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day 61 in the lab

Korean TOPIK 5 in 120 days
unit 10 · science & the planet

Talk about basic science: the states of matter, living things, metals, figures and chances.

Science words fill TOPIK reading texts and the news, and many are built from small pieces like -체 (body, state) and -성 (quality).

words

word	romanisation	meaning	example
물리	mulli	physics	동생은 대학에서 물리를 전공해요. My younger brother is studying physics at university.
화학	hwahak	chemistry	고등학교 때 화학 시간이 제일 어려웠어요. Chemistry was the hardest class at high school.
공학	gonghak	engineering	유키 씨는 환경 공학을 공부해요. Yuki studies environmental engineering.
생물	saengmul	living thing; biology	바다에는 다양한 생물이 살아요. All kinds of living things live in the sea.
생명체	saengmyeongche	living being, life form	과학자들은 다른 별에도 생명체가 있는지 연구한다. Scientists study whether there is life on other planets.
미생물	misaengmul	microbe, microorganism	김치는 미생물 덕분에 발효된다. Kimchi ferments thanks to microbes.
유전자	yujeonja	gene	눈 색깔은 유전자에 따라 달라요. Eye colour depends on your genes.
진화	jinhwa	evolution (인간의 진화)	인간의 진화에는 아주 오랜 시간이 걸렸다. Human evolution took a very long time.
공룡	gongnyong	dinosaur	아이들은 공룡을 정말 좋아해요. Children really love dinosaurs.
성분	seongbun	ingredient, component, content	이 약의 성분을 확인해 보세요. Check the ingredients of this medicine.
농도	nongdo	concentration, density (of a substance)	소금물의 농도가 너무 높아요. The salt water is too concentrated.
산소	sanso	oxygen	높은 산에서는 산소가 부족해서 숨쉬기 힘들어요. High up a mountain there's less oxygen, so it's hard to breathe.
고체	goche	solid	얼음은 물이 고체가 된 거예요. Ice is water that has become a solid.
액체	aekche	liquid	비행기에 액체를 많이 가지고 탈 수 없어요. You can't take much liquid on a plane.
기체	giche	gas (기체 연료)	물은 끓으면 기체로 변해요. Water turns into a gas when it boils.
수증기	sujeunggi	steam, water vapour	냄비에서 하얀 수증기가 올라와요. White steam is rising from the pot.

알칼리성	alkalliseong	alkaline, alkalinity	이 물은 약한 알칼리성이에요. This water is slightly alkaline.
중성	jungseong	neutral (중성 용액)	중성 세제는 옷감에 순해요. Neutral detergent is gentle on fabric.
금속	geumsok	metal	금속은 전기가 잘 통해요. Metal conducts electricity well.
철	cheol	iron (철을 녹이다)	이 다리{dari-2}는 철{cheol-3}로 만들었어요. This bridge is made of iron.
재질	jaejil	material (what it's made of)	이 가방은 재질이 가벼워서 좋아요. This bag is nice because the material is light.
비례	birye	proportion (비례하다: be in proportion)	월급은 일한 시간에 비례해요. Pay is in proportion to the hours worked.
확률	hwangnyul	probability, chance	이길 확률이 50%예요. There's a 50% chance of winning.
수치	suchi	figure, numerical value (통계 수치)	오늘 미세먼지 수치가 높아요. The fine-dust level is high today.

pattern science building blocks: -체 (body, state) and -성 (quality)

고 / 액 / 기 / 생명 + 체 알칼리 / 중 + 성

-체 means a body or a state: 고체 (a solid), 액체 (a liquid), 기체 (a gas), 생명체 (a living thing). -성 means a quality or a nature: 알칼리성 (alkaline), 중성 (neutral). Learn the first syllable and you can guess new words: 고 = hard, 액 = liquid, 기 = air.

얼음은 고체이고, 물은 액체이며, 수증기는 기체이다. **eoreum eun goche igo mul eun aekche imyeo sujeunggi neun giche ida** Ice is a solid, water is a liquid and steam is a gas.

미생물은 눈에 보이지 않는 아주 작은 생명체이다. **misaengmul eun nun e boiji anneun aju jageun saengmyeongche ida** Microbes are tiny living things you can't see.

이 물은 알칼리성이 아니라 중성이다. **i mul eun alkalliseong i anira jungseong ida** This water isn't alkaline but neutral.

dialogue why, why, why?

hajun 공룡이다! 할머니, 공룡 진짜 커!

gongnyong ida halmeoni gongnyong jinjja keo · A dinosaur! Grandma, the dinosaur is so big!

choi 어머, 정말 크네. 이런 건 목돈을 줘도 못 사요. 하준아, 뛰지 말고 천천히 걸어.

eomeo jeongmal keune ireon geon mokdon eul jwo do mot sayo hajun a ttwiji malgo cheoncheonhi georeo · Oh my, it really is big. You couldn't buy something like this for a fortune. Hajun, don't run, walk slowly.

yuki 하준아, 공룡은 아주 오래전에 살았던 생물이야. 지금은 없어.

hajun a gongnyong eun aju orae jeon e saratdeon saengmul iya jigeum eun eopseo · Hajun, dinosaurs were living things from a very long time ago. They're gone now.

hajun 왜 없어?

wae eopseo · Why are they gone?

yuki 과학자들도 아직 연구하고 있어. 그런데 새가 공룡에서 진화했대.

gwahakja deul do ajik yeongu hago isseo geureonde sae ga gongnyong eseo jinhwahaetdae · Scientists are still studying that. But they say birds evolved from dinosaurs.

anna 공룡 뼈를 이렇게 가까이에서 보니까 짜릿해요. 그건 유전자를 조사해서 알아낸 거예요?

gongnyong ppyeo reul ireoke gakkai eseo bonikka jjaritaeyo geugeon yujeonja reul josa haeseo aranaen geo yeyo · Seeing dinosaur bones this close is thrilling. Did they find that out by studying genes?

yuki 네, 뼈의 성분도 분석하고요. 저는 물리나 화학보다 생물이 더 재미있어서 환경 공학을 전공했어요.

ne ppyeo ui seongbun do bunseok hagoyo jeo neun mulli na hwahak boda saengmul i deo jaemiisseoseo hwangyeong gonghak eul jeongong haesseoyo · Yes, and by analysing what the bones are made of. I find biology more fun than physics or chemistry, so I chose environmental engineering.

anna 유키 씨 연구실에서는 뭘 연구해요?

yuki ssi yeongusil eseo neun mwol yeongu haeyo · What does your lab study, Yuki?

yuki 더러운 물을 깨끗하게 만드는 미생물을 연구해요. 물속 산소 농도에 따라 미생물이 일하는 속도가 달라지거든요. 실험 기계가 다 고가품이라서 늘 조심해야 돼요.

deoreoun mul eul kkaekkeutage mandeuneun misaengmul eul yeongu haeyo mulsok sanso nongdo e ttara misaengmul i il haneun sokdo ga dallajigeodeunyo silheom gigye ga da gogapum iraseo neul josim haeya dwaeyo · We study microbes that clean dirty water. How fast they work depends on the oxygen level in the water. All the lab machines are expensive, so we always have to be careful.

hajun 미생물이 뭐야?

misaengmul i mwo ya · What's a microbe?

yuki 눈에 안 보이는 아주 작은 생명체야. 하준이 손에도 있어!

nun e an boineun aju jageun saengmyeongche ya hajun i son e do isseo · A tiny living thing you can't see. There are some on your hands too, Hajun!

hajun 으악! 이모, 너무해요! 손 씻을래!

euak imo neomuhaeyo son ssiseullae · Eek! That's mean! I want to wash my hands!

choi 세 살 아이가 미생물 공부까지 하다니, 정말 대견하네요. 오늘 공룡이 하준이 호기심을 제대로 돋우었어요. 잠자리에서도 공룡 이야기만 할 거예요.

se sal ai ga misaengmul gongbu kkaji hadani jeongmal daegyeonhane yo oneul gongnyong i hajun i hogisim eul jedaero dodueosseoyo jamjari eseo do gongnyong iyagi man hal geo yeyo · A three-year-old studying microbes: I'm so proud of him! The dinosaurs really fired up his curiosity today. He'll be talking about nothing but dinosaurs at bedtime.

write it trace the grey, then write your own

룡 ryong dinosaur													

good to know · Subjects of study end in -학 or stand alone: 물리(학) physics, 화학 chemistry, 생물(학) biology, 공학 engineering. 환경 공학 is environmental engineering, 유전 공학 genetic engineering. Idiom: 하나를 보면 열을 안다, “see one and you know ten”: a small thing shows what the whole is like, the scientist’s favourite shortcut.

Solids, liquids, gases and a three-year-old’s “why?”: you can now answer him in Korean. Tomorrow: inventions and machines.
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day 62 inventions and machines

Korean TOPIK 5 in 120 days
unit 10 · science & the planet

Describe a machine or an invention: what it does, how fast, how big, how it's charged, and two things at once with -는 동시에.

Product pages, tech news and TOPIK reading texts describe machines in exactly these words, and -는 동시에 is how they say "and at the same time".

words

word	romanisation	meaning	example
발명가	balmyeongga	inventor	그 발명가는 평생 천 개가 넘는 물건을 만들었다. That inventor made over a thousand things in his lifetime.
발명품	balmyeongpum	invention (the thing)	전화는 세상을 바꾼 발명품이에요. The telephone is an invention that changed the world.
설계	seolgye	design, plan (of a building or machine)	이 다리는 한국 회사가 설계했어요. A Korean company designed this bridge.
모형	mohyeong	model (a small copy)	아이가 비행기 모형을 만들었어요. The child made a model plane.
장비	jangbi	equipment, kit	등산 장비를 빌릴 수 있어요? Can I rent hiking gear?
장치	jangchi	device, mechanism	이 문에는 안전 장치가 있어요. This door has a safety device.
성능	seongneung	performance (of a machine)	새 컴퓨터는 성능이 훨씬 좋아요. The new computer performs much better.
신형	sinhyeong	new model	이 차{cha-2}는 올해 나온 신형이에요. This car is a new model out this year.
최신형	choesinhyeong	the latest model	동생이 최신형 휴대폰을 샀어요. My brother bought the latest phone.
수동	sudong	manual (수동으로 움직이다)	이 차{cha-2}는 수동이라서 운전하기 어려워요. This car is a manual, so it's hard to drive.
무인	muin	unmanned, self-service (무인 판매)	요즘은 무인 가게가 많아요. There are lots of unstaffed shops these days.
방수	bangsu	waterproofing; waterproof	이 시계는 방수가 돼요. This watch is waterproof.
용량	yongnyang	capacity	휴대폰 용량이 부족해서 사진을 지웠어요. My phone was out of storage, so I deleted some photos.
출력	chullyeok	printing (out); output (문서 출력)	이 파일 좀 출력해 주세요. Please print this file.

충전	chungjeon	charging (배터리 충전)	휴대폰 충전을 깜빡했어요. I forgot to charge my phone.
속력	songnyeok	speed (of a moving thing)	차{cha-2}가 속력을 줄였어요. The car slowed down.
시속	sisok	speed per hour, km/h	이 길은 시속 50킬로미터 이하로 달려야 해요. You have to drive under 50 km/h on this road.
회전	hoejeon	rotation, turning	이 문은 회전하는 문이에요. This door is a revolving door.
곡선	gokseon	curve, bend	산길은 곡선이 많아요. Mountain roads have lots of bends.
수직	sujik	vertical, perpendicular	벽은 바닥과 수직이에요. The wall is at right angles to the floor.
순환	sunhwan	circulation, cycle	운동을 하면 혈액 순환이 잘 돼요. Exercise helps your circulation.
주기	jugi	cycle, interval (일 년 주기)	이 버스는 20분 주기{jugi}로 와요. This bus comes every 20 minutes.
인지	inji	cognition, recognition	나이가 들면{deulda=get (older)} 인지 능력이 떨어질 수 있다. Cognitive ability can decline with age.
응용	eungyong	application, applying (a skill or idea)	배운 것을 일에 응용해 보세요. Try applying what you've learned at work.

pattern at the same time as, while also: -는 동시에

verb -는 / adjective -은 / noun 인 **동시에** **the second thing that also happens or is true**

-는 동시에 says two things happen at the same moment (문이 열리는 동시에 불이 켜진다: the light comes on as the door opens) or that one thing has two sides (전화기인 동시에 컴퓨터: a phone and also a computer). Verbs take -는, adjectives -은 / -ㄴ, nouns 인. It sounds careful and written; in chat people often say -면서.

문이 열리는 동시에 음악이 나온다. **mun i yeollineun dongsi e eumak i naonda** Music starts the moment the door opens.

그는 발명가인 동시에 사업가이다. **geu neun balmyeongga in dongsi e saeopga ida** He is an inventor and a businessman at the same time.

이 로봇은 길을 인지하는 동시에 사람도 피한다. **i robot eun gil eul injihaneun dongsi e saram do pihanda** This robot recognises the road and avoids people at the same time.

dialogue the delivery robot

tom 안나, 여기야! 청소년 발명 대회 취재 왔는데 볼 게 정말 많아. 관람객들도 아침부터 속속 들어오고 있어.

anna yeogi ya cheongsonyeon balmyeong daehoe chwijae wanneunde bol ge jeongmal mana gwallamgaek deul do achim buteo soksok deureoogo isseo · Anna, over here! I'm covering a youth invention fair, and there's so much to see. Visitors have been arriving one after another since the morning.

anna 와, 이게 다 학생들 발명품이야?

wa ige da haksaeng deul balmyeongpum iya · Wow, are these all students' inventions?

tom 응. 이건 고등학생 발명가가 만든 배달 로봇 모형이야. 설계부터 혼자 다 했대. 대학에서 로봇 공학을 공부하는 게 꿈이라서 이번 대회 상을 간절히 바라고 있대.

eung igeon godeunghaksaeng balmyeongga ga mandeun baedal robot mohyeong iya seolgye buteo honja da haetdae daehak eseo robot gonghak eul gongbu haneun ge kkum iraseo ibeon daehoe sang eul ganjeolhi barago itdae · Yeah. This is a model delivery robot made by a high-school inventor. He did it all himself, from the design on. His dream is to study robot engineering at university, so he's hoping with all his heart to win a prize here.

anna 대단하네! 사람이 직접 움직이는 거야?

daedanhane saram i jikjeop umjigineun geo ya · Amazing! Does someone steer it?

tom 아니, 무인이야. 길을 스스로 인지하는 동시에 앞에 있는 물건도 피한대. 계단은 수직으로 올라가고.

ani muin iya gil eul seuseuro injihaneun dongsi e ap e inneun mulgeon do pihandae gyedan eun sujigeuro ollagago · No, it's unmanned. It recognises the road by itself and avoids things in front of it at the same time. And it climbs stairs straight up.

anna 비 오는 날에도 괜찮아?

bi oneun nal e do gwaenchana · Is it OK on rainy days?

tom 방수 장치가 있어서 괜찮대. 한 번 충전하면 다섯 시간 움직이고, 속력은 시속 6킬로미터 정도래.

bangsu jangchi ga isseoseo gwaenchantae han beon chungjeonhamyeon daseot sigan umjigigo songnyeok eun sisok killomiteo jeongdo rae · It has waterproofing, so it's fine. One charge lasts five hours, and it goes about six kilometres an hour.

anna 학생이 만든 건데 성능이 최신형 제품 못지않네.

haksaeng i mandeun geonde seongneung i choesinhyeong jepum motjianne · A student made it, but it performs as well as the latest products.

tom 그렇고말고. 심사하는 선생님들도 다 감탄했어. 그 학생은 외동아들인데, 부모님이 아침부터 와서 열렬히 응원하셨어. 1등 팀에게는 해외 대회에 나갈 기회를 부여한대.

geureokomalgo simsa haneun seonsaengnim deul do da gamtanhaesseo geu haksaeng eun oedongadeul inde bumonim i achim buteo waseo yeollyeolhi eungwon hasyeosseo deung tim ege neun haeoe daehoe e nagal gihoe reul buyeo handae · It certainly does. The teachers judging it were all amazed. He's an only son, and his parents have been here since the morning, cheering him on like mad. The winning team gets the chance to go to a competition abroad.

anna 그런데 너, 취재 장비가 왜 이렇게 많아?

geureonde neo chwijae jangbi ga wae ireoke mana · But why have you got so much reporting kit?

tom 카메라 배터리가 오래돼서 용량이 작거든. 중간에 꺼지느니 차라리 다 들고 오는 게 낫지. 무거운 배터리를 들고 다니는 것도 이제 질려서 새로 살 거야.

kamera baeteori ga oraedwaeseo yongnyang i jakgeodeun junggan e kkeojineuni charari da deulgo oneun ge natji mugeoun baeteori reul deulgo danineun geot do ije jillyeoseo saero sal geo ya · My camera batteries are old, so they don't hold much charge. Rather than have one die halfway, I'd sooner bring them all. I'm fed up with lugging heavy batteries around, though, so I'm going to buy new ones.

anna 하하, 네가 신형 배터리를 하나 발명해야겠다.

haha nega sinhyeong baeteori reul hana balmyeong haeyagetda · Ha ha, then you should invent a new battery.

good to know · Spec words come in pairs: 수동 (manual) ↔ 자동 (automatic), 유인 (manned) ↔ 무인 (unmanned: 무인 매장, a shop with no staff). 신형 is a new model, 최신형 the very latest, 구형 an old model. 출력 has two jobs: printing a document (문서 출력, 출력하다) and the output or power of a machine (출력이 높다). 충전 is charging (배터리 충전, 충전기: a charger).

Robots, batteries and two things at once: tomorrow we go online, where everything is connected.
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day 63 online and connected

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Talk about networks, devices, hacking and navigation, and say what is likely or makes sense with -을 법하다.

Online life has its own vocabulary, from IDs to hacking, and -을 법하다 is the careful way to say “that’s quite likely” or “that would make sense”.

words

word	romanisation	meaning	example
법하다	beopada	-을 법하다: likely, it would make sense	그럴 법한 이야기예요. It’s a believable story.
데이터	deiteo	data	이 데이터를 그래프로 정리해 주세요. Please put this data into a graph.
네트워크	neteuwokeu	network	회사 네트워크에 문제가 생겼어요. There’s a problem with the company network.
무선	museon	wireless	이 카페는 무선 인터넷이 무료예요. This café has free Wi-Fi.
초고속	chogosok	high-speed, ultra-fast	초고속 인터넷 덕분에 영화를 금방 받았어요. Thanks to high-speed internet, I downloaded the film in no time.
단말기	danmalgi	terminal, device, card machine	버스 단말기에 카드를 대세요. Tap your card on the bus reader.
아이디	aidi	ID, username	아이디를 잊어버려서 로그인을 못 했어요. I forgot my username, so I couldn’t log in.
조회	johoe	look-up, check (비밀번호 조회)	홈페이지에서 시험 결과를 조회했어요. I checked my exam results on the website.
전송	jeonsong	sending, transmission (of data)	사진을 친구에게 전송했어요. I sent the photo to my friend.
해킹	haeking	hacking	해킹을 막으려면 비밀번호를 자주 바꾸세요. Change your password often to prevent hacking.
내비게이션	naebigeisyeon	satnav, navigation system	내비게이션 덕분에 길을 쉽게 찾았어요. Thanks to the satnav, I found the way easily.
나침반	nachimban	compass	산에서 길을 잃으면 나침반이 필요해요. If you get lost in the mountains, you need a compass.
인공위성	ingongwiseong	(man-made) satellite	한국도 인공위성을 우주로 보냈다. Korea has also sent satellites into space.
탐색	tamsaek	search, exploration	구조{gujo-2} 팀이 밤새 바다를 탐색했다. The rescue team searched the sea all night.
항공기	hanggonggi	aircraft	공항에는 많은 항공기가 서{seoda} 있었다. Many aircraft stood at the airport.

오디오	odio	audio system, stereo	차{cha-2}에 새 오디오를 달았어요. I put a new stereo in the car.
이어폰	ieopon	earphones	지하철에서는 이어폰을 끼고 음악을 들어요. I listen to music with earphones on the subway.
음질	eumjil	sound quality	이 오디오는 음질이 정말 좋아요. This stereo has really good sound quality.
잡음	jabeum	noise, interference, crackle	라디오에서 잡음이 나요. The radio is crackling.
동화	donghwa	assimilation (동화 작용)	그는 한국 생활에 빠르게 동화{donghwa-2}되었다. He quickly blended into life in Korea.
차단	chadan	blocking, cutting off (자외선 차단)	모르는 번호를 차단했어요. I blocked an unknown number.
핵	haek	nuclear; core (핵 개발)	세계는 핵 문제에 대해 함께 이야기해야 한다. The world must talk about the nuclear issue together.

pattern likely, it would make sense: -을 법하다

verb / adjective -을 / -ㄹ | 법하다 | = it's likely; it would make sense

-을 법하다 says something is quite likely or reasonable, judging by the situation: 그럴 법한 이야기 (a believable story), 생길 법한 일 (the kind of thing that's bound to happen). 법 here is "the way things go", not the law. It sounds thoughtful; 그럴 법하다 (that makes sense) is the everyday chunk.

요즘 같으면 우리 회사에도 생길 법한 일이었어요. **yojeum gateumyeon uri hoesa e do saenggil beopan il ieosseoyo** The way things are these days, it was bound to happen to our company too.

그렇게 피곤하면 실수할 법도 하지. **geureoke pigon hamyeon silsu hal beopdo haji** If you're that tired, no wonder you make mistakes.

그 사람 말은 충분히 믿을 법한 이야기예요. **geu saram mal eun chungbunhi mideul beopan iyagi yeyo** What he says is quite believable.

dialogue a hacking attempt

hyunwoo 여러분, 어젯밤에 우리 예약 사이트에 해킹 시도가 있었대요. 오늘 아침 신문 지면에도 실렸어요.

yeoreobun eojetbam e uri yeyak saiteu e haeking sido ga isseotdaeyo oneul achim sinmun jimyeon e do sillyeosseoyo · Everyone, apparently there was a hacking attempt on our booking site last night. It's even in this morning's paper.

anna 네? 고객 정보는 괜찮아요?

ne gogaek jeongbo neun gwaenchanayo · What? Is the customer data OK?

hyunwoo 보안 팀이 바로 차단해서 피해는 없대요. 그러니까 너무 낙심하지 마세요. 그래도 고객들한테 비밀번호를 바꾸라고 안내해야 해요.

boan tim i baro chadanhaeseo pihae neun eopdaeyo geureonikka neomu naksimhaji maseyo geuraedo gogaek deul hante bimilbeonho reul bakkurago annae haeya haeyo · The security team blocked it straight away, so there was no damage. So don't lose heart. Still, we have to tell customers to change their passwords.

subin 요즘 이런 일이 많으니까 언젠가 우리 회사에도 생길 법한 일이었어요.

yojeum ireon il i maneunikka eonjenga uri hoesa e do saenggil beopan il ieosseoyo · This happens so often these days, it was bound to happen to us sooner or later.

anna 맞아요. 아이디랑 비밀번호를 여러 사이트에서 똑같이 쓰는 사람이 많잖아요.

majayo aidi rang bimilbeonho reul yeoreo saiteu eseo ttokgachi sseuneun saram i manchanayo · True. Lots of people use the same ID and password on lots of sites.

hyunwoo 안나 씨가 고객 안내문을 좀 써 줄래요? 해킹에 관한 내용은 짧고 정확하게요.

anna ssi ga gogaek annaemun eul jom sseo jullaeyo haeking e gwanhan naeyong eun jjalgo jeonghwak hage yo · Anna, could you write the notice for customers? Keep the part about the hacking short and accurate.

anna 네. 예약 내역은 홈페이지에서 조회할 수 있다고 쓸게요. 환불을 신청할 때 구비해야 할 서류도 같이 쓸까요?

ne yeyak naeyeok eun hompeiji eseo johoe hal su itdago sseulgeyo hwanbul eul sincheong hal ttae gubi haeya hal seoryu do gachi sseulkka yo · Sure. I'll say they can check their booking details on the website. Shall I also list the papers they need to have ready to ask for a refund?

subin 차장님, 그리고 회의실 무선 인터넷이 또 끊겼어요. 데이터 전송이 너무 느려요.

chajang nim geurigo hoeuisil museon inteonet i tto kkeunkyeosseoyo deiteo jeonsong i neomu neuryeoyo · And the meeting-room Wi-Fi has dropped again. Data transfer is so slow.

hyunwoo 우리 층 네트워크도 점검해야겠네요. 초고속 인터넷이라더니 이름만 초고속이에요.

uri cheung neteuwokeu do jeomgeom haeyagenneyo chogosok inteonet iradeoni ireum man chogosok ieyo · We'll need to check our floor's network too. It's supposed to be high-speed, but that's just the name.

anna 제 이어폰도 잡음이 심해서 어제 영상 회의 때 음질이 안 좋았어요.

je ieopon do jabeum i simhaeseo eoje yeongsang hoeui ttae eumjil i an joasseoyo · My earphones crackle a lot too, so the sound was bad in yesterday's video call.

subin 안나, 그건 이어폰이 오래돼서 그래. 내 거 신형인데, 빌려 줄게.

anna geugeon ieopon i oraedwaeseo geurae nae geo sinhyeong inde billyeo julge · Anna, that's because your earphones are old. Mine are a new model; I'll lend them to you.

anna 고마워. 아, 생각해 보니 이 이어폰 산 지 5년이 넘었는걸!

gomawo a saenggak hae boni i ieopon san ji nyeon i neomeonneungeol · Thanks. Oh, come to think of it, I bought these earphones over five years ago!

write it trace the grey, then write your own

탐
tam
search, exploration

good to know · Many tech words are English: 아이디 (ID, username), 네트워크, 데이터, 오디오, 이어폰, 내비게이션. 무선 is wireless (무선 인터넷 = Wi-Fi), 초고속 high-speed, and 단말기 a terminal: the card machine, the phone, the device itself. Idiom: 발 없는 말이 천 리 간다, “a word with no feet travels a thousand li”: news, and data, spreads faster than you think.

Hackers blocked, Wi-Fi checked and a believable -을 법하다. Tomorrow: energy, power and the waste we leave behind.
Do this day interactively, with audio and games, free at **wishyou.today/learning**

day 64 energy and waste

Talk about energy sources, power cuts, pollution and waste, and read an environment notice.

Energy and the environment are a TOPIK favourite, in reading texts, charts and essays alike, and these words also fill the news every day.

words

word	romanisation	meaning	example
탄소	tanso	carbon (탄소 배출)	자전거를 타면 탄소 배출을 줄일 수 있어요. Riding a bike can cut carbon emissions.
온실가스	onsilgaseu	greenhouse gas	온실가스는 지구를 따뜻하게 만든다. Greenhouse gases warm the earth.
발전	baljeon	(power) generation (수력 발전)	이 강에서는 수력{==hydroelectric} 발전{baljeon-2}을 해요. This river is used for hydroelectric power.
발전소	baljeonso	power station	마을 근처에 발전소가 있어요. There's a power station near the village.
원자력	wonjaryeok	nuclear power	원자력 발전소는 안전 관리가 중요하다. Safety management is vital at nuclear power stations.
태양열	taeyangnyeol	solar heat, solar power	이 집은 태양열로 물을 데워요. This house heats its water with solar power.
풍력	pungnyeok	wind power	바람이 센 곳에서는 풍력 발전{baljeon-2}을 해요. Windy places produce wind power.
전력	jeollyeok	electric power (전력 소비량)	여름에는 전력이 부족할 수 있어요. Electricity can run short in summer.
정전	jeongjeon	power cut	태풍 때문에 정전이 됐어요. There was a power cut because of the typhoon.
누전	nujeon	short circuit, electrical leak	누전 때문에 불이 날{nada} 수 있어요. A short circuit can start a fire.
친환경	chinhwangyeong	eco-friendly, green	친환경 제품을 쓰려고 노력해요. I try to use eco-friendly products.
천연	cheonyeon	natural (천연 향료)	이 비누는 천연 재료로 만들었어요. This soap is made from natural ingredients.
배출	baechul	discharge, emission	쓰레기는 정해진 날에 배출해야 해요. Rubbish must be put out on the set days.
배기가스	baegigaseu	exhaust (gas)	오래된 차{cha-2}는 배기가스가 많이 나와요. Old cars give off a lot of exhaust.
매연	maeyeon	smoke, soot (from cars, factories)	공장 매연 때문에 하늘이 회색이에요. The sky is grey with factory smoke.
폐수	pyesu	waste water	공장 폐수는 깨끗하게 만든 뒤에 버려야 한다. Factory waste water must be cleaned before it is released.

유출	yuchul	leak, spill, outflow	바다에 기름이 유출되었다. Oil leaked into the sea.
유해	yuhae	harmful (유해 물질)	담배에는 유해 물질이 많다. Cigarettes contain many harmful substances.
수질	sujil	water quality	이 강은 수질이 아주 깨끗해요. The water in this river is very clean.
식수	siksu	drinking water	섬에서는 식수가 귀해요. Drinking water is precious on the island.
이면지	imyeonji	scrap paper (printed on one side)	이면지를 메모지로 써요{sseuda-3}. I use scrap paper as notepaper.
찌꺼기	jjikkeogi	dregs, leftovers, scraps	커피 찌꺼기로 냄새를 없앨 수 있어요. You can get rid of smells with coffee grounds.

pattern word families: -력 (power), -수 (water), -출 (going out)

원자 / 풍 / 전 + 력 | 폐 / 식 + 수 | 배 / 유 + 출

-력 is power or force: 원자력 (nuclear power), 풍력 (wind power), 전력 (electric power). -수 is water: 폐수 (waste water), 식수 (drinking water); 수질 is water quality. -출 is going out: 배출 (letting out, emissions) is on purpose, 유출 (a leak) is by accident.

제주도는 바람이 세서 풍력 발전을 많이 한다. **jejudo neun baram i seseo pungnyeok baljeon eul mani handa** Jeju is windy, so it produces a lot of wind power.

공장은 폐수를 깨끗하게 만든 뒤에 배출해야 한다. **gongjang eun pyesu reul kkaekkeutage mandeun dwi e baechulhaeya handa** Factories must clean their waste water before letting it out.

기름이 바다로 유출되면 생물들이 큰 피해를 입는다. **gireum i bada ro yuchuldoemyeon saengmul deul i keun pihae reul imneunda** When oil leaks into the sea, living things suffer badly.

dialogue a low-carbon tour

subin 안나, 이번 제주도 상품에 풍력 발전소 견학을 넣으면 어때?
anna ibeon jejudo sangpum e pungnyeok baljeonso gyeonhak eul neoeumyeon eottae · Anna, how about adding a visit to a wind farm to the Jeju tour?

anna 좋은 생각이다! 바닷가에 있는 그 큰 발전소 맞지?
joeun saenggak ida badatga e inneun geu keun baljeonso matji · Great idea! That's the big power station by the sea, right?

subin 응. 지난달에 가 봤는데 규모가 엄청 크데. 마을 전력의 반을 거기서 만든대. 그 마을에 친환경 카페도 새로 개업했어.
eung jinandal e ga bwanneunde gyumo ga eomcheong keude maeul jeollyeok ui ban eul geogiseo mandeundae geu maeul e chinhwangyeong kape do saero gaeeop haesseo · Yeah. I went last month, and it was huge. They say it makes half the village's power. A new eco-friendly café has opened in that village, too.

anna 그럼 손님들이 여행하는 동시에 에너지 공부도 할 수 있겠네.
geureom sonnim deul i yeohaeng haneun dongsi e eneoji gongbu do hal su itgenne · Then the guests can learn about energy while they travel.

subin 그리고 비행기 대신 배를 타면 탄소 배출을 많이 줄일 수 있어.
geurigo bihaenggi daesin bae reul tamyeon tanso baechul eul mani juril su isseo · And if they take the boat instead of a plane, we can cut carbon emissions a lot.

anna 그런데 배는 시간이 너무 오래 걸리잖아. 배 안에 잡음도 심한 편이고. 손님들이 좋아할까?
geureonde bae neun sigan i neomu orae geollijana bae an e jabeum do simhan pyeonigo sonnim deul i joahalkka · But the boat takes so long. And it's rather noisy on board. Will the guests like it?

subin 요즘은 친환경 여행을 일부러 찾는 손님이 많아. 지난번 조사에서도 60%가 해 보고 싶다고 했잖아.
yojeum eun chinhwangyeong yeohaeng eul ilbureo channeun sonnim i mana jinanbeon josa eseo do ga hae bogo sipdago haetjana · Lots of guests look for green travel on purpose these days. In the last survey, 60% said they'd like to try it.

anna 맞다. 그럼 숙소는 태양열로 물을 데우는 마을 숙소로 하자. 감성 있는 돌집이라서 손님들이 좋아할 거야.
matda geureom sukso neun taeyangnyeol ro mul eul deuneun maeul sukso ro haja gamseong inneun dol jip iraseo sonnim deul i joahal geo ya · True. Then let's put them in the village guesthouse that heats its water with solar power. It's a stone house with real charm, so the guests will love it.

subin 좋아. 아, 이 기획안 이면지에 출력해 줄래? 종이도 아껴야지. 프린터가 수동이라서 한 장씩 넣어야 돼.
joa a i gihoek an imyeonji e chullyeokae jullae jongi do akkyeoyaji peurinteo ga sudong iraseo han jang ssik neoeoya dwae · Good. Oh, could you print this plan on scrap paper? We should save paper too. The printer is manual, so you have to feed it one sheet at a time.

anna 친환경 팀이 새 종이를 쓰다니, 말도 안 되지! 하하. 기념품 포장지도 이면지로 하자.
chinhwangyeong tim i sae jongi reul sseudani mal do an doeji haha ginyeompum pojangji do imyeonji ro haja · The green team using new paper? Unthinkable! Ha ha. Let's wrap the souvenirs in scrap paper too.

good to know · 발전 has twins: the development you know (경제 발전) and power generation (수력 발전: hydro power, 발전소: a power station). Context decides, and 발전소 is always the power station. 이면지 is paper already printed on one side: Korean offices keep a tray of it by the printer. 찌꺼기 is the leftover bits: 음식물 찌꺼기 (food scraps), 커피 찌꺼기 (coffee grounds).

Wind, sun, scrap paper and fewer emissions: a greener tour in greener Korean. Tomorrow: a warming world.
Do this day interactively, with audio and games, free at **wishyou.today/learning**

day 65 a warming world

Talk and write about climate change, heat waves and the natural world, and state careful conclusions with -는 듯하다.

Climate is a TOPIK reading and writing classic, and -는 듯하다 is how an article says “it seems” without claiming too much.

words

word	romanisation	meaning	example
온난화	onnanhwa	(global) warming	지구 온난화로 여름이 길어지고 있다. Summers are getting longer because of global warming.
빙하	bingha	glacier, ice sheet	빙하가 녹으면 바닷물이 높아진다. When glaciers melt, the sea level rises.
북극	bukgeuk	the Arctic, the North Pole	북극에는 하얀 곰이 살아요. White bears live in the Arctic.
남극	namgeuk	the Antarctic, the South Pole	남극은 지구에서 가장 추운 곳이다. Antarctica is the coldest place on earth.
멸종	myeoljong	extinction	공룡은 오래전에 멸종했다. Dinosaurs died out long ago.
생태계	saengtaegye	ecosystem	쓰레기는 바다 생태계를 파괴한다. Rubbish destroys the ocean ecosystem.
동식물	dongsingmul	plants and animals, wildlife	이 공원에는 다양한 동식물이 많다. This park has many kinds of plants and animals.
야생	yasaeng	wild (야생 동물)	야생 동물에게 먹이를 주지 마세요. Don’t feed the wild animals.
산성비	sanseongbi	acid rain	산성비를 맞으면 머리카락이 상할 {sanghada=be damaged} 수 있어요. Acid rain can damage your hair.
황사	hwangsa	yellow dust (from the deserts)	황사가 심한 날에는 창문을 닫으세요. Close the windows on days with heavy yellow dust.
자외선	jaoeseon	ultraviolet (UV) rays	여름에는 자외선이 강해요. UV rays are strong in summer.
열대야	yeoldaeya	tropical night (above 25°C)	열대야 때문에 잠을 못 잤어요. I couldn’t sleep because of the tropical night.
열대	yeoldae	the tropics; tropical	열대 지방에서는 일{il-2} 년 내내 더워요. It’s hot all year round in the tropics.
아열대	ayeoldae	subtropical (zone)	제주도 남쪽은 아열대 기후에 가까워요. The south of Jeju is close to a subtropical climate.
온대	ondae	temperate (zone)	온대{ondae} 지방은 사계절이 뚜렷하다. Temperate regions have four distinct seasons.
냉대	naengdae	subarctic zone (냉대 기후)	냉대 지방은 겨울이 길고 추워요. Subarctic regions have long, cold winters.

연평균	yeonpyeonggyun	yearly average	이 도시의 연평균 기온은 13도이다. This city's average yearly temperature is 13 degrees.
예년	yenyeon	an average year (예년 수준)	올해 겨울은 예년보다 따뜻해요. This winter is warmer than usual.
고온	goon	high temperature	음식은 고온에서 오래 두면 상해요. Food goes off if you leave it in the heat for long.
불쾌지수	bulkwaejisu	discomfort index (heat and humidity)	오늘은 불쾌지수가 높으니까 서로 조심해요. The discomfort index is high today, so let's go easy on each other.
체감	chegam	how it feels (체감 온도)	바람 때문에 체감 온도가 더 낮아요. Because of the wind, it feels even colder.
탁하다	takada	murky, stale (공기가 탁하다)	방 공기가 탁하니까 창문을 열어요. The air in the room is stale, so let's open the window.
생명력	saengmyeongnyeok	vitality, life force	이 꽃은 생명력이 강해서 어디서나 잘 자라요. This flower is very hardy and grows well anywhere.

pattern it seems (written, careful): -는 듯하다 / -은 듯하다 / -을 듯하다

verb -는 · past -은 · future -을 / adjective -은 **듯하다 (듯싶다)** **= it seems, it looks as if**

At level 4 you met -는 듯 (as if). -는 듯하다 is the full sentence ending "it seems": careful and a little formal, so it suits articles, reports and essays (in chat, -는 것 같다). Now: 녹고 있는 듯하다. Past: 오른 듯하다. Future or guess: 비가 올 듯하다. Adjectives take -은: 더운 듯하다. -는 듯싶다 means the same.

북극의 얼음이 해마다 줄어드는 듯하다. **bukgeuk ui eoreum i haemada jureodeuneun deut hada** The Arctic ice seems to be shrinking every year.

올여름은 예년보다 더 더울 듯하다. **ollyeoreum eun yenyeon boda deo deoul deut hada** This summer looks likely to be hotter than an average year.

체감 온도는 35도쯤 되는 듯해. **chegam ondo neun do jjeum doeneun deut hae** It feels like about 35 degrees.

dialogue the seventh tropical night

jiho 안나, 아직 안 자?

anna ajik an ja · Anna, are you still up?

anna 너무 더워서 잠이 안 와. 밤 열두 시가 넘었는데도 30도야.

neomu deowoseo jam i an wa bam yeol du si ga neomeonneundedo do ya · It's too hot to sleep. It's past midnight and it's still 30 degrees.

jiho 벌써 일주일째 열대야야. 불쾌지수도 엄청 높대. 내일은 자외선 지수도 아주 높을 거래.

beolsseo iljuil jjae yeoldaeyaya bulkwaejisu do eomcheong nopdae naeil eun jaoeseon jisu do aju nopeul geo rae · It's the seventh tropical night in a row. They say the discomfort index is sky-high too. And tomorrow the UV index will be very high.

anna 선풍기를 틀어도 뜨거운 바람만 나와. 체감 온도는 35도쯤 되는 듯해.

seonpunggi reul teureo do tteugeoun baram man nawa chegam ondo neun do jjeum doeneun deut hae · Even with the fan on, only hot air comes out. It feels like about 35 degrees.

choi 둘 다 아직 안 자요? 수박 좀 먹고 자요. 이렇게 더울 때는 통이 넓은 바지를 입어요.

dul da ajik an jayo subak jom meokgo jayo ireoke deoul ttae neun tong i neolbeun baji reul ibeoyo · Are you both still up? Have some watermelon before bed. When it's this hot, wear wide-legged trousers.

anna 아주머니, 옛날에도 여름이 이렇게 더웠어요?

ajumeoni yennal e do yeoreum i ireoke deowosseoyo · Mrs Choi, were summers this hot in the old days too?

choi 아니요. 예년에 비하면 올여름은 너무 더워요. 옛날 서울은 이렇지 않았어요. 요즘은 옛날의 시원한 여름밤을 그리며 겨우 잠이 들어요. 잠을 못 자는 게 만병의 근원인데.

aniyo yenyeon e bihamyeon ollyeoreum eun neomu deowoyo yennal seoul eun ireochi anasseoyo yojeum eun yennal ui siwonhan yeoreum bam eul geurimyeo gyeou jam i deureoyo jam eul mot janeun ge manbyeong ui geunwon inde · No. Compared with an average year, this summer is far too hot. Seoul wasn't like this in the old days. These days I only get to sleep by dreaming of the cool summer nights we used to have. And lack of sleep is the root of all illness.

jiho 어제 텔레비전 대담 프로그램에서 그러는데, 한국 남쪽은 점점 아열대 기후로 바뀌고 있대요.

eoje tellebijeon daedam peurogeuraem eseo geureoneunde hanguk namjjok eun jeomjeom ayeoldae gihu ro bakkwigo itdaeyo · On a TV talk show yesterday they said the south of Korea is slowly turning subtropical.

choi 그래서 요즘 제주도에서 열대 과일을 키우는 거예요?

geuraeseo yojeum jejudo eseo yeoldae gwail eul kiuneun geo yeyo · Is that why they grow tropical fruit on Jeju these days?

jiho 네, 그럴 법해요. 남쪽 바다의 물고기도 많이 달라졌대요.

ne geureol beopaeyo namjjok bada ui mulgogi do mani dallajeotdaeyo · Yes, that makes sense. They say the fish in the southern seas have changed a lot too.

anna 다 지구 온난화 때문이겠죠. 우리 같은 여행사도 책임이 있어요. 항공기가 탄소를 많이 배출하니까요. 북극 빙하도 계속 녹고 있대요.

da jigu onnanhwa ttaemun igetjyo uri gateun yeohaengsa do chaegim i isseoyo hanggonggi ga tanso reul mani baechul hanikkayo bukgeuk bingha do gyesok nokgo itdaeyo · It must all be global warming. Travel companies like ours are partly to blame: aircraft give off a lot of carbon. They say the Arctic ice keeps melting too.

good to know · Climate zones: 열대 (tropical), 아열대 (subtropical), 온대 (temperate), 냉대 (subarctic). 열대야 is a "tropical night", when it stays above 25°C all night; 열대어 are tropical fish. 체감 온도 is the temperature as it feels (wind or humidity included), and 불쾌지수, "the discomfort index", is the summer number on the Korean weather forecast that tells you how sticky and irritable the day will be.

Melting ice, sticky nights and careful conclusions with -는 듯하다: you can now write like a science reporter. Tomorrow: disasters, and staying safe.
Do this day interactively, with audio and games, free at **wishyou.today/learning**

day 66 disasters

Follow weather warnings and disaster news, and talk about evacuating, damage and recovery.

Weather warnings, emergency texts and disaster news use a tight set of words, and in Korea you'll get them on your phone in Korean.

words

word	romanisation	meaning	example
자연재해	jayeonjaehae	natural disaster	지진은 무서운 자연재해이다. Earthquakes are a terrifying natural disaster.
재난	jaenan	disaster, emergency	휴대폰으로 재난 문자가 왔어요. An emergency alert came to my phone.
재해	jaehae	disaster (damage)	정부는 재해에 대비{daebi-2}해야 한다. The government must prepare for disasters.
수해	suhae	flood damage	올여름 수해로 많은 사람들이 집을 잃었다. Many people lost their homes in this summer's floods.
호우	hou	heavy rain, downpour	호우 때문에 비행기가 취소됐어요. The flight was cancelled because of heavy rain.
침수	chimsu	flooding, being under water	비가 많이 와서 지하 주차장이 침수됐다. The underground car park was flooded after the heavy rain.
산사태	sansatae	landslide	산사태 때문에 길{gil}이 막혔어요. The road was blocked by a landslide.
눈사태	nunsatae	avalanche	겨울 산에서는 눈사태를 조심해야 한다. You have to watch out for avalanches in the mountains in winter.
화산	hwasan	volcano	제주도는 화산이 만든 섬이에요. Jeju is an island made by a volcano.
붕괴	bunggoe	collapse	지진으로 다리가 붕괴되었다. The bridge collapsed in the earthquake.
꺼지다	kkeojida	sink, cave in (땅이 꺼지다)	비가 많이 와서 길{gil}이 꺼졌어요{kkeojida-2}. The road caved in after the heavy rain.
대피	daepi	evacuation, taking shelter	불이 나면 계단으로 대피하세요. If there's a fire, evacuate by the stairs.
복구	bokgu	restoration, recovery (after damage)	태풍 피해 복구에 한 달이 걸렸다. Repairing the typhoon damage took a month.
강풍	gangpung	strong wind, gale	강풍 때문에 배{bae-3}가 출발하지 못했다. The boat couldn't leave because of the gale.
벼락	byeorak	lightning, a thunderbolt	어젯밤 큰 나무가 벼락을 맞았어요{matda-5}. A big tree was struck by lightning last night.
불길	bulgil	flames, a blaze	소방관들이 불길을 잡았다. The firefighters got the blaze under control.

세차다	sechada	fierce, strong (rain, wind)	밤새 비가 세차게 내렸어요. It poured all night.
거세다	geoseda	violent, rough, fierce	파도가 거세서 수영을 할 수 없어요. The waves are too rough to swim.
뒤흔들다	dwiheundeulda	shake (violently); rock	그 소식은 온{on} 나라를 뒤흔들었다. That news shook the whole country.
떠내려가다	tteonaeryeogada	be swept away (by water)	홍수로 다리가 떠내려갔다. The bridge was swept away in the flood.
파묻히다	pamuchida	be buried	마을이 눈에 파묻혔어요. The village was buried in snow.
기상청	gisangcheong	the (Korea) weather service	기상청은 내일 비가 온다고 발표했다. The weather service announced it will rain tomorrow.
기상	gisang	weather (기상이 악화되다)	기상 상황이 나빠서 비행기가 늦게 출발했다. The plane left late because of bad weather.
강우량	ganguryang	rainfall (amount)	올해 여름은 강우량이 적었다. There was little rain this summer.

pattern disaster words: 재해, 재난, 수해 and -사태

(자연)재해 • 재난 • 수해 **산 / 눈 + 사태** **대피 → 복구**

재해 is damage from a disaster, often natural (자연재해: a natural disaster). 재난 is a disaster as an emergency for people (재난 문자: an emergency alert text). 수해 is flood damage. -사태 is a slide: 산사태 (a landslide), 눈사태 (an avalanche). First you 대피하다 (evacuate), then you 복구하다 (restore, repair).

기상청은 내일 남부 지방에 호우가 내릴 것이라고 경고했다. **gisangcheong eun naeil nambu jibang e hou ga naeril geot irago gyeonggo haetda** The weather service warned of heavy rain in the south tomorrow.

산사태 위험이 있는 지역 주민들은 학교로 대피했다. **sansatae wiheom i inneun jiyeok jumin deul eun hakgyo ro daepihaetda** Residents of areas at risk of landslides evacuated to a school.

비가 그치자 마을 사람들이 함께 복구 작업을 시작했다. **bi ga geuchija maeul saramdeul i hamkke bokgu jageop eul sijak haetda** When the rain stopped, the villagers started the clean-up together.

dialogue heavy-rain warning

hyunwoo 기상청에서 내일 제주도에 호우가 내릴 거라고 경고했어요.
gisangcheong eseo naeil jejudo e hou ga naeril geo rago gyeonggo haesseoyo · The weather service has warned of heavy rain on Jeju tomorrow.

anna 네? 내일 출발하는 손님이 스무 명이나 있는데요.
ne naeil chulbal haneun sonnim i seumu myeong ina inneunde yo · What? We've got twenty guests leaving tomorrow.

hyunwoo 강풍까지 분다니까 비행기도 못 뜰 거예요. 출발을 미뤄야겠어요.
gangpung kkaji bundanikka bihaenggi do mot tteul geo yeyo chulbal eul mirwoyagesseoyo · They say there'll be strong winds too, so the planes won't be able to fly. We'll have to postpone.

subin 차장님, 방금 마을에서 전화가 왔어요. 벌써 비가 세차게 와서 마을 앞 길이 침수됐대요.
chajang nim banggeum maeul eseo jeonhwa ga wasseoyo beolsseo bi ga sechage waseo maeul ap gil i chimsudwaetdaeyo · Sir, the village just called. It's already pouring, and the road in front of the village is flooded.

hyunwoo 산사태 위험은 없대요?
sansatae wiheom eun eopdaeyo · Is there any risk of landslides?

subin 뒷산 근처 집들은 마을 학교로 대피했대요. 산에 사는 야생 동물들도 걱정이에요. 기상 상황이 더 나빠질 수도 있대요.
dwitsan geuncheo jip deul eun maeul hakgyo ro daepihaetdaeyo san e saneun yasaeng dongmul deul do geokjeong ieyo gisang sanghwang i deo nappajil su do itdaeyo · The houses near the hill behind have evacuated to the village school. I'm worried about the wild animals on the hill too. They say the weather could get worse.

hyunwoo 안나 씨, 오늘 안으로 손님들한테 다 연락해 주세요. 이번 비 때문에 제 주름살만 늘어요.
anna ssi oneul an euro sonnim deul hante da yeollak hae juseyo ibeon bi ttaemun e je jureumsal man neureoyo · Anna, please contact all the guests by today. This rain is giving me more wrinkles.

anna 오늘 안으로 스무 명한테 다 연락하라니요? 아, 네… 수빈 씨랑 나눠서 할게요. 이어폰 끼고 바로 전화 돌릴게요.
oneul an euro seumu myeong hante da yeollak haraniyo a ne subin ssi rang nanwoseo halgeyo ieopon kkigo baro jeonhwa dollilgeyo · All twenty of them by today? Oh, right… I'll split them with Subin. I'll put my earphones in and start calling right away.

hyunwoo 미안해요. 안전이 먼저니까요. 비가 그치면 마을 복구도 도와야 하고요.
mian haeyo anjeon i meonjeo nikkayo bi ga geuchimyeon maeul bokgu do dowaya hagoyo · Sorry. Safety comes first. And when the rain stops, we should help the village clean up.

subin 그럼 다음에는 손님들이랑 같이 마을을 돕는 여행을 만들어도 좋겠어요. 그러면 젊은 손님들도 끌어들이기가 쉬울 거예요.
geureom daeum e neun sonnim deul irang gachi maeul eul domneun yeohaeng eul mandeureo do jokesseoyo geureomyeon jeolmeun sonnim deul do kkeureodeurigi ga swiul geo yeyo · Then next time we could make a tour where the guests help the village too. That would make it easy to draw in younger guests, too.

hyunwoo 좋은 생각이에요. 일단 오늘은 기상 정보부터 계속 확인합시다.
joeun saenggak ieyo ildan oneul eun gisang jeongbo buteo gyesok hwagin hapsida · Good idea. For today, let's keep checking the weather first.

good to know · Weather words: 기상 is the weather in science and news (기상청: the weather service, 기상 정보, 기상이 악화되다). 호우 is heavy rain (집중 호우: torrential rain), 강풍 strong wind, 강우량 rainfall. 세차다 and 거세다 both mean "fierce": 비가 세차게 내리다 (the rain pours down), 바람이 거세다 (the wind is violent). 거세다 also works for protests and criticism: 거센 비판.

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day 67 mission: yuki's lab open day

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chapter 1 late again

anna 톰, 왜 이렇게 늦었어? 벌써 10시야.
tom wae ireoke neujeosseo beolsseo siya · Tom, why are you so late? It's already ten.

tom 미안. 내비게이션이 길을 탐색하다가 엉뚱한 건물을 안내했어. 인공위성 신호가 약했나 봐.
mian naebigeisyeon i gil eul tamsaekadaga eongttunghan geonmul eul annae haesseo ingongwiseong sinho ga yakaenna bwa · Sorry. The satnav was searching for the route and took me to the wrong building. The satellite signal must have been weak.

jiho 톰 씨, 다음에는 나침반을 들고 다니는 게 어때요? 하하.
tom ssi daeum e neun nachimban eul deulgo danineun ge eottaeyo haha · Tom, how about carrying a compass next time? Ha ha.

tom 놀리지 마세요. 그래도 오늘은 취재 장비 없이 그냥 친구로 왔어요.
nolliji maseyo geuraedo oneul eun chwijae jangbi eopsi geunyang chingu ro wasseoyo · Don't tease me. Anyway, today I've come as a friend, without my reporting kit.

anna 잘했네! 오늘은 유키 씨가 주인공이니까.
jalhaenne oneul eun yuki ssi ga juingong inikka · Good for you! Today is Yuki's day.

jiho 저기 안내문이 있어요. 제가 읽어 볼게요. "[연구실 공개의 날] 과학과 공학 실험실을 여러분께 공개합니다. 물리·화학 실험실: 고체, 액체, 기체의 변화와 수증기 실험, 금속과 철의 재질 비교. 생물 실험실: 유전자로 보는 생물의 진화, 공룡에서 새까지. 기계 공학 실험실: 무인 배달 로봇의 성능 시험, 시속 20킬로미터로 곡선과 수직 계단 달리기. 대기 과학 실험실: 황사, 산성비, 자외선 수치 알아보기. 환경 공학 실험실: 미생물을 이용한 폐수 처리, 오전 11시 발표. 단, 실험실 안에서는 반드시 장갑을 착용하고, 음식물은 가지고 들어갈 수 없습니다."
jeogi annaemun i isseoyo jega ilgeo bolgeyo yeongusil gonggae ui nal gwahak gwa gonghak silheom sil eul yeoreobun kke gonggae hamnida mulli hwahak silheom sil goche aekche giche ui byeonhwa wa sujeunggi silheom geumsok gwa cheol ui jaejil bigyo saengmul silheom sil yujeonja ro boneun saengmul ui jinhwa gongnyong eseo sae kkaji gigye gonghak silheom sil muin baedal robot ui seongneung siheom sisok killomiteo ro gokseon gwa sujik gyedan dalligi daegi gwahak silheom sil hwangsa sanseongbi jaoeseon suchi arabogi hwangyeong gonghak silheom sil misaengmul eul iyong han pyesu cheori ojeon si balpyo dan silheom sil an eseo neun bandeusi janggap eul chagyong hago eumsingmul eun gajigo deureogal su eopseumnida · There's a notice over there. I'll read it. "[Lab open day] Our science and engineering labs are open to you. Physics and chemistry lab: solids, liquids and gases changing, and steam experiments; comparing metals and iron. Biology lab: evolution seen through genes, from dinosaurs to birds. Mechanical engineering lab: performance tests of an unmanned delivery robot, running bends and straight-up stairs at 20 km an hour. Atmospheric science lab: finding out the figures for yellow dust, acid rain and UV. Environmental engineering lab: treating waste water with microbes, talk at 11 a.m. Please note: gloves must be worn in the labs, and no food may be taken in."

tom 볼 게 정말 많네요. 공룡 실험실에는 하준이를 데리고 왔으면 좋았을 텐데.
bol ge jeongmal manneyo gongnyong silheom sil e neun hajuni reul derigo wasseumyeon joasseul tende · There's so much to see. We should have brought Hajun to the dinosaur lab.

anna 얼마 전까지 실험이 잘 안 돼서 많이 힘들어했는데, 결과가 잘 나왔대.
eolma jeon kkaji silheom i jal an dwaeseo mani himdeureo haenneunde gyeolgwa ga jal nawatdae · Until recently her experiments weren't working and she was having a hard time, but she says the results came out well.

jiho 다행이에요. 아, 저기 유키 씨가 나오네요!
dahaeng ieyo a jeogi yuki ssi ga naone yo · That's a relief. Oh, there's Yuki coming out!

chapter 2 yuki's little helpers

yuki 와 주셔서 고마워요! 여기가 우리 실험실이에요. 들어가기 전에 이 장갑부터 착용해 주세요.
wa jusyeoseo gomawoyo yeogi ga uri silheom sil ieyo deureogagi jeon e i janggap buteo chagyong hae juseyo · Thanks for coming! This is our lab. Please put these gloves on before you go in.

tom 와, 장비가 다 최신형이네요. 이 기계는 뭐예요?
wa jangbi ga da choesinhyeongineyo i gigye neun mwo yeyo · Wow, the equipment is all the latest model. What's this machine?

yuki 폐수 속 성분을 분석하는 장치예요. 물속 유해 물질의 농도를 수치로 보여 줘요.
pyesu sok seongbun eul bunseok haneun jangchi yeyo mulsok yuhae muljil ui nongdo reul suchi ro boyeo jwoyo · It's a device that analyses what's in waste water. It shows the level of harmful substances in the water as a figure.

jiho 병원에서 쓰는 기계랑 비슷하네요. 그럼 저 큰 통 안에는 뭐가 있어요?
byeongwon eseo sseuneun gigye rang biseutaneyo geureom jeo keun tong an e neun mwo ga isseoyo · It's like the machines we use at the hospital. Then what's in that big tank?

yuki 미생물이 살고 있어요. 미생물이 폐수 속 찌꺼기를 먹고 물을 깨끗하게 만들어요. 산소를 넣어 주면 더 빨리 일하고요.
misaengmul i salgo isseoyo misaengmul i pyesu sok jjikkeogi reul meokgo mul eul kkaekkeutage mandeureoyo sanso reul neoeo jumyeon deo ppalli il hagoyo · Microbes live in it. They eat the bits of waste in the water and make it clean. And if you add oxygen, they work faster.

anna 산소가 많을수록 물이 더 깨끗해져요?
sanso ga maneulsurok mul i deo kkaekkeutaejeoyo · The more oxygen, the cleaner the water?

yuki 어느 정도까지는 산소의 양에 비례해요. 그리고 물이 알칼리성보다 중성일 때 미생물이 제일 잘 일해요.
eoneu jeongdo kkaji neun sanso ui yang e biryehaeyo geurigo mul i alkalliseong boda jungseong il ttae misaengmul i jeil jal il haeyo · Up to a point, it's in proportion to the amount of oxygen. And the microbes work best when the water is neutral rather than alkaline.

anna 그런데 실험 중에 정전이 되면 어떻게 해요?
geureonde silheom jung e jeongjeon i doemyeon eotteoke haeyo · But what happens if there's a power cut in the middle of an experiment?

yuki 비상용 배터리가 있어요. 한 번 충전하면 하루를 쓸 만큼 용량이 커요. 누전이 생기지 않게 물 근처 장치는 다 방수 처리를 했고요.
bisang yong baeteori ga isseoyo han beon chungjeonhamyeon haru reul sseul mankeum yongnyang i keoyo nujeon i saenggiji anke mul geuncheo jangchi neun da bangsu cheori reul haetgoyo · There's a back-up battery. One charge holds enough to last a day. And all the devices near the water are waterproofed so there's no short circuit.

tom 미생물도 생명체니까 이름이 있어요?
misaengmul do saengmyeongche nikka ireum i isseoyo · Microbes are living things, so do they have names?

yuki 하하, 저는 '꼬마들'이라고 불러요. 매일 같은 주기로 먹이를 주고, 물은 계속 순환시켜요.
haha jeo neun kkoma deul irago bulleoyo maeil gateun jugi ro meogireul jugo mul eun gyesok sunhwansikyeoyo · Ha ha, I call them "the little ones". I feed them on the same cycle every day and keep the water circulating.

jiho 유키 씨, 얼마 전보다 표정이 훨씬 밝은걸요.
yuki ssi eolma jeon boda pyojeong i hwolssin balgeungeoryo · Yuki, you look so much happier than you did a while ago, you know.

chapter 3 microbes that clean water

yuki 안녕하십니까? 환경 공학과 대학원생 유키입니다. 오늘은 미생물을 이용한 폐수 처리 기술에 관해 발표하겠습니다.

annyeong hasimnikka hwangyeong gonghak gwa daehagwon saeng yuki imnida oneul eun misaengmul eul iyong han pyesu cheori gisul e gwanhae balpyo hagetseumnida · Good morning. I am Yuki, a graduate student in environmental engineering. Today I will talk about a technology that uses microbes to treat waste water.

yuki 지구 온난화가 계속되는 가운데 집중 호우와 같은 자연재해가 늘고 있습니다. 호우로 공장 지역이 침수되면 폐수가 강으로 유출되기 쉽습니다. 그러면 강의 수질이 나빠지고 주민들의 식수에도 문제가 생깁니다.

jigu onnanhwa ga gyesok doeneun gaunde jipjung hou wa gateun jayeonjaehae ga neulgo itseumnida hou ro gongjang jiyeok i chimsudoemyeon pyesu ga gang euro yuchuldoegi swipseumnida geureomyeon gang ui sujil i nappajigo jumin deul ui siksu e do munje ga saenggimnida · As global warming continues, natural disasters such as torrential rain are increasing. When heavy rain floods factory areas, waste water easily leaks into rivers. Then the river's water quality falls and residents' drinking water is affected too.

yuki 약품을 쓰는 기존의 방법은 효과가 빠른 동시에 전력을 많이 쓰고 탄소 배출량도 많습니다. 반면 저희 연구실의 방법은 자연에 원래 있는 천연 미생물이 유해 물질을 먹어서 없애기 때문에 친환경적입니다. 이 미생물들은 생명력이 강해서 더러운 물에서도 잘 삽니다.

yakpum eul sseuneun gijon ui bangbeop eun hyogwa ga ppareun dongsi e jeollyeok eul mani sseugo tanso baechullyangdo manseumnida banmyeon jeohui yeongusil ui bangbeop eun jayeon e wollae inneun cheonyeon misaengmul i yuhae muljil eul meogeoseo eopsaegi ttaemun e chinhwangyeongjeogimnida i misaengmul deul eun saengmyeongnyeok i ganghaeseo deoreoun mul eseo do jal samnida · The existing method, using chemicals, works fast but at the same time uses a lot of electricity and gives off a lot of carbon. Our lab's method, by contrast, is eco-friendly, because natural microbes that already live in nature eat the harmful substances and remove them. These microbes are very hardy and live well even in dirty water.

yuki 저희는 지난 1년 동안 무선 장치로 물의 상태를 확인하고, 그 데이터를 실시간으로 연구실 단말기에 전송했습니다. 그 결과 오염 물질의 농도가 평균 80% 줄었고, 필요한 전력의 일부는 태양열로 해결할 수 있었습니다.

jeohui neun jinan nyeon dongan museon jangchi ro mul ui sangtae reul hwagin hago geu deiteo reul silsigan euro yeongusil danmalgi e jeonsong haetseumnida geu gyeolgwa oyeom muljil ui nongdo ga pyeonggyun jureotgo piryo han jeollyeok ui ilbu neun taeyangnyeol ro haegyeol hal su isseotseumnida · For the past year, we checked the water with wireless devices and sent the data in real time to the lab's terminal. As a result, the level of pollutants fell by 80% on average, and part of the power we needed came from solar heat.

yuki 아직 실험실 단계이지만, 이 기술은 수해를 입은 지역에서 깨끗한 물을 만드는 데에도 응용할 수 있을 듯합니다. 앞으로도 생태계를 지키는 연구를 계속하겠습니다. 감사합니다.

ajik silheom sil dangye ijiman i gisul eun suhae reul ibeun jiyeok eseo kkaekkeutan mul eul mandeuneun de e do eungyong hal su isseul deut hamnida ap euro do saengtaegye reul jikineun yeongu reul gyesok hagetseumnida gamsa hamnida · It is still at the lab stage, but it seems this technology could also be applied to making clean water in flood-hit areas. We will keep doing research that protects ecosystems. Thank you.

chapter 4 could it help in a disaster?

tom 질문 하나 해도 될까요? 데이터를 무선 네트워크로 보내면 해킹 위험은 없나요?
jilmun hana haedo doelkkayo deiteo reul museon neteuwokeu ro bonaemyeon haeking wiheom eun eomna yo · May I ask a question? If you send the data over a wireless network, isn't there a risk of hacking?

yuki 연구실 아이디로만 접속할 수 있고, 모르는 단말기는 자동으로 차단돼요. 매일 접속 기록도 조회하고요.
yeongusil aidi ro man jeopsok hal su itgo moreuneun danmalgi neun jadong euro chadandwaeyo maeil jeopsok girok do johoe hagoyo · You can only log in with the lab ID, and unknown devices are blocked automatically. We check the access log every day, too.

tom 그럼 이 기술을 재난 지역에서 바로 쓸 수 있을까요? 지난주 제주도처럼 호우로 길이 침수되고 주민들이 대피한 곳에서요.
geureom i gisul eul jaenan jiyeok eseo baro sseul su isseulkkayo jinanju jejudo cheoreom hou ro gil i chimsudoego jumin deul i daepihan got eseo yo · Then could it be used right away in disaster areas? Places like Jeju last week, where heavy rain flooded the roads and people had to evacuate.

yuki 장치가 작고 가벼워서 충분히 가능할 법해요. 다만 지금은 수동으로 움직여야 해서, 자동으로 바꾸는 설계를 하고 있어요.
jangchi ga jakgo gabyeowoseo chungbunhi ganeung hal beopaeyo daman jigeum eun sudong euro umjigyeoya haeseo jadong euro bakkuneun seolgye reul hago isseoyo · The device is small and light, so it should be quite possible. But for now it has to be worked by hand, so we're designing an automatic version.

jiho 병원 폐수에도 쓸 수 있을까요? 병원에는 약 성분이 섞인 물이 많거든요.
byeongwon pyesu e do sseul su isseulkkayo byeongwon e neun yak seongbun i seokkin mul i mankeodeunyo · Could it be used for hospital waste water too? Hospitals have a lot of water mixed with medicine.

yuki 좋은 질문이에요. 지금 다른 연구실과 함께 실험하고 있는데, 효과가 있는 듯해요. 성공할 확률을 더 높이는 게 과제예요.
joeun jilmun ieyo jigeum dareun yeongusil gwa hamkke silheom hago inneunde hyogwa ga inneun deut haeyo seonggong hal hwangnyul eul deo nopineun ge gwaje yeyo · Good question. We're testing that with another lab now, and it seems to work. The task is to raise the chance of success.

anna 미생물이 지구 온난화를 막는 데도 도움이 될까요?
misaengmul i jigu onnanhwa reul mangneun de do doum i doelkkayo · Could microbes help stop global warming too?

yuki 직접 막을 수는 없지만, 전력을 덜 쓰니까 온실가스를 줄이는 데 도움이 돼요.
jikjeop mageul su neun eopjiman jeollyeok eul deol sseunikka onsilgaseu reul jurineun de doum i dwaeyo · They can't stop it directly, but they use less power, so they help cut greenhouse gases.

tom 와, 이 꼬마들이 웬만한 발명가보다 낫네요!
wa i kkoma deul i wenmanhan balmyeongga boda nanneyo · Wow, these little ones are better than most inventors!

yuki 하하, 우리 꼬마들이 저보다 훨씬 부지런한걸요.
haha uri kkoma deul i jeo boda hwolssin bujireonhangeoryo · Ha ha, my little ones are far more hard-working than I am, you know.

chapter 5 yuki's day

yuki 여러분, 사실 좋은 소식이 있어요. 어제 대학원 졸업 심사를 통과했어요!
yeoreobun sasil joeun sosik i isseoyo eoje daehagwon joreop simsa reul tonggwa haesseoyo · Everyone, I actually have some good news. Yesterday I passed my graduate-school final review!

anna 정말요? 몇 달 전에는 졸업이 늦어질까 봐 걱정했는데, 이렇게 통과하다니 너무 기뻐요!
jeongmaryo myeot dal jeon e neun joreop i neujeojilkka bwa geokjeong haenneunde ireoke tonggwa hadani neomu gippeoyo · Really? A few months ago you were worried your graduation would be late, so I'm thrilled you've passed!

jiho 축하해요! 그때 실험실에서 엉엉 울었다더니, 이제 웃는 날이 왔네요.
chukha haeyo geuttae silheom sil eseo eongeong ureotdadeoni ije unneun nal i wanneyo · Congratulations! I heard you once sobbed your heart out in the lab, and now your day to smile has come.

yuki 다 안나 씨 덕분이에요. 포기하느니 한 번만 더 해 보자고 생각했거든요.
da anna ssi deokbun ieyo pogi haneuni han beon man deo hae bojago saenggak haetgeodeunyo · It's all thanks to you, Anna. I told myself to try just once more rather than give up.

tom 오늘 점심은 제가 살게요. 날씨도 덥고 불쾌지수도 높은데 시원한 냉면 어때요? 어, 지갑을 안 가져왔네!
oneul jeomsim eun jega salgeyo nalssi do deopgo bulkwaejisu do nopeunde siwonhan naengmyeon eottaeyo eo jigap eul an gajeowanne · Lunch is on me today. It's hot and sticky, so how about cold noodles? Oh, I haven't brought my wallet!

jiho 톰 씨, 진짜 너무해요! 하하.
tom ssi jinjja neomuhaeyo haha · Tom, that's just too much! Ha ha.

yuki 괜찮아요. 오늘은 제가 낼게요. 제가 제일 기쁜 날인걸요.
gwaenchanayo oneul eun jega naelgeyo jega jeil gippeun nal ingeoryo · It's fine. Today I'll pay. It's my happiest day, after all.

tom 그럼 저는 다음 주 뉴스에 '미생물로 폐수를 깨끗하게'라는 기사라도 써야겠어요.
geureom jeo neun daeum ju nyuseu e misaengmul ro pyesu reul kkaekkeutage raneun gisa rado sseoyagesseoyo · Then I'll have to write a news story next week: "Microbes clean waste water".

yuki 하하, 그러면 우리 꼬마들이 유명해지겠네요.
haha geureomyeon uri kkoma deul i yumyeong haejigenneyo · Ha ha, then my little ones will be famous.

A lab tour, a research talk and an essay on saving the planet, all in Korean. Congratulations to Yuki, and to you: two more units done.
Do this day interactively, with audio and games, free at **wishyou.today/learning**