-sustaining wages, funds local schools and public services, and creates long-term career pathways in construction, operations, maintenance, electrical work, and environmental safety.

Infographics

Element	Framing Text	Image / Visual Description
Common Petroleum Products	Oil and natural gas aren't just fuels—they're raw materials used to make thousands of everyday products. Let's look at what those products are and where they come from.	Product icon → arrow → material description for each item: • Plastic water bottles → PET plastic from petroleum and NGL • Polyester clothing → Petroleum-based synthetic fibers • Phone cases → Plastic polymers from crude oil • Disposable gloves → Petrochemical-based plastics (nitrile/vinyl) • Car tires → Synthetic rubber made partly from petroleum
Local Impact: Where the Money Goes	When oil and natural gas are developed locally, the benefits don't disappear once production begins. In Ohio, oil and gas activity generates tax revenue and economic activity that support local schools, roads, emergency services, and other public needs in shale-producing counties.	Center: Ohio county map or county outline graphic. Left: "Energy activity" icon with arrows flowing into a tax/revenue pool. Right: 3 benefit boxes— 1. Schools: Property tax revenue funds school districts. Example: Carrollton schools building $38M high school from gas tax revenue. 2. Roads: Tax revenue and road-use agreements help maintain transportation infrastructure near producing areas. 3. Public Services: Energy-related taxes support counties, villages, townships, and cities (emergency response, municipal needs). Bottom callout: "Energy dollars stay local and help communities."

Comprehension Check: Drag & Drop + Reflection

Part 1: Sort Items (Made Using Petroleum / Not Made Using Petroleum)

Made Using Petroleum	Not Made Using Petroleum
Plastic water bottle, Toothbrush, Shampoo bottle, Polyester shirt, Rain jacket, Disposable gloves, Car tire, Phone case, Snack wrapper, Pen	Glass cup, Wooden chair, Cotton towel, Paper notebook, Ceramic mug, Metal spoon, Stone coaster, Wool scarf, Bamboo utensil, Cotton socks

Part 2: Reflection

#	Question	Answer / Feedback
1	**Look around you right now. List 3 items you can see that might be made using petroleum.**	Sample: My phone case (plastic), water bottle (PET), laptop keyboard (synthetics).
2	**How could local energy tax revenue show up in your everyday life?**	Sample: Better school buses or roads from property taxes in shale counties; new playground or fire truck funded by gas royalties.

Auto-feedback: Part 1 reveals correct matches. Part 2 is ungraded; sample responses shown post-submit.

Section 6 Careers: Your Future in Ohio Energy

Video (~72 sec) · Workbook · Comprehension Check

Video

What to Watch For	Pay attention to how people got started, what skills they learned on the job, and what keeps them in the industry long-term. Notice that there's no single path into energy careers.
Video Storyboard	See separate Section 6 storyboard document ("Your Future in Ohio Energy" — ~72 sec).

Workbook Intro Text: Your Future in Ohio Energy

Ohio's oil and natural gas industry supports thousands of high-wage, skilled careers—from field operations to data analysis and engineering. With more than 16,000 direct jobs and 200,000+ total roles statewide, oil and gas offers stable, family-sustaining career paths that don't all require a four-year degree.

Many professionals start with technical training, certifications, or on-the-job learning and grow from there. As you explore this section, consider: Where could your strengths fit into Ohio's energy workforce?

Careers Infographic: Ohio Oil & Gas Careers—Skills for Success

The infographic below breaks down key oil and gas careers in Ohio. As you read, focus on the skills involved—not just the job titles. Many skills are transferable across roles.

Role	Description	Key Skill	Visual (Icon / Photo)
Geologist	Studies rock formations and Utica Shale data to pinpoint drilling sites.	Stratigraphy analysis	Geologist with rock core and subsurface map (diverse worker photo)
Geophysicist	Interprets seismic data to map underground reservoirs.	3D imaging software	Geophysicist at monitor with colorful seismic image
Seismic Technician	Deploys sensors and operates trucks for sound wave surveys.	Field equipment calibration	Tech operating vibroseis truck in field
Data Analyst (Energy)	Crunches seismic/well logs to predict production viability.	Python/SQL for analytics	Analyst at data/code screens
Field Technician	Monitors wells, collects samples, maintains equipment on-site.	Safety protocols & troubleshooting	Technician at wellhead in safety gear
Environmental Scientist	Ensures compliance, monitors emissions and water during operations.	Regulatory reporting (ODNR)	Scientist at field monitoring station
Drilling Engineer	Designs and plans well paths for safe, efficient extraction.	Rig oversight & pressure management	Engineer reviewing well schematic on tablet

Footer: Wages ~55% above OH avg. · Entry: Associate degree or technical certificate. · These roles fuel Ohio's $108B energy boom—explore yours!

Understanding how jobs connect to real work tasks is essential in career planning. The activity below helps learners practice identifying which roles use which skills—just like employers do.

Comprehension Check: Match Job ⇾ Task + Reflection

Part 1: Match each task to the correct role

#	Question	Answer / Feedback
1	**Analyze core samples for shale quality**	Geologist
2	**Run seismic truck vibrations**	Seismic Technician
3	**Model reservoir data in software**	Data Analyst
4	**Check emissions at pad site**	Environmental Scientist
5	**Oversee drill bit path**	Drilling Engineer
6	**Interpret wave echoes for traps**	Geophysicist
7	**Repair wellhead sensors**	Field Technician

Part 2: Reflection

Which role fits you and why? (e.g., "Geologist—love rocks/maps!")

Sample responses: Geologist—fascinated by rocks and mapping from hiking. / Data Analyst—Excel whiz, excited to crunch seismic data. / Field Technician—hands-on mechanic background, ready for well monitoring outdoors. / Environmental Scientist—biology background, passionate about clean ops and ODNR compliance. / Drilling Engineer—math/engineering student; drilling paths sound like puzzle-solving.

Section 7 Final Knowledge Check

Product-to-Source Mystery Chain · Interactive Branching Scenario · 3–5 minutes

Activity Overview

Format	Interactive branching scenario (recommended: Genially, H5P, or Lumi)
Estimated Time	3–5 minutes
Purpose	Learners apply knowledge across the full module by tracing everyday products back to the oil and natural gas exploration process. Reinforces connections between petroleum-based products, underground geology, exploration decisions, and career roles without repeating earlier drag-and-drop exercises.
How It Works	Learners start with a familiar product and click through a short chain of choices. Each chain leads from an everyday item to the correct energy source, underground concept, and related career. Wrong choices trigger brief corrective feedback and loop back. Correct choices advance the chain until the full pathway is complete.
Instructions	Choose the correct path from an everyday product back to the science and careers that make energy discovery possible. Click the best answer at each step. If you choose an incorrect path, read the feedback and try again.

Branching Chains

Note: The correct answer is always listed first below. Choices would be shuffled when building in Genially or H5P.

Chain	Step 1 — Product Source	Step 2 — Underground Concept	Step 3 — Career / Process
Chain 1 Plastic Water Bottle	Which source? ✓ Petroleum and natural gas liquids ✕ Sand and glassmaking ✕ Wood pulp	Where was the oil/gas found? ✓ In reservoir rock formations ✕ In source rock shales ✕ In permeable migration paths	Which group locates these resources? ✓ Geologists and geophysicists ✕ Environmental compliance officers ✕ Mud loggers Success: Plastic bottles connect to petroleum materials, underground rock formations, and exploration professionals.
Chain 2 Polyester Shirt	Which material source? ✓ Petroleum-based synthetic fibers ✕ Sheep wool only ✕ Clay minerals	For oil/gas to collect underground, what happens? ✓ They become trapped in rock formations ✕ They freeze into solid blocks ✕ They stay spread evenly through all soil	Which rock feature holds oil/gas in tiny spaces? ✓ Porosity ✕ Permeability ✕ Stratigraphy Success: Polyester depends on petroleum inputs; petroleum must first be stored and trapped in rock formations.
Chain 3 Phone Case	A plastic phone case most likely comes from: ✓ Crude oil	How do exploration teams gather info about rock layers before drilling? ✓	Which career interprets those subsurface images? ✓ Geophysicists ✕ Wellsite geologists ✕

Chain	Step 1 — Product Source	Step 2 — Underground Concept	Step 3 — Career / Process
	refined into polymers ✕ Natural latex tree sap ✕ Recycled ocean plastics	Seismic surveys and data analysis ✕ Guessing where oil might be ✕ Waiting for oil to appear on the surface	Petrophysicists Success: A phone case traces back to petroleum materials and the exploration process using seismic data.
Chain 4 Disposable Medical Gloves	Many disposable gloves are connected to: ✓ Petrochemical feedstocks ✕ Natural rubber latex ✕ Biodegradable corn starch	What confirms whether a predicted oil/gas location is correct? ✓ Test well drilling ✕ Core sample analysis ✕ Production logging	Which career plans and oversees safe drilling operations? ✓ Drilling engineer ✕ Well site supervisor ✕ Rig safety officer Success: Medical products connect to petrochemical materials, exploration decisions, and engineering work that supports drilling.

Learning Objective Alignment

The Final Quiz functions as a systems-level capstone: no single chain carries the full assessment burden. Together the four chains assess all five module learning objectives.

Chain	Focus	Supported Learning Objectives
Chain 1 Plastic Water Bottle	Materials → Reservoir → Exploration science	Obj 3 (petroleum products); Obj 1 & 4 (reservoirs, underground storage); Obj 2 & 5 (exploration steps, careers)
Chain 2 Polyester Shirt	Trapping mechanisms & rock properties	Obj 3 (energy products); Obj 1 (migration and trapping); Obj 1 & 4 (porosity terminology)
Chain 3 Phone Case	Exploration technology & data interpretation	Obj 3 (petroleum in products); Obj 2 (seismic surveys, exploration methods); Obj 2 & 5 (data use, careers)
Chain 4 Medical Gloves	Decision points & drilling oversight	Obj 3 (energy relevance); Obj 2 (drilling decisions confirm predictions); Obj 5 (engineering career, safety)