Nobel Prizes 1941 to 1950

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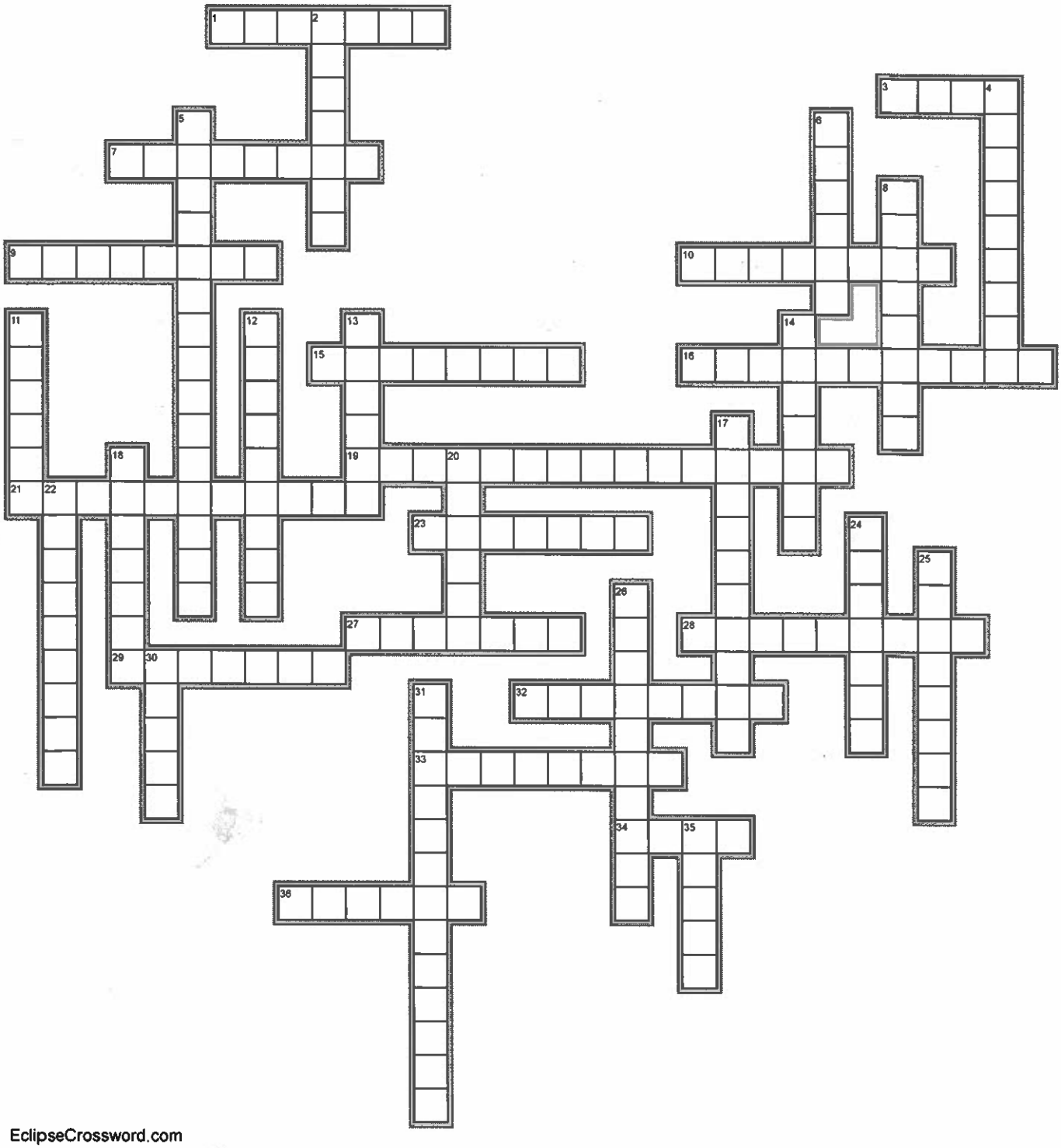

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Across

1. The Hungarian chemist George de Hevesy was a co-discoverer of the element _____, which is a transition metal with 72 protons.
3. Professor _____ was awarded the 1944 Nobel Prize for his work in the field of high energy nuclear reactions. He was unable to travel to Stockholm, Sweden in 1945 to receive it, due to the War across Europe.
7. Chemist and agriculture researcher Artturi ___ invented the method and named it after his initials (Artturi Ilmari _____).
9. The 1944 Nobel Prize in Physics was awarded to Isidor Isaac Rabi "for his resonance method for recording the ____ properties of atomic nuclei." His work gave rise to the quantum number "I" or nuclear spin.
10. The current version of AIV liquid is composed of 76% formic acid, 5.5% _____formate, and water. It is an acidic solution.
15. In 1939 this 1946 Nobel Laureate published a book entitled' Crystalline Enzymes: The Chemistry of Pepsin, Trypsin, and Bacteriophage. In 1929, John _____ crystallized the enzyme pepsin and later in 1938 purified and crystallized the first bacteriophage.
16. The 1950 Nobel Prize in Chemistry 1950 was awarded to Otto Diels and Kurt Alder in the general area of organic synthesis. The Diels–Alder reaction is a reaction involving an diene and a alkene (aka dienophile), and forms a _____ derivative.
19. Arne Tiselius won the 1948 Nobel Prize in chemistry for his new chemical separation process. It was first described in the literature in 1931, with the classic paper in the field, entitled "A new apparatus for electrophoretic analysis of colloidal mixtures," published in 1937. The technique is called _____
21. George de Hevesy won the 1944 Nobel Prize in chemistry for his work with _____. _____ are radioactive nuclei that are used as a diagnostic tool in medicine.
23. Wendell _____published a book entitled; "Chemistry: A Beautiful Thing," and was nominated for a Pulitzer Prize. He studied the tobacco mosaic virus, which infects tobacco plants. He was a co-recipient of the 1946 Nobel Prize in chemistry.
27. Oak Ridge National Lab uses a high temperature method to separate isotopes of _____ in the gas phase. _____ is complexed with six atoms of fluorine, forming _____(IV) or hexa fluoride. K-25 was the name of the massive gaseous diffusion plant at ORNL.
28. A nuclear chain reaction can occur if enough fuel, such as uranium or _____, is collided with enough critical mass.
29. The 3rd law of thermodynamics focuses on _____ or disorder of chemical system. It states that as temperature decreases so does ____, and if absolute zero is achieved, that is the only system in which _____ (S) could be zero (0 J/mol K). Absolute zero is zero degrees Kelvin (0 K), –273.15°C or –459.67°F. It has never been achieved.
32. Bose-_____ condensate (BEC), a state of matter cooled to near absolute zero (0 K, - 273.15 °C, or - 459.67 °F; K = kelvin). At this temperature the matter becomes a single quantum mechanical state.
33. The neutron, with a mass almost the same as a proton, was utilized by Enrico Fermi to create the new field of nuclear synthesis. Chadwick experimentally verified the neutrons existence. In the late 1930s, Professor _____slammed high energy neutrons into the actinide's thorium (90 protons) and uranium (92 protons). He discovered that these heavier elements could be split or broken into smaller elements.
34. Isidor _____won the Nobel Prize in 1944 in physics for his work in atomic physics, particularly focused on the magnetic properties of the nucleus. He conducted his Nobel work at Columbia University in New York City. During World War Dr. Rabi helped develop radar at Massachusetts Institute of Technology (MIT) and on the Manhattan Project.
36. George de _____ won the 1943 Nobel Prize in chemistry for the development of Radiotracers to study biological processes in animals.

Down

2. The isotopes of hydrogen have _____ spins (I) of 1H (I=1/2); 2H or deuterium (I=1); and tritium or 3H I=1/2); 12C, which is 98.9% of naturally occurring carbon has a _____ spin of I=0; while 13C which is approximately 1.1% of naturally occurring carbon, has a _____ spin of I=1/2. 23Na has a _____ spin of I=3/2 and 27Al has a I=5/2.
4. The 1949 Nobel Peace Prize was unusual in that it was awarded to a scientist named John Boyd Orr. Most Nobel Peace prizes are awarded to organizations, politicians or lawyers. His worked focused on understanding and involving _____, from babies getting the correct milk to farm animals consuming the proper food.
5. In 1926 James B. Sumner showed that the enzyme urease could be isolated and crystallized. Many chemists thought the _____ was impossible. He was one of three recipients of the 1946 Nobel Prize in chemistry for his work with

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Down

protein _____.

6. Molecules that include a radioactive atom are used to study living organisms, from digestive tracts to circulation. This is possible because some elements concentrate in certain parts of the body – _____ in the thyroid, phosphorus in the bones, and potassium in the muscles.

8. Perhaps the most famous oceanographer of all time is Jacques _____. He was in the French navy during WW2. In the 1940's he started to further developed SCUBA, which stands for Self Contained Underwater Breathing Apparatus, so longer underwater trips were possible. His unit was called an aqualung. He developed one of the first underwater films called EPAVE (1943), that can be viewed here (note: it's in French) https://www.youtube.com/watch?v=shv9f3rJ9cU

11. When World War II started the U.S. lost access to over ninety percent of natural _____, produced from countries such as Thailand, Indonesia, Vietnam, and Malaysia. Over 2,000 plants produce latex that contains natural _____. President Franklin D. Roosevelt organized U.S. industries to develop a process to mass produce synthetic _____ for the war effect.

12. _____ National Lab in northern New Mexico was built during World War 2 to construct the first nuclear weapons.

13. AIV liquid is a preservative that is mixed with green _____ before storage. _____is any agricultural material that is used to feed livestock, such as cattle, sheep, horses, chickens, and pigs. Straw, hay, pellets, oils, grains, and malts can be _____

14. In 1945 the Nobel Prize for Medicine was awarded to Sir Alexander _____, Sir Howard Florey and Dr. E. Chain. Fleming discovered penicillin in 1929 by isolating it from a mold, and showed it had anti-bacterial properties. Florey and Chain would expand on this work and help develop a method to mass produce the antibiotic medicine, the first of its kind in the history of humanity.

17. Chain and Florey, 1946 Novel Laureates in Medicine, published a paper in 1940 describing the production, purification, and experimental use of _____ . It has the ability to protect animals infected with bacterium such as Staphylococcus aureus. This resulted in the first large scale production of an antibiotic for human use, and saved many lives in WWII.

18. William _____won the 1949 Nobel Prize in chemistry for his work at extremely low temperatures that involved entropy measurements of crystals.

20. Ruth Rogan Benerito was a scientist that conducted applied research for the _____ industry. After WW2 she developed technology that spanned basic chemical research and applied engineering to produce _____ fabrics that were wrinkle free and flame resistant.

22. The 1947 Nobel Prize in Chemistry was awarded to Robert Robinson for his work with _____. _____ are a group of nitrogen containing molecules, extracted from plants that impact humans. Examples include morphine, quinine, atropine, and strychnine.

24. War accelerated the development of some needed technologies. DDT was the first large scale insecticide developed, and it reduced mosquito populations in regions where malaria was rampant. It was developed in the 1940's and was used to reduce malaria and typhus. The synthesis of the drug _____ was also a critical break through and helped treat many troops with malaria in the south Pacific theater

25. The 1949 Nobel Prize in Literature to William _____, who some rank as the most significant American author in history. His writings range from popular novels such as The Sound and the Fury: ….. to collections of stories co-authored with other authors (i.e. A Treasury of Civil War Stories).

26. Radioactive isotopes, such as Iodine-131 in the thyroid and _____-32, are used in medical diagnostic procedures.

30. No _____Prizes were awarded in 1940, 1941, and 1942 due to World War II.

31. Hafnium (Hf) has a large neutron capture _____. Because of this feature, it is used in control rods in nuclear power plants.

35. An American physician and medical researcher, Charles Drew is credited with being the inventor of the _____ bank.