

2022 A.T.O.M. SCIENCE CLUB SUMMER CAMP

Is your child **NEW** to A.T.O.M. Science Club and/or to physics and chemistry? This will determine your **CLASS TIME** (see page 1, 2, or 3 for times and topics)

Then pick one of the following options

OPTION 1: Monday (10 classes total)

OPTION 2: Monday/Wednesday (20 classes total)

OPTION 3: Monday/Wednesday/Friday (30 classes total)

[BRACKETS] indicate **BONUS** classes (first two weeks)

PAGE 1: Students **NEW** to Physics and Chemistry (New to A.T.O.M. Science Club OR who have not had exposure to chemistry and physics) - **Any grade**

WEEK/DATE	Monday: Introduction to the topic	Wednesday: Go deeper into the topic	Friday: Go even deeper!	Friday	Saturday
	1 - 2:30pm Students NEW to Physics and Chemistry - Any grade	1 - 2:30pm Students NEW to Physics and Chemistry - Any grade	1 - 2:30pm Students NEW to Physics and Chemistry - Any grade	7 - 8:30 pm Guest speakers/virtual field trips	7 - 8:30 pm Movie Night!
BONUS (June 6)	[Cosmology : Learn the origin and development of our 13.75 billion-year-old universe.]	[Cosmology : When did gravity begin? When did light begin? When did life begin?]	[Cosmology : When and how did stars and galaxies first form?]		
BONUS (June 13)	[Quantum Mechanics : What is the smallest quantity of matter? What is a wave?]	[Quantum Mechanics : Is there anything that can be both a particle and wave at the same time?]	[Quantum Mechanics : How does light get captured in telescopes and our eyes?]		
1 (June 20)	Beginning Chemistry : Introduction to the universe's building blocks—a.k.a. ATOMS.	Beginning Chemistry : How are atoms able to bond together to form molecules?	Beginning Chemistry : Atoms and molecules in outer space come to Earth—special delivery!—on meteorites. We'll study the Murchison meteorite carrying proteins' building blocks (amino acids).		
2 (June 27)	Beginning Chemistry : How are atoms used on Earth and in space?	Beginning Chemistry : The role of atoms and molecules in rocket fuel.	Beginning Chemistry : Can atoms survive in a black hole?		
3 (July 4) (no meetings on July 4)	Happy 4th of July!	Beginning Physics : "Let the force be with you!" What is force and what are Newton's three laws? What, exactly, is power?	Beginning Physics : Energy can neither be created or destroyed. It is the ultimate transformer, constantly changing from one form to the other.		
4 (July 11)	Beginning Physics : What is light?	Beginning Physics : How do rockets launch?	Beginning Physics : Effects of extreme force and extreme energy on Earth and outer space.		
5 (July 18)	To the Moon & Beyond : Getting ready for NASA's Artemis mission to the Moon. (Hopefully we can watch the launch together in July.)	To the Moon & Beyond : The Moon is our closest neighbor in space. Where did it come from? What do we need to do so people can live on it?	To the Moon & Beyond : Learn to use the "Solar Systems Treks" tools that NASA scientists use to explore other planets and asteroids.		
6 (July 25)	Life in Outer Space : What is life? Why is water necessary for all life?	Life in Outer Space : Astrobiology—the search for extra-terrestrial life.	Life in Outer Space : Humans living in space.		
7 (Aug 1)	Telescopes : Learn how telescopes work and ultimately provide images of the past.	Telescopes : Learn about how NASA's James Webb Space Telescope will see farther back than any other telescope.	Telescopes : We hope the first images from the James Webb Space Telescope will be available for us to view and explore together!		
8 (Aug 8)	Black Holes : Gravity taken to the extreme.	Black Holes : How is a black hole made?	Black Holes : We'll imagine taking a trip into a black hole.		

PAGE 2: Students FAMILIAR with Physics and Chemistry OR returning A.T.O.M. Science Club members - 3rd grade and below

WEEK/DATE	Monday: Introduction to the topic	Wednesday: Go deeper into the topic	Friday: Go even deeper!	Friday	Saturday
	3 – 4:30 Students FAMILIAR with Physics and Chemistry 3rd grade and below	3 – 4:30 Students FAMILIAR with Physics and Chemistry 3rd grade and below	3 – 4:30 Students FAMILIAR with Physics and Chemistry 3rd grade and below	7 – 8:30 pm Guest speakers/virtual field trips	7 – 8:30 pm Movie Night!
BONUS (June 6)	[Cosmology : Learn the origin and development of our 13.75 billion-year-old universe.]	[Cosmology : When did gravity begin? When did light begin? When did life begin?]	[Cosmology : When and how did stars and galaxies first form?]		
BONUS (June 13)	[Quantum Mechanics : What is the smallest quantity of matter? What is a wave?]	[Quantum Mechanics : Can an atom be crushed?]	[Quantum Mechanics : How does light get captured in telescopes and our eyes?]		
1 (June 20)	Chemistry : Remembering that atoms are the smallest building blocks in the whole universe, we'll look at atoms in our universe and see what unusual things they form beyond Earth.	Chemistry : How do heat, density, and pressure affect atoms and molecules?	Chemistry : Atoms and molecules in outer space come to Earth—special delivery!—on meteorites. We'll study the Murchison meteorite carrying proteins' building blocks (amino acids).		
2 (June 27)	Chemistry : On Earth and throughout the whole universe... why do atoms want to make chemical bonds?	Chemistry : The role of atoms and molecules in rocket fuel.	Chemistry : Why will the Moon's water be such an important natural resource for us when we live there?		
3 (July 4) (no meetings on July 4)	Happy 4th of July!	Physics : "Let the force be with you!" What is force and what are Newton's three laws?	Physics : Energy can neither be created or destroyed. It is the ultimate transformer, constantly changing from one form to the other.		
4 (July 11)	Physics : What type of light will the James Webb Space Telescope collect and why?	Physics : How do rockets launch? What, exactly, is power?	Physics : Learn how humans could live in a city in outer space if artificial gravity was made and mirrors reflected sunlight to provide energy.		
5 (July 18)	To the Moon & Beyond : Getting ready for NASA's Artemis mission to the Moon. (Hopefully we can watch the launch together in July.)	To the Moon & Beyond : The Moon is our closest neighbor in space. Where did it come from? What do we need to do so people can live on it?	To the Moon & Beyond : Learn to use the Solar System Treks tools that NASA scientists use to explore other planets and asteroids.		
6 (July 25)	Life in Outer Space : What is life? Why is water necessary for all life?	Life in Outer Space : Astrobiology—the search for extra-terrestrial life.	Life in Outer Space : What will need to be done for humans to live in space?		
7 (Aug 1)	Telescopes : Learn how telescopes work to provide images of the past.	Telescopes : Learn about how NASA's James Webb Space Telescope will see farther back than any other telescope.	Telescopes : Looking at the first images from NASA's James Webb Space Telescope!		
8 (Aug 8)	Black Holes : Learn how a black hole is gravity taken to the extreme... so much so that it is the most extreme place in our Universe outside the Big Bang.	Black Holes : Study how a black hole is a region in space that is both black and empty.	Black Holes : Learn how a black hole is made.		

PAGE 3: Students FAMILIAR with Physics and Chemistry OR returning A.T.O.M. Science Club members – 4th grade and above

WEEK/DATE	Monday: Introduction to the topic	Wednesday: Go deeper into the topic	Friday: Go even deeper!	Friday	Saturday
	5 – 6:30 Students FAMILIAR with Physics and Chemistry 4 th grade and up	5 – 6:30 Students FAMILIAR with Physics and Chemistry 4 th grade and up	5 – 6:30 Students FAMILIAR with Physics and Chemistry 4 th grade and up	7 – 8:30 pm Guest speakers/virtual field trips	7 – 8:30 pm Movie Night!
BONUS (June 6)	[Cosmology : Starting at the universe’s origin— explore its 13.7-billion-year history to present day.]	[Cosmology : When did atoms form? What is cosmic microwave background radiation? When did black holes first form?]	[Cosmology : How and when did stars, galaxies, and life begin in the universe?]		
BONUS (June 13)	[Quantum Mechanics : Particles and waves— The central mystery of quantum mechanics]	[Quantum Mechanics : How can light from faraway galaxies continue to travel in the universe for 13.75 billion years?]	[Quantum Mechanics : Why did astronomers choose infrared as the wavelength for the James Webb Space Telescope to detect?]		
1 (June 20)	Chemistry : What is the chemical composition of humans, the Earth, the Sun, and galaxies?	Chemistry : Why are we looking for water and methane on other planets and moons?	Chemistry : Atoms and molecules in outer space come to Earth—special delivery!—on meteorites. We’ll study the Murchison meteorite carrying proteins’ building blocks (amino acids).		
2 (June 27)	Chemistry : What is going to happen to the liquid oxygen and liquid hydrogen rocket fuel during ignition of the SLS rocket when we go to the Moon?	Chemistry : What will happen to our biochemistry when humans are living in space?	Chemistry : What atoms are found in humans? Do all these atoms have to be present in order to call something alive?		
3 (July 4) (no meetings on July 4)	Happy 4th of July!	Physics : Study gravity and its effect on objects in outer space.	Physics : Energy can neither be created or destroyed. It is the ultimate transformer, constantly changing from one form to the other.		
4 (July 11)	Physics : How can light travel for billions of years, at the fastest speed in the universe, and never stop until it interacts with something... like the James Webb Space Telescope?	Physics : Learn how stars are incredible transformers, transforming magnetic energy into solar flares into infrared heat energy into high energy particles that stream to Earth.	Physics : Extreme places in space—pulsars, magnetars, and neutron stars. Look at the effects of extreme force and extreme energy on Earth and in outer space.		
5 (July 18)	To the Moon & Beyond : Getting ready for NASA’s Artemis mission to the Moon. Explore what makes a rocket launch such a powerful event. Hopefully we can watch the launch together in July.	To the Moon & Beyond : What are we doing so people can live on the moon? Learn about Gateway, a multi-purpose outpost orbiting the moon that is getting us ready for deep space exploration.	To the Moon & Beyond : Learn to use the Solar System Treks tools used by NASA scientists to explore our Moon, planets, and asteroids.		
6 (July 25)	Life in Outer Space : What is life? Why is water necessary for all life? Could life exist in a gas giant planet like Jupiter or Saturn?	Life in Outer Space : Astrobiology—the search for extra-terrestrial life.	Life in Outer Space : What will need to be done for humans to live in space? Plan and design a city in outer space.		
7 (Aug 1)	Telescopes : Learn how telescopes work to provide images of the past and what the James Webb Space Telescope will observe.	Telescopes : Learn about how NASA’s James Webb Space Telescope will see farther back in time than any other telescope.	Telescopes : Looking at the first images from the James Webb Space Telescope!		
8 (Aug 8)	Black Holes : Learn how a black hole is gravity taken to the extreme so much so that it is the most extreme place in our universe outside the Big Bang.	Black Holes : Study how a black hole is a region in space-time that is both black and empty. Explore what it means to be empty.	Black Holes : Learn how black holes are currently being formed in our universe.		