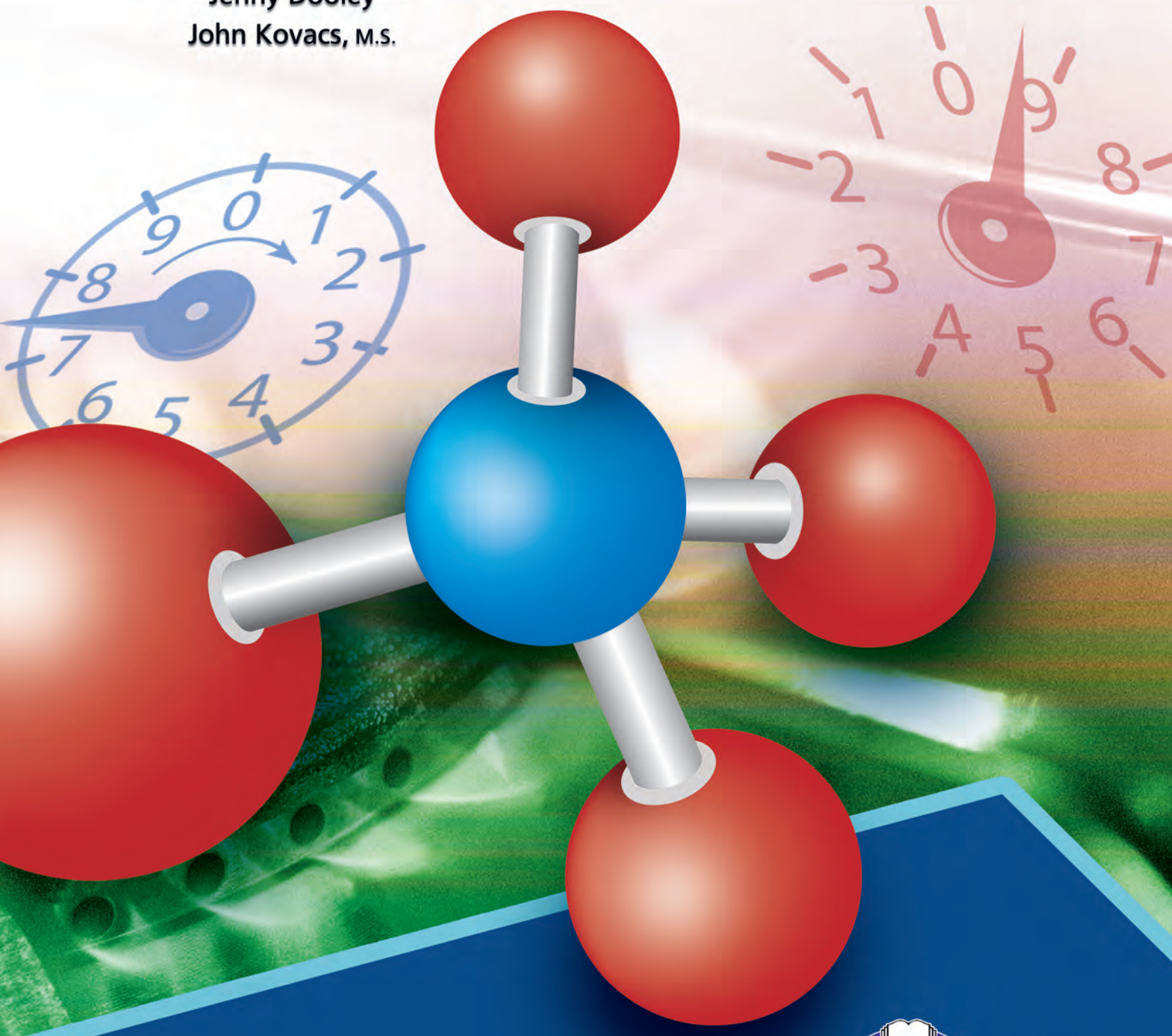
CAREER PATHS

Natural Gas I

Virginia Evans
Jenny Dooley
John Kovacs, M.S.



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CAREER PATHS

Natural Gas I

Book 1

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Express Publishing

Scope and Sequence

Unit	Topic	Reading context	Vocabulary	Function
1	Natural Gas Jobs 1	Webpage	accountant, engineer, geochemist, geologist, geophysicist, hydrologist, landman, lawyer, marketing executive, salesperson	Introducing yourself
2	Natural Gas Jobs 2	Advertisement	company representative, derrick man, driller, drilling contractor, motorman, painter, rig manager, rig welder, roughneck, roustabout	Asking for information
3	In the Company	Company profile	distribution, downstream, drill, exploration and production (E&P), midstream, sell, storage, survey, transportation, upstream	Expressing opinion
4	In the Natural Gas Field	Magazine article	cathead, catline, catwalk, cellar, doghouse, double, joint, rabbit, slang, spud in, thief	Asking for clarification
5	Work Locations	Advertisement	arctic, coast, desert, island, jungle, offshore, polar, prairie, relocation, remote, tropical, tundra	Expressing interest
6	Working Conditions	Employee manual	arduous, bonus, facility, harsh, hazardous, health plan, hours on/off, manual labor, on leave, perk, salary, shift work, skill	Describing plans or schedules
7	Weather Conditions	Article	arid, blizzard, extreme, gale-force wind, hail, humid, hurricane, lightning, monsoon, rain, sandstorm, snow, thunderstorm, tornado	Describing degree
8	Actions	Job description	assemble, bolt, cap, clear, climb, dig, erect, inspect, locate, plug, provide, repair, screw, supply, tighten	Deciding on a course of action
9	Basic Tools	Webpage	chainsaw, chisel, drill bit, drill, file, grinder, hacksaw, hammer, pipe wrench, pliers, saw, screwdriver, spanner, vice, welding torch	Asking about prices
10	Fishing Tools	Handbook excerpt	boot basket, fish, fishing string, fishing, impression block, junk mill, overshoot, spear, tapered mill reamer, washpipe, wireline spear	Asking for advice
11	Numbers	Financial report	add, and, comes to, equal, estimate, fraction, is, less, minus, multiplied by, plus, subtract, times	Expressing surprise
12	Geometry	Advertisement	circle, cube, cylinder, diagonal, height, hexagon, horizontal, length, octagon, rectangle, sphere, square, surface area, triangle, vertical, volume, width	Explaining a process
13	Area Measurements	Textbook excerpt	acre, centimeter, decimeter, foot, hectare, inch, kilometer, meter, mile, millimeter, yard	Estimating distance
14	Natural Gas Measurements	Article	British thermal unit (BTU), compressed natural gas (CNG), conversion, cubic feet, energy output, fuel, gasoline gallon equivalent (GGE), kilogram, mass, pound, quad, Therm	Calculating amounts
15	Safety Equipment	Employee handbook excerpt	chemicals, coveralls, earplugs, face shield, fumes, goggles, hard hat, high visibility jacket, require, respirator mask, rubber gloves, steel toe boots	Giving a reminder

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Natural Gas I

Book 2

Virginia Evans
Jenny Dooley
John Kovacs, M.S.

Express Publishing

Scope and Sequence

Unit	Topic	Reading context	Vocabulary	Function
1	Parts of a Drilling Rig	Advertisement	bit, blowout preventer, crown block, derrick, drill collar, drill pipe, drill string, engine, hook, kelly, mud hose, mud pump, rotary table, sump pit, swivel, traveling block	Listing pros and cons
2	Types of Off-shore Rigs	Article	compliant tower, drilling barge, drillship, fixed platform, jack-up rig, seastar platform, semisubmersible rig, spar platform, submersible rig, subsea system, tension- leg platform	Providing options
3	Parts of an Off-shore Rig	Advertisement	accommodation module, ballast tank, barge, drilling pipe deck, flare stack, helipad, hull, jacket, piles, pontoon, service crane, store area	Describing possible consequences
4	Rig Power Systems	Brochure	air-purging system, console, converter, current, DC bus, eddy current brake system, fuse, induction motor, switchboard, top drive, torque, transformer, ventilator fan, voltage	Making comparisons
5	Rig Rotary Systems	Handbook excerpt	bearings, bottomhole assembly (BHA), cement casing, innermost string, kelly bushing, master bushing, riser, stabilizer, stand, sub, threaded connection, tool joint, tubular	Troubleshooting
6	Rig Circulation Systems	Textbook excerpt	additive, annular space, clay, cutting, detergent, emulsion fluid, invert-emulsion system, mud pit, mud, nozzle, rotary hose, settling pit, shale shaker, spotting fluid, thinner	Explaining what is needed
7	Rig Hoisting Systems	Training manual	braided, cantilever, catshaft, crown block, dead line, drawworks, drum, fast line, mast, node, pulley, sheave, supply reel	Outlining steps in a task
8	Drill Bits	Trade magazine article	cone, core bit, diamond, fishtail bit, hybrid, insert bit, mill bit, polycrystalline diamond compact bit, rigid teeth, rotate, steel tooth rotary bit, steel, synthetic, tip, tungsten carbide	Describing characteristics
9	The Drilling Process	Webpage	break up, circulate, cutting, diameter, drill, drilling fluid, generate, lubricate, monitor, onsite, pipe, pressure, pump, wellbore	Describing a process
10	Drilling Problems	Employee handbook excerpt	blowout, corrosion, differential pipe sticking, dogleg, downtime, embrittlement, fatal, kick, lost circulation, shale sloughing, stuck pipe, suspend, wasted	Estimating a time frame
11	New Drilling Technology	Email	benefit, coiled tubing drilling, conventional, decibel, deviation drilling, directional drilling, displace, disruptive, multilateral drilling, slant drilling, slimhole drilling, underbalanced drilling	Discussing pros/cons
12	Well Completion	Brochure	abandon, case, cased hole completion, completed, dry hole, flow path, open hole completion, perforate, plug, reservoir, sandscreen, well completion	Scheduling an appointment
13	Well Stimulation	Article	acidizing, frac fluid, frac job, fracturing, mud cake, paraffin, production, production target, radial fracture, reactivate, reopen, sidetrack drilling, well stimulation	Suggesting solutions
14	Natural Gas Processing	Brochure	amine, contactor, cryogenic expansion, desiccant, dry gas, gycol dehydration, glycol, methane, natural gas liquids (NGL), solid-desiccant dehydration, sour gas, sulfur, sweetening, vapor, wet gas	Stating possibilities
15	Underground Natural Gas Storage	Pamphlet	aquifer, base gas, base load storage, depleted underground gas reservoir, indefinite, liquefied natural gas (LNG), peak load storage, physically unrecoverable gas, pressure differential, recondition, salt cavern, seasonal demand, working gas	Agreeing with an opinion

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CAREER PATHS

Natural Gas I

Book 3

Virginia Evans
Jenny Dooley
John Kovacs, M.S.

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Scope and Sequence

Unit	Topic	Reading context	Vocabulary	Function
1	Blowouts	Poster	blow up, cap, capping stack, evacuate, fatality, influx fluid, kill fluid, kill, reservoir pressure, subsea blowout, surface blowout, underground blowout, well control	Asking for information
2	Workovers	Webpage	abrasion, bailer, cement squeeze job, corrosion, guy line, holiday, outrigger, perforate, service company, shut in, sidetracking, split, workover rig, workover	Giving an opinion
3	Rig Dismantling	Advertisement	debris, decommission, detach, dismantle, dispose, mounting, plug, recycle, removal, salvage, scrap, tow, well abandonment	Clarifying information
4	Automation	Flyer	adapt, advantage, automation, efficiency, operator, productivity, program, remote control, repetitive, robot, technology, unmanned	Disagreeing with an opinion
5	Raw Natural Gas	Article	associated gas, butane, condensate, crude oil, dissolved gas, ethane, free gas, mixture, non-associated gas, pentane, petroleum, propane, raw natural gas, semi-liquid	Asking for/ making predictions
6	Geological Formation Characteristics	Brochure	accumulation, cap rock, cement, deposit, geological trap, kerogen, maturation, mobility, outcrop, permeability, porosity, reservoir rock, sedimentary rock, source rock	Describing similarities
7	Natural Gas Traps	Textbook excerpt	angular unconformity, anticline, combination trap, deform, dip-slip, fault, fold, impenetrable, pinch-out, salt dome, stratigraphic trap, strike-slip, structural trap, truncation, uplift	Adding information
8	Geological Formations	Pamphlet	basin, coastal plain, continental shelf, continental slope, delta, dune, geographical feature, lagoon, reef, ridge, shoreline, submarine canyon, trench	Making predictions
9	Uses of Natural Gas	Brochure	ammonia, coal, efficient, electricity, fertilizer, methanol, nonresidential, petrochemical, pollution, power plant, residential, synthetic, textiles, transport fuel	Asking for a suggestion
10	Natural Gas and the Environment	Press release	acid rain, ash, atmosphere, fossil fuel, greenhouse gas, outweigh, particulate matter, reduce, smog, soot	Giving a compliment
11	Contracts in the Natural Gas Industry	Email	adhere, breach of contract, compensation, contract, draw up, expire, lease, lessee, lessor, negotiate, party, remain in force, sue, term	Explaining a term
12	Financing in the Natural Gas Industry	Memo	account, asset, balance sheet, capital, contingency, depreciate, expenditure, expenses, finance, fluctuate, incur, liability, loss, market price, profit, statement	Asking for clarification
13	Marketing in the Natural Gas Industry	Article	advertisement, brand awareness, campaign, client, feature, image, media relations, place, press release, price, product, promotion, target group, trade fair	Offering suggestions
14	Liquefied Natural Gas	Webpage	autorefrigeration, crystallization, dehydrate, domestic product, export, import, insulated, internationally, liquefaction plant, liquefy, regasification plant, regasify, reheat, stranded reservoir, tanker	Providing reassurance
15	Tight gas	Employee manual excerpt	accessible, fracture, impermeable, inaccessible, irregular, nature, pressure vacuum, surrounding, sweet spot, tight gas, tight sand, uneconomical, unrecoverable	Expressing confidence

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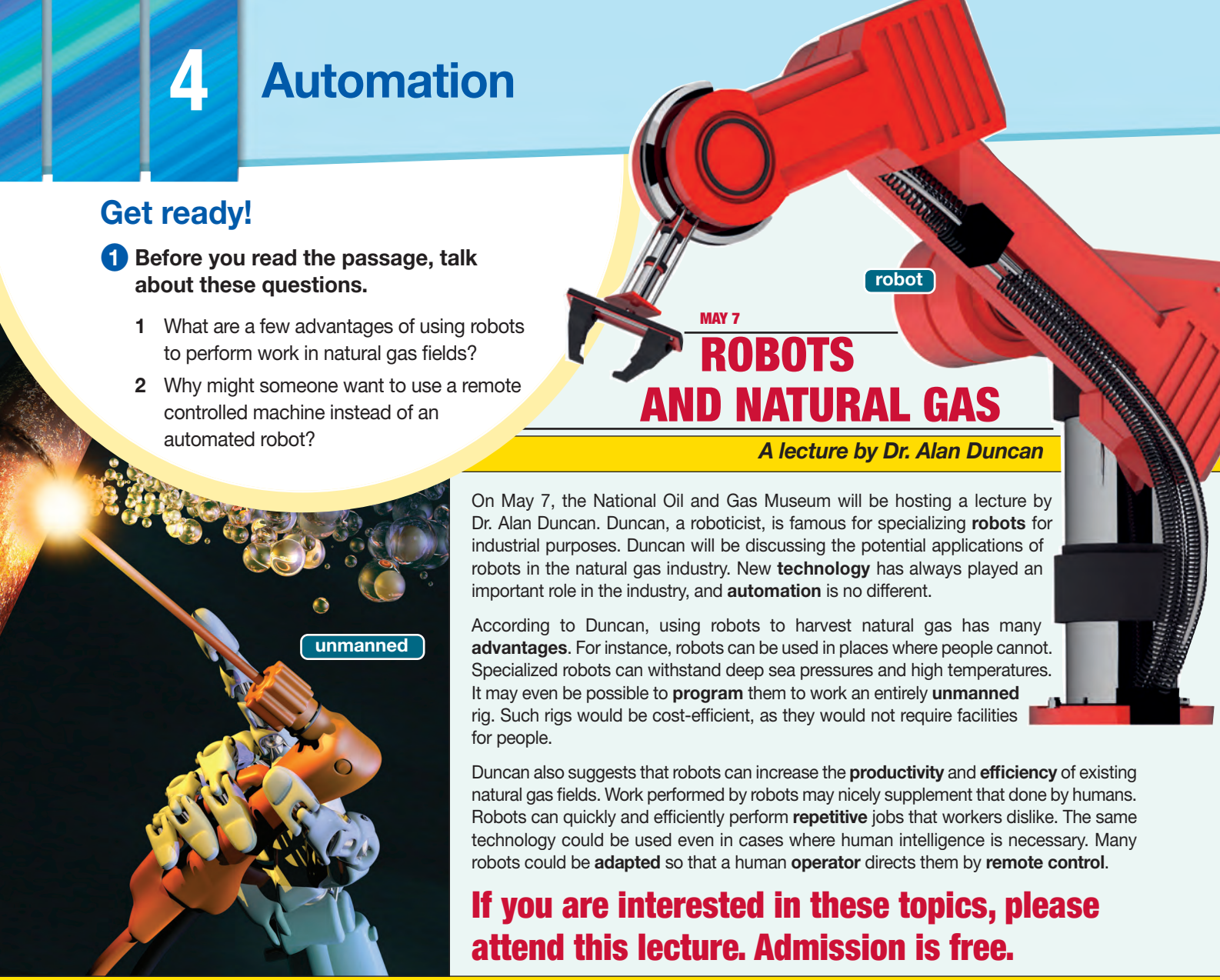
4 Automation

Get ready!

1 Before you read the passage, talk about these questions.

1 What are a few advantages of using robots to perform work in natural gas fields?

2 Why might someone want to use a remote controlled machine instead of an automated robot?



MAY 7

ROBOTS AND NATURAL GAS

A lecture by Dr. Alan Duncan

On May 7, the National Oil and Gas Museum will be hosting a lecture by Dr. Alan Duncan. Duncan, a roboticist, is famous for specializing **robots** for industrial purposes. Duncan will be discussing the potential applications of robots in the natural gas industry. New **technology** has always played an important role in the industry, and **automation** is no different.

According to Duncan, using robots to harvest natural gas has many **advantages**. For instance, robots can be used in places where people cannot. Specialized robots can withstand deep sea pressures and high temperatures. It may even be possible to **program** them to work an entirely **unmanned** rig. Such rigs would be cost-efficient, as they would not require facilities for people.

Duncan also suggests that robots can increase the **productivity** and **efficiency** of existing natural gas fields. Work performed by robots may nicely supplement that done by humans. Robots can quickly and efficiently perform **repetitive** jobs that workers dislike. The same technology could be used even in cases where human intelligence is necessary. Many robots could be **adapted** so that a human **operator** directs them by **remote control**.

If you are interested in these topics, please attend this lecture. Admission is free.

Reading

2 Read the flyer. Then, mark the following statements as true (T) or false (F).

1 __ Eventually, robots may allow natural gas rigs to function without people.

2 __ Using robots alongside human workers would improve productivity.

3 __ Robotic technology would be unusable for jobs that require human intelligence.

Vocabulary

3 Fill in the blanks with the correct words or phrases from the word bank.

WORD BANK

robots advantage remote control
operator efficiency technology

1 Thanks to the new machinery, the well is now running at peak _____.

2 The company needs to hire and train a new _____ to run this machine.

3 A worker may be able to drill for gas from far away using a(n) _____.

4 As current _____ improves, many industries become more productive.

5 The main _____ of automation is that work gets done without paying out salaries.

6 Companies can now use _____ to perform work too dangerous for humans.

4 **Read the sentence pairs. Choose which word best fits each blank.**

1 automation / productivity

A Some people think that _____ will eliminate the need for human workers.

B Upgrading technology often saves money and increases _____.

2 programs / adapt

A The company needs to _____ its methods to make better use of current technology.

B The inventor _____ the robots to perform a larger range of functions.

3 unmanned / repetitive

A We hope to develop a(n) _____ rig that could be used in hazardous locations.

B Many people dislike work that seems overly _____.

5 **Listen and read the flyer again. Why would robots be used to perform repetitive work?**

Listening

6 **Listen to a conversation between two executives. Then, choose the correct answers.**

1 What is the conversation mainly about?

A the specific jobs that robots could perform harvesting gas

B why the technology they use is inefficient

C the effects that automation would have on their industry

D whether workers can become as efficient as robots

2 Why is the man against investing in automation technology?

A He thinks it will put human employees out of work.

B He assumes that automated systems will malfunction.

C He believes it will be less efficient than using humans.

D He supposes that workers will have to be retrained to use it.

7 **Listen again and complete the conversation.**

Executive 2: I thought the speaker made some very good points **1** _____ _____ _____ automation.

Executive 1: Indeed, the technology seemed **2** _____ _____.

Executive 2: We should invest in **3** _____ _____ as soon as possible.

Executive 1: I don't **4** _____ _____ _____ way.

Executive 2: Why? Surely, you're not against efficiency.

Executive 1: No, but I don't like the idea of replacing humans **5** _____ _____.

Executive 2: Why would we replace human workers?

Executive 1: Isn't that the point? Work done by robots would be more efficient, so we'd **6** _____ _____ _____.

Speaking

8 **With a partner, act out the roles below based on Task 7. Then, switch roles.**

USE LANGUAGE SUCH AS:

What did you think ...?

I don't feel ... / How so?

Student A: You are an executive at a natural gas company that has just listened to a lecture on automation. Talk to Student B about:

- what you thought of the lecture
- why you disagree with an idea someone had
- why your reason for disagreeing is valid or invalid

Student B: You are an executive at a natural gas company. Talk to Student A about automation.

Writing

9 **Use the flyer and the conversation from Task 8 to write a memo to an executive at a gas company to explain why using automated systems would be a good idea. Include: the pros and cons of automation, how your choice would affect the company's productivity, and what role you think people should have in the process.**

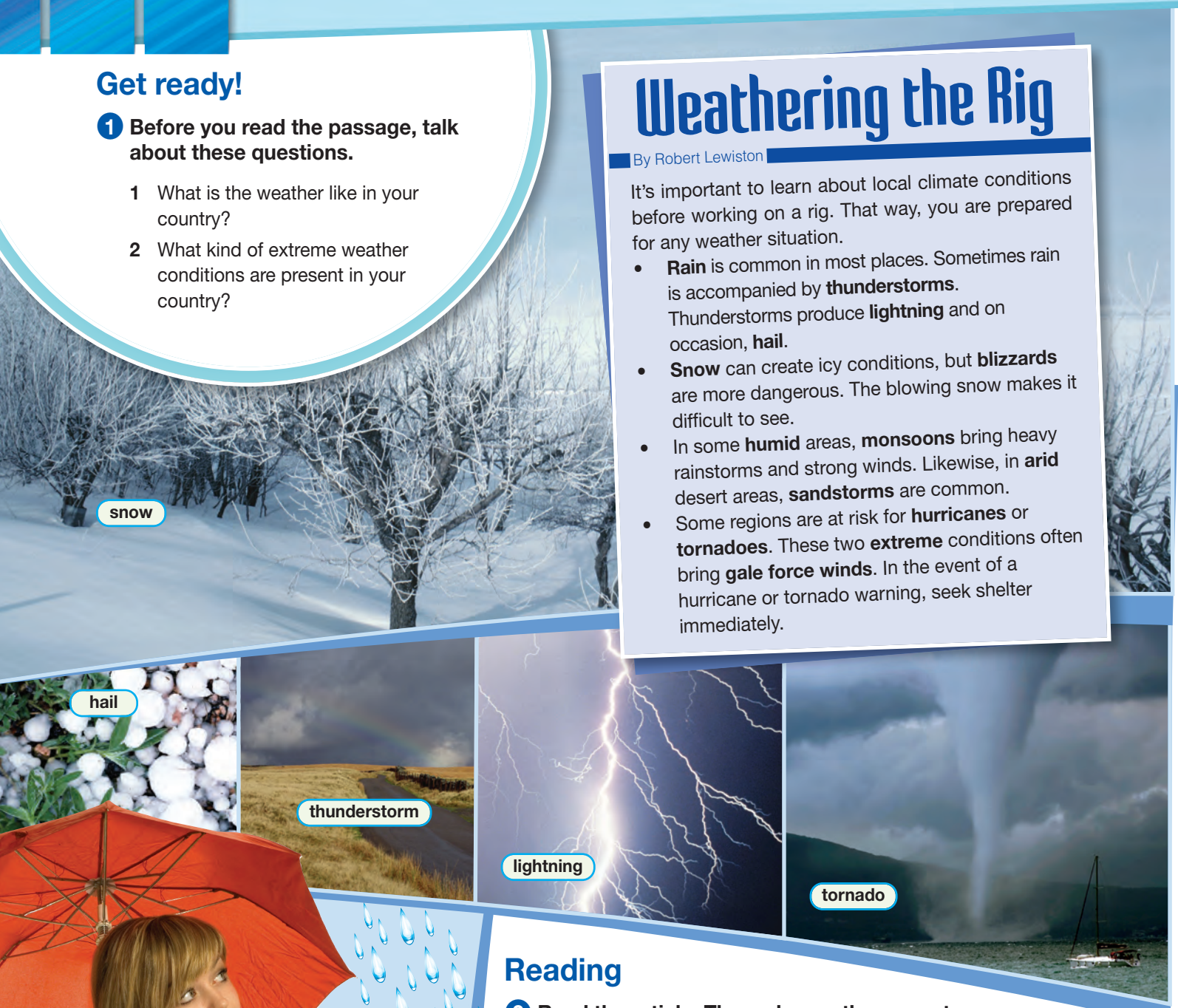
7 Weather Conditions

Get ready!

1 Before you read the passage, talk about these questions.

1 What is the weather like in your country?

2 What kind of extreme weather conditions are present in your country?



Weathering the Rig

By Robert Lewiston

It's important to learn about local climate conditions before working on a rig. That way, you are prepared for any weather situation.

- **Rain** is common in most places. Sometimes rain is accompanied by **thunderstorms**. Thunderstorms produce **lightning** and on occasion, **hail**.
- **Snow** can create icy conditions, but **blizzards** are more dangerous. The blowing snow makes it difficult to see.
- In some **humid** areas, **monsoons** bring heavy rainstorms and strong winds. Likewise, in **arid** desert areas, **sandstorms** are common.
- Some regions are at risk for **hurricanes** or **tornadoes**. These two **extreme** conditions often bring **gale force winds**. In the event of a hurricane or tornado warning, seek shelter immediately.

Reading

2 Read the article. Then, choose the correct answers.

1 What is the main idea of the article?

A how to prepare for different weather conditions
B what types of weather rig workers encounter
C where to seek shelter from dangerous storms
D what conditions cause a storm warning to be issued

2 According to the article, which condition occurs in humid areas?

A monsoons **C** snow
B tornadoes **D** hurricanes

3 What is the danger associated with blizzards?

A gale-force winds **C** blowing sand
B lightning strikes **D** reduced visibility

Vocabulary

3 **Match the words and phrases (1-8) with the definitions (A-H).**

1	__ hail	**5**	__ tornado
2	__ blizzard	**6**	__ lightning
3	__ extreme	**7**	__ thunderstorm
4	__ hurricane	**8**	__ gale-force wind

A a flash of electricity in the sky during a storm
B a very strong wind
C a dangerous spinning wind storm
D falling ice balls
E a strong tropical storm
F a storm with rain and lightning
G a storm with a lot of snow
H more serious than normal

4 **Read the sentence pairs. Choose which word best fits each blank.**

1 rain / snow

A The trees are white with _____ .
B The _____ flooded the streets.

2 arid / humid

A It is quite _____ in the jungle.
B Deserts are very _____ places.

3 monsoon / sandstorm

A The _____ left the village flooded.
B The _____ reduced visibility.

5 **Listen and read the article again. What is produced by thunderstorms?**

Listening

6 **Listen to a conversation between two workers. Mark the following statements as true (T) or false (F).**

1 __ The man heard the weather forecast.
2 __ The woman thinks she heard thunder.
3 __ The storm is moving slowly.

7 **Listen again and complete the conversation.**

Worker 1: The clouds off to the east look pretty dark.
Worker 2: Yeah. The weather forecast said we were in for a **1** _____ today.
Worker 1: I guess we'll be **2** _____ _____ in the doghouse soon.
Worker 2: Why do you say that?
Worker 1: It's too dangerous to be out on the rig when there's **3** _____ .
Worker 2: Oh, of course. I thought I just heard **4** _____ .
Worker 1: Me, too. The storm's **5** _____ _____ than I thought.
Worker 2: We'd better **6** _____ the others.

Speaking

8 **With a partner, act out the roles below based on Task 7. Then, switch roles.**

USE LANGUAGE SUCH AS:

I guess we'll be hiding out ... / It's too ...
We'd better ...

Student A: You are a worker on a natural gas rig. Talk to Student B about:

- what the storm clouds look like
- where you will shelter from the storm
- why you need to seek shelter

Student B: You are a worker on a natural gas rig. Talk to Student A about the storm that is coming.

Writing

9 **Use the article and the conversation from Task 8 to fill out the rig weather report.**

Rig #456 Weather Report

Weather Conditions: _____
_____

Actions taken by crew: _____
_____

Reason for actions: _____
_____

Glossary

fatality [N-COUNT-U1] A **fatality** is a human death.

fault [N-COUNT-U7] A **fault** is a break in a rock formation that displaces one side in relation to the other.

feature [N-COUNT –U13] A **feature** is an important part of a product that makes it unique.

fertilizer [N-COUNT-U9] A **fertilizer** is a substance added to soil to assist the growth of plants.

finance [N-UNCOUNT-U12] **Finance** is the management of money by a large company.

fluctuate [V-I-U12] To **fluctuate** is to rise and fall irregularly.

fold [N-COUNT-U7] A **fold** is a curve or bend in a layer of rock.

fossil fuel [N-COUNT-U10] A **fossil fuel** is a fuel like oil or coal that is created by the slow decay of animals and plants that lived a very long time ago.

fracture [N-UNCOUNT-U15] A **fracture** is a separation in a geological formation.

free gas [N-UNCOUNT-U5] **Free gas** is natural gas in an oil formation that is not mixed with the oil.

geographical feature [N-COUNT-U8] A **geographical feature** is a formation on the surface of the Earth.

geological trap [N-COUNT-U6] A **geological trap** is an area in a rock formation where gas and oil can accumulate.

greenhouse gas [N-COUNT-U10] A **greenhouse gas** is a type of gas, such as methane or carbon dioxide, that prevents heat from leaving the atmosphere. Greenhouse gases cause the greenhouse effect.

guy line [N-COUNT-U2] A **guy line** is a thick cord or line that braces a workover rig.

holiday [N-COUNT-U2] A **holiday** is a break in the cement that connects the casing and the cell wall.

image [N-UNCOUNT-U13] An **image** is the reputation or opinion of the company and its goods or services.

impenetrable [ADJ-U7] If something is **impenetrable**, nothing can pass through it.

impermeable [ADJ-U15] If a substance is **impermeable**, liquid and gas cannot pass through it.

import [V-T-U14] To **import** something is to buy it from a different country then bring it into your own country.

inaccessible [ADJ-U15] If something is **inaccessible**, it is difficult or impossible to find or reach.

incur [V-T-U12] To **incur** is to acquire something unpleasant.

influx fluid [N-UNCOUNT-U1] An **influx fluid** is an unwanted fluid that finds its way into a borehole. Influx fluids are the main causes of blowouts.

insulated [ADJ-U14] If something is **insulated**, it is covered in order to protect it from factors such as temperature changes.

internationally [ADV-U14] If natural gas is transported **internationally**, it crosses the border into at least one other country.

irregular [ADJ-U15] If something is **irregular**, it does not follow a rule or pattern.

kerogen [N-UNCOUNT-U6] **Kerogen** is the natural content found in source rock.

kill [V-T-U1] To **kill** a well is to get its pressure back to normal levels.

kill fluid [N-UNCOUNT-U1] **Kill fluid** is the fluid used to suppress the pressure of a well.

lagoon [N-COUNT-U8] A **lagoon** is a body of sea water separated from the sea by a reef or sand.

lease [N-COUNT-U11] A **lease** is a contract to rent land or property for a period of time.

lessee [N-COUNT-U11] A **lessee** is the member of an agreement that holds a lease.

lessor [N-COUNT-U11] A **lessor** is a property owner who leases land to another party.

liability [N-COUNT-U12] A **liability** is something that a company is responsible for. It is the opposite of an asset.

liquefaction plant [N-COUNT-U14] A **liquefaction plant** is a type of factory where natural gas is turned into a liquid (LNG).

liquefy [V-T-U14] To **liquefy** something is to turn it into a liquid or to cause it to turn into a liquid.

loss [N-UNCOUNT-U12] **Loss** is the money that a company loses.

market price [N-COUNT-U12] A **market price** is the price that a product sells for.

maturation [N-UNCOUNT-U6] **Maturation** is the time it takes for gas and oil to form and move to the reservoir rock.

media relations [N-UNCOUNT-U13] **Media relations** are a company's communications and interactions with various media (television, press, etc.).

Natural Gas I

Career Paths: Natural Gas I is a new educational resource for petroleum and natural gas industry professionals who want to improve their English communication in a work environment. Incorporating career-specific vocabulary and contexts, each unit offers step-by-step instruction that immerses students in the four key language components: reading, listening, speaking, and writing. ***Career Paths: Natural Gas I*** addresses topics including jobs in the industry, types of rigs, gas storage and transport, safety procedures, and the drilling process.

The series is organized into three levels of difficulty and offers a minimum of 400 vocabulary terms and phrases. Every unit includes a test of reading comprehension, vocabulary, and listening skills, and leads students through written and oral production.

Included Features:

- A variety of realistic reading passages
- Career-specific dialogues
- 45 reading and listening comprehension checks
- Over 400 vocabulary terms and phrases
- Guided speaking and writing exercises
- Complete glossary of terms and phrases

The **Teacher's book** contains a full answer key and audio scripts.

The **audio CDs** contain all recorded material.

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