

The Lifecycle of Stars (Adapted from

<https://www.schoolobservatory.org/learn/astro/stars/cycle>)

1. What stages are there in the life cycle of stars? Try to order them.

supernova red giant black dwarf interstellar material white dwarf
black hole protostar neutron star nebula nova

2. Read the text and check your answers. Supply a short heading for each paragraph.

A)Like the Sun, most stars are huge balls of plasma composed largely of hydrogen along with some helium and a very small percentage of other elements. Nuclear fusion of the hydrogen to helium produces the enormous energy that stars emit. The sizes of stars vary greatly, and a given star can have different sizes during its lifetime.

B)Stars are born, radiate energy, expand, possibly explode, and then die. However, the exact details depend on a star's mass and, in a minor way, on its composition. The greater the mass of a star, the faster it moves through its life cycle. Gas and dust among the stars are known as interstellar medium. They, however, are not distributed uniformly but instead form cool, dense clouds called nebulae.

C)The birth of a star begins with the accretion (gathering) of interstellar material. The accretion is due to gravitational attraction between the interstellar material. As the interstellar gas condenses and loses gravitational potential energy, the temperature rises and the material gains thermal energy. It becomes a protostar. As it continues to decrease in size, the temperature continues to increase, and the thermonuclear (fusion) reaction begins in which hydrogen is converted into helium. The core begins to contract and heat up. The rapid release of energy causes the star to expand and enter the red-giant phase of its evolution. During this phase a star varies in temperature and brightness. It becomes a variable star for a relatively short time. It is very unstable and the outer layers are blown off, forming a planetary nebula. The remaining core is now a white dwarf in which fusion no longer occurs. It radiates its residual energy and gets very small becoming a black dwarf.

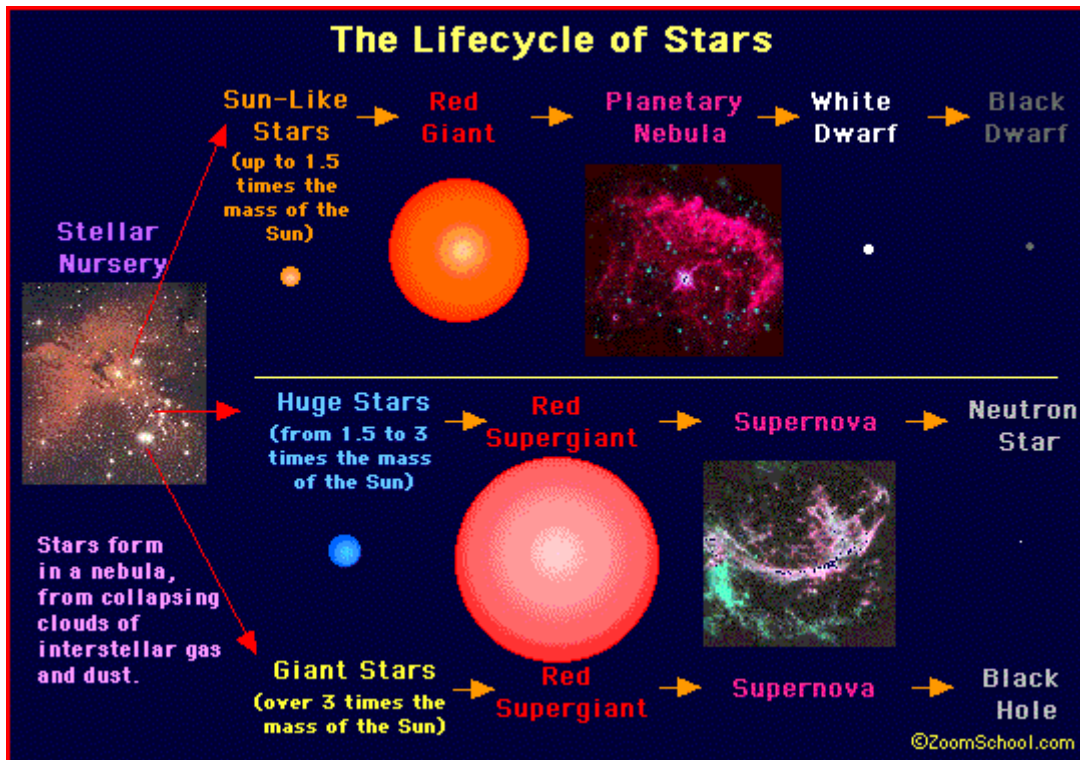
D)Many stars appear dim but suddenly increase in brightness by a factor of 100 to millions. Such a star is called a nova. It is the result of a nuclear explosion on the surface of a white dwarf. Sometimes stars explode catastrophically and throw off large amounts of material and radiation. Such a gigantic explosion is known as supernova. A Type I supernova results from the destruction of a white dwarf with a carbon-oxygen core. A Type II supernova results from the collapse of the iron core of a massive red super-giant. A Type II supernova leaves behind either a neutron star or a black hole. In a black hole, the star's matter continues to contract until the original volume becomes a fantastically dense point called a singularity.

3. Read again part C and D and find expressions that are used to describe cycles. Give examples of

- a) verbs: begin with,
- b) linking words: as,
- c) cause-effect markers: results from,

4. Now look at the picture and describe the lifecycle of stars illustrated in the diagram.

<http://www.enchantedlearning.com/subjects/astronomy/stars/lifecycle/>



5. Irregular nouns. Study these examples.

It is very unstable and the outer layers are blown off, forming a *planetary nebula*.

They form cool, dense clouds called *nebulae*.

Supply the missing information in the table

singulars	plurals	patterns
analysis		-is → -es
criterion		
	formulae	-a → -ae
	spectra	
pendulum		
focus		-us → -i
	nuclei	
matrix		
	theses	

6. Supply the missing words from the table in the correct form.

- a) In physics the point where waves of light or sound which are moving towards each other meet is called a
- b) We had to learn many chemical at school but I can only remember H₂O for water.
- c) The sets of colours into which beams of light can be separated are called
- d) Students are writing their on black holes.
- e) Nuclear fission means the dividing of a and nuclear fusion means the joining of the two
- f) The I apply to any problem is “What will make me happiest”?
- h) are separations of things into their parts or components.

7. The Galaxy Song. <https://www.youtube.com/watch?v=buqtdpuZxvk>

Listen to the song and write down what the numbers refer to.

- a) 900
- b) 19
- c) 1,000,000
- d) 40,000
- e) 100,000,000,000
- f) 100,000.....
- g) 16,000
- h) 3,000
- i) 30,000
- j) 200,000,000
- k) 12,000,000

Teaching Reporting Verbs to ESL Students

By [Keith Taylor](#) STUDENTS

The most common verbs we use to report what someone says are "say" and "tell". These are the verbs which students learn first when they learn reported speech. These are fine, of course, but there will come a time in your students' learning when they want to use other verbs to more accurately report what someone says.

We use many different reporting verbs in English, and the way we use them in a sentence varies, for example:

Verb + gerund: *James denied taking the money.*

Verb + preposition + gerund: *They apologized for arriving late.*

Verb + infinitive: *Susan promised to work hard.*

Task 1. Read the story and answer the questions using reporting verbs.

7 year old Adam was leaving school one afternoon when he saw a group of older boys, aged 8, smoking. One of them, Chris, said 'Hey, Adam, have a drag of this'. *What did Chris do?.....*

'No, I don't want to', Adam replied. *What did Adam do?.....*

'Go on. It's really good', said Chris, and then Trevor said 'I smoke 5 a day.' *What did Chris do? And Trevor?*

'Go on. You'll like it and you can join our gang', said Chris.

'Well, OK then', said Adam. *What did Chris do? And Adam?*

Adam coughed and coughed and he felt sick. On his way home he stopped to buy some mints to get rid of the smell. But when he got home Mummy was waiting for him and she gave him a big kiss.

'Adam. You've been smoking!' she said. *What did Mummy do?*

'No, I haven't.' *What did Adam do?*

'Tell me the truth Adam.'

'OK, I did smoke, but only a little.' *What did Adam do?*

'Adam, if you ever smoke again I'll tell Daddy.' *What did Mummy do?*

'No Mummy, please don't tell Daddy. I'm really sorry. I'll never smoke again.' *What did Adam do?*

'OK, Adam. You shouldn't listen to those naughty boys. Now, why don't you go upstairs and do your homework?' *What did Mummy do?*

Task 2. There are some reporting verbs. Divide them into columns according to the pattern they use.

remind	promise	blame	deny	admit
encourage	offer	congratulate	apologize	accuse
recommend	invite	refuse	advise	insist
suggest	threaten	warn	agree	decide
add	emphasise	affirm	argue	claim

verb object infinitive	verb infinitive	verb (that)	verb gerund	verb object preposition gerund	verb preposition gerund
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Task 3. A role-play. Work in the groups of 3 – 4. You are friends who share a house, but you have been living together for some time, and your habits are starting to annoy each other. You are going to have a house meeting to discuss your grievances!

If a student has slips of paper with, for example, "deny", "accuse" and "apologise", (s)he must deny doing something, accuse someone of doing something and apologise for doing something.

Model activity: "Mario, you're always leaving your laundry on the floor." "Elena, if you don't stop playing loud music at 2am, I'll throw your stereo out of the window." Ask the students what you said. (You accused David of leaving his laundry on the floor. You threatened to throw Elena's stereo out of the window.)