

THE ASTRONOMER'S SONGBOOK

(Songs of Space and Time, 2003 Edition)

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FORWARD

Ever since I was a kid, I sang. When I grew up, I still sang – with choral groups and choirs, as a cantor and soloist in church, in musicals, and even with the Virginia Opera for eight years (no kidding!) In all this time, I've come to appreciate the power of song.

I use music to teach children, college students and adults about astronomy. I have also conducted a few space songs workshops (the Roper Mountain, Nashville, Jacksonville and Winston-Salem SEPA conferences and the Montreal IPS conference most recently), featuring well-known tunes, plus some of my own and others creation.

Songs are an effective, entertaining way to convey ideas and information. While there are a few popular astronomy songs (*Twinkle, Twinkle, or Why Does the Sun Shine?*, for example), there have not been nearly enough tunes about outer space that lend themselves to actually teaching astronomy concepts. A lot of songs you might *think* talk about astronomy really only use astronomical objects and concepts to talk about other things, usually love (*Fly Me to the Moon, Catch a Falling Star, Stardust*, etc.) While it's nice to know that people regard the stuff of your profession as romantic, the songs don't really say anything useful about astronomy. In this latest songbook collection I've concentrated on "astronomy concept" ditties you may find useful in conducting your own programs, workshops, or classes.

Naturally there are quite a lot of songs that have not made it into this collection. I've included songs that, I think, stand the best chance of being performed by the greatest number of us. So while there are some terrific pieces out there by artists such as Astro Capella, the Notochords, and Lynda Williams, the Physics Chanteuse - the original music for their songs is not easy for many of us to reproduce with just a guitar, an autoharp or a kazoo, a cappella or any other star for that matter.

I can and have sung pretty much all of this stuff at one time or another. Above the lyrics I have provided the chords that work best for my vocal range (2nd tenor.) Feel free to transpose, capo, whatever. If you don't know a tune, call me and I'll be happy to hum it to you over the phone. (I guess the next step in this project is to go into the recording studio and cut a disc?) And there are a few songs here the chords to which I've not yet been able to figure out. If you have any better

luck with these, let me know; meanwhile I'll keep working on them for subsequent editions of the Astronomer's Songbook. Also, there are still some songs the authors of which I have not yet discovered. If you know of any mistakes or omissions on these pages, or if you have any other songs to suggest, please contact me and I'll work on getting it all into the next revision.

This 2003 edition of the Songbook has a few new songs written since the 2001 copy; I've put the word, "NEW" next to them in the Table of Contents, as well as on the individual pages. Also, keep these other features in mind:

1. Instead of putting the songs in strict alphabetical order, I have attempted to pigeonhole them into broad categories or chapters. You may well discover that quite a few of these songs can apply to more than one area, while there are a couple of tunes that I've found hard to put into any category whatsoever. Music isn't rocket science after all.

2. Also, I have tried to identify the AUDIENCE for whom each song works best. Some tunes and concepts are geared only for little kids (ELEMENTARY); others will work for high school students through adults (YOUNG ADULT – ADULT). A couple of songs have earned my strongest rating (ADULT) mainly because of their adult content (now I think I know how Hollywood got itself into such a pickle!) And there are many songs that I've found work for everybody (ALL AGES). I hope this addition is helpful, but don't let it keep you from experimenting; as they say, your actual mileage may vary.

3. In order to fill up each page, I've added a lot of quotes as filler. That's because, A: They're some pretty good quotes I think, and B: I have tried to squeeze as many songs on to each page as possible, but for greater ease in performing a song I am loath to break it up by stretching it across two different pages, unless it's a really, really long song that needs the space (there's a couple like that.)

4. Now that things are in categories, an index is needed. You'll find one in the back of the book.

At some point, you may be inspired to write your own space songs. I hope so. Actually, all I've mostly done is take a familiar, not-too-hard-to-sing tune and put new words to it. Trust me, it's a lot easier than you think. You just need to "have a song in your heart," and be in the write frame of mind, if you know what I mean. And as I said before, let me know what you come up with ...

"The Astronomer's Song Book" has been expanding nicely, thanks to many of you who have contributed to it, including the good folks at Indian Rive Community College and its print shop, plus Dori Anderson, Lisa Schoenster Bell, Stephen Berr, Joanne Bloomfield, Sherry Bowen, Kevin Conod, Shelly Craig, George Fleenor, Aimie Gallagher, Debbie Gibbons, John Hare, Jane Hastings, Peter Jedicke, Cindy Kays, Leo Kretzner, Kevin Krisciunas, Fred Kuentz, Rob Landis, Erich Landstrom, Joe Lenartiene, Dave Maness, Becky Fox Matthews, Peter Macinnis, Pat McQuillan, Terry Moore, Janet Nadel, Judy Polan, Gary Purinton, Dale Rieth, Elizabeth E. Roettger, Marc Rouleau, Steven Russo, Mickey Schmidt, Paul Shuch, Kelly Quinn, Betty Wasiluk, April Whitt, Ken Wilson, Gene Zajac and others whose works appear in this songbook.

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SONGS ABOUT THE SKY, CONSTELLATIONS AND NATURE

BOLD ORION

By Leo Kretzner, Verse 3 by Jon Bell

AUDIENCE: ALL AGES

Em D
When the days are gettin' shorter, & the nights are growin' long,
C D Em
And the north wind puts a tear into your eye,
D
If you're out about 'round midnight and you look off to the east,
C D Em
There you may see bold Orion on the rise.
G Em
You may know him by his stance or the starry shield he holds,
G Em
As he rises silent in a clear cold sky,
D Em
Young Jack Frost and old man Winter, they both beckon to the call
D C Em
Of their master bold Orion on the rise.

CHORUS: C Em D Em
Bold Orion, mighty hunter, rising in a clear cold sky,
C Em D C Em
See the summer fall before him, Bold Orion's on the rise.

2. For seven starry ages he has ruled the winter skies With the fires of lost eons in his eyes,
He has seen the rise and fall of kings and continents and all, Rising silent, bold Orion on the rise.
When he ascends, no hesitation, when he moves, no turnin' round, Like a soul been called to
glory, Earthly born but heavenly bound. Now the bird is on the wing, and its southward that she
flies, Hastened on by bold Orion on the rise. CHORUS

3. Orion had a lover, she's the goddess of the hunt, And of the forest and the golden moon.
Artemis they called her, the fair sister of the sun; But their time together ended all too soon.
Apollo took his vengeance on the man his sister loved, An arrow sped him to a painful death,
But once a month she visits him, a moon among the stars,
Looking down with whispered love upon her breath. CHORUS

4. Summer comes on all too slowly, and it passes far too fast, And you wonder is there nothin'
that can last, Here today and gone tomorrow as the green leaves turn to red, As the present
quickly turns into the past. Cut the wood and stack it high now, stoke the fires in your home
Burnin' nightly send the smoke up to the sky, Keep the winter at your door and keep the summer
in your heart, Drink a toast to bold Orion on the rise.

CHORUS 2X

CATCH A FALLING STAR

Paul Vance and Lee Pockriss

CHORUS: C F C F C F C
Catch a falling star and put it in your pocket, Never let it fade away.
C F C F C F C
Catch a falling star and put it in your pocket, Save it for a rainy day.
F C F C
For love may come and tap you on the shoulder, Some starless night.
F C G C G
And just in case you feel you want to hold her, You'll have a pocket full of starlight. CHORUS

For when your troubles start in multiplying And they just might.
It's easy to forget them without trying, With just a pocket full of starlight. CHORUS

*Go and catch a falling star, get with child a mandrake root, tell me, where all past years are,
Or who cleft the devil's foot. - John Donne, Song*

CONSTELLATION JIG

Hy Zaret and Lou Singer

(from Space Songs, published by Argosy Music, 1959)

AUDIENCE: ALL AGES

Wouldn't it be heavenly to know the constellations,
Scan the skies and recognize their names and their locations?
Tho, they're only figments of our own imaginations,
Wouldn't it be heavenly to know the constellations?
Hercules, Delphinus and Andromeda and Lyra,
Pegasus and Sagitta, Dorado and Lacerta,
Ursa Major, Ursa Minor, Cetus and Orion.
I could name a dozen more if I were really tryin'.
In the Zodiac, you'll find a dozen constellations.
You can trace them in the sky with just a little patience.
Leo, Virgo, Scorpius and Gemini and Taurus,
These are five, now who can name the other seven for us?

SPOKEN: Aquarius! Saggittarius! Aries! Libra! Capricorn! Cancer! Pisces!

What determines what we see among the constellations?
Atmosphere, the time of year, as well as their locations.
Latitude and time of night are prime considerations.
Each of them are factors when we see the constellations.

THE CONSTELLATION SONG

Kevin Krisciunas, 1987 (to the tune of “Modern Major General” by Gilbert & Sullivan)**

AUDIENCE: ALL AGES

The constellations in the sky were not put there to bore us.
There's Antlia, Andromeda, Aquarius, and Taurus,
And Apus, Leo, Lepus, Ara, Aries, and Centaurus,
Carina, Crater, Cancer, Canis Major/Minor, Corvus,

And Aquila, Auriga, Leo Minor, and Monoceros,
Columba, Libra, Lyra, Lynx, and Caelum, Cygnus, Circinus,
Corona Borealis, Cetus, Crux, Oh! do not scorn us
When you learn we fondly love the likes of Capricornus.

Horologium and Hydra, Hydrus, Indus, Microscopium,
And Cepheus, Bootes, Eridanus, Telescopium,
Chameleon and Hercules, Dorado, Draco, Delphinus,
Norma, Octans, Lupus, Musca, Pyxis, Grus, and Scorpius.

There's Coma Berenices, Fornax, Pavo, Puppis, Perseus,
Corona Australis, Tucana, places like Equuleus,
Sagittarius and Sagitta, both north and south Triangulum,
And Scutum, Sculptor, Sextens, Serpens, Mensa and Reticulum.

Lacerta, Ophiuchus, Pictor, Gemini and Pisces
Is where we hope to find a cloud of interstellar ices.
Orion, Piscis Austrinus, in Phoenix, and in Pegasus is
Where the clouds are dense enough and each then coalesces.

*Towards Cassiopeia, towards the Giraffe, and also towards the Hunting Dogs
We find the stars and galaxies and scribble in our nightly logs.
Ursa Major/Minor, Vela, Virgo, Volans, and Vulpecula
Is where we plan to aim tonight with million dollar specula.
To lofty mountains off we go in confident reliance,
In hot pursuit of photons there and world beating science.

[Alternate last two lines: The constellations in the sky, they number eight and eighty.
They're up there every dark, clear night. I hope you've seen them lately.]

* Camelopardus = the Giraffe. Canes Venatici = the Hunting Dogs.
(These two just don't rhyme with anything.)

*When I was young, why did not somebody teach me the constellations, and make me at home in
the starry heavens which I don't half know to this day?*

- Thomas Carlyle

DARK SKIES

Jon U. Bell, December 2000 (sung to the tune, "Dark Moon" by Ned Miller)

AUDIENCE: ALL AGES

F

Dark skies –

C

Away out there beyond the lights, beyond the towns, beyond the cars, beyond the cities;

Dark skies –

F

How can it be that we might see what some would say we cannot see, we see the stars.

C

F

Mortals may dream of dark skies supreme,

Dm

C

But they don't realize, Streetlights can spoil our dreams

F

Of dark skies –

Away out there beyond the lights, beyond the towns, beyond the cars, beyond the cities;

Dark skies –

How can it be that we might see what some would say we cannot see, we see the stars.

Too bright by half? That sums up the problem as I see it - our towns and cities, all over the world, are suffering from too much light.

-Andre Tammes, Professor of Light & Lighting, Bartlett School of Architecture, University College, London Feb. 1997

ERIDANUS THE RIVER

Jon Bell and Kelly Quinn (To the tune, "Flow Gently Sweet Afton" by J.E. Spilman)

AUDIENCE: ALL AGES

G

C

G

Flow gently sweet star stream, I see you above

D

You wander the heavens, past Columba the Dove

G

C

G

You start at Orion, Toucana's your end,

Em

G

D

G

Eridanus the River, my heavenly friend.

2. The stars in the dark sky are twinkling and bright,
They shine out from far off across the great night.
Their light beams they travel most swiftly in flight,
There's nothing so rapid as the speed of light.

FOLLOW THE DRINKING GOURD

Spiritual

AUDIENCE: ALL AGES

CHORUS:

Am G Am Em G Am
Follow, follow, follow the Drinkin' Gourd,
Am G Am Em G Am
Follow, follow, follow the Drinkin' Gourd.

(first and last times only)

C G Am Em
For the old man is a waitin' for to carry you to Freedom
Am Em G Am
If you follow the drinkin' gourd.

Am
When the sun comes back and the first quail calls
G Em G Am
Follow the Drinkin' Gourd
C G Am Em
For the old man is a'waitin' for to carry you to Freedom
Am Em G Am
If you follow the Drinkin' Gourd.

CHORUS

The riverbank make a mighty good road
The dead trees will show you the way
Left foot, peg foot travellin' on,
Follow the Drinkin' Gourd

CHORUS

The river runs between two hills
Follow the Drinkin' Gourd
There's another river on the other side
Follow the Drinkin' Gourd

CHORUS

Where the big river meets the little river
Follow the Drinkin' Gourd
There the old man is a waitin' for to carry you to Freedom!
If you follow the Drinkin' Gourd.

CHORUS 2X

The Drinking Gourds are the Big and Little Dippers. Their placement in the northern sky in the springtime evening enabled runaway slaves to escape north via the underground railroad before and during the American Civil War.

HOME ON THE RANGE
Brewster Higley & Dan Kelly
AUDIENCE: ALL AGES

G C
Oh, give me a home where the buffalo roam
G D
Where the deer and the antelope play
G C
Where seldom is heard a discouraging word
G D G
And the skies are not cloudy all day

G C G
CHORUS: Home, home on the range
D
Where the deer and the antelope play
G C
Where seldom is heard a discouraging word
G D G
And the skies are not cloudy all day

Where the air is so pure and the zephyrs so free
And the breezes so balmy and light
That I would not exchange my home on the range
For all of the cities so bright.

CHORUS

How often at night when the heavens are bright
With the light of the glittering stars
I stand there amazed and I ask as I gaze
Does their glory exceed that of ours?

CHORUS

*When I heard the learn'd astronomer,
When the proofs, the figures, were ranged in columns before me.
When I was shown the charts and diagrams, to add, divide, and measure them
When I sitting heard the astronomer where he lectured with much applause in the lecture-room,
How soon unaccountable I became tired and sick,
Till rising and gliding out I wander'd off by myself,
In the mystical moist night-air, and from time to time,
Look'd up in perfect silence at the stars.*

- Walt Whitman

*Last night as I lay in bed looking at the stars I thought 'Where the hell is the ceiling ?'
— unknown*

LOOK TO THE STARS

Song and Lyrics by Judy Polan, additional lyrics by Jon Bell

AUDIENCE: ALL AGES

C
Guide to ancient mariners, searching for a home,
G F C
Look to the stars, look to the stars,

In times of questioning they'll hint at what's to come,
G F C
Look to the stars, look to the stars.

CHORUS:

G F C
Look to the stars, they'll tell you where we're going.
Am G F G
Look to the stars, for the secrets of time are written there,
C F C
And the night it will not seem so lonely,
G F C
Look to the stars, look to the stars.

Travelling westward, on a journey 'cross the sea,
Look to the stars, look to the stars,
The pole star guides us on our search for destiny,
Look to the stars, look to the stars.

CHORUS

The ocean beckons, the tide is running high,
Look to the stars, look to the stars,
Our vessel takes us on a journey 'cross the sky,
Look to the stars, look to the stars.

CHORUS

The comet's coming, and it won't be back again,
Look to the stars, look to the stars.
When it returns, I'll be a hundred and ten,
Look to the stars, look to the stars.

CHORUS 2X

Following the light of the sun, we left the Old World.

- Inscription on Columbus' caravels

Should the Comet return according to our prediction, impartial posterity will not refuse to acknowledge that this was first discovered by an Englishman

- Edmund Halley

MORNING HAS BROKEN

Eleanor Farjean/traditional Scottish tune

AUDIENCE: ALL AGES

C Dm G F C
Morning has broken like the first morning
C EmAmD G
Blackbird has spoken like the first bird
C F C Am D
Praise for the singing, praise for the morning
G C F G C (FC)
Praise for the springing fresh from the Word.

Sweet the rain's new fall sunlit from heaven
Like the first dew fall on the first grass
Praise for the sweetness of the wet garden
Sprung in completeness where His feet pass

Mine is the sunlight, mine is the morning
Born of the one light Eden saw play
Praise with elation, praise every morning
God's re-creation of the new day!

*Awake! For Morning in the Bowl of Night
Has flung the stone that put the Stars to Flight!* - from the Rubaiyat of Omar Khayyam

Aurora Musis amica. (Dawn is friend of the muses.)

Morning glory is the best name, it always refreshes me to see it. - Henry David Thoreau

*Angels in the early morning may be seen the dews among.
Stooping, plucking, smiling, flying.
Do the buds to them belong?* - Emily Dickinson

And even the sun in dawn chorus sings, a celestial melody to the earth below. - Tjaden

When you arise in the morning, think of what a precious privilege it is to be alive - to breathe, to think, to enjoy, to love. - Marcus Aurelius

*The breeze at dawn has secrets to tell you.
Don't go back to sleep.* - Rumi

Whether I retire to bed early or late, I rise with the sun. - Thomas Jefferson

MUSIC OF THE NIGHT

By Andrew Lloyd Webber, Lyrics by Charles Hart, Additional Lyrics by Richard Stillgoe
From "The Phantom of the Opera"

AUDIENCE: YOUNG ADULT - ADULT

Night time sharpens Heightens each sensation
Darkness wakes And stirs imagination
Silently the senses Abandon their defenses
Helpless to resist the notes I write
For I compose the music of the night

Slowly, gently Night unfurls its splendor
Grasp it, sense it Tremulous and tender
Hearing is believing Music is deceiving
Hard as lightning, soft as candlelight
Dare you trust the music of the night

Close your eyes for your eyes will only tell the truth
And the truth isn't what you want to see
In the dark it is easy to pretend
That the truth is what it ought to be

Softly, deftly Music shall caress you
Hear it, feel it Secretly possess you
Open up your mind Let your fantasies unwind
In this darkness which you know you cannot fight
The darkness of the music of the night

Close your eyes, start a journey to a strange new world
Leave all thoughts of the world you knew before
Close your eyes and let music set you free
Only then can you belong to me

Floating, falling Sweet intoxication
Touch me, trust me Savor each sensation
Let the dream begin Let your darker side give in
To the power of the music that I write
The power of the music of the night

You alone can make my song take flight
Help me make the music of the night.

*And the night shall be filled with music,
And the cares, that infest the day,
Shall fold their tents, like the Arabs,
And as silently steal away.*

-Henry Wadsworth Longfellow

SECOND STAR TO THE RIGHT

Lyrics by Sammy Cahn, Music by Sammy Fain (from Disney's "Peter Pan")

AUDIENCE: ALL AGES

The second star to the right
Shines in the night for you
To tell you that the dreams you plan
Really can come true

The second star to the right
Shines with a light that's rare
And if it's Never Land you need
It's light will lead you there

Twinkle, twinkle little star
So I'll know where you are
Gleaming in the skies above
Lead me to the one who loves me

And when you bring him my way
Each time we say "Goodnight"
We'll thank the little star that shines
The second from the right!

Shoot for the moon. Even if you miss it you will land among the stars. - Les Brown

Night is a dead monotonous period under a roof; but in the open world it passes lightly, with its stars and dews and perfumes, and the hours are marked by changes in the face of Nature. What seems a kind of temporal death to people choked between walls and curtains, is only a light and living slumber to the man who sleeps afield.

-Robert Louis Stevenson

I often think that the night is more alive and more richly colored than the day.

- Vincent Van Gogh

I think nighttime is dark so you can imagine your fears with less distraction.

- Calvin, from Bill Watterson's "Calvin & Hobbes"

Weather forecast for tonight: dark.

-George Carlin

If Mom and Dad cared about me at all, they'd buy me some infra-red nighttime vision goggles.

- Calvin, from Bill Watterson's "Calvin & Hobbes"

THE STAR CIRCUS

Jon Bell, 1990 (to the tune: "When Johnny Comes Marching Home" by Lambert)

AUDIENCE: ELEMENTARY

Em G
The circus of stars is coming to town, hoorah, hoorah!
Em G Bm
The circus of stars is coming to town, hoorah, hoorah!
Em D
The circus of stars is coming to town,
Em D
There's lions and big bears and maybe a clown
Em DEm D Em
And they're all above us, up in the sky above!

The stars make pictures in the sky, Hoorah, hoorah, (REPEAT LINE)
The stars make pictures in the sky,
They're called constellations, and who could deny
That they're all above us, up in the sky above!

The circus strongman is Hercules, Hoorah, hoorah, (REPEAT LINE)
The circus strongman is Hercules,
He's a big hairy guy who's got big knobby knees, (alt: "and he's covered with fleas,")
And he's up above us, Up in the sky above!

Leo the Lion's a big friendly cat, Hoorah, hoorah, (REPEAT LINE)
Leo the Lion's a big friendly cat,
Who chases Orion, who carries a bat
And they're up above us, Up in the sky above!

The stars in the sky are both big and small, Hoorah, hoorah! (REPEAT LINE)
The stars in the sky are both big and small,
They're hot or cool, and round like a ball,
And they're all above us, Up in the sky above!

THE BEST THINGS IN LIFE ARE FREE (The Moon/Stars Belong to Everyone)

Words & Music by B.G. DeSylva, Lew Brown, & Ray Henderson

(c) 1927 by DeSylva, Brown & Henderson, Inc

AUDIENCE: ALL AGES

The moon belongs to ev'ry-one, the best things in life are free.
The stars belong to ev'ry-one. They gleam there for you and me.
The flowers in Spring, the robins that sing,
The sunbeams that shine: they're yours, they're mine.
And love can come to anyone, the best things in life are free.

SUMER IS ICUMEN IN (SUMMER IS A'COMING IN)

13th century Middle English song

AUDIENCE: ALL AGES

C F G
Sumer is icumen in, lhude sing cuccu
C G C F C F G
Groweth sed and bloweth med and springth the wde nu
C F C F C F C G C
Sing cuccu! Awe bleteth after lombe, lhouth after calve cu
C F C F C F C
Bulluc sterteth, bucke verteth, Murie sing cuccu!
C F C F C G CG C F C
cuccu, cucu wel singes thu cucu. Ne swik thu naver nu!

Summer is a-coming in, loudly sing cuckoo
 Groweth seed and bloweth mead, and springs the wood anew
 Sing cuckoo! Ewe is bleating after lamb, cow after calf lows too
 Bullock starting, buck now browsing [literal: “bullock starting, buck now farting”]
 Merry sing cuckoo! Cuckoo, cuckoo, well singest thou cuckoo. O sing thou ever new!

I walk without flinching through the burning cathedral of the summer. My bank of wild grass is majestic and full of music. It is a fire that solitude presses against my lips.

- *Violette Leduc, Mad in Pursuit*

Stand by the grey stone when the thrush knocks and the setting sun with the last light of Durins Day will shine upon the keyhole.
- J.R.R. Tolkien, The Hobbit

- J.R.R. Tolkien, The Hobbit

Summer Solstice folklore:

If it rains on June 27, then it will rain for the next seven weeks.

A wet June makes a dry September.

A dripping June brings all things in tune.

If swallows fly near the ground in June, rain is coming.

Hot and dry weather will come tomorrow if Bats are seen flying on a June evening.

When the Moon is New, braid your hair or some kind of string while saying:

*"I braid this knot, this knot I braid,
To know the thing I know not yet,
That while I sleep I plain may see
The man that shall husband be,
Not in his best but worst array,
Just what he weareth every day,
That I tomorrow may him ken
From among all other men."*

TWINKLE, TWINKLE
Traditional
AUDIENCE: ALL AGES

C F C
Twinkle, twinkle, Little Star,
F C G C
How I wonder what you are.
C F C G
Up above the world so high,
C F C G
Like a diamond in the sky!
C F C
Twinkle, twinkle, little Star
F C G C
How I wonder what you are!

2.

When the blazing sun is gone,
When he nothing looks upon
Then you show your little light
Twinkle, twinkle all the night!
Twinkle, twinkle, etc.

3.

Then the trav'ler in the dark,
Thanks you for your tiny spark.
He could not see which way to go,
If you did not twinkle so.
Twinkle, twinkle, etc.

4.

In the dark blue sky you keep
And often through my curtains peep
For you never shut your eye
Till the sun is in the sky
Twinkle, twinkle etc.

(LATIN):

Mica, mica, parva stella, Miror quatenam sis tam bella;
Splendens eminus in illo, Albavelut gemma caelo!
Mica, mica etc.

Quando fervens sol discessit, Nec calore prata pascit.
Mox extendis lumen parvum, Micans, micans per obscurum!
Mica, mica etc.

*Twinkle, twinkle little star
I don't wonder what you are,
For by spectroscopic ken
I know that you are hydrogen
– D. Bush , 1950
“Science & English Poetry”*

*Twinkle, twinkle little star
I know exactly what you are
If you're wondering how I know,
Carl Sagan told me so.
- Berke Breathed
“Bloom County”*

WALTZING WITH BEARS

Robert Force and Al D'Osche, original words by Theodore Geisel
(from the Planetarium Show, "Bear Tales and Other Grizzly Stories")

AUDIENCE: ALL AGES

C F C
My Uncle Walter goes waltzing with bears;
G C
It's a most unbearable state of affairs;
F Am
Every Saturday night he creeps down the back stairs
F C G C
Sneaks out of the house and goes waltzing with bears!

CHORUS:

C F C
He goes wa-wa-wa-wa-wa, waltzing with bears,
G C
Raggy bears, baggy bears, shaggy bears too,
F Am
And there's nothing on earth Uncle Walter won't do,
F C F C
So he can go waltzing, a wa-wa-wa waltzing,
F C G C
So he can go waltzing, a waltzing with bears!

I went to his room in the middle of the night,
I tiptoed inside and I turned on the light,
But to my despair he was nowhere in sight,
'Cause my Uncle Walter goes waltzing at night!

CHORUS

I bought Uncle Walter a new coat to wear,
But when he comes in it's all covered with hair,
And lately I've noticed there's several new tears,
I'm sure Uncle Walter's been waltzing with bears!

CHORUS

We asked Uncle Walter, "Why won't you be good?
And do all the things that we say that you should?
We know that you'd rather be out in the woods,
We're afraid that we'll lose you, we'll lose you for good!"

We begged and we pleaded, "Oh please won't you stay?"
And managed to keep him home for a day,
But the bears all barged in and they took him away,
Now he's dancing with pandas, and we don't understand 'em,
But the bears all demand at least one dance a day!

CHORUS 2X

WHAT IS A SHOOTING STAR? (The Meteor Song)

Hy Zaret and Lou Singer

(from Space Songs, published by Argosy Music, 1959)

AUDIENCE: ALL AGES

Em

A shooting star is not a star,
Is not a star at all,

Am

A shooting star's a meteor that's

Em D* Em

Heading for a fall.

A shooting star is not a star, how does it shine so bright?
The friction as it falls through air produces heat and light.

A shooting star or meteor, whichever name you like,
The minute that it falls to earth it's called a meteorite.

*Bm also works

- repeat song a cappella as a 4 voice round, each voice making its entrance at each new line

*The accepted nomenclature is as follows: the object itself is a **meteor**; the body in flight is sometimes called a **meteoroid**; the fallen body is a meteorite. A **fireball** is bright enough to cast a shadow; a **bolide** explodes with an audible noise.*

Cecilia Payne-Gaposhchkin, Introduction to Astronomy, 1954

The story goes that in 1807, upon hearing that two Yale professors had verified observations of stones falling from the sky, U.S. President Thomas Jefferson responded, "Gentlemen, I would rather believe that two Yankee professors would lie than believe that stones fall from heaven."

A rock from space that falls to the earth is called a meteorite. However, if it lands to the left of you it's called a meteorleft.

- very, very old astronomy class joke

Only recently have we had the technical means to illuminate, and thus enjoy, our cities after nightfall. Unfortunately we have not achieved inviting environments, partly because in recent years we have stressed quantity rather than quality of night lighting.

- Warren Boeschstein, Assoc.Prof., School of Architecture, University of Virginia, 1985

*Though my soul may set in darkness It will rise in perfect light;
I have loved the stars too fondly To be fearful of the night.*

-Sarah Williams

WHY DO STARS TWINKLE?

Hy Zaret and Lou Singer

(from Space Songs, published by Argosy Music, 1959)

AUDIENCE: ELEMENTARY

G

Why do the stars twinkle at night?

D

Why do they have a twinkley light?

G

The light of the stars is steady and clear

D

But we see the stars through the atmosphere

G

The atmosphere has layers of air

D

The layers keep moving from here to there

G

Because of the different temperatures

D

The layers keep moving from here to there

G

The air moves in, the air moves out

D

And tosses the light of the stars about

G

The moving air, bends the light

G

C

And that's why the stars

G

D G

Twinkle at night

SPOKEN: The stars twinkle because they are tiny bright points of light.

The planets do not twinkle because they are much closer and have a noticable size.

The air moves in, the air moves out

And tosses the light of the stars about

The moving air, bends the light

And that's why the stars

Twinkle at night

I will love the light for it shows me the way,

Yet I will endure the darkness for it shows me the stars.

- Og Mandino, "The Greatest Salesman in the World"

SONGS ABOUT THE MOON AND SUN

BAD MOON RISING

Creedence Clearwater Revival. Music & Lyrics : J. C. Fogerty
AUDIENCE: ALL AGES

G D G
I see the bad moon arising.
 D G
I see trouble on the way.
 D G
I see earthquakes and lightnin'.
 D G
I see bad times today.
C
Don't go around tonight,
 G
Well, it's bound to take your life,
D C G
There's a bad moon on the rise.

I hear hurricanes ablowing.
I know the end is coming soon.
I fear rivers over flowing.
I hear the voice of rage and ruin.
Don't go around tonight,
Well, it's bound to take your life,
There's a bad moon on the rise.
All right!

Hope you got your things together.
Hope you are quite prepared to die.
Looks like we're in for nasty weather.
One eye is taken for an eye
Don't go around tonight,
Well, it's bound to take your life,
There's a bad moon on the rise.
REPEAT

BLUE MOON

Richard Rodgers and Lorenz Hart

Blue moon, you saw me standing alone
Without a dream in my heart Without a love of my own
Blue moon, you know just what I was there for
You heard me saying a prayer for Someone I really do care for
And then suddenly appeared before me The only one my arms could ever hold
I heard somebody whisper please adore me
But when I looked that moon had turned to gold
Blue moon, now I'm no longer alone
Without a dream in my heart, Without a love of my own, Without a love of my own

BY THE LIGHT OF THE SILVERY MOON

Edward Madden/Gus Edwards

AUDIENCE: ALL AGES

C F
By the light of the silvery moon
G C Am G
I want to spoon, to my honey I'll croon love's tune
C F
Honey Moon, keep a-shining in June
C F C Em Am
Your silv'ry beams will bring love's dreams, we'll be cuddling soon,
G C
By the silvery moon!

DANCIN' IN THE MOONLIGHT

by King Harvest

AUDIENCE: ALL AGES

We get it almost every night
And when that moon gets big and bright
It's supernatural delight
Everybody was dancin' in the moonlight
Guitar Solo

Everybody here is outta' sight
They don't bark and they don't bite
They keep things loose, they keep things light
Everybody was dancin' in the moonlight
Dancin' in the moonlight

Everybody feelin' warm, and right
It's such a fine and natural sight
Everybody's dancin' in the moonlight
We like our fun and we never fight
You can't dance and stay uptight
It's supernatural delight
Everybody was dancin' in the moonlight.

*That orb'd maiden
With white fire laden
Whom mortals call the Moon.* - Shelley

Everyone is a moon and has a dark side which he never shows to anybody. - Mark Twain

DARK MOON
Ned Miller
AUDIENCE: ALL AGES

F
Dark moon, Away up high up in the sky,
C
Tell me why, oh tell me why You've lost your splendor
Dark moon, What is the cause Your light withdraws
F
Is it because, is it because I've lost my love?
C F
Mortals have dreams Of love's perfect schemes,
Dm C
But they don't realize That love can sometimes bring
F
A dark moon, Away up high in the sky,
C
Tell me why, tell me why You've lost your splendor
Dark moon, What is the cause Your light withdraws
F
Is it because, is it because I've lost my love? CHORUS and REFRAIN

There is no dark side of the moon. Matter of fact, it's all dark... - Pink Floyd's "DSM" album

THE MAN IN THE MOON
Unknown
AUDIENCE: ALL AGES

The man in the moon as he sails the sky Is a very remarkable skipper.
But he made a mistake when he tried to take A drink from the milk of the dipper.
He dipped right out of the Milky Way And slowly but carefully filled it.
But the big bear growled And the little bear howled,
And frightened him so that he spilled it!

*The bente Mone with her hornes all pale,
Saturnus and Jove, in Cancro joyned were.* - Chaucer, "Troilus and Creseide"

*On Saturday night I lost my wife,
And where do you think I found her?
Up in the moon, singing a tune,
And all the stars around her.* - Mother Goose nursery rhyme

THE MAN IN THE MOON IS A LADY
By ? (from a musical tune sung by Bea Arthur)
AUDIENCE: ADULT

I have a little secret I'd like to impart That I hope doesn't give you too much of a start
Though it's shocking, it's completely true. I know it isn't gossip or rumour of course
For I've had it from quite a reliable source And I'd like to pass it on to you.

The man in the moon is a lady, a lady with lipstick and curls
The cow that jumped 'ovah' cried "Jumpin' Jehovah, I think it's just one of the girls!"
She winks at the stars from her bed of green cheese That isn't a nightgown, it's a satin chemise
Her friends are the stars and the planets, she sends the big dipper a kiss
So don't ever offend her, remember her gender – The man in the moon is a 'Miss'!

MR. MOON
20th century tune, politically correct lyrics by Jon Bell
AUDIENCE: ALL AGES

G C G D G

Oh Mr. Moon, moon, bright and shiny moon, won't you please shine down on me?

C Am D

Oh Mr. Moon, moon, bright and silvery moon - hidin' behind that tree!

G D

I want to shoot that possum* with my big shotgun,

G D

Shoot that possum 'fore he starts to run,

G C Em

Oh Mr. Moon, moon, bright and shiny moon,

G D G D G C D G

Won't you please shine down on, please shine down on, please shine down on me?

* My friends and former coworkers at the Virginia Living Museum in Newport News reminded me that the two verses about "shooting possums" in the original song somehow just didn't fit in with its environmental mission statement, so I made up these more appropriate PC lyrics:

G D

I want to see you shinin' down on earth below,

G D

See you shine way up above us so –

MR. MOON 2
Unknown
AUDIENCE: ALL AGES

Mr. Moon, Mr. Moon, you're out too soon! The sun is still in the sky
Go back to bed and cover up your head And wait 'til the day goes by.

MOONSHADOW
Cat Stevens
AUDIENCE: YOUNG ADULT - ADULT

CHORUS:

C

I'm being followed by a moonshadow -

F G C

Moonshadow, moonshadow

Leapin' and a hoppin' like a moonshadow -

F G C

Moonshadow, moonshadow

F C F G C

(last time only): Moonshadow, moonshadow, moonshadow moonshadow.

F C F C F C F G

And if I ever lose my hands, lose my plow, lose my lands

F C F C F Dm C Am

Yes if I ever lose my hands, o if -

Dm G C

I won't have to work no more.

CHORUS

And if I ever lose my eyes, all my color all run dry

Yes if I ever lose my eyes, o if... I won't have to cry no more.

CHORUS

And if I ever lose my legs, I won't moan and I won't beg

Yes if I ever lose my legs, o if... I won't have to walk no more.

And if I ever lose my mouth, all my teeth north and south

Yes if I ever lose my mouth, o if... I won't have to talk -

CHORUS

BRIDGE:

D G D G

Will it take long to find me? I asked the faithful light

D G D G

Yes, did it take long to find me and are you going to stay the night?

CHORUS

PAPER MOON

Music by Harold Arlen, Lyrics by Billy Rose and E.Y. Harburg, 1933

AUDIENCE: ALL AGES

G C D G D G
Say it's only a paper moon sailing over a cardboard sea,
C D G
But it wouldn't be make-believe if you believed in me.
C D G D G
Yes, it's only a canvas sky hanging over a muslin tree,
C D G
But it wouldn't be make-believe if you believed in me.
D C G D C G
Without your love it's a honky-tonk parade,
D C G D C
Without your love it's a melody played in a penny arcade.
G C D G D G
It's a Barnum & Bailey world, just as phony as it can be,
C D G
But it wouldn't be make-believe if you believed in me. REPEAT

SHINE ON HARVEST MOON

Nora Bayes-Norworth & Jack Norworth, 1908

AUDIENCE: ALL AGES

INTRO: The night was mighty dark so you could hardly see, for the moon refused to shine.
Couple sitting underneath a tree, for love they pine.
Little maid was kinda "fraid of darkness" so she said, "I guess I'll go."
Boy began to sigh, looked up at the sky, told the moon his little tale of woe.

E7 A7
Shine on, shine on harvest moon, up in the sky
D7 G
I ain't had no lovin'; since January, February, June or July
E7 A7
Snow time ain't no time to stay outdoors and spoon
D7 G C7 G
So shine on, shine on harvest moon, for me and my gal (guy)

I can't see why a boy should sigh, when by his side is the girl he loves so true.
All he has to say is, "Won't you be my bride, for I love you."
Why should I be telling you this secet when I know you you can guess
harvest moon will smile, shine on all the while if the little girl should answer "Yes."

CHORUS

THERE OUGHT TO BE A MOONLIGHT SAVINGS TIME

Kahahl and Richman
AUDIENCE: ALL AGES

INTRO: Birdies fly with new ambition, Spring is in their song!
Soon you'll find yourself a wishin' days were not so long.
If my thought is not defined, listen while I speak my mind:

REFRAIN: There ought to be a moonlight saving time, So I could love that gal of mine,
Until the birdies wake and chime Good morning!
There ought to be a law in clover time To keep that moon out overtime
To keep each lover's lane in mind 'til dawning.

BRIDGE: You'd better hurry up, hurry up, Hurry up get busy today!
You'd better croon a tune, croon a tune, To the man up in the moon,
And here's what I'd say:

REFRAIN

WHY DOES THE SUN SHINE? (THE SUN SONG)

Hy Zaret and Lou Singer
(from Space Songs, published by Argosy Music, 1959)
AUDIENCE: ALL AGES

CHORUS:

G C
The sun is a mass of incandescent gas,
G D
a gigantic nuclear furnace,
G C
Where hydrogen is built into helium
G D G
at a temperature of millions of degrees!

G C G C G Am D
Yo ho, it's hot, the sun is not a place where we could live,
G Em Am C D G
But here on earth there'd be no life without the light it gives.
G C G C G Am D
We need its light, we need its heat, we need its energy,
G Em Am C D G
Without the sun without a doubt there'd be no you and me!

CHORUS

The sun is hot, the sun is large, the sun is far away
And even when it's out of sight, the sun shines night and day.
The sun gives heat the sun gives light the sunlight that we see
The sunlight comes from our own sun's atomic energy!

CHORUS

SONGS ABOUT THE SOLAR SYSTEM

AWAKE, O YE COMETS

Peter Jedicke, based on a poem by G.M. Hopkins in the 19th Century

(to the tune of "Amazing Grace.")

AUDIENCE: ALL AGES

G C G
Awake, o ye comets, deep in space,
 D
From slumber dark and cold.
 G C G
Come fly to me, discovery waits.
 D G
Come don your smocks of gold.

Tis time, my friend, to leave Oort's cloud, Where no one knows your name.
Your central star has called you down To fields of light and fame.

So spin your skirts across the sky And feel the contagious sun.
I shall watch for you with patient eye, And then tell everyone!

*..like a comet burned that fires the length of Ophiuchus huge
In th'arctic sky, and from his horrid hair shakes pestilence and war.*

- Milton

(BLOW THE) DINOSAUR DOWN

Jon U. Bell, 1999 (to the tune of the Halliards Chantey, "Blow the Man Down")

AUDIENCE: ALL AGES

C F G
A dinosaur walking along ancient swampland saw a great big fireball come down,
He thought it was a groove until it struck Chixulub,
 C
Then it proceeded to blow them all down.
Blow down the T-Rex, and blow down the Duckbill,
 F G
Hey, ho, blow them all down,
Blow down the Bronto and blow down the 'Dactyl,
 C
Next thing you know, they're all dead and gone!

GRAZZIE, PADRE PIAZZI

(The Asteroid Discovery Song)

By Jon U. Bell, April 2, 2002 (sung to the tune, "Funiculi' Funicula")

AUDIENCE: ALL AGES

1. One night – Padre Piazzi was ‘a-searching The starry sky, the starry sky,
He used – a telescope he’d bought in London, A Ramsden scope, a real good buy;
He saw – a little star beside some others, A tiny star, eighth magnitude;
He knew – it wasn’t found on any star charts, It wasn’t there, it must be new!

Piazzi said, “Aha! What have we here? “This may be a planet way out there!”
And so began the search anew For planets, moons and asteroids too –
Grazie, Padre Piazzi, we’re indebted to you!

2. It was – a new year’s night so long ago now, Eighteen oh one, two centuries;
And in – the weeks that followed Padre Piazzi Tracked his star, ‘though he did freeze.
He saw – to his amazement that it wandered From night to night, a moving light,
He knew – that by its motion it was wand’ring Out beyond Mars, that’s pretty far!

He told his colleagues, “Look what I have found!” They said, “For sure for this you’ll be
renowned!” And so it was as they had said as others followed where he led,
The search for asteroids began, just look what he started!

3. Piazzi – named his little planet Ceres, A goddess she, of Sicily;
It was – the largest rock ever discovered From Sicily, we all agree.
Five hun-dred miles of solid real estate there, Up in the air – *above* the air;
And yet – it wasn’t big enough to be a full-fledged planet, It was too small, it wasn’t fair!

William Herschel made a small request: “I suggest that ‘asteroid’ sounds best,”
And so a minor planet round An asteroid it was ‘noured’ –
Ceres was the very firstest asteroid ever found!

4. A year – went by without another hint of Discovery, oh woe is me!
And then – just as the lonely winter ended In eighteen-two, in Germany;
Wil-helm Olbers thought he’d look along the zodiac-ac, along the paths the planets track;
Ano-ther little dot was then found out-out, It moved about, he gave a shout,
Wilhelm Olbers found an asteroid, He named it Pallas, floating in the void!
And then Juno was one more and then old Vesta made it four...
Now we’ve named ten thousand* asteroids orbiting the sun!

* 9,213 named asteroids as of March 2002, but who’s counting?

C3PO:

Sir, the possibility of successfully navigating an asteroid field is approximately 3,720 to 1!

Han Solo:

Never tell me the odds!

from Star Wars 2: The Empire Strikes Back

Dave Maness, 1997 (to the tune, "King Tut," by Steve Martin)
AUDIENCE: YOUNG ADULT - ADULT

*After several attempts to sing this, I give up. See Dave.

Why are we out here chasing comets? *Commander Riker to Captain Picard*

- Ken Croswell, "Planet Quest" (1997)

30

IO, IO

By Jon Bell & Janet Nadel (sung to the tune, “Heigh-Ho” by Frank Churchill)

June 2001 (at the SEPA-GLPA Richmond KY conference workshop)

AUDIENCE: ALL AGES

C F D G
Io, Io, ‘round Jupiter you go,
F C F
With sulfur-spurting volcanoes,
C G
Io, Io, Io,
Io, Io, Galileo
Discovered you so long ago*
Io Io!

*alternate: “Discovered you sixteen one-oh”

On the seventh day of January in this present year 1610, at the first hour of night, Jupiter presented itself to me. Beside the planet there were three starlets, small indeed, but very bright. Returning on January eighth I found a very different arrangement. On the thirteenth of January four stars were seen by me for the first time.

- Galileo Galilei, “Siderius Nuncias”

MY GONDWANALAND (the Plate Tectonics Anthem)

by Jon U. Bell, December 2001 (sung to “Marche Slav,” by Tchaikovsky)

AUDIENCE: ALL AGES

Firm stands our continent, rising above
Basaltic lava plains across the Earth,
Long may Pangaea rule the oceans that surround it!
And long may our voices sing
Gondwanaland!

Reunite Gondwanaland!

-graffiti on college geology department’s bathroom wall

THE ORDER OF THE PLANETS

(by ?, to the tune “The Old Folks at Home” by Stephen Foster)

AUDIENCE: ELEMENTARY

C F C G C
My Very Educated Mother Just Served Us Nine Pizza Pies!

One in z, wet planets has intelligent life, where $1 < z < 10^{23}$. Don't you just love astronomy?

- David Hughes

MERVEM J. SUNE P
By Shelly Craig, c. 2000
AUDIENCE: ALL AGES

CHORUS: MerVEM J. SUNeP where will you take us?
To each of the planets that circle the sun
MerVEM J. SUNeP what will you teach us?
That each of the planets can be lots of fun.

The first place we'll go is to the sun,
But we mustn't get too close
Because it's 25 million degrees
And it will turn us into toast
Mercury is the very first planet
And closest to the sun
A hot, rocky desert with no air
So breathing wouldn't be much fun
Venus is the hottest at number two
And the brightest in the sky
A place with volcanoes and acid clouds
If we went there we'd be French-fried

CHORUS

The pretty green Earth is your home
With people, water, animals and air
It will be your home for a long, long time
If you learn how to care
Mars comes up as number four
With sand dunes made of rust
Number five is giant Jupiter
The largest planet of gas I've seen
I guess all the people who live there
Must eat a lot of beans

CHORUS

Number six is Saturn, its rings look very nice
They're very wide but awfully thin
They're made of rocks and ice
Eighteen moons Uranus has, it's planet number seven
Although it is very hard to see
It's the green one in our heavens
Bring a sweater when we go to Neptune
The planet colored blue
It's over 300 degrees below zero,
I guess I'd be blue, too
Pluto is the smallest one and also the farthest away
It takes 248 years to circle the sun
Guess you won't have a lot of birthdays

CHORUS

ODE TO PLANET NUMBER NINE

Jon Bell, Feb. 2001 (sung to "John O' Dreams," Tschaiakovsky's Symphony #6 "Pathétique")

Dedicated to Francine Oliver, who really ran the Hayden Planetarium

AUDIENCE: ALL AGES

Far out in space the planet Pluto lies,
Though it is well known it is small in size;
While critics natter, what does it matter?
This distant world is planet number nine,
Pluto is surely planet number nine.

Once long ago there lived a man named Lowell,
To find the ninth world was his special goal,
Then came Clyde Tombaugh,
Who searched 'til he saw
A small faint dot that they called Planet X,
And Pluto was that far-flung Planet X.

The river Styx encircled Pluto's realm,
The Ferryman Charon was at the helm,
Their names were borrowed
For worldlets shadowed
A double planet rolling through the dark,
Both go around a barycentric mark.

Some say this world's too small and made of ice,
They say its inclination's imprecise.
A planet reject -
A Kuiper Object,
With words like these its status they malign
They turn their backs on planet number nine,

Five billion years ago the planets formed,
Nearby the sun these wand'ers then were warmed
But in the darkness,
Deep in the abyss -
Where our dear sun is just a small bright star,
The sun from Pluto's just a small bright star.

The King of Kuiper objects waits out there,
Its icy rind sublimated to air
A far encounter
Would seem in order,
To tell us is it planet number nine?
Pluto is surely planet number nine.

Young man, I am afraid you are wasting your time. If there were any more planets they would have been found long before this.

- Visiting astronomer to Clyde Tombaugh before he discovered Pluto, 1929

PLANETS

Hy Zaret and Lou Singer

AUDIENCE: ELEMENTARY

CHORUS: High above us, way up yonder, planets wander
Through the starry skies
While we gaze at them and ponder
They just wander on

Stars appear to blink and twinkle
But the planets have a steady glow
Are the stars and planets different
And what makes them so?

CHORUS

SPOKEN: Which is the biggest? Jupiter. Which is the brightest? Venus. Which one has the rings? Saturn. Which one is most likely to support life? Mars. Which one is nearest the sun? Mercury. Which is the one we love the best? Good old mother earth.

What a wonderful and amazing Scheme have we here of the magnificent Vastness of the Universe! So many Suns, so many suns, so many earths....
- Christiaan Huygens

THE PLANETS GO SPINNING

Lyricist unknown (sung to the tune, "When Johnny Comes Marching Home")

AUDIENCE: ELEMENTARY

The planets revolve around the sun, hooray, hooray,
The planets revolve around the sun, hooray, hooray,
The planets revolve around the sun, And spin on their axes, everyone
And they all go spinning, Around and around they go!

The heavens are now seen to resemble a luxuriant garden, which contains the greatest variety of productions, in different flourishing beds.
- William Herschel

I raised the visor on my helmet cover and looked out to try to identify constellations. As I looked out into space, I was overwhelmed by the darkness. I felt the flesh crawl on my back and the hair rise on my neck.
- astronaut William Pogue

VOLCANO

Jimmy Buffett, Keith Sykes, Harry Dailey, 1979

new astronomy lyrics by Jon U. Bell, April 2000

AUDIENCE: ALL AGES

CHORUS 2X: G D
Now I don't know, I don't know,
 G C
I don't know where I'm a gonna go
 G D G
When the volcano blows.

 G C G
1. Don't want to live up on Maxwell Mountain,
 D G
Venus is not where I want to be.
 C G
Temp'rature high as a pizza oven
 D G
Molten hot rock and me disagree.

CHORUS

2. Don't want to be on no Mount Olympus,
Seventeen mile up the air is thin.
Carbon dioxide is not for breathing,
Mars is too cold for my frozen skin.

CHORUS

3. Don't want to go to Loki Patera,
Io is not where I want to stay.
Jupiter's moon smell like eggs all rotten,
Sulfur dioxide for sure not okay.

CHORUS

4. Don't want to travel to far-out Neptune,
Place where me breath turn to solid ice
Nitrogen geysers on frozen moon Triton
Swimming in methane lakes is not so nice.

CHORUS

5. Don't want to live out on tiny old Pluto,
Land of perpetual twilight gray
Hundreds of years just to make one orbit,
Sun is a tiny spark far, far away.

CHORUS

6. Think I will live on this pretty blue planet,
This be my home, and me want to stay
Volcanoes on the Earth not half as scary
As most of the things in the big Milky Way.

CHORUS 2X or more

WE'RE A TRAVELIN' THROUGH OUR SOLAR SYSTEM

By ? , new responses by Dori Anderson & Gene Zajac, SEPA-GLPA conference, 2002
(sung to the tune, "She'll Be Comin' 'Round the Mountain")

AUDIENCE: ELEMENTARY

G C D G G D
We're a travelin' through our solar system now, REPEAT

G C
At the center is our Sun, a star, We see it shining from afar,

G C D G
REFRAIN: We're a travelin' through our solar system. Wow!

We're a travelin' on to Mercury right now, - shout response – "Too close!"
We're a travelin' on to Mercury right now, - shout response – "Too close!"
It's the closest planet to the Sun In Eighty-eight days its year is done, REFRAIN

We're a travelin' on to cloudy Venus now, - shout response – "Too hot!"
It has C-O-two for air, It's too hot to live out there, REFRAIN

We're a travelin' on to planet Earth right now, - shout response – "My home!"
It's the only one with living things, Plants and animals, human beings, REFRAIN

We're a travelin' on to ol' red Mars right now, - shout response – "Maahz!"
It's a planet worth explorin', Huge volcanoes we'll be tourin', REFRAIN

We're a travelin' past those asteroids right now - shout response – "Old rocks!"
These are smaller planets spinnin' round, Thirty thousand can be found, REFRAIN

We're a travlin' on to Jupiter right now - shout response – "Big Red!"
Of the planets it's the largest one, It is the fifth one from the Sun, REFRAIN

We're a travelin' on to lovely Saturn now, - shout response – "Nice rings!"
It has more moons than the others do, This planet's rings are famous too, REFRAIN

We're a travelin' on to Uranus right now - shout response – "No jokes!"
It's the planet spinnin' on its side, Inside it fifty Earths could hide, REFRAIN

We're a travelin' on to distant Neptune now - shout response – "Big Blue!"
From Earth it seems a tiny star, Because this planet's out so far, REFRAIN

We're a travelin' on to little Pluto now - shout response – "Too cold!"
It's by far the coldest planet yet, And a moon named Charon orbits it
We're done travelin' through our solar system, Wow!

*Then felt I like some watcher of the skies
When a new planet swims into his ken....*

- Keats

SONGS OF DEEP SPACE

BALLAD OF THE HERTZSPRUNG-RUSSELL DIAGRAM

Jon U. Bell, 1995 (To the tune of "The Stars and Stripes Forever" by John Phillip Sousa)

AUDIENCE: YOUNG ADULT - ADULT

G

The stars shine in red, white and blue,

D

And in brown and in orange and yellow;

The white and the blue stars are hot,

G

C

D

And the brown, red and orange are not.

G

The yellow stars you may have guessed,

B7

Em

Aren't as hot or as cold as the rest;

C

G

The yellow stars shine out the best!

They're not too hot, they're not too cold

D G

They're in the middle.

2. The stars that you see in the sky are all round or oblate in the middle,
The stars can be big or quite small...and those black holes aren't hardly there at all!
White dwarfs are as small as the earth And pulsars are the size of a city;
But big stars are immense in their girth like Betelgeuse, a billion miles across the middle!

3. The stars are all far out in space, 'xcept the sun, eight light minutes away
Four light-years to the next star out and each light-year is six trillion miles!
That star we call Alpha Centauri Is a bright point of light in the night
Its distance is 25 trillion miles! That's pretty far, I sure would hate to have to walk it!

4. OBAFGKM VERSE

Oh, Be A Fine Girl, Kiss Me,
Or Buy A Friendly Guy Khaki Menswear!
Oh Boy A Fat Go-rilla kicked me,
On Bobsleds A Frost Gives Ken Migraines
Out Back Are Five Green Kegs Mellowing,
Other Boys Are Funny, George Keeps Monkeys
Octopus Bait And Fish Guts Kill Manatees,
& Only Britons Are For Going Kilt Mooning!

5. SCIENCE FICTION OBAFGKM

Oh Boy, A Fine Ghak Klingon Meal,
Orbit Back And Face Green Killer Martians.
Our Borg Assimilate Few Good Kind Men
Obiwan Builds A Force Gedi Knights Miss*
Oh Beeblebrox Arthur Ford Go Kick Marvin
On Bajor A Ferengi Gets Killed Mercilessly,
Old But Agile Flash Gordon Kidnaps Ming,
On Betelgeuse A Fire Glows Kindling
Mightily!

* Yes, I *know* it's misspelled but hey, you can do *anything* so long as it's set to music!

BETELGEUSE SONG

Peter Jedicke, 1986 (To the tune “Edelweiss” by Richard Rodgers)

AUDIENCE: YOUNG ADULT - ADULT

C G C F C F G
Betelgeuse, Betelgeuse Bright red star in Orion
C G C F C G C
Soon I'm told you'll explode So you're worth keeping my eye on.
G C F D G
Only two hundred parsecs away And we know what this means
C G C F C G C
You're so near that some year You'll blow us all to smith'reens.

2. Betelgeuse, Betelgeuse, Speckle interferometry
Seems to show spots that glow Spoil your spherical symm'try.

You're losing mass by convecting gas, You'll go supernova!
Cosmic rays Will amaze,
Then it all will be ova (over.)

Behold, directly overhead, a certain strange star was suddenly seen . . . Amazed, and as if astonished and stupified, I stood still.

- Tycho Brahe, Danish Astronomer

Stars are like animals in the wild. We may see the young but never the actual birth, which is a veiled and secret event.

- Heinz R. Pagels, American Physicist

Traveling through hyperspace ain't like dusting crops, boy! Without precise calculations we could fly right through a star or bounce too close to a supernova and that'd end your trip real quick, wouldn't it?

- Han Solo, “Star Wars”

Kaela Evers: You want to tell me what you're doing out here?

Unknown: I like deep space, it's quiet.

- from the movie, “Supernova”

"Any old starbase in a supernova." -Federation catch-phrase

- Star Trek

Put three grains of sand inside a vast cathedral, and the cathedral will be more closely packed with sand than space is with stars.

- Sir James Jeans, English Astronomer

THE GALAXY SONG (a.k.a. the Universe Song)

Eric Idle

AUDIENCE: YOUNG ADULT - ADULT

C
Just remember that you're standing on a planet that's evolving,
G
And revolving at 900 miles an hour,
That's orbiting at 19 miles a second, so it's reckoned
C
A sun that is the source of all our power
The sun and you and me and all the stars that we can see
Dm
Are moving at a million miles a day
F C A7
In an outer spiral arm at 40 thousand miles an hour
D G C
Of the galaxy we call the Milky Way.

Our galaxy itself contains a hundred billion stars
It's a hundred thousand light years side to side
It bulges in the middle, 16,000 light years thick
But out by us it's just 3,000 light years wide.
We're 30,000 light years from galactic central point
We go 'round every 200 million years
And our galaxy is only one of millions of billions
In this amazing and expanding universe!

The universe itself keeps on expanding and expanding
In all of the directions it can whiz,
As fast as it can go, the speed of light you know
12 million miles a minute and that's the fastest speed there is
So remember when you're feeling very small and insecure
How amazingly unlikely is your birth,
And pray that there's intelligent life somewhere up in space
'Cause it's hard to find it down here on earth!

. . . the perceptible Universe exists as a cluster of clusters, irregularly disposed.

- Edgar Allan Poe

You look into space, and you find out who you are.

- John Denver, song lyric

Kevin Krisciunas, 1987 (to the tune of Give my Regards to Broadway by Irving Berlin)
AUDIENCE: YOUNG ADULT - ADULT

If we are still here to witness the destruction of our planet some five billion years or more hence, then we will have achieved something so unprecedented in the history of life that we should be willing to sing our swansong with joy - Sic Transit Gloria Mundi.

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MY FAVORITE SPACE THINGS

Kevin Krisciunas, 1990 (to the tune "My Favorite Things" by Richard Rogers)

AUDIENCE: ALL AGES

Faint fuzzy quasars And matter that's hidden.
Pulsars and blazars And research I've written.
Brown dwarfs and white dwarfs And strange cosmic strings.
These are a few of my favorite things.

False-color pictures of nebular places.
Faraway realms having poisonous traces.
Emission-line spectra with flux in their wings.
These are a few of my favorite things.

Galaxies streaming with very large redshifts.
Mountains with domes there, not buried in snowdrifts.
Four-wheel vehicles bouncing on springs.
These are a few of my favorite things.

When the frost bites, When the moon's bright, When the seeing's bad,
I simply remember my favorite things
And then I don't feel so sad.

NEUTRON STAR

Peter Jedicke (to the tune "Jealous Heart." By Jenny Carson)

AUDIENCE: YOUNG ADULT - ADULT

Neutron star, oh, neutron star, you're massive,
and your tidal forces are intense.
You have crushed your atom shells to pieces,
neutron star, your gravity's immense.

You were once a star like all the others,
shining brightly in the evening sky.
'Til your thermonuclear reactions
consumed all your hydrogen supply.

Neutron star, oh, neutron star, you're spinning,
'round and 'round at such a fever pitch.
You conserve your angular momentum
and speed up with every little glitch.

Mortal as I am, I know that I am born for a day. But when I follow at my pleasure the serried multitude of the stars in their circular course, my feet no longer touch the earth.

- Ptolemy, AD150

ODE TO A BLACK HOLE

Jon U. Bell, 1994

AUDIENCE: ADULT

C F C
Though you're just a big black hole in the fabric of space and time -
Em
And people say you've got a dark side,
D G
But who doesn't? That's not a crime.
C F C
In all of outer space it seems there's nothing quite so sublime

As a big black hole in the galaxy,
F G C
And baby, you're all mine!

2. My folks say I can't see you because you're degenerate
But I just tell 'em your singular,
And that we've never met
For if I get too close to you, it'd be all over for me,
Forever in your clutches,
I'd be caught by your gravity.

BRIDGE:

F G C F Dm
Chandreskhar warned me, Scwharzchild he did too, Hawking and Penrose
G
Have had their say, but Albert Einstein, where are you?

3. How can we ever see eye to eye When I can't see you anymore
You'll disappear one day, I fear, sneaking out through a wormhole door
Whenever I get near you, time seems to stand quite still
Though I make light of the situation,
I think I've had my fill!

4. You're too intense for your own good, it's a negative energy
But I'm caught in your massive clutches, at maximum density...
Yonder's the event horizon, out here on the cosmic sea,
My situation is heavy
Looks like it's all x-rays for me!

STAY, O COSMOS!

George Gamow (to the tune "Rule Britannia")

AUDIENCE: YOUNG ADULT - ADULT

G C G Em D G D
The universe by Heaven's decree, Was ne-e-e-ver formed in ti-i-me gone by,
A D
Was never formed in time gone by, in time gone by,
G C Am D G C G C G D G
But is, has been, has been shall ever be For so say Bondi, Gold and I.
C Am D G C G C G D G
Stay, o Cosmos, O Cosmos stay the same! We the Steady State proclaim.

The aging galaxies disperse, Burn out and exit from the scene.
Burn out and exit from the scene.
But all the while, the universe Is, was, shall ever be, has been.
Stay, o Cosmos, O Cosmos stay the same! We the Steady State proclaim.

And still new galaxies condense From nothing, as they did before.
From nothing as they did before.
(Lemaitre and Gamow, no offence!) All was, will be for evermore.
Stay, o Cosmos, O Cosmos stay the same! We the Steady State proclaim.

The Universe is an infinite sphere, the centre of which is everywhere, the circumference nowhere.
- Pensées, Blaise Pascal, French mathematician and natural philosopher

There was no "before" the beginning of our universe, because once upon a time there was no time.
- John D. Barrow

I don't pretend to understand the Universe--it's a great deal bigger than I am.
- Thomas Carlyle

A universe that came from nothing in the big bang will disappear into nothing at the big crunch. Its glorious few zillion years of existence not even a memory.
- Paul Davies

Nothing puzzles me more than the time and space; and yet nothing troubles me less.
- Charles Lamb

Anyone informed that the universe is expanding and contracting in pulsations of eighty billion years has a right to ask, "What's in it for me?"
- Peter De Vries

THE STEADY STATE IS OUT OF DATE
George Gamow (to the tune “O Tannenbaum”)
AUDIENCE: YOUNG ADULT - ADULT

G C D G
'Your years of toil,' said Ryle to Hoyle, 'Are wasted years, believe me.
C D G
The steady state is out of date; Unless my eyes deceive me,
C G D G
My telescope has dashed your hope; Your tenets are refuted.
C D G
Let me be terse: Our universe Grows daily more diluted!'

Said Hoyle, ‘You quote Lemaitre, I note, And Gamow. Well forget them!
That errant gang And their Big Bang - - Why aid them and abet them?
You see, my friend, *It has no end And there was no beginning,*
As Bondi, Gold, and I will hold Until our hair is thinning!’

‘Not so!’ cried Ryle With rising bile And straining at the tether;
‘Far galaxies Are, as one sees, More tightly packet together!’
 ‘You make me boil!’ Exploded Hoyle, His statement rearranging;
‘New matter’s born Each night and morn, The picture is unchanging!’

'Come off it, Hoyle! I aim to foil You yet' (The fun commences)
'And in a while,' Continued Ryle, 'I'll bring you to your senses!' [stop at 1st double bar]

There is a coherent plan in the universe, though I don't know what it's a plan for. – Fred Hoyle

Now my own suspicion is that the Universe is not only queerer than we suppose, but queerer than we can suppose.
- J. B. S. Haldane

There is a theory which states that if ever anybody discovers exactly what the Universe is for and why it is here, it will instantly disappear and be replaced by something even more bizarre and inexplicable. There is another theory which states that this has already happened.

- *Douglas Adams*

Only two things are infinite, the universe and human stupidity, and I'm not sure about the former.
- Albert Einstein

Hobbes: What would you call the creation of the universe?

Calvin: The Horrendous Space Kablooie! - from Bill Watterson's "Calvin and Hobbes"

STAR TYPES

Hy Zaret and Lou Singer

(from Space Songs, published by Argosy Music, 1959)

AUDIENCE: ELEMENTARY

Some stars are yellow, some are blue
Some are red and some are white
The color of each star it's true
Depends upon its fahrenheit

The color of a star you can be sure
Is mostly due to its temperature
The temperature is measured by
Can you guess? Yes you're right
Measured by its fahrenheit

Red stars are cooler than the yellow
Yellow cooler than the white
The color of each star above
Depends upon its fahrenheit

The color of a star you can be sure
Is mostly due to its temperature
The temperature is measured by
Can you guess? Yes you're right
Measured by its fahrenheit

(Spoken) There are many kinds of stars - Some are red giants - Some are blue giants
Some are white dwarfs - Some are meduim sized and yellowish white like our sun
Some stars are dark and give no light. And astronomers think that stars change
They start young and grow old, And they finally die out.

I'M SIGNIFICANT!...screamed the dust speck. –from Bill Watterson's "Calvin & Hobbes"

Duct tape is like the Force. It has a light side, a dark side, and it holds the universe together....

- Douglas Adams

The crux... is that the vast majority of the mass of the universe seems to be missing.

- William J. Broad

On the Milky Way: It is nothing else but a mass of innumerable stars planted together in clusters.

-Galileo Galilei

SUPERNOVA SONG

Peter Jedicke, 1981 (to the tune of “When Johnny Comes Marching Home” by Lambert)

AUDIENCE: YOUNG ADULT - ADULT

The stars go nova one by one, kaboom, kaboom!
Nucleosynthesis is done, kaboom, kaboom!
The supernovae dissipate What fusion energy helped create
And the stars go nova in the galaxy.

The heavy elements are born, kaboom, kaboom!
And from the stellar cores are torn, kaboom, kaboom...
Shells of gas are strewn through space, Distributing mater all over the place,
And the spiral arms are littered with debris.

As years go by the remnants spread, kaboom, kaboom!
But the Universe is far from dead, kaboom, kaboom!
To eliminate the tedium, The interstellar medium
Forms the molecules that make up you and me.

Let your soul stand cool and composed before a million universes. -Walt Whitman

*Some people swallow the universe like a pill; they travel on through the world, like smiling
images pushed from behind.* -Robert Louis Stevenson

"Jim, do you think the end of the world will come at nighttime?"
- Sal Mineo in Nicholas Ray's *Rebel Without A Cause*

It is well to remember that the entire universe, with one trifling exception, is composed of others.
- John Andrew Holmes

*The human mind is not capable of grasping the Universe. We are like a little child entering a
huge library. The walls are covered to the ceilings with books in many different tongues. The
child knows that someone must have written these books. It does not know who or how. It does
not understand the languages in which they are written. But the child notes a definite plan in the
arrangement of the books a mysterious order which it does not comprehend, but only dimly
suspects.* -Albert Einstein

*Beyond a wholesome discipline, be gentle with yourself.
You are a child of the Universe no less than the trees and the Stars;
You have a right to be here.*

-Max Ehrmann, “Desiderata” excerpt

THE UNIVERSE

Kevin Krisciunas, 1987 (to the tune of "I am so proud" by Gilbert and Sullivan)

- a trio for three baritones (A, B, C)

AUDIENCE: YOUNG ADULT - ADULT

A: The universe for good or worse most every place is empty space.
10 billion years or more ago, apart it flew in an instant or two.
The Big Bang's light once lit up the night.
It now behaves at microwaves, at microwaves.

B: A cloud of gas of proper mass, if dense enough, becomes star stuff, becomes star stuff.
The cloud oblates, coagulates. The knots diffuse. Some gas we lose.
Now every star, both near and far, is born this way the experts say.

C: I heard one day a physicist say, as if he cared, E is mc^2 .
The stellar cores perform their chores. And so they gain, they gain, a helium strain.
If this is true, it's jolly for you. Hot stars are blue and soon they are through.

(now the round)

B: And so, although, all stars they must go,
Yet recollect this death effect we can't correct by intellect.
Their ends direct we thus detect.

A: And so, although, some stars they must blow,
They greatly pine to brightly shine,
And take the line of a hero fine.
Ere they decline, they're not benign.

C: A hot white dwarf, this endomorph, throughout will get degenerate.
Its course is set, don't you forget.
I'll make my bet, which I won't regret.

all 3 from here on out) I won't regret, I won't regret
We thus detect, we thus detect
They're not benign, they're not benign

Red giants are distended with a hot white core
Less than Chandrasekhar's limit, which is 1.4.
A supergiant has a very different goal
Like a neutron star,
OR pulsar, OR a big black hole. (repeat)
A hot white core, Mass 1.4, A different goal,
A big black hole. Red giants are distended,
Then there's Chandrasekhar's limit,
But a supernova soon becomes
A neutron star or pulsar or a big, black hole.

WHAT IS THE MILKY WAY?

Hy Zaret and Lou Singer

(from Space Songs, published by Argosy Music, 1959)

AUDIENCE: ELEMENTARY – ALL AGES

What is the Milky Way?

Stars along the rim of our Galaxy.

Billions of stars, they say, make the Milky Way a delight to see.

There are many billions of stars.

Could it be that somewhere among all these, there's another planet like ours?

SPOKEN: Our galaxy is a flat spiral composed of billions of stars. The nearest galaxy to ours is a million light years away. The farthest we can see are about a billion light years away, and somewhere among the billions of galaxies there could be planets like ours with life on them.

REPEAT

Eighteen centuries ago, Ptolemy distinguished the Milky Way - 'everywhere as white as milk.' He looked into the sky and saw a picture book of legends: Cassiopea, Andromeda, Orion, and the rest. The legends persist. We cherish them. But where I live, Orion no longer is visible to the naked eye. The Milky Way is just a candy bar.

- M.W. Newman, Chicago newspaper writer (Notre Dame Magazine, Spring 1996)

The large-scale homogeneity of the universe makes it very difficult to believe that the structure of the universe is determined by anything so peripheral as some complicated molecular structure on a minor planet orbiting a very average star in the outer suburbs of a fairly typical galaxy."

- Steven Hawking

I find it quite improbable that such order came out of chaos. There has to be some organizing principle. God to me is a mystery but is the explanation for the miracle of existence, why there is something instead of nothing.

- Alan Sandage

For the scientist who has lived by his faith in the power of reason, the story ends like a bad dream. He has scaled the mountains of ignorance; he is about to conquer the highest peak; as he pulls himself over the final rock, he is greeted by a band of theologians who have been sitting there for centuries.

- Robert Jastrow

Gravitation can not be held responsible for people falling in love.

Einstein

SONGS ABOUT FORCES AND CONCEPTS

ADD ANOTHER DOT TO THE SKY

Or, Caveat Emptor

by Jon U. Bell, October 2000 – May 2001

(with thanks and apologies to Don McClean and American Pie)

AUDIENCE: YOUNG ADULT - ADULT

A long long time ago I can still remember now -
How star charts used to make me smile;
And I knew with opportunity
That I could make the people see,
And maybe they'd be starstruck for a while.
But then there came an awful shiver
With every star talk I'd deliver,
Bad news was in those dark skies;
It led to very deep sighs.
I heard about this hustler's game
Where you could win eternal fame,
To faint stars you could give a name -
But it's just a crying shame. So,

CHORUS: Buy, buy all those stars in the sky! Give me 50, you'll get nifty
Star charts built on a lie, Them good ole folks They looked me straight in the eye
Saying, add a few more dots to the sky, Add another dot to the sky.

(fast tempo)

Did you write Skalnate Pleso, Or Palomar Sky Surveys to show If I..A.U. tells you so?
Now do you believe in Almagest, Is Allen's Star Names just the best,
And can you teach me north, south, east and west?
Well I know that you got your own star Cause I saw it framed above your bar -
It's off in Ophiuchus, And 9th magnitude or less.
They took a felt tip pen and made a mark Upon a spot bereft and dark
But I knew that it was just a lark, Your star did not exist. I started shoutin',

CHORUS

Now, in this job you're the only one, No thanks will come for what you've done,
You've burst their bubble wait and see... Those star sellers they've rigged it right,
You'll lose if you put up a fight. They'll sue you 'til you lose your appetite.
Oh and while you all were talking loud They came and stole away your crowd,
They said they were official: Those stars they sold they could sell.
And cherished loved ones who had died Star names were placed by their graveside
To comfort those still here we tried The day they sold the stars. So,

CHORUS

The best thing to see with's a telescope, See farther than the eye alone could hope,
Faint stars never seen before...Up the tube'n through the lens To see a star at the other end,
How it splits that star in two or three or more Now the cold moist air was sweet perfume, Stars
transcend the stale lecture-room, Astronomers searched the skies But we found to our great
surprise - These hucksters took our star charts from us And then they said, hey, what's the fuss?
These stars are ours, get on the bus! The day they sold the stars. And,

CHORUS

Oh, and there we were all in one place A generation lost in space
With no one left who knew the stars... So come on twinkle, twinkle Little star,
Now I know just what you are - Just a packaged product, nothing more.

And when I found them on the net, My palms began to itch and sweat
No lawsuits nor alarms Could stop their ghoulis charms

And as streetlights shone out harsh and bright I lost the stars I lost the night!
I saw them laughing with delight The day they sold the stars. They were singin'

CHORUS

slow tempo:

I met a girl who knew the sky And I asked her for some stars to buy
But she just smiled and turned away

I went back to my starry home Where I'd seen the lights on the vaulted dome,
But the man there said the stars had gone away.

And one by one the stars burnt out The trav'lers strayed as the lights went out
The damage went unmended, The Universe had ended

And three men who had made star screed- Hipparchus, Bayer and Flamsteed -
They'd say 'twas just a case of greed, The day they sold the stars. And they were singing

CHORUS (slow tempo, then a little faster second and last time around)

Calvin: Do you believe our destinies are determined by the stars?

Hobbes: Nah.

Calvin: Oh, I do.

Hobbes: Really? How come?

Calvin: Life's a lot more fun when you're not responsible for your actions.

—from Bill Watterson's "Calvin & Hobbes"

BENSON, ARIZONA
John Carpenter, lyrics by Bill Taylor
from the motion picture, Dark Star
AUDIENCE: ADULT

A E
I'm layin' sunshine down, but I see only one,
A
When I think I'm over you I find I've just begun
D
The years move faster than the days, there's no warmth in the light
E A
'N How I miss those desert skies, your cool touch in the night.

CHORUS:

D A
Benson, Arizona, the warm wind through your hair
F# E
My body flies the galaxies, my heart longs to be there.
D A F#
Benson, Arizona, the same stars in the sky,
G7 B7 E A
But they seem so much kinder when we watch them you and I.

Now the years pull us apart, I'm young and now you're old
But you're still in my heart, 'N the mem'ry won't grow cold
I dream all the times and spaces I left far behind
'N where we spent or last few days, Benson's on my mind.

CHORUS 2x

If we could speed up our sense of time until thousands of years were speeding by in the wink of an eye, we would see bright nebulae burst into light, deliver themselves of a shower of stars, then fade back into darkness. As it is we see each nebula frozen at a stage in the process.

- Timothy Ferris

*O had I power like inclination,
I'd hoist thee up a constellation!
To canter with the Sagittare,
Or leap the Ecliptic like a bear,
Or turn the Pole like any arrow;
Or when old Phoebus bids good-morrow
Down the Zodiac urge the race,
And cast dirt on his godship's face:
For I could lay my bread and kale
He'd ne'er cast salt upon they tail!*

- Robert Burns

FRICITION

Hy Zaret and Lou Singer

(from Space Songs, published by Argosy Music, 1959)

AUDIENCE: ELEMENTARY

Friction, what is friction?

Friction, is the rubadubdub, rubadubdub of objects

That are moving and the rubadub of contact is friction at work.

Your shoes are made of friction material,

It's immaterial what kind you wear.

Walking or running, friction material

Helps you in getting from here to there!

SPOKEN: Oh come now, you don't mean all parts of my shoes?

SPOKEN: No, only the parts that touch the ground. And, by the way, did you know that cars couldn't move without friction? The tires couldn't grip the ground.

Friction, what is friction?

Friction is the rubadubdub, rubadubdub of objects

That are moving and the rubadub of contact is friction at work.

Friction is greater on rubber surfaces

On smoother surfaces friction is less

Oil is quite useful for many purposes

Speaking of friction, what is your guess?

SPOKEN: Oil smooths the surfaces and reduces the friction.

Friction, what is friction?

Friction is the rubadubdub, rubadubdub of objects

That are moving and the rubadub of contact is friction at work

Our little planet whirls into outer space

Out there in outer space, friction is nil

That's why our planet maintains a whirling pace

Whirling and twirling it won't stand still

Friction, what is friction?

Friction is the rubadubdub, rubadubdub of objects

That are moving and the rubadub of contact is friction at work!

The gem cannot be polished without friction, nor man perfected without trials. - Chinese proverb

Some people can tell what time it is by looking at the sun. But I have never been able to make out the numbers.

- From Holly Hatch's UNC collection of 5th & 6th grader responses

GRAVITY CAROL

A. Lee, 1982 (to the tune, "Jingle Bells")

AUDIENCE: ALL AGES

G C
A comet hits the earth; It's made of methane ice.
D G
It makes a giant force. Now isn't that so nice?
So, what made it come here? What made it hit the earth?
G C D G
The answer's very clear, my friend, It fills you up with mirth.

CHORUS: Gravity, gravity, Keeps us on the ground.
C G D
An apple fell on Newton He said, "What goes up comes down."
Gravity, gravity, mass times nine-point-eight.
Remember, travel very fast If earth you must escape.
(alt: - Is a vector pointing down that's sometimes known as weight).

2.

Walk around the earth; Keep a steady pace.
If gravity twern't here You'd float away in space.
Call it what you want, Call it any name.
But this force is a heavy weight; Attraction is its game; Ohhhh!!

CHORUS

We can lick gravity, but the paperwork's a bit tougher. — Werner von Braun.

During the heat of the space race in the 1960's, the U.S. National Aeronautics and Space Administration decided it needed a ball point pen to write in the zero gravity confines of its space capsules. After considerable research and development, the Astronaut Pen was developed at a cost of about \$1 million U.S. The pen worked and also enjoyed some modest success as a novelty item back here on Earth.

The Soviet Union, faced with the same problem, used a pencil

I canna change the laws of physics, Captain — but I can find ye a loophole! — Scotty, Star Trek

Black holes are where God divided by zero. — Stephen Wright.

The sun, with all those planets revolving around it and dependent on it, can still ripen a bunch of grapes as if it had nothing else in the universe to do. — Galileo

Hy Zaret and Lou Singer

AUDIENCE: ALL AGES

C	G
---	---

D

G

C	G
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
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89	89
90	90
91	91
92	92
93	93
94	94
95	95
96	96
97	97
98	98
99	99
100	100

D

G

G

D

G

D

C D G

And before you fly from the face of the earth there's a force to counteract CHORUS 2X

- Galileo

- Alan Dean Foster, *The Black Hole*

- *T.S. Elliot*

- another very, very old astronomy class joke

SONGS ABOUT ASTRONOMERS & SCIENTISTS, PLANETARIUMS & OBSERVATORIES

ARECIBO

Copyright 1995 by H. Paul Shuch, from "Sing a Song of SETI", the official songbook of The SETI League, Inc., ISBN 0-9650707-1-9, used by permission.
(to the tune "I Feel Pretty" by Leonard Bernstein)
AUDIENCE: YOUNG ADULT - ADULT

Arecibo Puerto Rico Is the home of the world's largest dish,
And it's working At fulfilling SETI's fondest wish.
Serendip is There, detecting Any signals which happen our way.
Earth is joining The Galactic Brotherhood some day.
BRIDGE: Look at all the stars in the Milky Way. All the other galaxies, too.
Maybe you can see Creatures just like me. Could they even be Calling you?
Find the proper Right ascension. Tune the Water Hole, listen with care,
And you'll find All the signals waiting out there.
BRIDGE: Get a good receiver and LNA, Listen near the Hydrogen line.
Pick a nearby G Star and you will see We've had company all the time.
Arecibo Puerto Rico Is the best telescope that we own
And someday It will show us we're not alone!

Think again of those astronomers who beamed radio signals into space from Arecibo, describing Earth's location and its inhabitants. In its suicidal folly that act rivalled the folly of the last Inca emperor, Atahualpa, who described to his gold-crazy Spanish captors the wealth of his capital and provided them with guides for the journey. If there really are any radio civilizations within listening distance of us, then for heaven's sake let's turn off our own transmitters and try to escape detection, or we are doomed. Fortunately for us, the silence from outer space is deafening. What woodpeckers (they are the only species on the planet to have developed means to dig holes in living trees to eat insects living under bark) teach us about flying saucers is that we are unlikely to ever see one.

- Jared Diamond, "The Rise and Fall of the Third Chimpanzee"

So far as I know, every such story has alien intelligences which treat humans as approximate equals, either as friends or foes. It is assumed that A-I will either be friends, anxious to communicate and trade, or enemies who will fight and kill, or possibly enslave, the human race. There is another and more humiliating possibility - alien intelligences so superior to us and so indifferent to us as to be almost unaware of us. They do not even covet the surface of the planet where we live - they live in the stratosphere.... Our mightiest engineering formations they regard as coral formations, i.e., seldom noticed and considered of no importance. We aren't even nuisances to them. And they are no threat to us, except that their engineering might occasionally disturb our habitat, as the grading done for a highway disturbs gopher holes. Some few of them might study us casually - or might not.

- Robert A. Heinlein, "Grumbles from the Grave"

THE ASTRONOMER'S DRINKING SONG

Author Unknown (included in Augustus de Morgan's Budget of Paradoxes, 1866)
Can be sung to the tune of "Kingdom Come" by Henry Work, or "Yankee Doodle"

AUDIENCE: ADULT

C G
Whoe'er would search the starry sky, Its secrets to divine, sir,
C G C
Should take his glass--I mean, should try A glass or two of wine, sir!
F C G
True virtue lies in golden mean, And man must wet his clay, sir;
C G C
Join these two maxims, and 'tis seen He should drink his bottle a day, sir!**

Old Archimedes, reverend sage! By trump of fame renowned, sir,
Deep problems solved in every page, And the sphere's curved surface found, sir
Himself he would have far outshone, And borne a wider sway, sir,
Had he our modern secret known, And drank a bottle a day, sir!

When Ptolemy, now long ago, Believed the Earth stood still, sir,
He never would have blundered so, Had he but drunk his fill, sir:
He'd then have felt it circulate, And would have learnt to say, sir,
The true way to investigate Is to drink your bottle a day, sir!

Copernicus, that learned wight, The glory of his nation,
With draughts of wine refreshed his sight, And saw the Earth's rotation;
Each planet then its orb described, The Moon got under way, sir;
These truths from nature he imbibed For he drank his bottle a day, sir!

The noble Tycho placed the stars, Each in its due location;
He lost his nose by spite of Mars, But that was no privation:
Had he but lost his mouth, I grant He would have felt dismay, sir,
Bless you! he knew what he should want To drink his bottle a day, sir!

Cold water makes no lucky hits; On mysteries the head runs:
Small drink let Kepler time his wits On the regular polyhedrons:
He took to wine, and it changed the chime, His genius swept away, sir,
Through area varying as the time At the rate of a bottle a day, sir!

Poor Galileo, forced to rat Before the Inquisition,
E pur si muove was the pat He gave them in addition:
He meant, whate'er you think you prove, The Earth must go its way, sirs;
Spite of your teeth I'll make it move, For I'll drink my bottle a day, sirs!

Great Newton, who was never beat Whatever fools may think, sir;
Though sometimes he forgot to eat, He never forgot to drink, sir:
Descartes took nought but lemonade, To conquer him was play, sir;
The first advance that Newton made Was to drink his bottle a day, sir!

D'Alembert, Euler, and Clairaut, Though they increased our store, sir,
Much further had been seen to go Had they tipped a little more, sir!
Lagrange gets mellow with Laplace, And both are wont to say, sir,
The philosophe who's not an ass Will drink his bottle a day, sir!

"Astronomers! what can avail Those who calumniate us;
Experiment can never fail With such an apparatus;
Let him who'd have his merits known Remember what I say, sir;
Fair science shines on him alone Who drinks his bottle a day, sir!

"How light we reckon of those who mock By this we'll make to appear, sir,
We'll dine by the sidereal clock For one more bottle a year, sir:
But choose which pendulum you will, You'll never make your way, sir,
Unless you drink--and drink your fill,- -At least a bottle a day, sir!"

* "I am upset by the continuing college fraternity mentality of the physics community as represented by devoting half a page to an astronomer's drinking song ... Drinking is a widespread problem on college campuses... and in professional communities..."
Margaret Geller, *Harvard-Smithsonian Center for Astrophysics*

Too low they build, who build beneath the stars. - Edward Young

*Many a night I saw the Pleiades, rising thro' the mellow shade,
Glitter like a swarm of fire-flies tangled in a silver braid.*
- Alfred Lord Tennyson

*You will expand your consciousness to encompass the Music Of The Spheres,
only to realize it consists entirely of circus marches.* - anonymous

Far away, hidden from the eyes of daylight, there are watchers in the skies
- Euripedes, *the Bacchae*

*Someday I would like to stand on the moon, look down through a quarter of a million miles of
space and say, "There certainly is a beautiful earth out tonight."*
- Lt. Col. William H. Rankin

You know how Einstein got bad grades as a kid? Well, mine are even worse!
- Calvin, from Bill Watterson's "Calvin & Hobbes"

THE AUSTRALIAN ASTRONOMER'S DRINKING SONG

Ronald B. Sawyer (to the tune of "When I Was a Lad" by Gilbert and Sullivan)

AUDIENCE: ADULT

When I was a lad I thought I'd be An expert in the field of astronomy
so I read textbooks voraciously And finally graduated with a Ph.D.

Chorus: He finally graduated with a Ph.D.

And with my Ph.D. in hand I thought my chance to get a job was really grand
so I sent my name and resume To each observatory listed in Ap.J.

Chorus: He sent his resume and a copy of his grades to each observatory listed in Ap.J.

For some reply to come to me I waited for what seemed like an eternity
but the weeks dragged into months and still

There was nothing in the mail but my student loan bill.

Chorus: There was nothing in his mail but his student loan bill.

When finally a reply came through With a stamp that showed a picture of a kangaroo
Since I'd never seen the southern skies I decided to go down under and give it a try

Chorus: He had seen the northern lights but the south was out of sight

So he decided to go down under and give it a try.

In Australia I received a chance To work alone with very hefty research grants
but I didn't know if I could hack Being stuck out in the middle of the great outback

Chorus: Being stuck out in the middle of the great outback

So I went but much too late to know That my instruments were manufactured by Tasco
But I had a huge supply of beer And that's what kept me going for about a year

Chorus: With a huge supply of beer he had conquered all his fear

And that's what kept him going for about a year

When they found me I was almost lost From genuflecting nightly to the southern cross
I was dazed and crazed and feverish too From trying to build a transit from a didgeridoo

Chorus: From trying to build a transit from a didgeridoo

Now I'm a sane and healthy bloke And astronomy I'm leaving to those other folk
So to heck with miss Urania I'm happy driving taxi in Tasmania

Chorus: So to heck with all the stars to him comets were just cars

And he's happy driving taxi in Tasmania.

Light thinks it travels faster than anything but it is wrong. No matter how fast light travels it finds the darkness has always got there first, and is waiting for it.

Do not hurry the night, the sun will always rise for its own sake

- Eritrean Expression

DECK THE HALLS/DECK THE PHYSICS LAB

Dennis McNulty? (to the tune, "Deck the Halls With Boughs of Holly")

AUDIENCE: YOUNG ADULT - ADULT

G C G F D G

Deck the halls with spools of wire, Fa la la, la la, la la, la la.

My oscilloscope's on fire, Fa la etc...

C G D

Who has taken my resistors?.. Sing a song of bad transistors.

2. Fill the lab with amplifiers.. My new circuit has no wires..

All the op-amps have no gain.. Electronics is a pain.

3. Work till midnight, then work longer.. Watch that circuit get still wronger..

If it has a major defect.. Fix it as an honors project.

4. Shoot the walls with Star Wars' phasors.. Made from Hunter's diode lasers..

Though they glow with opalescence.. Still can't see the darn fluorescence.

5. Deck the physics lab with lenses.. Light bends more when they are densest..

We can now observe reflection.. Not to mention its direction.

6. Stroboscopes are swiftly turning.. While our eager minds are learning..

Light diffraction, we can now see.. See how fun our physics can be.

DECK THE DOME

Mark Rouleau (to the tune, "Deck the Halls...")

AUDIENCE: YOUNG ADULT - ADULT

Deck the Dome with stars and planets... Wow the crowds with special effects

Get those pictures grab your camera... For your brand new panorama!

See those lights above ablaze... Telescopes for our stargazers

If you've got bad light pollution... Come up with your own solution!

Work all night on your productions... Give those school groups their instructions

Show them a rotating galaxy... See how fun a planetarium can be!

Little bo peep has lost her sheep, The radar has failed to find them.

They'll all, face to face, Meet in parallel space, Preceding their leaders behind them.

- Frederick Winsor, The Space Child's Mother Goose

*Looking to the stars always makes me dream, as simply as I dream over the black dots
representing towns and villages on a map. Why, I ask myself, shouldn't the shining dots of the sky
be as accessible as the black dots on the map of France?*

- Vincent Van Gogh

*People think it must be fun to be a super genius, but they don't realize how hard it is to put up
with all the idiots in the world.*

- Calvin, from Bill Watterson's "Calvin & Hobbes"

EINSTEIN THE GENIUS
Henry Jankiewicz
AUDIENCE: YOUNG ADULT - ADULT

C G D G
Einstein was a genius, unlike you or me,
C D G C G
He wrote equations every day, on Mondays he wrote three,
C D G
Mondays, he wrote three.

CHORUS:

C G C G
Albert, dance around, Albert be profound;
C D G C G D G
Albert, let your hair stick out and your socks hang down!

I had a frame of reference, I left it on the fence
Along come relativity, ain't seen the darn thing since,
Ain't seen the darn thing since!

CHORUS

A man got in a space ship, he flew a million miles
Busted through the speed of light, he came back a child,
He came back a child!

CHORUS

A man looked through a telescope 'til his eye was red
He looked through outer space and saw the back of his own head,
Back of his own head!

CHORUS

A wave and a particle were walkin' side by side,
One said to the other, which one of us am I?
Which one of us am I?

CHORUS

Newton had an apple, it hit him on the head
Doc McCoy came up to him, said "Jim, I think he's dead."
Jim, I think he's dead!"

CHORUS

Einstein played the violin, he liked to dance and sing,
If that ain't genius, that ain't anything!
That ain't anything!

CHORUS 2X

*A neutron goes into a bar and asks the bartender, "How much for a beer?"
The bartender replies, "For you, no charge."*

THE ENTYMOLOGIST'S* FAREWELL

Jon Bell (to the tune, "Happy Trails" by Roy Rogers and Dale Evans)

AUDIENCE: ALL AGES

Happy snails to you, until we meet again!
Happy snails to you, keep slimin' until then...
'Tho we're just slugs with shells that tend to move slow,
Served with a garlic sauce we're called escargot!
Happy snails to you, 'til we meet again.

* I realize that snails and slugs are actually gastropods and not insects, but "entymologist" sounds so much snappier than whatever it is you call someone who studies gastropods.

GLORY, GLORY, ALBERT EINSTEIN

From The Official Oberlin College Physics Songbook

(to the tune: "Battle Hymn of the Republic")

AUDIENCE: YOUNG ADULT - ADULT

G
Oh Albert Einstein changed the ways of things both bound and free
C G D
With his general and his special types of relativity
G
We only wish that these applied to things that we could see
C G D G
His light goes speeding on.

Chorus: Glory, glory, Albert Einstein, What a genius, Albert Einstein
As we travel on our time line, In space-time we'll remain.

He told us if we got close to a certain value "c"
The universe would flatten out but only in 1-D
At .8c a four by five would seem like four by three
His light goes speeding on.

CHORUS

Though warped time-space the human race completely disregards
The 'nomalies Einstein's theories predict in our regards
We can't see the curvature here in our own backyards
His light goes speeding on.

CHORUS

When they broke open molecules, they found they were only stuffed with atoms. But when they broke open atoms, they found them stuffed with explosions.

- From Holly Hatch's UNC collection of 5th & 6th grader responses.

By Dori Anderson & Jon Bell (sung to the tune, Home on the Range by Higley & Kelly)
June 2001 (at the SEPA-GLPA conference, Richmond, KY
AUDIENCE: ALL AGES

CHORUS. Home, home in the dome,
Where the stars are projected above
Where seldom is seen such a nifty machine
And all the star patterns I love!

IT'S A SCIENTIFIC FACT

Hy Zaret and Lou Singer

(from Space Songs, published by Argosy Music, 1959)

AUDIENCE: ALL AGES

CHORUS: It's a scientific fact, a scientific fact,
It has to be correct, it has to be exact,
Because it is, because it is a scientific fact!

SPOKEN: It's a scientific fact that our high and low tides are caused by the gravitational pull of the moon.

It's been proven to be true,
Like one and one are two
It's checked and double checked
A fact that can be backed
Because it is, because it is a scientific fact!

SPOKEN: It's a scientific fact that there are belts of radiation in outer space which are a hazard for future space travelers to overcome.

CHORUS

SPOKEN: Well of course even scientific facts are not perfectly exact, but they are as exact as it is humanly possible to make them at the time.

CHORUS

IT'S DARK ON OBSERVATORY HILL

Johnny Burke, music by Harold Spina, 1934

AUDIENCE: ADULT

I didn't pass in my Latin class today; My mind wandered so I just didn't know what to say.
And all through Botany what monotony trying to idle the time away.
While dreaming about our date tonight I failed in my history test;
But what do I care, it's great tonight and, darling, may I suggest:
CHORUS: It's dark on Observatory Hill, Come on let's pretend we're Jack and Jill.
We'll stroll to the hilltop where college sweethearts go,
To look at the lights on the Campus down below.
We'll learn what Astronomy is for; We'll learn what the stars can have in store.
I know in advance, the moon may mean romance When it's dark on Observatory Hill.

I'VE BEEN LOOKIN' THROUGH THE EYEPiece

By Jon Bell, June 2001 – June 2002

Sung to the tune "I've Been Workin' on the Railroad"

AUDIENCE: ELEMENTARY - ADULT

I've been lookin' through the eyepiece All the live-long night.
I've been lookin' through the eyepiece Just to count the stars so bright!
Don't you hear the clock drive humming? M-1's just cleared the rooftops,
Don't you hear the neighbors shouting, "Honey, call the cops!?"

"Honey, call the cops!" "Honey, call the cops!" "Honey, call the cops right now!"
"Honey, call the cops!" "Honey, call the cops!" "Honey, call the cops right now!"

Someone's on the front lawn – a prowler! Someone's on the front lawn, I know.
Someone's on the front lawn, a prowler! And he's got a strange gizmo.

And saying,
M1, M2, M3, M4, M5, M-siiiiix.
Ninety-seven to go -
And I'll have completed the list!

*The best thing that we're put here for's to see; The strongest thing that's given us to see with's
A telescope. Someone in every town Seems to me owes it to the town to keep one.*

- Robert Frost

*For my confirmation, I didn't get a watch and my first pair of long pants, like most Lutheran
boys. I got a telescope. My mother thought it would make the best gift.*

- Wernher von Braun

*Music helps set a romantic mood. Imagine her surprise when you say,
"We don't need a stereo - I have an accordian."*

- Martin Mull

*The moon has a face like the clock in the hall; She shines on thieves on the garden wall,
On streets and fields and harbor quays, And birdies asleep in the forks of the trees.*

*The squalling cat and the squeaking mouse, The howling dog by the door of the house,
The bat that lies in bed at noon, All love to be out by the light of the moon.*

*But all of the things that belong to the day Cuddle to sleep to be out of her way;
And flowers and children close their eyes Till up in the morning the sun shall rise.*

- Robert Louis Stevenson

Jon Bell, 1994 (to the tune “Let’s Call the Whole Thing Off” by George Gershwin)
AUDIENCE: ADULT

65

THE PLANETARIUM LECTURER'S LAMENT

Jane Hastings and Jon Bell (to the tune "Lucille" by Hal Bynum & Roger Bowling)

AUDIENCE: PLANETARIANS

C
I knew when you came in that you'd soon be leavin'
G
You just had that look in your eye.

You looked at your watch and you said to your honey,
F C
"If I don't get coffee I'll die."

CHORUS: C F
You picked a fine time to leave my star show,
C
With four blazin' quasars and a black hole to go,
G C
You picked a fine time to leave my star show!

2. You thought there were lasers and Star Wars' Darth Vaders
And popcorn and soft drinks and beer.
Instead there's just me and my trusty hot pointer
And 88 star groups I fear.

CHORUS

3. The show was beginnin, and you wasn't grinnin,
You didn't know what would come next.
I talked about Hertzsprung and star evolution,
Until you looked very perplexed.

CHORUS

4. A few minutes later the silence grew greater,
Your gripin' and grumblin' had passed;
But just as we thought you were getting the message,
We noticed your snoring at last!

CHORUS

5. I talked about Io's explosive volcanoes
We waited to see one erupt,
But just as it happened the sound that we heard,
Was not a "kaboom" but "snuck snuck" (snoring noise)

CHORUS

6. With star systems dyin' your kids started cryin',
I feared that my anger would grow.
But just then you woke up and stood up and spoke up,
And bellowed, "Hey honey, let's go!"

CHORUS

SIR ISAAC NEWTON
Hy Zaret and Lou Singer
(from Space Songs, published by Argosy Music, 1959)
AUDIENCE: ALL AGES

REFRAIN: There is no disputin', there is no refutin' We're all indebted to Sir Isaac Newton
Because, because, because -
Sir Isaac discovered, his genius uncovered The nature of natural laws!

For example it's simple said he The first law of motion should be...

SPOKEN: An object at rest tends to remain at rest, and an object in motion tends to remain in motion with the same speed and in the same direction.

REFRAIN

If an apple falls down on your head That is gravity Sir Isaac said!

SPOKEN: It strikes me that all objects in the universe exert gravitational attraction upon each other.

REFRAIN

He illumined the subject of light And showed an amazing insight!

SPOKEN: By passing a beam of sunlight through an opening in a darkened room and into a prism,
Ladies and gentlemen, I believe that we can see that white light is a combination of the seven colors of the rainbow.

There is no disputin', there is no refutin' We're all indebted to Sir Isaac Newton

Because, because, because –

SPOKEN: He constructed a reflecting telescope;

Because, because, because –

SPOKEN: He made great discoveries in the field of mathematics;

Because, because, because –

SPOKEN: He discovered many of the laws on which physics and mechanics have been developed;

Because, because, because –

Sir Isaac discovered, his genius uncovered The nature of natural laws!

SPOKEN: Naturally, he was a genius.

THE TWELVE DAYS OF NEWTON
Dennis McNulty (to the tune, “the Twelve Days of Christmas”)
AUDIENCE: YOUNG ADULT - ADULT

G D C G D G

On the first day of Newton, Sir Isaac gave to me The acceleration due to gravity.
On the second, etc. – Two torques a balanced..
On the third, etc. – Three laws of motion..
And in descending order:
Twelve particles of light; Eleven speeds of sound; Ten z-components;
Nine point eight; Eight mints of money; Seven spectrum colors;
Six point six seven; Five Newton’s rings; Four falling apples; Three laws of motion;
Two torques a balanced, and Acceleration due to gravity.

UNIVERSE CALLING!

(Per Ardua Ad Astra: A History Lesson)

by Jon U. Bell, March 30, 2002 (Sung to the tune: "Lilli Burlero")

AUDIENCE: ALL AGES, especially college astronomy students

Note: I wrote this as a mnemonic for my students, and included many of the people discussed in their astronomy textbook. But of course there are still more verses to write...

- Preamble: G C D
 G C D G
The stars in the sky that we see every night,
Their beauty inspires us – a heavenly sight!
They shine down upon us from light-years away
And someday we hope to be going their way!
- Chorus: G C
 G Em D
So look to the stars, tell me what do you see?
The heavens unfolding, a great mystery;
 C G C G
The Universe calling, 'cross in-fin-i-tee,
 C D G
Per ardua ad astra*, they beckon to me!
- Ancient: Stonehenge was built on the plains of Sals'bree,
 A calendar temple, three thousand B.C.
 Sunrise o'er heelstone, the solstice in June,
 Eclipse of the sun and eclipse of the moon!
- Greek: Pythagoras said, "listen – the tune of the spheres!"
 Plato told Ari, "save that which appears;"
 Hipparchus made charts and gave star magnitudes,
 Ptolemy's book met some dark interludes.
- Middle Ages: In Baghdad the Caliph he gathered the best,
 There learn-eds deciphered the great Almagest!
 And abbots and monks in their monast-er-ees
 Wrote down and recorded the ancient world's deeds!
- Renaissance: In Poland a cleric was having some fun,
 Copernicus said Earth did go 'round the Sun!
 And on Hveen a man built a great observat'ray
 He measured the stars did the Dane Tycho Brahe!

* On the last chorus, substitute, "Per aspera ad astra," (*By hope to the stars*), for "Per ardua ad astra" (*By hardship to the stars*)

Kepler: Kepler he had him a thought most profound,
The orbits of planets are not all that round;
“Velocity varies with distance,” sayeth he,
P squared equals A cubed, elliptically!”

Galileo: A telescope built in the year sixteen-nine
Gave Galileo a view simply divine!
The moons of great Jove were laid out on display,
The phases of Venus, the moon rough and gray!

Newton: In Cambridge an apple did fall from a tree,
Sir Isaac then noted the force gravity;
“The moon’s like an apple,” the great Newton said,
“It falls ‘round the Earth, just not on my head!”

Herschel: In Bath William built him a good telescope,
Discovered a world and it gave him great hope;
Herschel did count all the stars he could see
And found out the shape of our great Galaxy!

Cannon: Annie Jump Cannon quite often did see
Dark spectral lines at Harvard Observa-tree;
She catalogued them hot to cool by degree,
O B A F G K M, won’t you kiss me!

Einstein: Einstein the genius addressed gravity,
“You’re not what you seem, just what can you be?
“Everything’s relative, space-time is curved,
“To travel the speed of light seems quite absurd!”

old limerick: There once was a brilliant young lady named Bright,
Her speed was much greater than that of light.
She set out one day in a relative way,
And thus she returned on the previous night!

1920: “Our sun’s halfway out in the great Milky Way,
“Eight K P C,” Shapley told Curtis one day;
Curtis retorted, “Those spirals you see,
“They’re galaxies and not nearby nebulae!”

Leavitt: Leavitt has cepheids in mind as she thinks,
“They brighten and dim as they swell up and shrink;
“The brighter they are then the slower they tick,
“I’ve found thus a much larger measuring stick!”

Hubble: To measure the distance to M-31,
A cepheid was needed, a dim dying sun;
Ed said to Milton, "Let's see what you've got,"
And Humason gave Hubble a variable dot!

Big Bang: "The cosmos expandeth," sayeth Father LeMaitre,
And Hubble concurred but Hoyle countered, "What rot!"
Then red shifts were found that provided the proof,
The galaxies fly, Einstein said, "I did goof!"

Chandra.: Chandrasekhar did establish his goals
For white dwarfs and neutron stars and for black holes:
"One point four, two point four, mass of the sun,
Determines the fate in the end of each one!"

Cosmic BR: Penzias and Wilson worked hard at Bell lab
To lose telephone noise they thought they'd take a stab,
Dickey was looking, but they got there first
And found the great voice of the whole Universe!

Bell pulsar: Jocelyn Bell worked with radio 'scopes
She studied the squiggles of stars with high hopes
A regular pulse, could it be L.G.M?
No, just the quick beat of a neutron star gem!

Superclusters: Huchra and Geller, their students as well,
Discovered the places where galaxies dwell;
Great walls and voids John and Margaret did chart,
A stick-man revealed by their red-shifted art!

Peculiars: "Quasars are distant and brilliant," said Schmidt,
Hawking said, "Black holes radiation emit,"
Galaxies crash and collide as they go
It's amazing how much we now know we don't know!

CHORUS TWO TIMES MORE

I looked up at the sky and it was all I thought about. I felt suspended in time and space. I believed myself uniquely privileged at the same time I understood my connection to the millions of humans who had done this before and would afterward.

- Elizabeth Berg, "Talk Before Sleep"

We have your satellite if you want it back send 20 billion in Martian money. No funny business or you will never see it again. *seen on a hall wall at NASA's Jet Propulsion Labs*

THE WESTERN ASTRONOMERS' SONG

by Kevin Krisciunas, June 1989

(to the tune of the Major General's song from the Pirates of Penzance, Gilbert and Sullivan)

AUDIENCE: YOUNG ADULT – ADULT

This list of names is incomplete, but mention these I oughta:
There's Abell, Abt and Adams, Aller, Angel, Arp, and Baade.
They all have reputations great and surely they did earn 'em,
Like Bok, and Barnard, Becklin, both the Burbidges, and Burnham,
And Campbell, Curtis, Keeler, Kraft, and Kuiper, Kron, and Aitken,
And Goldberg, Greenstein, Gunn, and Hale, Leuschner, Low, and Leighton.
Of course there's more who saw the light and showed us data golden
Like Herbig, Herring, Hiltner, Hubble, Humason, and Holden.
If you're inclined, with falling stars, to often be a wisher,
There's Wampler-Robinson, and Faber-Jackson, Tully-Fisher,
And go with those in winter clothes, await the twilight hour
With Aden Meinel, Ivan King, and Gerry Neugebauer.
You want to know who's really who? Just read a lot or ask it.
There's Osterbrock, the Riekes too, and Popper, Joy, and Plaskett,
And Ritchey, Wright and Franklin Roach, John Jefferies, Harold Johnson,
Shane-Wirtanen and Sandage, Schmidt, Bill Sinton, Harley Thronson,
And Babcock, Mayall, Slipper, Shapley, Struve, Swings and Stebbins,
Clyde Tombaugh, Charlie Townes and Trumpler, Weaver, David Evans,
And Ira Bowen, Bob McMath, and Lowell. Please be neighborly
And not forget T. J. J. See and nicer guys like Schaeberle.
Vas[i]levskis and de Vaucouleurs, van Biesbroeck, and van Maanen,
Minkowski and Bobrovnikoff don't rhyme, but then we can, in
Spite of this conclude our list - it shouldn't be too tricky.
There's Wallerstein and Whitford, Westphal, Zuckerman and Zwicky.
To lofty mountains off they went in confident reliance,
In hot pursuit of photons there and world beating science.

Far out in the uncharted backwaters of the unfashionable end of the Western Spiral arm of the Galaxy lies a small unregarded yellow sun. Orbiting this at a distance of roughly ninety-two million miles is an utterly insignificant little blue green planet whose ape-descended life forms are so amazingly primitive that they still think digital watches are a pretty neat idea.

- Douglas Adams

There is a theory which states that if ever anybody discovers exactly what the Universe is for and why it is here, it will instantly disappear and be replaced by something even more bizarre and inexplicable. There is another theory which states that this has already happened.

- Douglas Adams

YOU CAN'T SEE IN THE DARK WITH THE LIGHTS ON

by Kevin Krisciunas, 1994

AUDIENCE: YOUNG ADULT - ADULT

- 1 Our teacher taught us that the Sun is just an average star.
It's made entirely of gas and isn't very far.
Without its heat and light the Earth would rapidly grow cold
And then we'd never go outside again, or so I'm told.
- 2 The other stars are found at distances so large and vast
You might not get there even if you ran extremely fast.
For running's not so hard if it's from home plate to first base.
If that's the distance to the Sun, it's quite another race
To reach the nearest other star - I'll give you all a clue:
That would be the distance from New York to Timbuktu.*
- 3 Because the stars are very far, in spite of being bright
Each one that shines upon us gives us very little light.
But stars are sparkly wondrous things you'll want to set your sights on,
If only you can go someplace they haven't left the lights on.
To see them you must find a certain special place to park,
Without the Sun or Moon as well - a place where dark is DARK.
- 4 "To find us such a place," you say - "A place that's really dark -
Shouldn't be as difficult as teaching cats to bark."
So off we went one evening, 'cross the street to see the stars
But most of what we saw outside were buses, trucks, and cars.
The lights in houses, streets, and alleys added to the view.
How many stars did we see out there? Maybe one or two.
- 5 One day my father took us all to see the planetarium.
My brother tired on the walk and father had to carry him.
Then we went in and marvelled at a modern major miracle -
The alien machinery and ceiling hemispherical.
The doors were closed, the lights were dimmed, the show began inside.
It was a kind of interstellar roller coaster ride.
- 6 "There's eight and eighty constellations - star groups, if you please,
Exactly what you'd count on a piano keyboard's keys.
If you practice the piano, you'll play charming melodies.
If you know where all the stars are, you can sail the Seven Seas.
Sailors use the stars as beacons - that's called navigation.
And every star there ever was is in a constellation."

- 7 And so began the talk while the projector whizzed and whirred.
We learned of mythic beasts and things both wondrous and absurd.
The stars can have as many names as there are folks that see 'em -
Chinese, Greek, and Arabic. We need a star museum!
But which of stellar names is weirdest might be hard to choose.
There's Zuben-el-genubi, Alpheratz, and Betelgeuse.
- 8 The universe, we're told, contains some pretty nifty things
All held in place by gravity, not rubber bands or springs.
Jupiter has lots of moons and Saturn has those rings.
There's galaxies with spiral arms and also cosmic strings.
The last of these have not been seen, so frankly anyone
Might think that some astronomers just dreamt them up for fun.
- 9 The lecturer described to us some projects observational
On asteroids and comets which would frankly be sensational.
It seems these objects now and then can land here with a CRASH!
Or make the largest ocean waves if landing with a SPLASH!
So if the bug that bites you is called Comet Finding Fever
You could be a world famous Comet Prize Receiver.
- 10 While all of what we heard about was pretty fancy stuff,
For me the feeling was that it was simply not enough.
It's one thing to hear someone else describe the universe.
(It's mostly filled with empty space, for better or for worse.)
The talk of stars and galaxies left me not feeling right.
When all was said and done it merely whet my appetite.
- 11 Last year I finally found the cure for stellar deprivation
Not far from the Grand Canyon on our annual vacation.
And since then I can tell you I would really like to own a
Cabin or a camping place near Flagstaff, Arizona.
Every day we stayed there we had skies of brilliant blue,
The kind of skies you'd say were unpolluted, tried and true.
- 12 The first night that we stayed there I awoke at who knows when.
I heard the most ferocious noise, and then heard it again!
From what I knew it sounded like a mountain lion roaring,
But then I realized that it was just my father snoring!
So after that I had no fear I'd meet a grizzly bear
And got up with the urge to take a visit you-know-where.

- 13 The night was clear and cold, the quarter moon was setting fast.
My flashlight batteries were weak and soon ran out of gas.
Under such conditions you'd think nothing could be seen.
'Twas neither dawn nor dusk. It hovered somewhere inbetween.
But when I reached a clearing and looked up and saw the view
I gasped and yelled, "Eureka!" Had you been there, you would too!
- 14 Everywhere were stars - they were a-blazing and a-gleaming.
(I rubbed my eyes again. Was I awake or was I dreaming?)
Like jewels on a velvet cloth, they sparkled without measure.
I, the jeweler, held what was a king's exquisite treasure.
And passing overhead, quite grandly crowning this display -
The streak, the band, the swath of light we call the Milky Way.
- 15 So I discovered something every ancient tribe once knew.
The night sky isn't really dark. It sparkles orange and blue.
There's stars and planets to be seen, some comets by and by,
And now and then a meteor will streak across the sky.
But never mind the fancy things you might read in a book.
Just bundle up then sally forth and go outside and look!

But remember: You can't see in the dark with the lights on.

* This analogy works out to within a couple percent, given the parallax of Proxima Centauri, the size of a baseball diamond, and the actual distance from NY to Timbuktu, about 7210 km.

The following quotes are from <http://www.darksky.org/~pai/ValDA/Tour/quotes.html>

When it is dark enough you can see the stars.

- Charles A. Beard

Protecting the visual nighttime environment should be another component of our broad effort to insure that all our natural resources will be available for the livelihood and recreation of our children and grand children.

- Mitchell Van Yahres, letter February 7, 1997

I say plainly that I believe that in a deep and primitive way, these heavenly bodies have always served an essential psychological purpose for human beings, and that I would be very unhappy to allow a child to grow up, or an adult to live permanently, in circumstances that make it impossible to see the moon and stars overarching the workaday world on a cold, clear night.

- Libby Purves, British writer (Times of London, 13 August 1996)

SONGS ABOUT SPACECRAFT & SPACE EXPLORATION

FIREBALL (XL5)

Words and music by Barry Gray

AUDIENCE: ALL AGES

I wish I was a spaceman The fastest Guy alive
I'd fly you 'round the universe In Fireball XL5
Way out in space together Conquerors of the skies
My heart would be a fireball, a fireball
Every time I gazed into your starry eyes

We'd take the path to Jupiter And maybe very soon
We'd cruise along the Milky Way (And) land upon the Moon
To a wonderland of star dust We'd zoom our way to Mars
My heart would be a fireball, a fireball
Cause you'd be my Venus of the stars

But though I'm not a spaceman Famous and renowned
I'm just a guy that's down to earth With both feet on the ground
Although its imagination And I'll never reach the stars*
My heart is still a fireball, a fireball
Every time I gazed into your starry eyes
*(alternative) It's all imagination I'll never reach the stars

The earth is simply too small and fragile a basket for the human race to keep all its eggs in.
- Arthur C. Clarke

FLY ME TO THE MOON

Bart Howard

AUDIENCE: ALL AGES

Am Dm G C
Fly me to the moon and let me play among the stars
F Dm E (G) Am
Let me see what spring is like on Jupiter and Mars
Dm G C
In other words - hold my hand
Dm G C
In other words - darling, kiss me!

Fill my heart with song and let me sing forever more
You are all I long for all I worship and adore
In other words - please be true!
In other words - I love you!

REPEAT 2ND VERSE, THEN 1ST VERSE AGAIN

MAN ON THE MOON

Copyright 1983, B. Matthews; Adobe Pagoda recorded live at Smith Springs Rd., 1985

AUDIENCE: ALL AGES

In 1969 three men in a ship voyaged to the unknown
To a land where no man had been before, Their trajectory was set for the moon.
Apollo Eleven was their ship, Its rockets had seven million pounds of thrust.
The lunar module they called the Eagle, The command module, Columbia.

Man on the moon. The Eagle has landed.
Man on the moon. The first man on the moon.

Neil Armstrong was the first to step from the Eagle;
Buzz Aldrin was the second man to stand on the moon.
Orbiting the moon in Columbia, Michael Collins was waiting
For docking when the Eagle returned.

A few hours on the moon, back to Earth in 3 days, They landed with a splash in the ocean.
After three trips quarantines were lifted, Moon Base was established,
With colonizing came a new home for man.

ROCKET MAN

By Elton John

AUDIENCE: YOUNG ADULT - ADULT

She packed my bag last night, pre-flight Zero-hour: nine AM
And I'm gonna be high As a kite by then I miss the Earth so much, I miss my wife
It's lonely out in space On such a timeless flight

REFRAIN – SING 2X: And I think it's gonna be a long, long time
 'Til touchdown brings me 'round again to find
 I'm not the man they think I am at home, Oh, no, no, no
 I'm a rocket man Rocket man burning out his fuse up here alone

Mars ain't the kind of place to raise your kids
In fact, it's cold as hell And there's no one here to raise them If you did
And all this science, I don't understand It's just my job, five days a week
A rocket man, rocket man

REFRAIN – SING 2X And I think it's gonna be a long, long time... REPEAT TO FADE

From now on, we live in a world where man has walked on the moon. It wasn't a miracle, we just decided to go.
- Jim Lovell, "Apollo 13"

SPACE IS THE PLACE

Jon Bell, 1999 (to the tune "Toreador" from Carmen by Georges Bizet)

AUDIENCE: ALL AGES

G
Space is the place that I would like to be,
C G Em D
Out among the stars in our galaxy.
Am Em
You've no idea how much I'd like to be
Bm F#7 B7
Out in the nebulae!
 C
Out there I can be free,
 G
You must agree,
 D G
Space is the place for me!

I count the stars as they go whizzing by Some as they're born, some as they die,
And when they're born they shine out beautifully Formed from the nebulae!
And when they die, they might Light up the night, It's really quite a sight!

STAR TREK THEME SONG

Original lyrics by Gene Rodenberry, new ones by Jon Bell, music by Alexandar Courage

AUDIENCE: ALL AGES

ORIGINAL: Beyond the rim of the starlight, My love is wand'ring in star flight.
I know he'll find in star clustered reaches Love, strange love a starwoman teaches.
I know his journey ends never; His Star Trek will go on forever
But tell him while he wanders his starry sea Remember, remember me.

NEW LYRICS, WRITTEN FOR THE PLANETARIUM SHOW, "BOLDLY GO"

Out there, in the ocean of stars, Out there, sailing beyond Mars!
That's where I want to be, Whooshing through the Galaxy!
Star Trek, you sure are the one, Star Trek, our journey has begun!
Our thanks to Gene Rodenberry, For Star Trek, Great Bird of the Galaxy!

Today's Science Fiction is often tomorrow's Science Fact. The physics that underlies STAR TREK is surely worth investigating. To confine ourselves to Terrestrial matters would be to limit the human spirit.

- Stephen Hawking

The Space Shuttle is the most effective device known to man for destroying dollar bills.

- US Congressman Dana Rohrabacher

STAR TREKKIN'

by The Firm (Lister/John O'Connor), lyrics transcribed by Robert Muratore.

CHORUS: Star Trekkin' across the universe, On the Starship Enterprise under Captain Kirk.
Star Trekkin' across the universe, Only going forward 'cause we can't find reverse.

(spoken) Lt. Uhura, report.

There's Klingons on the starboard bow, starboard bow, starboard bow;
there's Klingons on the starboard bow, starboard bow, Jim.

(spoken) Analysis, Mr. Spock.

It's life, Jim, but not as we know it, not as we know it, not as we know it;
it's life, Jim, but not as we know it, not as we know it, Captain.

Add Uhura's song, then CHORUS

(spoken) Medical update, Dr. McCoy.

It's worse than that, he's dead, Jim, dead, Jim, dead, Jim;
it's worse than that, he's dead, Jim, dead, Jim, dead.

Add Spock and Uhura's songs

(spoken) Starship Captain, James T. Kirk:

Ah! We come in peace, shoot to kill, shoot to kill, shoot to kill;
we come in peace, shoot to kill, shoot to kill, men.

Add McCoy, Spock and Uhura ditties, but change last line of Uhura to "scrape 'em off, Jim."

CHORUS (change last line to "Only going forward, and things are getting worse!")

(spoken) Engineering, Mr. Scott:

Ye cannot change the laws of physics, laws of physics, laws of physics;
ye cannot change the laws of physics, laws of physics, Jim.

Add Kirk, change last line to "Scotty, beam me up!" Add McCoy, Spock, Uhura

(change last line of Uhura to: "better calm down!")

Ye cannot change the script Jim. Och, #!*& Jimmy.

It's worse than that, it's physics, Jim.

Bridge to engine room, warp factor 9.

Och, if I give it any more she'll blow, Cap'n!

CHORUS 2 X

THOSE STARS

Jon Bell (to the tune "This Land," by Woody Guthrie)

AUDIENCE: ALL AGES

C G
Those stars are your stars, those stars are my stars
D G
From red Antares, to blue-white Rigel,
C G Em
From near Centauri, to far Polaris,
D GCG
Those stars were made for you and me.

I've traveled light years, and I've traveled parsecs In constant search of the cosmic bound'ries,
But all around me, a voice was saying, Space is a great infinity.

CHORUS

I've seen the light of the golden moonlight And walked the footsteps of the last Apollo
The moon is waiting, her dry seas beckon; That moon was made for you and me. CHORUS

I've floated outward on the rings of Saturn, And wandered onward to the moons of Neptune
These worlds are out there, I hear them calling: Those worlds were made for you and me!
CHORUS

From bold Orion, to the mighty centaurs From Canis Major, to the flying horses
From the stars of Taurus, to Berenice's tresses Those stars were made for you and me CHORUS

Earth is the cradle of mankind. But man was not meant to stay in the cradle forever.
Konstantin Tsilkovsky

THUNDERBIRDS

Words and music by Barry Gray

AUDIENCE: ALL AGES

If your life or love are in danger, Or your heart is in distress
Call International Rescue By sending them an SOS

Then you'll see Thunderbirds Flying way up high Thunderbirds, Roaring through the sky

If you are on the edge of disaster, Or you're stranded in outer space
Call International Rescue No matter what the time or the place

Then you'll see Thunderbirds Hurrying to save the day
Thunderbirds, Thundering on their way, Thunderbirds (fade out)

UP THERE

Hy Zaret and Lou Singer
(from Space Songs, published by Argosy Music, 1959)
AUDIENCE: ALL AGES

Why do we all want to be up there, up there, up there
What is there to do or see up there, up there,

CHORUS: Outer space is the place where we'll trace the future
There's a lot of who knows what Away up there.

(Spoken) Now that I think of it, why do we want to be up there?
(Spoken) Because we're people, members of the human race.
We thirst for knowledge, we want to know.
And we do know that new frontiers and discoveries
Are waiting for new pioneers and scientists
Way up there.

CHORUS

ZOOM A LITTLE ZOOM (Rocket Ship)

Hy Zaret and Lou Singer
(from Space Songs, published by Argosy Music, 1959)
AUDIENCE: ALL AGES

Zoom a little zoom in a rocket ship,
Off we go, on a trip!
Headin' for the moon at a rocket clip,
We're gonna zoom-zoom. . .rocket!
Zoom a little zoom, now we're almost free, from the Earth's gravity.
Zoomin' to the moon at terrific speed, because there is no friction.
Soon, we'll see if the moon is made out of green cheese, ha, ha, ha, ha!
Zoom, we're here at the moon, let's see what the moon is like.

Spoken: Look at those high mountains and wide craters and jagged peaks. . .and
look at that great big moon up there.
That isn't the moon. . .That's our Earth.
We've landed! I feel so light. Watch me jump. . .Thirty feet, a world's record!
Oh, that's easy on the moon. Keep your suit on, remember there's no air around here.

Zoom a little zoom in a rocket ship, home we go, on a trip!
Comin' back to Earth at a clip. We're gonna zoom-zoom, rocket!

You know, Hobbes, some days even my lucky rocketship underpants don't help.

- Calvin, from Bill Watterson's "Calvin & Hobbes"

TIME WARP

Written by Lynda Williams (the Physics Chanteuse), copyright 2000

- for Kip Thorne (sung to the tune, "Time Warp" from the movie Rocky Horror Picture Show)

AUDIENCE: Young Adult - Adult

Science fact is stranger than fiction when you work with Kip.
He'll warp your logic with matters exotic and strip away your cosmic censorship!
Jumping into Wormholes!
And hyperspace tunnels!
Building an Einstein-Rosen Bridge
with exotic matter made up of
NEGATIVE ENERGY!

CHORUS: Let's do the Time Warp with Kip! Let's do the Time Warp with Kip!
You don't need a space ship! Or go faster than light!
To take a time trip with Kip! All you need is Einstein!
You'll remember your future! Riding on a closed time-time curve!
Let's do the Time Warp with Kip! Let's do the Time Warp with Kip!

It's all so dreamy
But the vacuum is seething with a fluctuating quantum foam.
And if you are from a civilization that is infinitely advanced and very, very quick
you can pull a wormhole right out of it!
Put your head into it's mouth instantly you will pop out
into another space and time!
But you better take care on the other side not to commit matricide!
Let's do the time warp with Kip!

Well I was taking a nap in my emedding sheet when a mini-wormhole opened up next to me.
I could see on through to the other side
Kip was looking back and he was waving Hi!
The hole exposed my naked singularity so I sewed it back up with some Super Strings!
Let's do the time warp with Kip!

You don't need a space ship!
Or go faster than light!
To take a time trip with Kip!
All you need is Einstein!
You'll remember your future!
Riding on a closed time-time curve!
Let's do the Time Warp with Kip!
Let's do the Time Warp with Kip!

I don't care if history itself comes unravelled.

Janeway, ST Voyager episode, "Relativity"

Astronaut Ron McNair is believed to be the first person to take a musical instrument into space. He brought along his saxophone on shuttle flight STS-41B in Feb. 1984. He made a tape recording of his playing while there but unfortunately the tape was later accidentally recorded over.*

McNair died in the Challenger explosion. During the flight he had planned to play a work composed for him by Jean-Michel Jarre. It would have been the first musical piece whose debut occurred in space. The piece latter appeared on Jarre's album "Rendez-Vous" with the sax played by Pierre Gossez

– from MusicSpace, <http://www.hobbyspace.com/Music/>

...the whole procedure [of shooting rockets into space]...presents difficulties of so fundamental a nature, that we are forced to dismiss the notion as essentially impracticable, in spite of the author's insistent appeals to put aside prejudice and to recollect the supposed impossibility of heavier-than-air flight before it was actually accomplished... To begin with, the most powerful chemical reaction is unable to lift its own mass outside the earth's gravitational field: while the ejection of burnt fuel decreases the load automatically, the comparative weakness of the fuel compels a mass ratio of fuel carried initially to working load which would deter all but the paper-bold, who do not flinch from the notion of a twenty million ton rocket required to project a twenty ton mass to Venus and back. We do not see how a small party of passengers, whose equipment is limited to ten tons, could hope to erect their return rocket, of mass two million tons, on the surface of an alien planet where they would be handicapped by an unnatural temperature and the necessity of wearing gas masks.

- Richard Woolley, reviewing P.E. Cleator's "Rockets through Space", Nature, March 14, 1936

At first, the cosmonauts are buoyed by the excitement of the strange new environment, but after a couple of weeks the excitement wears off and the troubles start. Far and away the most vivid picture of a cosmonaut's emotional deterioration appears in the diary of Valentin Lebedev, who spent 211 days aboard the Salyut 7 space station. He was launched on May 11, 1982, and by May 21 he was already beginning to quarrel with crewmate Anatoly Berezovoy, who complained that he was forever catching Lebedev's stuff floating around the Salyut cabin. By May 23 Lebedev was beginning to suffer from insomnia. "If you don't sleep enough, you're worn out, and your face is swollen," he wrote. "Your mood isn't so great, either. What am I going to do? It's only been ten days." ... The psychologists have a variety of remedies to counteract the debilitating effects of asthenia. Basically, they try to keep the cosmonauts' schedules reasonable and regular, and they try to keep life aboard a space station as Earth-like and as integrated with their home life as possible. On one occasion Lebedev's crew doctor sensed that he was depressed and interrupted the evening period of communication with him, telling him to hold on a minute. Lebedev wrote in his diary: "Suddenly I heard a very familiar Ukrainian melody. I couldn't understand where it came from. Finally it dawned on me. It was my son playing the piano. It was so wonderful and unexpected that tears ran from my eyes."

- from The Loneliness of the Long-Duration Astronaut, by Henry S.F. Cooper Jr.

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