

Crossroads

CROSSROADS Language Studio's Newsletter November, 2014

LIGHT-EMITTING DIODES

This year the Nobel Prize in Physics was awarded to three Japanese inventors, Isamu Akasaki, Hiroshi Amano and Shuji Nakamura, for their invention of efficient blue light-emitting diodes which enable bright and energy-saving white light sources.

What exactly is a light-emitting diode (LED) and how does it work? Unlike the incandescent light bulb or a compact fluorescent bulb (CFL) which emits light from a vacuum or a gas, LED emits light from solid matter in the form of a semiconductor. A semiconductor is something that conducts electricity under certain conditions but not others.

LEDs emit a very narrow wavelength of light with a colour characteristic of the semiconductor material used to make the LED. The earliest LEDs in the 1950s emitted red light, then came green light in the 1960s, but blue-emitting LEDs did not come about until the 1980s. The breakthrough came with the discovery by Akasaki and Amano at Nagoya University and Nakamura at Nichia Corporation in Tokushima that gallium nitride (GaN) had a large bandgap energy corresponding to ultraviolet light. Together they overcame two other hurdles, how to produce high quality crystals of GaN with ideal optical properties, and how to dope GaN with zinc so it would serve as a suitable p-type semiconductor. After they were able to combine the p-type GaN semiconductors with other GaN semiconductors in multilayer heterojunctions, the first high brightness blue-LED was produced in 1993. Once blue-emitting LEDs became a reality, white light LEDs could be produced for general-purpose lighting by either mixing light from red, green, and blue LEDs, or using a phosphor to convert some of the light to other colours.



With their low consumption of energy, small size and low maintenance

LEDs have found practical use in a wide range of products. They have minimized the energy demands of back lighting in monitors, TV screens and many portable electronic devices. As visual signals they serve as status indicators and displays for equipment and installations. They are ideal for traffic lights, exit signs, emergency vehicle lighting, navigation lights on ships and Christmas lights. Owing to their rapid switching time, long life, and high visibility even in broad daylight they have found ready application in brake lights and turn signals for cars and trucks. White light LEDs are now used in hand-held flashlights, headlamps, camera flashes, stage lights, street lights and other architectural lighting, bicycle lights, and replacement bulbs in light fixtures and other applications requiring high efficiency lighting. In addition to their light-emitting capacity, LEDs can be used as a light sensor.

Lighting accounts for about 6 per cent of global CO₂ greenhouse gas emissions. Switching to solid state lighting (SSL) with LEDs for general lighting requirements, combined with smart controls, could reduce these emissions by 50 to 70 per cent.

Article by Kenneth



Net News

NET LESSONS: Too busy to come to CROSSROADS?

.... Try our *lessons through the net!*

SITE OF THE MONTH: Here is a short documentary on LED featuring an interview with Shuji Nakamura:

<http://uctv.tv/shows/Journey-to-a-Brilliant-Discovery-Lighting-the-World-Ep-2-24739>

Some Thoughts for the Month



Joshua Says: Kenneth will no longer be teaching with us here at the school from next month. I feel many of his students will miss his presence here, and we all want to thank him for devoting his time, energy and knowledge to the classes he has been in charge of during the time he has been with us. It has been a very rare opportunity to have had someone with Kenneth's background and expertise on our teaching staff and we all wish to thank him sincerely for giving us this experience.

Junko Says: I too feel very thankful to Kenneth for the good work he has done for our students during more than one year with us. I want to extend my gratitude and best wishes to him and his family. But, although he is not going to be teaching here at the school from next month, he will still continue some outside company lessons for us, so don't be surprised if you run into him around the school every now or then.



Kenneth Says: It has been my great pleasure to teach conversation English to my many students at Crossroads Language Studio. The classes have varied from discussion of issues in science and story-telling to jazz singing sessions. I have enjoyed hearing about Japanese traditions and culture, interesting destinations, Japanese cuisine, food cultivation and innovation in our world. Thank you for these sessions. May peace, good will and happiness find you at Christmas and always.

Danielle dit: Le sapin de Noel était très important chez moi quand j'étais petite. Mes parents nous emmenaient au marché le choisir et ensuite on le décorait ensemble. La coutume du sapin de Noël est née en Alsace, au début du XVIIe siècle. Pour la première fois, on présentait un sapin **entier** sur l'actuelle place Kebler de Strasbourg. Au Japon, j'ai toujours décore le sapin de Noel avec mon fils. Meme maintenant, a 16 ans, il a hate de sortir les lumières multicolores et ses bricolages d'enfance pour les accrocher dans l'arbre. Ensuite, on fait des biscuits de Noel ensemble. Ce sont de beaux souvenirs pour moi !



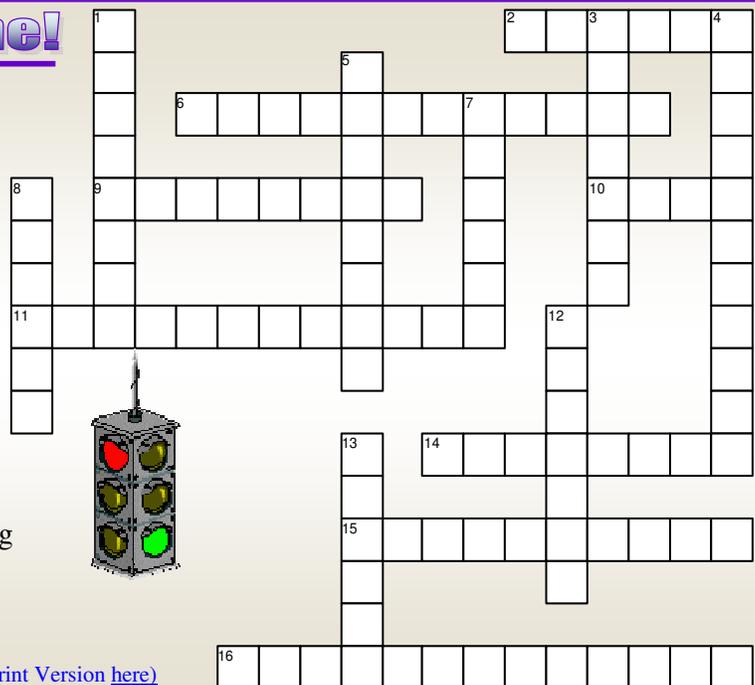
ACROSS

- 2 having no matter including air
- 6 emitting light through heating
- 9 joined or united into one
- 10 give off, expel, discharge
- 11 making an important discovery
- 14 make small or less important
- 15 ship or airplane guidance
- 16 similar to especially in position or purpose

DOWN

- 1 to gain an advantage, to win
- 3 change from one thing into another
- 4 keep something in good working order
- 5 the first person to think of or make something
- 7 change a thing or its position for another
- 8 capable or able to do a task
- 12 relating to light and sight
- 13 a device to receive light singles

Play A Game!



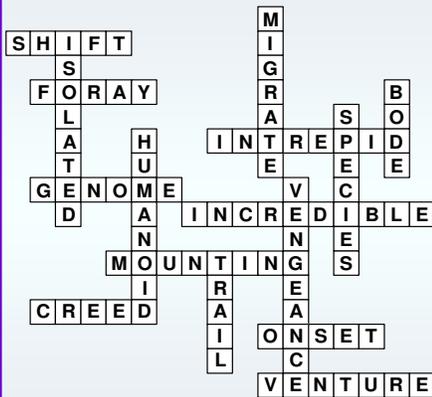
(Print Version [here](#))

NOTICE BOARD

An Excursion to Kashima by p-student Keiko Kurita



I went to Kashima island with my friend at the end of November. We rode on a train from Matsuyama to Hōjō. We had a bowl of udon at Matsuyama Station and bought a small lunchbox before riding on the train. It was a beautiful day. We got off the train at Hōjō Station and walked to the harbour. Then we boarded a boat for Kashima Island. It took three minutes. The visitors were just us. We climbed Kashima Mountain. It took only 15 minutes to the peak but my legs were hurting from the climb. The view from the summit was beautiful. We had our lunch there. There are many deer on Kashima Island although we didn't see any today. We went down the mountain and back to Hōjō Station. I found a nice curry restaurant by the station. Since we had to wait about half an hour for the train we decided to have a curry. It was delicious. So I had a good day walking and eating very much today.



Last Month's puzzle Solution

ACROSS

- 2 change place or direction
- 4 the first attempt to venture forward
- 8 not influenced by fear or intimidation
- 9 an organism's complete DNA sequence
- 11 surprising beyond belief
- 12 going up, increasing advancing
- 14 a system of beliefs
- 15 the beginning or early stage
- 16 go ahead despite risk or possible danger

DOWN

- 1 move from one country and settle in another
- 3 cut off or left left behind
- 5 a sign of something (important often bad) to come
- 6 a special group (mainly biological)
- 7 appearing to be or similar to human
- 10 redress or payback
- 13 a path or track



Here's a great idea to keep in touch with other Crossroads students, and practice English at the same time. Some students would like to link up through Facebook and create an English-fan "club". It is a way to share experiences, keep in touch outside of the school and to practice English together. We support this idea 100%, and we'd like to join in too!

All you need to leave your address with we'll pass it on. Your "like" hits to grow faster

Join Your Crossroads Friends on FACEBOOK

to do is Facebook us and us and than ever! And so will your English!!



Don't forget... Our SPECIAL 1+1 Campaign offer! Up to 50% off!!

See our notice board, or ask Junko in our office, for the details.