

School

Common Science

Joe Jeffers, Ph.D.



Gifted students

The Gifted Classes at Dallas Junior High School recently held a Science Fair. Judges were Fred Templin, Assistant to the Superintendent, Mrs. Margaret Johnson, biology teacher, and William Helgemo, Chairperson of the Dallas High School Science Department. Projects winning first place were The Making of a Vaccine by Danielle Baker and A Model Lazer by Myron Pitcavage and Mike Williams. Second place winners were Roseanne Rostock and Jeffery Dover. Jennifer Prebola and Alex Case were awarded third place ribbons. Pictured are, from left, first row, Mrs. Lee Ann Johnson, Gifted Program Luzerne Intermediate Unit, Roseanne Rostock, Mike Williams, Myron Pitcavage, Jeffery Dover, and Mrs. Margaret Johnson, judge. Second row, Leon Trager, Assistant Principal, Jennifer Prebola, Danielle Baker, William Helgemo, judge, Alex Case, and Fred Templin, judge.

(EDITOR'S NOTE: "Common Sense" is a science column written by Joe Jeffers, Ph.D. Jeffers received the Ph.D. in molecular biology and biochemistry from Purdue University. He teaches chemistry and biology at Ouachita Baptist University in Arkadelphia, Arkansas. "Common Science" is sponsored by The National Science Foundation and appears periodically in The Dallas Post.)

Every 100 years the Chinese umbrella bamboo flowers and dies. It does produce seed, of course, so another 100 year cycle can begin. The 17-year cicada of North America spends 17 years in its juvenile form feeding on the sap of plant roots underground. Then in a period of a few weeks the adults emerge, mate, and lay their eggs. The young hatch and burrow underground not to be seen for another 17 years. The Palolo worm of the south pacific near Samoa lives on the coral reef.

Each October and November at dawn on the first day of the last quarter of the moon, they release foot-long reproductive segments that float to the top of the water and burst open, whereupon millions of sperm and eggs are released to fertilize and fall back to the coral reef to begin new Palolo worms.

Events like these that seem to be so accurately timed are rather common place in nature. Living creatures seem to possess clocks that allow them to keep track of time with amazing precision. What kinds of clocks exist and how do they work? All of the answers are not known.

It is clear that planetary movement exerts a powerful environmental influence on biological rhythms. Circadian rhythms, which occur daily, follow the light-dark cycle of the earth's rotation; seasonal rhythms are due to the earth's revolution about the sun; lunar rhythms (monthly) seem tied to the revolution of the moon about the earth; and tidal rhythms result due to the gravitational effects of the sun and moon. Still, the clock itself seems to be internal. These external events may only serve to keep the clock synchronized.

Let's look first at circadian rhythms. Functions like body temperature, urine flow, hormone levels and sleep-wake cycles follow daily

patterns. Body temperature, for example, rises gradually to a peak about noon, then tapers off through the remainder of the day, dropping more abruptly at bedtime. Studies on persons show abilities like multiplication speed and accuracy differ, during the day and seem to follow the same basic pattern as body temperature. (Students take your math tests late in the morning!)

Laboratory animals placed in artificial light environments that are several hours out of phase with the outside world will change their activity patterns to fit this new artificial day. Light appears to synchronize the clock. If, however, these same animals are then kept in total darkness for several weeks, their "daily" activity patterns will readjust to the daytime pattern outside, even though they cannot see it.

Experiments have been conducted where persons are allowed to "free run," adapt to their own schedules. In these cases a person is placed where he cannot know whether it is day or night outside and he has no watch. He maintains his own schedule of sleeping and waking. Most persons drift into a pattern of approximately a day with the average being 25.8 hours.

Annual or seasonal rhythms seem to be photoperiodic, that is they are triggered by changes in duration and perhaps intensity of daylight. Consider the flowering of plants. Leaves react to length of day by producing hormones which switch on flower production. Some plants are short day plants and flower only in the winter. Others are long day plants and flower only in the summer.

Several are neutral and flower

regardless of the length of day. In the summer of 1920 researchers took the Maryland Mammoth tobacco plant, which normally flowers only during the short days of winter, and covered it for part of the day. The plant was "fooled" into flowering during the hot part of summer. Obviously temperature was not the trigger for flowering. Since that time plants have been routinely manipulated into flowering at odd times of the year by exposure to artificial daylight.

Duration and intensity of light seem to trigger animal reproduction too. Most wild creatures that reproduce once a year do so in the spring. It is important, of course, for all members of the same group to be ready to reproduce at the same time. Again light variations just serves to synchronize the process. Sheep kept in continuous artificial light for three years still breed at the same time as other sheep kept under natural conditions.

Tidal and lunar rhythms are also common. Tidal patterns are based on 24.8 hours rather than 24. Fiddler crabs are active at low tides. If fiddler crabs are kept in a laboratory in total darkness, they still have activity cycles that correspond to low tides. Adult human females show a lunar rhythm in that they produce eggs once per lunar month.

Much remains to be learned about how the internal clock works. It is known that the pineal gland of fish, birds, reptiles and mammals is involved. If it is removed, daily and seasonal patterns are upset. Deer produce antlers at the wrong time; birds lose the urge to migrate. The pineal gland produces the hormone melatonin. Light inhibits its production; it is made at night.

Tech announces honor students

Thomas F. Feeney, Principal of West Side Area Vocational-Technical School has announced the names of those students who will be placed on the honor roll for the second marking period.

GRADE 9 - HIGHEST HONORS: Lon Cottle, Debbie Koprowski, Susan Monigas, Mark Sadowski, Tracy Sanguilliano.

GRADE 9 - HIGH HONORS: Hoa Minh Doan, Kevin Hunter, Drue Inman, Brian Murphy.

GRADE 9 - HONORS: Nicole Cipriani, Lisa Hales, Daniel Miller, Kris Senchak, Erika Smallcomb, Thomas Vasicak, Lisa Wishinski.

GRADE 10 - HIGHEST HONORS: Linda Bobeck, Dawn Finney, Mary Finney, Lydia Glatz, Sean Heidig, Robert Roccograndi.

GRADE 10 - HIGH HONORS: Robert Koprowski.

GRADE 10 - HONORS: Lisa Houssock, Donn Hunter, Kathleen Kaminski, Anthony Klukosky, Allison Meyers, Diane Petruskas, Kimberly Pocono, Cheryl Simon, Valeri Spinicci, Michael Thomas.

GRADE 11 - HIGHEST HONORS: Jodie Halat, Michael Marinos, Heather Sanguilliano.

GRADE 11 - HIGH HONORS: Cindy Meade, Steve Richard, Valerie Storz, Joseph Valvano.

GRADE 11 - HONORS: Patrick Brennen, Sandra Casey, Monte Evedland, Richard Gabriesheski, Kimberly Hanadel, John Hopkins, Chris

James, Ann Marie Jenkins, Mark Kodra, Ann Langan, Amy Loberg, Gina Sitkowski, Gary Symons.

GRADE 12 - HIGHEST HONORS: Janet Blaine, Colleen Caffrey, Polly Hughes, Margaret Kaschak, Martha Miller, Raymond Miller, Carla Padavan, Susan Podskocho, Wendy Roushey, David Sheply, Kim Vasicak, Paul Zabloney.

GRADE 12 - HIGH HONORS: James Cwalina, Thomas Feeney, William Fox, Dorothy Hartman.

James Mazeika, David Monk, Michael Novak, Nick Pallone, Gary Young.

GRADE 12 - HONORS: Lisa Adamitz, William Berlew, Christopher Brin, Karen Ceppa, Damian Englehart, Paul Feeney, Brian Grzalla, Judith Gilligan, Barbara Gorgan, Michelle Hooper, Kim Januszewicz, Julie Kaminski, Kenneth Lutz, Tammy Nafus, Theresa Newhart, Francis Prsons, Stacey Pearce, Angela Philpot, Thomas Skiro, David Sutton, Peri-Sue Wolfe.

AIFS seeks coordinators

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Academic Year in America program.

For additional information on how you can share in this rewarding experience by becoming a Local Coordinator write: American Institute for Foreign Study Scholarship Foundation, Dept. PR-15, 100 Greenwich Avenue, Greenwich, Connecticut 06830 or call the Foundation, toll free at 800-243-4567. (In Connecticut call 203-625-0755).

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