

This year's calendar

5784

How to understand it

How to calculate it

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- A. Introduction and overview
- B. Choosing the calendar
- C. Yomim Tovim and Sidros
- D. Conclusion

Introduction

- 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.
- The Torah says that our calendar months should be set by the lunar cycle: החודש הזה לכם. A month begins with the sighting of the new moon. That happens 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.

Introduction

- For the first half of our history, the solution was to adjust 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. Since a lunar month is about 29 and a half days, they added an extra day about half the time.
- The Sanhedrin also decided each year whether to add Adar II, a thirteenth month, if it did not seem that spring would arrive before Pesach. A solar year is 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 a 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 - 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.
- Tiferes Yisrael, Sh'vilei d'rakia (at end of Seder Moed)
- 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/miymnimichoel> (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 תשפ"ד - 5784.

- Choose a calendar:
 - 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 day for this Rosh Hashanah and for the next.
 - 5) Choose the calendar.
- Arrange the chosen calendar:
 - 6) Find all the days of Rosh Chodesh, and all the yomim tovim.
 - 7) Determine the Torah readings (סדרות).
 - 8) Connect the calendar to the civil calendar.

Overview, cont. – choose a calendar

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 – (גז"ח אדז"ט).
- The number of the year we are calculating tells us which one it is.

Overview, cont. – choose a calendar

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 within a second. (אי"ב תשצ"ג)
- Knowing the number of years (and months) since Creation, knowing the starting point, and knowing the length of a month - calculate the moment of the molad.
- This is an exact time, not a day.

Overview, cont. – choose a calendar

3) Find the molad for the *next* Tishrei

- Repeat the process for the following year.
- To the result for *this* Tishrei, 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. – choose a calendar

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 – but not always!
- 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. – choose a calendar

5) Choose the calendar

- From the weekday of the first Rosh Hashanah, and the second, we know the length of the year. (שלימה, כסידרה, חסירה)
- That length, plus the starting week-day, plus whether it's a leap year or not, determines the full calendar.
- There are only fourteen possible calendars.
- *Chazal already worked out every detail of each of them. We're really done.*
The rest of the steps here will just describe how they did it.

Overview, cont. – arrange the chosen calendar

6) 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 weekdays are Rosh Hashanah at the beginning and end, we know 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 as well.

Overview, cont. – arrange the chosen calendar

7) Determine the Torah readings (סדרות).

- Now that the calendar is set up, we can see how many weekly Torah readings are needed – just count available Shabboses.
- We decide how many parshiyos need to be doubled up to fit.
- This was already done by Chazal for every possible calendar, but they gave some principles for how they decided which ones to double up.
- The results can be different in Eretz Yisroel and in chutzah la'aretz.

Overview, cont. – arrange the chosen calendar

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

- We are not actually going to do this step – just explain it.
- The קדמונים showed how to 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.

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B) Choosing the calendar

Okay, let's get started and really do it!

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

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

1) Peshuta or m'uberes?

	This year:
<ul style="list-style-type: none">• The regular years (peshutos) and leap years (m'ubaros) are in a repeating nineteen year cycle.• 7 leap years plus 12 regular years is 235 months. 235 lunar months is very close to 19 solar years.• Take the number of the year, take the remainder divided by 19.• The siman ג' ח"ט אדז"ט tells which ones are leap years: 3,6,8,11,14,17,19.	<ul style="list-style-type: none">• $7 \times 13 + 12 \times 12 = 235$• 235 months - 19 solar years = about two hours• $5784 \bmod 19 = \text{remainder } 8$• So this year is "ח", a leap year (מעוברת).

B) Choosing the calendar

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2) Introduction – how to calculate

- We use **day** of the week (1-7), **hours**, **chalakim** (reverse order in Hebrew).
- All our calculations use this triplet of numbers.
- 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.
- 1 chelek = $3\frac{1}{3}$ sec., 1080 chalakim = 1 hour, 24 hours = 1 day.
- Also 7 days = 1 week. But –
We don't normally need to worry about the weeks at all. Chazal set it up that it's enough to determine *the time for the molad within the week*.

How to calculate - example

- If you'd want to add 4 days, 18 hours, 443 chalakim (ד"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

- Basic procedure:
 - 1) Find how many months there are, from creation till the molad of this year's Tishrei. Remember that some years are leap years and some regular years.
 - 2) From the calendar's *starting point*, add the time for that many months.
 - 3) Now: what day of the week and time of day is that?

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 is part of Chazal's design to make things simpler.
- Instead of counting all those months, we can break the job into pieces:
 - 1) 19-year cycles, 2) additional regular years, and 3) additional leap years.

How to calculate - standard shifts, cont.

- The *starting point* is set near the beginning of the `_year_` one, but at בהר"ד: Monday, 5 hours, 204 chalakim.
- Amazingly enough, this is an *imaginary time*, before the world was created! Chazal could 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 adding one year to it, you do get Friday morning of 1 Tishrei the *next* year, year 2, the day when First Man was created.

How to calculate - standard shifts, cont.

To the starting point, we'll add multiples of the following *four 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 – built out of 12 of these months = ד"ח תתע"ו:
4 days, 8 hours, 876 chalakim
- Shana m'uberes - built out of 13 of these months = ה"א תקפ"ט:
5 days, 21 hours, 589 chalakim
- 19 year cycle - 19 years with 7 m'ubaros and 12 peshutos = ב"י"ו תקצ"ה:
2 days, 16 hours, 595 chalakim.

Each of these tells how far the molad moves after that many months. No weeks!

Calculator

So you don't have to do this yourself:

Year Month

	Days	Hours	Chalakim	Multiplier	Description (optional)
Input	2	5	204	<input type="text" value="1"/>	initial starting point (בהר"ד)
+Input	2	16	595	<input type="text" value="304"/>	19-year cycle (בי"ו תקצ"ה)
+Input	4	8	876	<input type="text" value="4"/>	1 peshutah (regular year, 12 months) (ד"ה תתע"ו)
+Input	5	21	589	<input type="text" value="2"/>	1 m'uberes (leap year, 13 months) (הכ"א תקפ"ט)
+Input	1	12	793	<input type="text" value="0"/>	1 month (אי"ב תשצ"ג)
+Input	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	Other
= Output	2	3	6		
The molad will be Sunday night, 9:00 pm and 6 chalakim					

B) Choosing the calendar

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3) Find the molad for this year's Tishrei

(If you know last year's molad it's easier, start from there. Otherwise,)

This year:

1. The starting point is the year zero, בהר"ד (Monday, 5 hours, 204 chalakim)
2. Find the number of 19 year cycles
3. Add (the number of 19 year cycles) * (the shift ביו תקצ"ה for each one)

- **(2,5,204)**
- **$5783 \div 19 = 304$** 19-year-cycles
- **$304 * (2,16,595) = (5,15,520)$**

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

	This year:
4. Using ג"ח אדז"ט, see how many peshutos (P) and how many m'ubaros (M) there have been already in this cycle.	<ul style="list-style-type: none">• $5784 \# 19 = \text{remainder } 8$, so 5 peshutos so far, 2 m'ubaros. P=5, M=2.
5. Add the shift for each: (P * ד"ח תתע"ו) + (M * ט"א תקפ"ט)	<ul style="list-style-type: none">• $(5 * (4,8,876)) +$ $(2 * (5,21,589)) =$ (5,15,158)
Add <u>all</u> of these_ [i.e., the results of 1., 3., and 5.] up for this year's molad	<ul style="list-style-type: none">• = (5,11,882) = Friday, 5:49 am
<ul style="list-style-type: none">• Remember – we don't care about the weeks!	(On the Calculator, you would enter multipliers 1, 304, 5, 2, 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 <i>different</i> month, say for announcing the molad in shul, also add the number of additional months * אי"ב תשצ"ג	<ul style="list-style-type: none">• Say for Cheshvan for this year: 1 additional month, so add (1,12,793) to the (6,11,882) we got for Tishrei. = (1,0,595) = [Saturday] night, 6:33 pm, 1 chelek.• (On the Calculator, the multipliers are now 1, 304, 5, 2, 1, 0.)

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

	This year:
<ul style="list-style-type: none">• Add one more year's shift, either peshuta (ד"ח תתע"ו) or m'uberes (הכ"א תקפ"ט) whichever this year is.• We now have the molad for Tishrei this year, and next year.• They are exact times, not days.	<ul style="list-style-type: none">• $5785 \# 19 = \text{remainder } 9$. 8th year, add one m'uberes shift (5,21,589) to (6,11,882) from above = (5,9,391)• (On the Calculator, the multipliers are now 1, 304, 5, 3, 0, 0.)• This year and next year: (6,11,882) and (5,9,391)

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4) Find Rosh Hashanah – the four dechiyos

	This year:
<ul style="list-style-type: none">For the actual calendar, we need to find the <i>day of the week</i> (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 <i>when its molad was</i>.Not always! – In four situations either one is moved later.This is pretty common.	<ul style="list-style-type: none">This time, those days would be: Friday for this year (from 6,11,882 calculated above) and Thursday for next year (from 5,9,391 calculated above).We'll see!

4) Find Rosh Hashanah – the Four Dechiyos

The ד' דחיות where they are moved *later* (never earlier):

- 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:
<ul style="list-style-type: none">• 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.	<ul style="list-style-type: none">• (6,11,882), (5,9,391): both are before noon.• No move (so far).

4b) The four dechiyos – לא אד"ו ראש

	This year:
<p><i>After you did the first dechiyah:</i></p> <ul style="list-style-type: none">• 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 <i>two</i> days.	<ul style="list-style-type: none">• This year's RH (5,11,882) is on Friday – <i>not</i> allowed. RH moves to Shabbos.• Next year's RH (5,9,391) is on Thursday – allowed.

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:

- Chazal only allowed three lengths to a year: 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.)
- By *comparing the day of this year's Rosh Hashanah to next year's*, you can tell which it is.

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 ה"א תקפ"ט: 5 days, 21+ hours. That was a shift in time-of-day within the week.
- 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.

Length of year - summary

	שלימה	כסידרה	חסירה
פשוטה	5 day shift (355 days)	4 day shift (354 days)	3 day shift (353 days)
מעוברת	7 day shift (385 days)	6 day shift (384 days)	5 day shift (383 days)

- You see now why we never worry about the weeks. That's the easy part; we really just need to figure out the days: that tells us which of these years it is.

4c) The four dechiyos – ג"ט ר"ד

This year:

- Okay! When you do the first two dechiyos, you can find that the second one moved forward too far, so the stretched year ends up one day longer even than a "sheleimah" – not allowed.
 - You fix it by moving the first RH forward as well.
 - This turns out to happen in only one case: a regular פשוטה year, when the molad falls on Tuesday, after 9 hours, 204 chalakim (therefore called ג"ט ר"ד).
 - But then RH moves *two* days forward, as it can't fall on Wednesday either (rule (2), לא אד"ו ראש).
 - For the *second* Rosh Hashanah, the same, but there 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:

- | | |
|--|---|
| <ul style="list-style-type: none">• In the reverse direction, you can find that the first Rosh Hashanah moved forward too far, and the squished year is one day shorter even than a "chaseirah" - too short.• You fix it by moving the <i>second</i> 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 molad falls on Monday, after 15 hours, 589 chalakim (therefore called בט"ו תקפ"ט). That Rosh Hashanah gets moved to Tuesday.• For the <i>first</i> Rosh Hashanah, the same, but it would depend on <i>last year</i> being a leap year. | <ul style="list-style-type: none">• 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.

- 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:

- This year is a leap year (מעוברת).
- One dechiya this year. The first Rosh Hashanah (i.e., the first day of Rosh Hashana) this year moved to Shabbos, the one for the next year is on Thursday. 5 day shift, so the year is **short** (חסירה).

B) Choosing the calendar

- 1) Peshuta or m'uberes?
- 2) Introduction – how to calculate the molad
- 3) Find the molad
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- 4) Find Rosh Hashanah - the four dechiyos
- 5) Choose the calendar
 - The Kevius page
 - Find this year's calendar

Choose the calendar

- We can now choose the calendar for the year.
- It turns out there are only fourteen possible calendars, total: seven for regular years, seven for leap years.
- To help visualize this, this is a chart in the Tur, Orach Chaim, 428.

חזרות העיבור

שפת השנים הפשוטות										אלה מעידים "מקרא קדוש אשר תקראו אותם במעדים"										שפת השנים המעורבות										
ב	ב	ג	ה	ה	ז	ז	ח	ח	ט	ב	ב	ג	ה	ה	ז	ז	ח	ח	ט	ז	ב	ב	ג	ה	ה	ז	ז	ח	ח	ט
ב	ב	ג	ה	ה	ז	ז	ח	ח	ט	ב	ב	ג	ה	ה	ז	ז	ח	ח	ט	ז	ב	ב	ג	ה	ה	ז	ז	ח	ח	ט
ד	ד	ה	ז	ז	ח	ח	ט	ט	כ	ד	ד	ה	ה	ז	ז	ח	ח	ט	כ	ד	ד	ה	ה	ז	ז	ח	ח	ט	כ	ד
ד	ד	ה	ז	ז	ח	ח	ט	ט	כ	ד	ד	ה	ה	ז	ז	ח	ח	ט	כ	ד	ד	ה	ה	ז	ז	ח	ח	ט	כ	ד
א	א	ב	ד	ד	ז	ז	ח	ח	ט	א	א	ב	ד	ד	ז	ז	ח	ח	ט	א	א	ב	ד	ד	ז	ז	ח	ח	ט	א
נ	נ	ד	ה	ה	ז	ז	ח	ח	ט	נ	נ	ד	ה	ה	ז	ז	ח	ח	ט	נ	נ	ד	ה	ה	ז	ז	ח	ח	ט	נ
ה	ה	ז	ז	ח	ח	ט	ט	כ	כ	ה	ה	ז	ז	ח	ח	ט	ט	כ	כ	ה	ה	ז	ז	ח	ח	ט	ט	כ	כ	ה
א	א	ב	ד	ד	ז	ז	ח	ח	ט	א	א	ב	ד	ד	ז	ז	ח	ח	ט	א	א	ב	ד	ד	ז	ז	ח	ח	ט	א
ו	ו	ז	ח	ח	ט	ט	כ	כ	כ	ו	ו	ז	ח	ח	ט	ט	כ	כ	כ	ו	ו	ז	ח	ח	ט	ט	כ	כ	כ	ו
א	א	ב	ד	ד	ז	ז	ח	ח	ט	א	א	ב	ד	ד	ז	ז	ח	ח	ט	א	א	ב	ד	ד	ז	ז	ח	ח	ט	א
ז	ז	ח	ח	ט	ט	כ	כ	כ	כ	ז	ז	ח	ח	ט	ט	כ	כ	כ	כ	ז	ז	ח	ח	ט	ט	כ	כ	כ	כ	ז
כ	כ	כ	כ	כ	כ	כ	כ	כ	כ	כ	כ	כ	כ	כ	כ	כ	כ	כ	כ	כ	כ	כ	כ	כ	כ	כ	כ	כ	כ	כ
כ	כ	כ	כ	כ	כ	כ	כ	כ	כ	כ	כ	כ	כ	כ	כ	כ	כ	כ	כ	כ	כ	כ	כ	כ	כ	כ	כ	כ	כ	כ
א	א	ב	ד	ד	ז	ז	ח	ח	ט	א	א	ב	ד	ד	ז	ז	ח	ח	ט	א	א	ב	ד	ד	ז	ז	ח	ח	ט	א
ב	ב	ג	ה	ה	ז	ז	ח	ח	ט	ב	ב	ג	ה	ה	ז	ז	ח	ח	ט	ב	ב	ג	ה	ה	ז	ז	ח	ח	ט	ב
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Choose the calendar – the Keviyus page

- A maybe fancier version of that chart:

סדרות

בראשית
נח
לך לך
וירא
חיי שרה
תולדות
ויצא
וישלח
וישב
מקץ
ויגש
ויחי
שמות
וארא
רא

מעוברת

זש"ה	זח"ג	הש"ג	הח"א	גכ"ז	בש"ז	בח"ה
תשרי ר"ה 1	תשרי ר"ה 1	תשרי ר"ה 1	תשרי ר"ה 1	תשרי ר"ה 1	תשרי ר"ה 1	תשרי ר"ה 1
ר"ה 2	ר"ה 2	ר"ה 2	ר"ה 2	ר"ה 2	ר"ה 2	ר"ה 2
צו"ג 3	צו"ג 3	3 האזינו	3 האזינו	צו"ג 3	צו"ג 3	צו"ג 3
4	4	צו"ג 4	צו"ג 4	4	4	4
5	5	5	5	5 וילך	5	5
6	6	6	6	6	6 וילך	6 וילך

Move to
פשטה →

Line up by
ר"ה

Line up by
day of week

Move to
ש"ת

חנוכה

אדר

פסח

שבועות

ט' באב

נצבים

B) Choosing the calendar

- 1) Peshuta or m'uberes?
- 2) Introduction – how to calculate the molad
- 3) Find the molad
 - for Tishrei this year
 - and for next year
- 4) Find Rosh Hashanah - the four dechiyos
- 5) Choose the calendar
 - The Kevius page
 - Find this year's calendar

Choose the calendar – find this year's calendar

	This year:
<ul style="list-style-type: none">• There are only 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.• Choose the correct calendar from those seven.• The first letter in the title at the top is the <i>day of the week of the initial Rosh Hashanah</i>.• The second is “ח” for chaseirah, “כ” for k'sidra, “ש” for sheleimah.	<ul style="list-style-type: none">• This year is a leap year. If the page header is פשוטה, click on the central pane and scroll right, or click the “מעוברת” button.• Rosh Hashanah at the beginning of this year is Shabbos – ז, the year is chaseirah. So the title should begin with חז. That matches גח”ג – the second one from the left.

Choose the 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.

ד' שערים Four gates

If molad Tishrei \geq	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	בש"ז			בש"ז
1d 20h 491ch				בש"ז
2d 15h 589ch	גכ"ה			גכ"ז
2d 18h 0ch				גכ"ז
3d 9h 204ch	הכ"ז			הח"א
3d 18h 0ch				הח"א
4d 11h 695ch	הש"ג			הש"ג
5d 9h 204ch				הש"ג
5d 18h 0ch	זח"א			זח"ג
6d 0h 408ch				זח"ג
6d 9h 204ch	זש"ג			זש"ה
6d 20h 491ch				זש"ה

(6d 11h 882ch)

Contents

- A. Introduction and overview
- B. Choosing the calendar
- C. Yomim Tovim and Sidros
- D. Conclusion

C) Yomim Tovim and Sidros

- 1) Establish the months
- 2) Yomim tovim
- 3) Sidros
 - Introduction
 - Arranging the sidros

Establish the months

We have our calendar. Now we determine the length of each of the months.

- Months can be either 29 days (כח) with one day of Rosh Chodesh at the end, or 30 days (כ"ט), 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, never vary. Roughly, they alternate:
 - 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.

Establish the months, cont.

	This year:
<ul style="list-style-type: none">Only two months, Cheshvan and Kislev, can vary: either 29 or 30 days. <i>That's</i> 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.If you know (a) if it's a leap year, and (b) if it's chaseirah, k'sidrah, or sheleimah, you can establish all the months.	<ul style="list-style-type: none">This year is a leap year and a chaseirah.So the sequence this year is Tishrei 30, Cheshvan 29, Kislev 29, Teves 29, Shvat 30, Adar I 30, Adar II 29, Nisan 30, Iyar 29, Sivan 30, Tammuz 29, Av 30, Elul 29. Total days: 383

C) Yomim Tovim and Sidros

- 1) Establish the months
- 2) Yomim tovim
- 3) Sidros
 - Introduction
 - Arranging the sidros

Yomim Tovim

	This year:
<ul style="list-style-type: none">• 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. Special cases:• Chanukah is always eight days, whether Rosh Chodesh Teves is one day or two, so Chanukah may end on 2 Teves or 3 Teves.• Fast days get pushed forward if they fall on Shabbos.	<ul style="list-style-type: none">• Scroll down through calendar בש"ה to see where this year's yomim tovim fall.• This year Rosh Chodesh Teves is one day, so Chanukah ends on 3 Teves.• Both 17 Tammuz and Tisha B'Av are on Wednesday this year.

Establish the months, cont.

- We saw 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 right 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.

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 ("א-ת-ב-ש"):
 - 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 (ה)
 - 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)

Establish the months, cont.

	This year:
<p>Remember the <i>last</i> letter of the calendar's title (not in the Tur's chart, but common since then)?</p> <ul style="list-style-type: none">• 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.• One result of it is that all fourteen calendars have unique titles.• Using the Tur's <i>אֶת-בֵּשׁ</i>, it gives us a lot of other yomim tovim as well.	<ul style="list-style-type: none">• This year Pesach begins on Tuesday (א), as you can see by scrolling down on that calendar (or clicking on the button for כּוֹפּ on the right). So the correct calendar is titled א"ח.

C) Yomim Tovim and Sidros

- 1) Establish the months
- 2) Yomim tovim
- 3) Sidros
 - Introduction
 - Arranging the sidros

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 and deciding which ones to double
 - 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 readings that year. Count.
- 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.

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:
<p>Scroll down your calendar for the year and see</p> <ul style="list-style-type: none">• 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.	<ul style="list-style-type: none">• ג"ה leap year. On Shabbos: Rosh Hashanah, 1st day of Sukkos and Shemini Ateres, both י"ח and ל"ו.• Only Matos-Masei is doubled, and Nitzavim-Vayeilech - for both.

C) Yomim Tovim and Sidros

- 1) Establish the months
- 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:
<ul style="list-style-type: none">• No sidros are ever combined until Adar - in olden times they wouldn't know till then if it would be a leap year!• 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.• But three of these pairs are after Pesach. So regular years won't catch up to leap years until around Shavuos.	<ul style="list-style-type: none">• Scroll down to Adar• It can help to open <i>two</i> calendars, side by side.• Go from פשוטה years to מעוברת years (right to left) and compare – Nisan on one side, Adar II on the other.• Scroll to Pesach and Shavuos, checking both sides.

2) Arranging the sidros – Pesach

	On Keviyus page:
<ul style="list-style-type: none">• Parshas Tzav is always right before Pesach for a peshutah.• This <i>usually</i> requires Vayakhel-Pikudei to be doubled: it's the only double parsha before Tzav.• A leap year has (at least) 4 extra Shabboses.• There are <i>no</i> double parshiyos before Pesach.• You get to Parshas Metzora, or Acharei Mos, before Pesach.	<ul style="list-style-type: none">• Check this for all calendars.• It can help to open <i>two</i> calendars, side by side – one near Simchas Torah, the other near 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:
<ul style="list-style-type: none">• There are exactly six Shabboses between Pesach and Shavuos.• The regular years catch up now, with Tazria-Metzora, Acharei Mos-Kedoshim, Behar-Bechukosai.• 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.	<ul style="list-style-type: none">• Scroll to show them. (It's easiest to use Line up by Pesach from here on.)• See the regular years catch up.• 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:
<ul style="list-style-type: none">• 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).• If there are 8 Shabboses after Shavuos, we need to combine two sets of sidros.• 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.	<ul style="list-style-type: none">• In left-hand pane, see Bamidbar to Devarim.• The two sets are Chukas-Balak, Matos-Masei. If just one, Matos-Masei.

5) Arranging the sidros – Nitzavim-Vayeilech

On Keviyus page:

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| <ul style="list-style-type: none">• 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 <i>another</i> 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. | <ul style="list-style-type: none">• 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 <i>end</i> of the calendars) how that adds an extra parsha.• Doesn't matter if the year is מעוברת or פשוטה. |
|---|---|

6) Eretz Yisroel and chutzah la'aretz

On Keviyus page:

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|--|---|
| <ul style="list-style-type: none">• 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.]• 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. | <ul style="list-style-type: none">• For headers ending with ר"__ it starts with Acharon shel Pesach.• For headers ending with ח"__ it starts with Shavuos. Neither one, this year.• Follow the sidros till they rejoin.• They don't always rejoin first chance they get. |
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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.
- Easiest way is to keep track from last year!

The civil calendar, cont.

- The two calendars do not match up well:

Year	2017	2018	2019	2020	2021	2022	
Days	365	365	365	366	365	365	...
Year	5777	5778	5779	5780	5781	5782	
Days	353	354	385	355	353	384	...

- They bounce back and forth, longer and shorter.
- It averages out.

The civil calendar, cont.

- They aren't even the same *average* length.

Mean solar year	Gregorian year	Tekufas Rav Adda (19-year cycle)
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365.24219 days	365.2425 days	365.24677 days
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Difference/year:	.0003 days	0.0046 days/year
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< 1/2 min	~ 6 minutes
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- Our calendar has drifted around a week out of synch.
- Chazal could have made it more accurate (as they did with the months).
- Why, then? They chose to use the 19-year cycle, easier to calculate.

The civil calendar, cont.

- The Rishonim did explain a related task: when to start saying *ותן טל וברכה* in *ל"ו*, 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. Also there was a one-time 11-day adjustment to get back in synch with the sun.
- You currently end up with Dec. 4th (or 5th before a civil leap year like 2020).
- 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!

References

- Rambam, Hilchos Kiddush Hachodesh
- Tur, Orach Chaim, 428. The chart there is the basis of the Keviyus web page.
- Tiferes Yisrael, Sh'vilei d'rakia (at end of Seder Moed)
- Rabbi Nathan Bushwick, *Understanding the Jewish Calendar*, Moznayim, 1989.
- You can get this presentation and software tools at my website <https://sites.google.com/site/miymnimichael> (along with other divrei Torah).
- This whole presentation (for 5780) is available on youtube, linked on that Google Site.