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| Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | Date: \_\_\_\_\_\_\_\_\_ | Period: \_\_\_\_\_\_\_ |

Waves,sound,and light

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| 1  E |  |  |  |  |  |  |  | 2  R |  | 3  N | A | T | U | R | A | L | F | R | E | Q | U | E | N | C | Y |  |  |  |  |
| L |  |  |  | 4  R |  |  |  | E |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| E |  |  |  | E |  |  |  | S |  |  |  |  |  |  |  |  |  |  |  |  | 5  F |  |  |  |  |  |  |  |  |
| C |  |  | 6  O | V | E | R | T | O | N | E | S |  |  |  |  |  | 7  F | R | E | Q | U | E | N | C | Y |  |  |  |  |
| T |  |  |  | E |  |  |  | N |  |  |  |  |  |  | 8  E |  |  |  |  |  | N |  |  |  |  |  | 9  W |  | 10  V |
| R |  | 11  U |  | R |  |  |  | A |  |  |  |  |  |  | L |  |  |  |  |  | D |  |  |  |  |  | A |  | I |
| O |  | L |  | B | 12  M |  | 13  I | N | T | E | R | F | E | R | E | N | C | E |  | 14  R | A | D | I | O | W | A | V | E | S |
| M |  | T |  | E | E |  |  | C |  |  |  |  |  |  | C |  |  |  |  |  | M |  |  |  |  |  | E |  | I |
| A |  | R |  | R | C |  |  | E |  |  |  |  |  |  | T |  |  |  |  |  | E |  |  |  |  |  | L |  | B |
| G |  | A |  | A | H |  |  |  |  |  | 15  D | I | F | F | R | A | C | T | I | O | N |  | 16  R | 17  D |  |  | E |  | L |
| N |  | V |  | T | A |  |  |  |  |  |  |  |  |  | O |  |  |  |  |  | T |  | A | O |  |  | N |  | E |
| E |  | I |  | I | N |  |  | 18  O |  |  |  |  |  |  | M |  |  |  | 19  T |  | A |  | D | P |  |  | G |  | L |
| T |  | O |  | O | I |  |  | V |  | 20  E |  |  | 21  X | R | A | Y | S |  | R |  | L |  | I | P |  |  | T |  | I |
| I |  | L |  | N | C |  |  | E |  | C |  |  |  |  | G |  |  |  | A |  | F |  | A | L |  |  | H |  | G |
| C |  | E |  |  | A |  |  | R |  | H |  |  |  |  | N |  |  |  | N |  | R |  | N | E |  |  |  |  | H |
| W |  | T |  | 22  E | L | 23  E | C | T | R | O | M | A | G | N | E | T | I | C | S | P | E | C | T | R | U | M |  |  | T |
| A |  | R |  |  | W | A |  | O |  |  |  |  |  |  | T |  |  |  | V |  | Q |  | E | E |  |  |  |  |  |
| V |  | A |  |  | A | R |  | N |  |  | 24  A | M | P | L | I | T | U | D | E |  | U |  | N | F |  |  |  |  |  |
| E |  | D |  |  | V | D |  | E |  |  |  |  |  |  | C |  |  |  | R |  | E |  | E | F |  |  | 25  C |  | 26  C |
| S |  | I |  |  | E | R |  |  | 27  L | O | U | D | N | E | S | S |  |  | S |  | N |  | R | E |  |  | A |  | O |
|  |  | A |  |  |  | U |  |  |  |  |  |  |  |  | P |  |  |  | E |  | C |  | G | C |  |  | R |  | N |
| 28  P | I | T | C | H |  | 29  M | U | S | I | C |  | 30  W | A | V | E | S |  |  | W |  | Y |  | Y | T |  |  | R |  | C |
|  |  | I |  |  |  |  |  |  |  |  |  |  |  |  | C |  |  |  | A |  |  |  |  |  |  |  | I |  | A |
|  |  | O |  |  |  |  |  |  |  |  |  |  |  |  | T |  |  |  | V |  |  |  |  |  |  |  | E |  | V |
|  | 31  I | N | F | R | A | R | E | D | W | A | V | E | S |  | 32  R | E | F | L | E | C | T | I | O | N |  |  | R |  | E |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | U |  |  |  |  |  |  |  |  |  |  |  | W |  | L |
|  |  |  | 33  G | A | M | M | A | R | A | Y | S |  | 34  C | O | M | P | R | E | S | S | I | O | N | A | L | W | A | V | E |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | V |  | N |
|  |  |  |  |  |  |  |  |  |  |  | 35  E | L | E | C | T | R | O | M | A | G | N | E | T | W | A | V | E |  | S |
|  |  |  | 36  G | L | O | B | A | L | P | O | S | I | T | I | O | N | I | N | G | S | Y | S | T | E | M |  | S |  |  |

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| **Across**  **3.** which a system oscillates when not subjected to a continuous or repeated external force.  **6.** series above a fundamental note and may be heard with it.  **7.** common unit of frequency is the hertz (Hz), corresponding to one crest per second.  **13.** he process in which two or more light, sound, or electromagnetic waves of the same frequency combine to reinforce or cancel each other  **14.** an electromagnetic wave of a frequency between about 104 and 1011 or 1012 Hz, as used for long-distance communication  **15.** typically accompanied by interference between the wave forms produced.  **21.** stream of such photons used for their penetrating power in radiography, radiology, radiotherapy, and scientific research.  **22.** he range of wavelengths or frequencies over which electromagnetic radiation extends.  **24.** the maximum extent of a vibration or oscillation, measured from the position of equilibrium.  **27.** is the characteristic of a sound that is primarily a psycho-physiological correlate of physical strength (amplitude).  **28.** a sound is determined by the rate of vibration, or frequency, of the sound wave.  **29.** a typical example: "the science or art of ordering tones or sounds in succession, in combination, and in temporal relationships  **30.**  involve the transport of energy without the transport of matte  **31.**  light rays which are longer than light but shorter than radio waves. Electromagnetic radiation with a wavelength between  **32.** The change in direction of a wave, such as a light or sound wave, away from a boundary the wave encounters.  **33.** penetrating electromagnetic radiation of a kind arising from the radioactive decay of atomic nuclei.  **34.**  is a region in a longitudinal wave where the particles are closest together.  **35.** one of the waves that are propagated by simultaneous periodic variations of electric and magnetic field intensity  **36.** system of satellites, computers, and receivers that is able to determine the latitude and longitude of a receiver on Earth by calculating the time difference for signals from different satellites to reach the receiver. | **Down**  **1.** hat are propagated by simultaneous periodic variations of electric and magnetic field intensity  **2.** ncrease in amplitude of oscillation of an electric  **4.** prolongaprolongation of a sound; resonance.  **5.** ncrease in amplitude of oscillation of an electric  **8.** the range of wavelengths  **9.** distance between one peak or crest of a wave and the next peak or crest.  **10.** a form of electromagnetic (EM) radiation, as are radio waves, infrared radiation, ultraviolet radiation, X-rays and microwaves.  **11.** in the part of the electromagnetic spectrum where wavelengths are just shorter than those of ordinary, visible violet light but longer than those of x-rays.  **12.** s a wave that is an oscillation of matter, and therefore transfers energy through a medium.  **16.** energy that travels by waves or particles, particularly electromagnetic radiation such as heat or x-rays.  **17.** an increase (or decrease) in the frequency of sound, light, or other waves as the source and observer move toward (or away from) each other  **18.** that is a part of the harmonic series above a fundamental note and may be heard with it.  **19.** oscillates perpendicular to the axis along which the wave travels  **20.** a sound or series of sounds caused by the reflection of sound waves from a surface back to the listener.  **23.** vibrates in response to sound waves; the tympanic membrane.  **25.** a high-frequency electromagnetic wave modulated in amplitude or frequency to convey a signal.  **26.** is a lens that possesses at least one surface that curves inwards |