

UNIT 1: SOCIAL RELATIONSHIPS

VIDEO: The Secret Lives of Orangutans p. 11

Robert: So, before I studied biology and anthropology in college, I really had no idea that other species had culture besides humans, and so when I saw these cultural traditions in orangutans for the first time, it was sort of a really big sight to behold.

So, orangutans do this vocalization called “kiss-squeaking.” It’s done by pursing their lips and making a kissing sound, like this [kiss-squeaks].

Cheryl: Like a real [kiss-squeaks], much louder vocalization.

Tim: A kiss-squeak is a kind of a threat sound they make when they actually meet an unfamiliar orangutan. They also do it to people sometimes.

Robert: In Gunung Palung, they do this using leaves. They grab some leaves, they bring it up to their mouth, they do the kiss-squeak, and then they throw the leaves out. In other field sites, they may not use the leaves at all.

Tim: This is an example of a local custom that’s found in that area, similar to the way people greet each other differently in different countries. Maybe in some places, people shake hands; in other places, they bow. So, orangutans are also showing these interesting cultural variations between sites.

Robert: There’s different ways that orangutans make umbrellas. One way is they just break off an entire branch and sort of modify this branch to make an umbrella. Other times, they pull the entire branch towards them and make a little roof over their head. Some orangutans, when they’re making a nest, and it’s still raining really hard, they actually make a big roof over their nest. They can put together a bunch of branches and leaves and sort of weave a covering, and that’s a really effective way to stay dry while they’re sleeping.

Cheryl: So, all the great apes make nests, and they’re the only primate that makes nests. That’s important because they have large bodies, and it’s a way that they can sleep in the trees where they’re safer from ground predators. There seems to be variation and kind of some subtleties of nest building.

Tim: We heard some researchers from another site describing that they made a pillow to go in the nest. And we thought, oh, you know, we’ve never seen that. Right? But we’d never thought about it. Like, we just thought of making a nest, building a platform, and lying down. We never watched that closely. Well, once we heard these researchers of another site say that they saw orangutans making a pillow, we started watching more carefully, and then, sure enough, we noticed that orangutans at Gunung Palung were also sometimes making pillows, putting it down just as they plop down on top of it. And so, as researchers learn more and more about orangutans and know what questions to ask and what to look for, we’re learning more interesting things.

UNIT 2: SCIENCE AND INVESTIGATION

VIDEO: Secrets in the Ice p. 35

Albert: My name is Albert Zink. I’m the head of the Institute for Mummies and the Iceman here at the European Academy in Bolzano, Italy. I’m responsible for the research on the Iceman, a 5,300-year-old mummy.

Narrator: In 1991, the Iceman’s body was discovered in the Ötztal Alps—an area on the border of Austria and Italy. Through an examination of the body, researchers found that the Iceman was killed by an arrow shot.

Albert: It’s such an interesting story. It’s a crime story. And for sure we want to know about how he died and why he died. And because it’s also such a spectacular finding, this mummy. Such an old mummy. It’s the only one we have here in this region of such a high age.

Man: Do you think there could be more mummies in this area?

Albert: Maybe. Maybe. I think there could be some. At least some evidence from other people. Maybe also just some other arrows. Maybe it was not just one shot. Or maybe there were more people, and we are losing some things or leaving some equipment here. I think the Iceman is so special because on the one hand, he’s perfectly preserved and he really gives us unique insights into this time that we don’t know so much about. He contains a lot of information also on different diseases. He had some genetic predisposition for

LEVEL 3 Video Scripts

coronary heart diseases. And this is a disease what we always believed is a modern-day disease. I think we can learn a lot if we study these mummies and understand how ... what role plays the genes and what role plays the nutrition. This could help to find new ways to avoid the diseases or to better also deal with these diseases. In the end, the Iceman is one of our ancestors, and it's very interesting to understand also the past and where we came from. And how they already were able to adapt to the environment, how they managed to live, and without all these modern technologies we have and so on. You can really still feel somehow that this person was alive 5,000 years ago.

Narrator: Albert Zink thinks that there could be more secrets up in the mountains. He believes that a deeper investigation might reveal more clues about the Iceman's death, such as who killed him and why, and whether there were other people with him. With further study, scientists hope that they can uncover what truly happened to the Iceman of the Alps.

UNIT 3: CITY SOLUTIONS

VIDEO: Farming Underground p. 59

Steven: We are in southwest London. Clapham North Station is about 100 yards in that direction. We are in a tunnel system that was built during the Second World War, and we are a hundred feet under London.

Narrator: These tunnels were left empty after World War II, but entrepreneurs Steven Dring and Richard Ballard have plans for this underground space: They want to build a carbon-neutral farm.

Steven: And that's what you see behind us, glowing pink. And it is a hydroponic farm that is powered by LEDs and those LEDs are all, all the energy for the LEDs are powered by renewable energy.

Narrator: A lot of food today is imported from overseas, but by building a farm in the middle of the city, Dring and Ballard hope they can encourage people to eat locally grown food and learn more about where their food comes from.

Steven: We've still got kids in the U.K. who think that spaghetti is grown on trees. This is a problem that we've got in terms of that disconnect from food. We are trying to cut down on those food miles, bring food closer to the people that consume it. If you project

into the future—10, 20, 30 years—and how people will be dining then, people will become more and more and more aware of the environment around us. In London, for example, we're going to have an additional two million people in the next 10 years, and we need to provide for that. So, it's about making sure that we have a food source that's from a new environment. And so we got one bench, but when we populate it—the whole of the tunnel—we'll have a bench on the floor, bench halfway up, and a bench up here as well, so we'll be growing that. That's the multilayered system, and that would be each side of this tunnel, so it's about utilizing all of the space that we've got down here.

UNIT 4: DANGER ZONES

VIDEO: Hurricanes 101 p. 83

Narrator: Cyclone, typhoon, hurricane. All of these names are used around the world to describe the most powerful storm known to man. Hurricanes are unpredictable, but scientists have a thorough understanding of how hurricanes form and sustain their power. In the Atlantic Ocean, hurricane season peaks during the late summer months when tropical waters are the warmest.

Hurricanes form from a cluster of thunderstorms that suck up the warm, moist air and move it high into Earth's atmosphere. The warm air is then converted into energy that powers the hurricane's circular winds. These winds spin around a low-pressure center called the eye, which can provide a 20- to 30-mile radius of eerie calm. Encircling it is the eye wall, a towering ring of clouds with some of the fastest wind speeds of the hurricane. Surrounding the eye wall are curved bands of clouds, the rain bands, often tens of miles wide, releasing sheets of rain and sometimes tornadoes.

When a tropical storm's winds reach at least 74 miles per hour, it becomes a hurricane. The hurricane then receives a category ranking of one to five on the Saffir-Simpson scale, based on its wind speed and potential damage.

But wind speed isn't always the most dangerous component when hurricanes come near land—it's storm surge. Storm surge is caused when winds from an approaching hurricane push water towards the

LEVEL 3 Video Scripts

shoreline up to 20 feet above sea level and can extend 100 miles. Ninety percent of all hurricane deaths are the result of storm surge.

While hurricanes can cause mass devastation, just like other natural disasters, they serve a higher purpose within the global ecosystem. Hurricanes help regulate our climate by moving heat energy from the Equator to the poles, keeping the Earth's temperature stable. Over time, science has helped us to better understand hurricanes and predict their paths, saving lives through early warning systems and helping us build better infrastructure to protect our cities. The more we study these complex storms, the better we can prepare for them and minimize their impact on human lives.

UNIT 5: THE TRAVEL BUSINESS

VIDEO: A Pledge to Palau p. 109

Narrator: Palau, a nation of small islands in the western Pacific Ocean, relies on tourism as a primary source of its economy. In recent years, the average number of visitors to Palau's shores is almost seven times greater than the local population. While this is great for their economy, problems arise from growing tourism. In the recent past, there have been numerous examples of tourists disrespecting the natural and living ecosystems—mostly unintentionally.

But Palau is making big waves when it comes to sustainability, becoming the first in the world to launch an ecotourism pledge that is required upon entry. The passport stamp reads, "Children of Palau, I take this pledge as your guest to preserve and protect your beautiful and unique island home. I vow to tread lightly, act kindly, and explore mindfully. I shall not take what is not given; I shall not harm what does not harm me. The only footprints I shall leave are those that will wash away."

In addition to the stamp itself, which comes in five languages, the Palau Pledge initiative comes with a mandatory in-flight video that educates all incoming visitors about their duty to be environmentally responsible. Along with a checklist of dos and don'ts that is distributed upon arrival, there are also national policies in place to strengthen the enforcement of environmental protection laws, including increased policing and reporting efforts.

Today, many locals feel that the Palau Pledge is a small but significant step toward shifting tourists' attitudes about the value of the country's natural and living resources. Though it is too early to tell, many are hopeful that the Palau Pledge can also serve as a tool to unite the local community toward the same vision of conservation.

Now what if every country required such a pledge to protect its environment and culture for future generations?

UNIT 6: PRODUCT DESIGN

VIDEO: A Helping Hand p. 133

Kieran: What it was like before having this hand or having any hand, it was pretty hard. I get bullied a lot and I really wanted to be part of a team. I wanted to have friends. I wanted to act like I actually had a right hand, and they wouldn't really care if I had that.

Jon: e-NABLE is an online global community of volunteers who are using 3-D printers and 3-D design software to make prosthetics for children and adults who are missing fingers, hands, and wrists, and we're giving them away for free.

Andreas: One of the reasons 3-D printing is so well suited to this problem is no two cases are exactly the same. Some kids are missing all of their fingers, some are missing even the palm and the wrist. And one of the reasons we can produce these devices for kind of incredibly low cost—well under a hundred dollars—is these devices are entirely body driven, purely mechanical. So, there are no motors, there are no sensors, there are no heavy batteries, so it's a very lightweight, very simple device.

Jon: These hands don't even pretend to look like normal hands. They're very different. These things look like something Iron Man or a superhero would have, and the kids love them for that reason.

Kieran: Once I had this hand, my friends would ask, "Hey dude, how's it going? Has anything changed it with it? Is it working better?" And it's pretty cool how they're actually involved. They're actually talking to me about it, and I love this because I could pick up stuff and I could help.

Andreas: It's been really great to have Kieran and his family come to Pier 9 to prototype these new ideas,

LEVEL 3 Video Scripts

to test drive these new hands, and to be able to see the higher perspective of what this is all about, to see how that hour of CAD translated into him being able to hold his coat or zip a zipper better. What e-NABLE has done is it seems that they've kind of proven that regular people can design amazing things if they're given access to the tools.

Kieran: I think it's pretty cool that I'm one of the people actually testing this out for a bunch of other people. It's going to be really awesome to see it when it's so big. Every kid that has a problem like me will have a hand.

UNIT 7: GLOBAL CHALLENGES

VIDEO: The Snow Guardian p. 157

Narrator: Have you ever wondered if you watched the snow long enough, what stories it might tell? There is someone who has done it. His name is billy barr.

billy: I spell it: small b-i-l-l-y, small b-a-r-r.

Narrator: Some people call him the Snow Guardian. He lives in a cabin out in the woods.

billy: Picture this: It's a snowy day, it's dark and cold, and you make a fire and you're sitting by the fire, and you're reading with a cup of tea, and it goes on for nine months.

Narrator: billy lives alone in this house he helped build. Here he grows his garden, has an impressive hat collection, loves cricket, and dreams of Bollywood. Every couple of weeks, he skis back into the nearest town for supplies. He's been doing this for more than 40 winters. But billy does a little more than just read and drink tea. For those 40 winters, billy has kept a meticulous record of snow in his little part of the world.

billy: Okay ... February 26th, 1978, 10 and a half inches of snow that day. January 20th, minus 11 and a half. April 28th, 1980, I was 41. Oh, that sounds nice. Nineteen ninety-seven, one-half inch knee snow, a weasel was roaming around inside the shack, and the birds were back. I lived in a 8-by-10-foot old shack. I had no electricity, no water, and I had nothing, and I was just there all day. The main thing I interacted with was the weather and the animals. So, I started recording things just because it was something to do. I had nothing to prove, no goals, no anything. So, actually, the researchers, the lab, wanted to look at it.

And then once he started looking at it scientifically, then, all of a sudden, like, these decades worth of data were being used for more than my own curiosity.

Narrator: billy has done this every day, twice a day, all winter long.

billy: I keep going until the snow is gone. If it snowed, I record that no matter when. The trend I see is that we're getting a permanent snowpack later, and we get to bare ground sooner. We'll have years where there was a lot of snow on the ground, and then we lost snow sooner than years that had a lot less snow, just because it's a lot warmer now.

Narrator: In a normal winter, you'd expect to have four to five record high temperatures. Last year, billy recorded 36.

billy: Not only is it a lot warmer, we're getting a lot of dust blowing in. Soon as you get dust on the snow, it melts like that. You're talking about the snowpack, the water supply for most of the southwest. I'm not real hopeful, just because I don't know how you reverse something like that.

UNIT 8: MEDICAL INNOVATIONS

VIDEO: Nanotechnology p. 181

Narrator: Welcome to the nanoworld. This incomprehensibly small place is the new frontier. Exploring it will lead to huge changes in our lives. Our most advanced microscopes can now see this: individual atoms, though fuzzy, proving years of scientific theory simulated here. And not only can we see them—with the tip of a powerful microscope, we can actually move atoms and begin to create amazing nanodevices. Some could one day patrol your body for all kinds of diseases and clean out clogged arteries along the way. Tiny chemical machines of the future may even repair DNA.

One of the wildest things about the nanoworld: Substances here behave differently than the same material does in our world. To us, gold reflects light and is golden in color, but nanogold can be any color. It absorbs light and generates heat, leading to a fascinating idea: injecting nano-sized gold particles into the bloodstream. After being chemically coated to attach to cancerous cells, a laser beam loads the gold particles with heat energy, burning the cells.

UNIT 9: LANGUAGES AND CULTURE

VIDEO: The Power of Language p. 207

Man 1: According to my own experience, I really felt the main barrier is really the language, because a lot of culture actually is expressed in language.

Woman 1: I know my English not perfect. I always make grammar mistakes, especially when it comes to the tense—the past tense and present tense—I always make mistakes.

Man 2: Instead of providing criticism only, we should also provide support for others.

Woman 2: In this specific moment, we were entering into a very powerful discussion, and it was a discussion spoken in English. So at some moment, I asked the group to swap from English to Chinese in order for those that English was their first language to notice the privilege and the rank and the power that comes when you feel comfortable with your own language. And it was important for the Americans to notice how it felt to have in that moment the powerful language not being English so everybody had an opportunity to experience the privilege of their own language.

Woman 3: What I love is that this is the most I've that I've heard him talk, so I was like, "Huh?!"

Man 1: I am really afraid to talk with others and I think it's also embarrassing for the other side.

Woman 3: I took Spanish for eight years, so the struggle with learning Spanish—whenever they would talk about languages, I always thought about me trying to learn Spanish.

Um, what about favorite food?

Man 3: Alright, if you say this way, it's gonna be easier. *Nǐ.*

Woman 3: *Nǐ.*

Man 3: Okay.

Woman 3: Is *nǐ* "you"?

Man 3: There you go. It always shows up. *Nǐ zài xīhuān chī shén me?*

Woman 3: [tries to repeat the sentence, with Man 3's help] Wow, that's a lot. OK. [repeats the sentence again]

Man 3: Perfect.

Woman 3: Thank you.

Man 3: No problem.

UNIT 10: SURVIVAL INSTINCT

VIDEO: Surviving a Night Outdoors p. 231

Narrator: Picture this: You're hiking with a friend in the forest, and it starts to get dark—fast. You realize you're still far from your campsite, and you're going to have to spend the night in the wilderness. All you brought are the clothes on your back, your camera, a bottle of water, and maybe some snacks. What do you think you'd need to do to survive the night?

Timmy: Hi, my name is Timmy O'Neill, and I'm a climber and a kayaker, and we're going to be talking about how to pull an all-nighter.

People wind up being stranded in the backcountry overnight when they get lost or they underestimate the amount of time that it's going to take them to accomplish their objective, and they wind up sleeping outside. If you find yourself in an all-nighter situation, immediately understanding where you are geologically and topographically will be important for your comfort and safety.

In reference to features that you want to be looking for, finding an area that is going to be protected from the wind, finding water could be something that is quite important depending upon when you ran out.

One of the things is retaining your body heat. You want to have a barrier between your body and the ground. One of the techniques that we use in climbing is to take the rope and coil it onto the ground, creating a mat.

You shiver through the night moving uncomfortably back and forth, foot to foot, and maybe you fall asleep for just a moment, and then you wake back up and you realize it's still dark.

The longer that you remain still, the colder your body will become. The alternatives would be to stand up and run in place, do jumping jacks, practice isometric exercises where you fire your muscles. Essentially what you'll be doing is rocking back and forth desperately hoping for the sun to rise.

So, you've made it through the night. Now what you want to do is compose yourself, make sure that you gather all your belongings, and slowly make your way down to the trailhead.