This year's calendar

How to understand it
How to calculate it

Contents

A. Introduction and overview

B. Days and months

C. Yomim Tovim and Sidros

D. Conclusion

Introduction

- The Torah requires that our calendar months be set by the lunar cycle: החודש הזה לכם. A month begins with the sighting of the new moon. That comes approximately every 29 and a half days – but not exactly.
- The Torah *also* requires that the calendar year stay in synch with the sun: Pesach must be בחודש האביב: in the spring. Sukkos must be חג האסיף, the gathering-in festival: in the fall. The solar year is approximately 365 and a quarter days - but not exactly.
- These two time scales are independent, and are not multiples of one another. They are bound to get out of synch.
- Maharsha: the bnei Esav's calendar only follows the sun, the bnei Yishmael's calendar only follows the moon – but the Torah requires us to follow both.

Introduction

- For most of our history, the solution was to adjust both of them by hand:
- Witnesses came to the Sanhedrin to establish the new month. Each month would be either 29 or 30 days long, whenever the new moon was sighted. A lunar month is about 29 and a half days, so they added an extra day about half the time.
- The Sanhedrin also decided each year whether to add Adar II, a thirteenth month, depending on whether it seemed spring would arrive before Pesach. A solar year is about a third of a month (about 11 days longer) longer than twelve lunar months, so they needed to do that every few years.
- In those days, there was no way to be sure ahead of time what the year's calendar would be.

Introduction

- By the days of Abaye and Rava it was very difficult to establish the months and years directly (Rambam: "no permanent court was left in Eretz Yisroel"), so the nasi Hillel ben Yehudah established our permanent calendar instead.
- The Rambam says this is halacha l'Moshe b'Sinai. (Chazon Ish: the Rambam means doing it by calculation when needed – not the exact details.)
- The current calendar is based only on calculation, not observation. It cannot be exact, but the approximate values chosen for month and year are close enough that it has drifted very slowly – several days - in the hundreds of years since.
- When we have a Sanhedrin again, we will be able to fix it.

References

- Rambam, Hilchos Kiddush Hachodesh
- Tur, Orach Chaim, 428. The chart there is the basis of the Keviyus web page.
- Rabbi Nathan Bushwick, *Understanding the Jewish Calendar*, Moznayim, 1989.
- Rav David Heber's yearly shiur on the calendar at Yeshiva Ner Yisroel, Baltimore.

- You can get this presentation and software tools at my website https://sites.google.com/site/miyminimichoel along with other divrei Torah.

Overview

We are going to calculate the Jewish calendar for a year.
All we need to know is the number of the year. This year is תשע"ט – 5779.

The steps we will follow:
1) Decide if this is a regular year (פשוטה) or leap year (מעוברת).
2) Find the molad for this Tishrei.
3) Find the molad for the *next* Tishrei.
4) Find the calendar days for this and the next Rosh Hashanah.
5) Find all the days of Rosh Chodesh, and all the yomim tovim.
6) Determine the Torah readings (סדרות).
7) Connect the calendar to the civil calendar – *not* included here.

Overview, cont.

1) Decide if this is a regular year (פשוטה) or leap year (מעוברת).

- The Torah requires the months to track the cycles of the moon.

- The Torah requires the years to track the seasons of the (solar) year.

- To keep them in synch, we sometimes add an extra month.

- There is a repeating nineteen-year cycle of regular and leap years.

- The number of the year we are calculating will tell us which one it is.

Overview, cont.

2) Find the molad for this Tishrei

- That is, the astronomical moment of the new moon for Tishrei of this year.
- Chazal made the approximation that all months are exactly the same length, from one new moon to the next.
- That amount is not an exact number of days; they estimated it nearly to the second.
- By knowing the number of years since Creation, knowing the starting point, and knowing the length of a month, we calculate the moment of the molad.
- This is an exact time, not a day.

Overview, cont.

3) Find the molad for the *next* Tishrei

- We repeat the process for the following year.

- To the result for *this* Tishrei, we need only add twelve more months worth of time (for a regular year), or thirteen (for a leap year), to get the molad for next year.

- Again, this is an astronomical moment in time, not a day.

Overview, cont.

4) Find the calendar day for each Rosh Hashanah.

● Very often Rosh Hashanah will be on the same day as the time that the molad we calculated falls.

● However, there are four situations that may cause it to be moved to the next day, or the day after.

● These are known as the Four Dechiyos (ד' דחיות).

● Each resulting Rosh Hashanah is a day of the week on the calendar now, not a moment in time.

Overview, cont.

5) Find all the days of Rosh Chodesh, and all the yomim tovim.

- Once we know whether the year is a regular or leap year, and which days are Rosh Hashanah at the beginning and end, we can figure out the total number of days in the year.

- That tells us the lengths of each of the months, and gives us the days of Rosh Chodesh for each month.

- Each of the yomim tovim is on a particular date in the calendar and is now determined.

Overview, cont.

6) Determine the Torah readings.

● Now that the calendar is set up, we can see how many weekly Torah readings are needed.

● We decide how many parshiyos need to be doubled up to fit.

● This was already done by Chazal for every possible calendar, but the קדמונים gave some rules for how they decided which ones to double up.

● The results can be different in Eretz Yisroel and in chutzah la'aretz.

Overview, cont.

7) Connect the calendar to the English (civil) calendar.

- We are not actually going to do this step – just explain it.

- We find the date when we start saying V'sein tal umatar, using the old *Julian* calendar.

- Convert to today's Gregorian calendar (used since 1582).

- Use that to find any other date, like January 1.

Contents

B) Days and months

Okay, let's get started!

We'll go through the steps to get the calendar for a year - and do it for *this* year.

1) Introduction – how to calculate
2) Peshuta or m'uberes?
3) Find the molad
    - for Tishrei this year
    - and for next year
4) Find Rosh Hashanah - the four dechiyos
5) Establish the months

1) Introduction – how to calculate

How to calculate

- We use **day** of the week (1-7), **hours**, **chalakim** (reverse order in Hebrew).

- 1 chelek = 3⅓ sec., 1080 chalakim = 1 hour, 24 hours = 1 day.

- The hours are measured starting from **6 pm** (*not* the more usual שעות זמניות, which are based on sunrise and sunset or darkness)‚ so 18 = 12 noon, etc.

- All our calculations use this triplet of numbers.

- We don't normally need to worry about the weeks at all. It is enough to determine the time within the week.

How to calculate - example

- If you'd want to add 4 days, 18 hours, 443 chalakim **(די"ח תמ"ג)** or (**ד, יח, תמג**) to 5 days, 20 hours, 742 chalakim (**ה, כ, תשמב**):

    443+742 = 1185 = 1 hour (=1080 chalakim) + 105 chalakim.

    18 + 20 + 1 (which was carried) = 39 = 1 day + 15 hours.

    4 + 5 + 1 = 10 = 1 week (ignore) + 3 days.

    The result: 3 days, 15 hours, 105 chalakim (**ג, טו, קה**).

- This is how all these calculations are done. Just keep carrying.

How to calculate - standard shifts

Everything we need for the molad are sums of multiples of the following *five shifts.*
- One molad – shift for one lunar month = אי"ב תשצ"ג:
  1 day (really 29 days - but we ignore the weeks), 12 hours, 793 chalakim
- Shana peshutah - 12 of these months = ד"ח תתע"ו:
  4 days, 8 hours, 876 chalakim
- Shana m'uberes - 13 of these months = הכ"א תקפ"ט:
  5 days, 21 hours, 589 chalakim
- 19 year cycle - 19 years with 7 m'ubaros and 12 peshutos = בי"ו תקצ"ה:
  2 days, 16 hours, 595 chalakim. And -

How to calculate - standard shifts, cont.

- The calendar's *starting point* is set near the beginning of the _year_ zero, but at בהר"ד: Monday, 5 hours, 204 chalakim.
- This is an *imaginary time,* before the world was created. Chazal could just as well have started from their own time, call it 4200, and gone forward – but then you would have had to subtract 4200 from the number of this year in the calculations. For convenience, they tracked backward in time to zero, so you wouldn't have to subtract.
- The time בהר"ד is arbitrary, just matches with whenever they really started. But it does correspond to Friday morning of Tishrei the *next* year, year 1, when newly created Adam would have first seen the new moon.
- Remember again: there have been thousands of weeks since creation, but we are only going to need to know the *day of the week and the time of day.* This makes things simpler. Whenever our numbers add up to another week we go back to the beginning.

Calculator

So you don't have to do this yourself:

Molad Calculator

Year 5779　　Month תשרי (Tishrei)

	Days	Hours	Chalakim	Multiplier	Description (optional)
Input	2	5	204	1	initial starting point (בהר"ד)
+Input	2	16	595	304	19-year cycle (בי"ו תקצ"ה)
+Input	4	8	876	2	1 peshutah (regular year, 12 months) (ד"ח תתע"ו)
+Input	5	21	589	0	1 m'uberes (leap year, 13 months) (הכ"א תקפ"ט)
+Input	1	12	793	0	1 month (אי"ב תשצ"ג)
+Input					Other
Output	2	14	316		

B) Days and months

Let's go through the steps to get the calendar for a year - and do it for *this* year.

1) Introduction – how to calculate
2) Peshuta or m'uberes?
3) Find the molad
   - for Tishrei this year
   - and for next year
4) Find Rosh Hashanah - the four dechiyos
5) Establish the months

2) Peshuta or m'uberes?

	This year:
• The regular years (peshutos) and leap years (m'ubaros) are in a repeating nineteen year cycle. • 235 lunar months is very close to 19 solar years. 7 leap years plus 12 regular months is 235 months.	
• Take the number of the year, take the remainder divided by 19.	• 5779 mod 19 = remainder 3
• The siman גו"ח אדז"ט tells which ones are leap years: 3,6,8,11,14,17,19.	• So this year is "ג", a **leap year (מעוברת)**.

B) Days and months

Calculate the calendar for a year.

1) Introduction – how to calculate
2) Peshuta or m'uberes?
3) Find the molad
   - for Tishrei this year
   - and for next year
4) Find Rosh Hashanah - the four dechiyos
5) Establish the months

3) Find the molad for this year's Tishrei

(If you know last year's molad it's easier – we'll use that method for the second year. Otherwise,)	**This year:**
1. The starting point is the year zero, בהר"ד (Monday, 5 hours, 204 chalakim	• **(2,5,204)**
2. Find the number of 19 year cycles	• **5779**\19 = **304** 19-year-cycles
3. Add (the number of 19 year cycles) * (the shift בי"ו תקצ"ה, for each one)	• 304 * (2,16,595) = **(5,15,520)**

3) Find the molad for this year's Tishrei, **cont.**

	This year:
4. Using גו"ח אדז"ט, see how many peshutos (P) and how many m'ubaros (M) there have been already in this cycle.	• 5779#19 = remainder 3, so 2 peshutos so far, no m'ubaros. **P=2, M=0**.
5. Add the shift for each: (P * ד"ח תתע"ו) + (M * הכ"א תקפ"ט)	• (2*(4,8,876)) + (0*(5,21,589)) = **(1,17,672)**
Add _all of these_ [i.e., the results of 1., 3., and 5.] up for this year's molad	• = **(2,14,316)**
• Remember – we don't care about the weeks!	(On the Calculator, you would enter multipliers **1, 304, 2, 0, 0, 0** to get this result.)

3) Find the molad for this year's Tishrei, cont.

	This year:
6. If you actually want the molad for a *different* month, say for announcing the molad in shul, also add the number of additional months * אי"ב תשצ"ג	• Say for Cheshvan for this year: 1 additional month, so add (1,12,793) to the **(2,14,316)** we got for Tishrei. **= (4,3,29)** **= Wednesday, 9 pm [3 hours after 6 pm], 29 chalakim.**
	• (On the Calculator, the multipliers are now **1, 304, 2, 0, 1, 0**.)

3) Repeat: Find the molad for *next* year's Tishrei

	This year:
• Add one more year's shift, either peshuta (ד"ח תתע"ו) or m'uberes (הכ"א תקפ"ט) whichever this year is.	• 5779#19 = remainder 3. 3rd year, add one m'uberes shift (5,21,589) to (2,14, 316) from above = **(1,11,905)**
	• (On the Calculator, the multipliers are now **1, 304, 2, 1, 0, 0**.)
• We now have the molad for Tishrei this year, and next year. • They are **exact times**, not days.	• This year and next year: **(2,14,316)** and **(1,11,905)**

B) Days and months

Calculate the calendar for a year.

1) Introduction – how to calculate
2) Peshuta or m'uberes?
3) Find the molad
   - for Tishrei this year
   - and for next year
4) Find Rosh Hashanah - the four dechiyos
5) Establish the months

4) Find Rosh Hashanah – the four dechiyos

	This year:
• For the actual calendar, we need to find the *day of the week* (of the first day) of each of the two Rosh Hashanos - not just the time of the molad. Normally each Rosh Hashanah is on that day of the week *when its molad was*. • However - there are four situations where they are moved later.	• This time, those days would be: Monday for this year (from **2**,14,316 calculated above), and Sunday for next year (from **1**,11,905 calculated above)

4) Find Rosh Hashanah – the Four Dechiyos

The ד' דחיות where they are moved *later*:

a) מולד זקן

b) לא אד"ו ראש

c) ג"ט ר"ד

d) בט"ו תקפ"ט

4a) The four dechiyos - מולד זקן

	This year:
• For each Rosh Hashanah's molad, is the hour after noon (18 hours in our system that measures from 6pm)? • If so, move it to the next day.	• (2,**14**,316), (1,**11**,905): neither of these is after noon.

4b) The four dechiyos - לא אד"ו ראש

	This year:
After you did the first dechiyah: • For each Rosh Hashanah, is the day now Sunday, Wednesday, or Friday? (**אד"ו** = **1**, **4**, **6**) • If so, move it to the next day. Those days are not allowed. • By now, we may have moved Rosh Hashanah *two* days.	• This year's RH (**2**,14,316) is on Monday, it doesn't change. • Next year's RH (**1**,11,905) is on Sunday – not allowed - so it moves up to Monday instead. • Both are now on Monday.

4) The four dechiyos, cont.

Last two dechiyos – בט"ו תקפ"ט and ג"ט ר"ד

● There are two more rules ("dechiyos") that have to do with the *length of the calendar year*.

Some background first:

● A year may only have three lengths: short (חסרה), medium (כסדרה), and long (שלמה).

● Chaseirah is one day shorter than k'sidrah, sheleimah is one day longer. (We'll see how this works when we talk about the lengths of the months.)

● You can tell which it is by *comparing the day of this year's Rosh Hashanah to next year's*.

Length of year - פשוטה

- The actual calendar doesn't use times, i.e. hours and chalakim, just complete days.
- We saw that a regular year (פשוטה) has a *molad shift* of ד"ח תתע"ו: 4 days and 8+ hours.
- In the actual calendar - which uses days, not times - a short chaseirah year (353 days) has a shift of three days from one Rosh Hashanah to the next, say from Shabbos this year to Tuesday the next.
- A regular k'sidrah year (354 days) has a four day shift,
- and a long sheleimah year (355 days) has a five day shift.
- These are all the choices that are allowed.

Length of year - מעוברת

- A leap year (מעוברת) we saw earlier has a molad shift of הכ"א תקפ"ט :הכ"א תקפ"ט: 5 days, 21+ hours.
- In the actual calendar, a chaseirah leap year (383 days) has a shift of five days from one Rosh Hashanah to the next (such as from Monday to Shabbos).
- A k'sidrah (384) has a six day shift.
- A sheleimah (385) has a seven day shift - that is, the two Rosh Hashanos are on the same day of the week.
- These are all the choices that are allowed.
- You see now why we never worried about the weeks. That's the easy part; we really just need to figure out the days.

4c) The four dechiyos – ג"ט ר"ד

	This year:
• When you do the first two dechiyos, you occasionally find that the second one moved forward too far, so the year ends up one day longer even than a "sheleimah" – not allowed. • You fix it by moving the first RH forward as well. • This only turns out to happen in one case: a regular פשוטה year, when the first Rosh Hashanah falls on Tuesday, after 9 hours, 204 chalakim (therefore called (ג"ט ר"ד). • But then it moves *two* days forward, as RH can't fall on Wednesday either (rule (2), לא אד"ו ראש). • For the *second* Rosh Hashanah, you'd need to see if *next year* is a פשוטה.	• Not this year. It last happened in 5772.

4d) The four dechiyos - בט"ו תקפ"ט

	This year:
• In the reverse direction, you can sometimes find that the first Rosh Hashanah moved forward too far, and the year is one day shorter even than a "chaseirah" - too short. • You fix it by moving the *second* Rosh Hashanah forward one day as well. • It turns out this also only happens in one case: a leap year (מעוברת), and only when the second Rosh Hashanah falls on Monday, after 15 hours, 589 chalakim (therefore called בט"ו תקפ"ט). It gets moved to Tuesday. • For the *first* Rosh Hashanah, this would depend on *last year* being a leap year.	• Not this year. It last happened Rosh Hashanah 5766 (at the end of 5765) – and never again till the year 6000. It happens very rarely.

4) The four dechiyos, cont.

	This year:
• After applying these four rules, where applicable, we have the day of the week for Rosh Hashanah, at both the beginning and the end of the year.	• This year is a leap year (מעוברת). • Both Rosh Hashanos this year ended up (starting) on Monday, so the year is **long** (**שלימה**).

B) Days and months

Calculate the calendar for a year.

1) Introduction – how to calculate
2) Peshuta or m'uberes?
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   - for Tishrei this year
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5) Establish the months

Now we determine the length of each of the months.

- Months can be either 29 days (חסר) with one day of Rosh Chodesh at the end, or 30 days (מלא), ending with two days of Rosh Chodesh.
  - If there are two, the first day of Rosh Chodesh is the 30th day of the previous month. The *last* day of Rosh Chodesh is always the 1st of the next month.
- The months must combine to form the right length year: as we saw, 353, 354, or 355 for a regular year, 383, 384, or 385 for a leap year.
- Most months have a specific length, alternating:
  - Tishrei 30, Teves 29, Shvat 30, Adar 29, Nisan 30, Iyar 29, Sivan 30, Tammuz 29, Av 30, Elul 29 – always.
- In a leap year, Adar I is added with 30 days and Adar II has 29.

5) Establish the months, cont.

	This year:
• Only two months, Cheshvan and Kislev, can vary: either 29 or 30 days. *That's* the three-day range for the length of the year. In a chaseirah both Cheshvan and Kislev are 29. In a k'sidrah Cheshvan is 29 and Kislev 30. In a sheleimah both are 30. • We need to know (a) if it's a leap year, and (b) if it's chaseirah, k'sidrah, or sheleimah. With that we can establish all the months.	• This year is a **leap year** and a **sheleimah**. • So the sequence this year is Tishrei 30, Cheshvan **30**, Kislev **30**, Teves 29, Shvat 30, Adar I **30**, Adar II **29**, Nisan 30, Iyar 29, Sivan 30, Tammuz 29, Av 30, Elul 29. Total days: 385

5) Establish the months, cont.

- We've seen that only three things vary in the calendar (aside from which day you start): Cheshvan, Kislev, and whether there's a second Adar.
- What that means: The entire calendar from the last Adar onward is always the same.
  From Adar II and Purim, Nisan and Pesach, all the way through the next Rosh Hashanah (really through Cheshvan) is an identical rigid span for all calendars (just shifted by the day it starts).
- The result: If you know the day of the week for any one of those days, you know all the rest.

5) Establish the months, cont.

- "If you know the day of the week for any one of those days, you know all the rest."
- See Tur Orach Chaim 428 for a mnemonic using this ("את-בש"):
  - 1st day of Pesach (א) same day as Tisha B'Av (ת)
  - 2nd day of Pesach (ב) same day as Shavuos (ש)
  - 3rd day of Pesach (ג) same day as Rosh Hashanah (ר)
  - 4th day of Pesach (ד) same day as Krias HaTorah (Simchas Torah) (ק)
  - 5th day of Pesach (ה) same day as Tzom (Yom Kippur) (צ)
  - 6th day of Pesach (ו) same day as the *previous* Purim (פ)

Contents

A. Introduction and overview

B. Days and months

C. Yomim Tovim and Sidros

D. Conclusion

C) Yomim Tovim and Sidros

1) Pick a calendar
   - Keviyus page
   - Find this year's calendar

2) Yomim Tovim

3) Sidros
   - Introduction
   - Arranging the sidros

Pick a calendar

- We can now lay out the calendar for the entire year.

- To help visualize this, this is a chart in the Tur, Orach Chaim, 428.

שער השנים המעוברות							אלה מועדי יי מקראי קדש אשר תקראו אותם במועדם	שער השנים הפשוטות						
זש	זח	השת	הה	גכ	בש	כח		זש	זח	השת	הכ	גכ	בש	כח
ז	ז	ה	ה	ג	ב	ב	ריה וסוכות ושמיני עצרת	ז	ז	ה	ה	ג	ב	ב
ב	ב	א	א	ה	ד	ד	צום גדליה	ד	ד	נדחה ליום ב	נדחה ליום א	ה	ד	ד
ב	ב	ז	ז	ה	ד	ד	צום כפור	ב	ב	ז	ז	ה	ד	ד
ו	ו	ד	ל'	ב	א	א	הושענא רבה	ו	ו	ד	ד	ב	א	א
אב	אב	ח	ח	דה	גד	נד	מרחשון	אב	אב	ח	ח	דה	גד	נד
נד	ג	אב	א	ו	הו	ה	כסליו	נד	ג	אב	א	ו	הו	ה
ז	ו	ה	ד	ב	ב	א	חנוכה	ז	ו	ה	ד	ב	ב	א
דה	ד	נד	כ	זא	זא	ו	מבט כ"פ יום	הו	ד	נד	בג	זא	זא	ו
א	ו	ז	ד	ג	ג	א	צום העשירי	א	ו	ז	ה	ג	ג	א
ז	ה	ה	ד	ג	ב	ב	שבט ל' יום	ז	ה	ה	ד	ג	ב	ז
כו לאדר ראשון	כט לאדר ראשון	כמ לאדר ראשון	ר"ח לאדר שני	כה לאדר ראשון	כה לאדר ראשון	כו לאדר ראשון	פרשת שקלים	כמ בשבט	כט בשבט	ר"ח אדר	ר"ח אדר	כה בשבט	כו בשבט	כמ בשבט
אב	זו	זו	דה	גד	נד	אב	אדר ראשון	אב	זו	זו	הו	נד	גד	אב
דד	בו	בו	זמו	זבו	זבו	דד	הפסקות	בו	דד	זמו	זמו	בו		בו
יא לאדר שני	יג לאדר שני	יג לאדר שני	ה לאדר שני	מ לאדר שני	מ לאדר שני	יא לאדר שני	זכור	יג לאדר	יא לאדר	מ לאדר	מ לאדר	יא לאדר	יא לאדר	יג לאדר
ב	מוקדם ליום ה	מוקדם ליום ה	ה	ד	ד	ב	צום אסתר	מוקדם ליום ה	מוקדם ליום ה	ה	ה	ד	ב	מוקדם ליום ה
ג	א	א	ו	ה	ה	ג	פורים	א	ו	ו	ה	ג	ג	א
נד	אב	אב	ח	הו	הו	נד	אדר שני כ"פ יום							
כח לאדר שני	כז לאדר שני	כו לאדר שני	כמ לאדר שני	ר"ח ניסן	ר"ח ניסן	כה לאדר שני	פרשת החודש	כו לאדר	כמ לאדר	כמ לאדר	ר"ח ניסן	כה לאדר	כה לאדר	כו לאדר
ה	ג	ג	א	ז	ז	ה	ניסן שלושים יום ופסה	ג	א	א	ז	ה	ה	ג
ח	דה	דה	בג	אב	אב	ח	אייר כ"פ יום	דה	בג	בג	אב	ח	ח	דה
א	ו	ו	ד	ג	ג	א	סיון ל' יום	ו	ד	ד	ג	א	א	ו
ו	ד	ד	ב	א	א	ו	שבועות	ד	ב	ב	א	ו	ו	ד
בג	זא	זא	זא	דה	דה	בג	תמוז כ"פ יום	זא	הו	הו	דה	בג	בג	זא
ה	ג	ג	א	א	א	ה	צום שבעה עשר בתמוז ותשעה באב	ג	א	נדחה ליום א	א	ה	ה	ג
ד	ב	ב	ז	ו	ו	ד	אב ל' יום	ב	ז	ז	ו	ד	ד	ב
הו	נד	נד	אב	זא	זא	הו	אלול כ"פ יום	נד	אב	אב	זא	הו	הו	נד

Pick a calendar – the Keviyus page

- A maybe fancier version of that chart:

C) Yomim Tovim and Sidros

1) Pick a calendar
- Keviyus page
- Find this year's calendar
2) Yomim Tovim
3) Sidros
- Introduction
- Arranging the sidros

Pick a calendar, cont. – find the calendar for the year

	This year:
• You'll see a total of 14 choices, 7 for regular years, 7 for leap years. • First choose the correct side - regular or leap year. Resize so all 7 for that side are visible.	• This year is a leap year. If the page header is פשוטה, click on the right-hand pane and scroll left, or click the "מעוברת" button.
• Choose the correct calendar from those seven. • The first letter in the title at the top is the *day of the week of the initial Rosh Hashanah*. • The second is "ח" for chaseirah, "כ" for k'sidra, "ש" for sheleimah.	• Rosh Hashanah at the beginning of this year is Monday - ב, the year is sheleimah. So the title should begin with בש. That matches בש"ז: the second one from the right.

Pick a calendar, cont.

	This year:
What about the *last* letter of the title (not in the Tur's chart, but common since then)?	
• That letter indicates the day of the week when Pesach falls. That day is actually determined by the first two, and is just given for convenience.	• This year Pesach begins on Shabbos (ז), as you can see by scrolling down on that calendar. So the correct calendar is titled בש"ז.
• One result of it is that all fourteen calendars have unique titles.	
• Using the Tur's א"ת ב"ש, it gives us a lot of other yomim tovim as well.	

Pick a calendar, cont. – ארבעה שערים

- The "Four Gates": Chazal found a way to mechanize the process of picking a calendar, to handle the ד' דחיות automatically.
- All you need is

  (a) the molad of this Rosh Hashanah, and

  (b) which of last year, this year, and next year are m'ubaros.
- Then you look up the answer on the chart. The ד' דחיות are built in.

Four gates   ד' שערים

(2d 14h 316ch)

If molad Tishrei ≥	Year of 19-year cycle			
	1 4 9 12 15 (מפ"פ)	7 18 (מפ"מ)	2 5 10 13 16 (פפ"מ)	③ 6 8 11 14 17 19 (פמ"פ)
7d 18h 0ch	בח"ג			בח"ה
1d 9h 204ch				
1d 20h 491ch	בש"ה			בש"ז
2d 15h 589ch				
2d 18h 0ch	גכ"ה			גכ"ז
3d 9h 204ch				
3d 18h 0ch	הכ"ז			הח"א
4d 11h 695ch				
5d 9h 204ch	הש"א			הש"ג
5d 18h 0ch				
6d 0h 408ch	זח"א			זח"ג
6d 9h 204ch				
6d 20h 491ch	זש"ג			זש"ה

C) Yomim Tovim and Sidros

1) Pick a calendar
   - Keviyus page
   - Find this year's calendar
2) Yomim tovim
3) Sidros
   - Introduction
   - Arranging the sidros

Yomim Tovim

	This year:
• We've already added the Roshei Chodoshim to the calendar. • Each of the other yomim tovim has a fixed date in the calendar - that gives its day of the week.	• Scroll down through calendar בש"ז to see where this year's yomim tovim fall.
• Chanukah is always eight days, whether Rosh Chodesh Teves is one day or two, so Chanukah may end on 2 Teves or 3 Teves.	• This year Rosh Chodesh Teves is two days, so Chanukah ends on 2 Teves.
• Fast days get pushed forward if they fall on Shabbos.	• 17 Tammuz and Tisha B'Av fall on Shabbos this year, so the actual fasts are on Sunday.

C) Yomim Tovim and Sidros

1) Pick a calendar
   - Keviyus page
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Sidros - introduction

- On the home stretch!
- The last major job: we need to place the Sidros (parshiyos). It should be easy - they're in order!
- Three things make things more complicated.
  a) Yomim Tovim
  b) Counting parshiyos
  c) Eretz Yisroel and chutzah la'aretz

3a) Yomim Tovim

- If the major yomim tovim fall on Shabbos, they have their own reading - and the weekly sidrah waits for the next week.

- This applies to:
  Rosh Hashanah, Yom Kippur, all of Sukkos, all of Pesach, and Shavuos.

- Sukkos and Pesach can contain one or two Shabboses.

3b) Counting parshiyos

- Depending on
  - when Rosh Hashanah falls at the beginning and end of the year, and
  - how many yomim tovim interrupt,
- we find the total numbers of weekly sidros to read that year.
- There are 54 sidros (see the left-hand pane in the Keviyus page). Some may need to be doubled up, to fit the actual number of readings.
- [One of them is V'zos Habracha, and it is read on Simchas Torah – doesn't count.]
- There are (about) four more weeks in a leap year (מעוברת) than in a regular year (פשוטה), so a regular year will need several more double parshiyos.

3b) Counting parshiyos, cont.

- The left pane on the Keviyus web page shows which sidros can be doubled – but not how to decide which ones actually are.

- Chazal did this in stages, going from one *benchmark* to another through the year.

- We'll need to know how many Shabbos readings there are between each pair of benchmarks. It may vary with the different calendars.

- How far apart are the benchmarks? – this many weeks, this many extra days. Each week is one reading.
  As for the extra days, it depends whether Shabbos falls in between.

3c) Eretz Yisroel and chutzah la'aretz

- The one-day yomim tovim in Eretz Yisroel can mean that the second day of yom tov falls on Shabbos, and takes over the Torah reading in chutzah la'aretz -

- but not in Eretz Yisroel.

- That would mean that Eretz Yisroel has room for an extra parsha that year, compared to chutzah la'aretz. It will jump a week ahead then, and stay ahead until chutzah la'aretz has a double parsha and Eretz Yisroel not.

Sidros, cont.

	This year:
Scroll down your calendar for the year and see • where the parshiyos get pushed away by the major Yomim Tovim • and how many times they need to be doubled to make things fit – to use all 54 sidros.	 • בש"ז leap year. On Shabbos: Chol Hamoed Sukkos, first day of Pesach - *and* the last day but only in chutzah la'aretz. • It turns out we are going to need one double parsha in chutza la'aretz (Matos-Masei) – and none at all in Eretz Yisroel.

C) Yomim Tovim and Sidros

1) Pick a calendar
    - Keviyus page
    - Find this year's calendar
2) Yomim Tovim
3) Sidros
    - Introduction
    - Arranging the sidros

Sidros – Arranging the sidros

We do this in stages, working between benchmarks.

1) Beginning the year

2) Pesach

3) Shavuos

4) Tisha B'Av

5) Nitzavim-Vayeilech

Plus - some changes between Eretz Yisroel and chutzah la'aretz

(A fuller description is in the separate Sidros.pptx)

1) Arranging the sidros – beginning the year

	On Keviyus page:
• No sidros are ever combined until Adar - in olden times they wouldn't know till then if it would be a leap year!	• Scroll down to Adar • It can help to open *two* calendars, side by side.
• In a regular year we need to catch up about four weeks, so in a leap year all of Vayakhel-Pekudei, Tazria-Metzora, Acharei-Kedoshim, Behar-Bechukosai are separate.	• Go from פשוטה years to מעוברת years (right to left) and compare – Nisan on one side, Adar II on the other.
• But three of these pairs are after Pesach. So regular years won't catch up to leap years until around Shavuos.	• Scroll to Pesach and Shavuos, checking both sides.

2) Arranging the sidros – Pesach

	On Keviyus page:
• Parshas **Tzav** is always right before Pesach for a peshutah.	• Check this for all calendars.
• This *usually* requires Vayakhel-Pikudei to be doubled: it's the only double parsha before Tzav.	• It can help to open *two* calendars, side by side – one near Simchas Torah, the other near Pesach.
• A leap year has (at least) 4 extra Shabboses. • There are *no* double parshiyos before Pesach. • You get to Parshas **Metzora**, or **Acharei Mos**, before Pesach.	• On some leap years, you just run out of room – you can't help getting to Parshas Acharei Mos without any double parshiyos at all.

3) Arranging the sidros – Shavuos

	On Keviyus page:
• There are exactly six Shabboses between Pesach and Shavuos.	• Scroll to show them. (It's easiest to use Line up by Pesach from here on.)
• The regular years catch up now, with Tazria-Metzora, Acharei Mos-Kedoshim, Behar-Bechukosai.	• See the regular years catch up.
• Both kinds of year get to Parshas **Bamidbar** just before Shavuos.	
• For some leap years we were already a week ahead before Pesach, so we can't help getting to Parshas **Naso** instead before Shavuos.	• For the calendars starting with Thursday (ה), scroll to see how it stays a week ahead.

4) Arranging the sidros – Tisha B'Av

	On Keviyus page:
• This is where we catch up completely.	
• Parshas **Devarim** is always right before Tisha B'Av. That's 10 sidros from Bamidbar (9 from Naso).	• In left-hand pane, see Bamidbar to Devarim.
• If there are 8 Shabboses after Shavuos, we need to combine two sets of sidros.	• The two sets are Chukas-Balak, Matos-Masei. If just one, Matos-Masei.
• If there are 9 Shabboses after Shavuos, we'll only combine one set of sidros.	
• If we reached Naso before Shavuos, we may not combine either.	

5) Arranging the sidros – Nitzavim-Vayeilech

	On Keviyus page:
- Parshas **Nitzavim** is always right before Rosh Hashanah. - That leaves Vayeilech and Ha'azinu. V'zos Habrocha is on Simchas Torah, doesn't count. - There is exactly 1 Shabbos between Rosh Hashanah and Yom Kippur. - If Rosh Hashanah falls on Monday or Tuesday, there is *another* Shabbos between Yom Kippur and Sukkos. If so, Vayeilech will be needed for Shabbos Shuvah, and Ha'azinu before Sukkos. - Otherwise, Nitzavim-Vayeilech is doubled.	- From Devarim to Nitzavim is seven sidros, in seven weeks, for all calendars. - When there's a Shabbos between Yom Kippur and Sukkos, see (at the *end* of the calendars) how that adds an extra parsha. - Doesn't matter if the year is פשוטה or מעוברת.

6) Eretz Yisroel and chutzah la'aretz

	On Keviyus page:
• Only two days can be a Yom Tov in chutzah la'aretz and chol in Eretz Yisroel: Acharon shel Pesach and the second day of Shavuos. • [Chol Hamoed overrides the leining anyhow, and Shemini Atzeres never falls on Friday.]	• For headers ending with ז"‗ (such as this year, בש"ז) it starts with Acharon shel Pesach. • For headers ending with ה"‗ it starts with Shavuos.
• When that happens, Eretz Yisroel is a week ahead of chutzah la'aretz till we get a double parsha in chutzah la'aretz and not in Eretz Yisroel.	• Follow the sidros till they rejoin. • They don't always rejoin first chance they get.

Contents

A. Introduction and overview

B. Days and months

C. Yomim Tovim and Sidros

D. Conclusion

    1) The civil calendar

    2) Acknowledgements

The civil calendar

- One step remains – matching our Hebrew calendar with the civil (English) calendar.

- We aren't going to go through it in detail.

- The Rishonim (Rambam, Tur, etc.) did not bother with this at all.

- It has become important in the last few centuries, as our connection with the non-Jewish society has grown, especially if we use the non-Jewish calendar for everyday living.

The civil calendar, cont.

- The Rishonim did explain a related task: when to start saying ותן טל ומטר in חו"ל, 60 days after the autumnal (fall) equinox – a *solar* date.

- The calculation [תקופת שמואל"] corresponds to the Julian calendar, where a year is exactly 365.25 days – a civil leap year (on Feb. 29) every four years.

- That was replaced in 1582 by today's *Gregorian* calendar, which has a more complex rule for leap years. They also did a one-time 11-day adjustment to get back in synch with the sun.

- You currently end up with Dec. 4th (or 5th in a civil leap year).

- Once that date is calculated, you can find all other corresponding civil dates. For example, Dec. 4 is the 338th day of the solar year, 337 days from Jan. 1.

D) Conclusion

- This year's calendar is complete. Do it again next year!
- Thanks for watching!