

# COURSE: MEASUREMENT METHODS AND TOOLS

**Week 3.** System of units of physical quantities

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(Andijan Technical Institute)

# O'LCHASH USULLARI VA VOSITALARI

## **3-Ma'ruza.** Fizik kattaliklarning birliklar tizimi.

**Ma'ruzachi:** PhD. B.Xamdamov  
(Andijon davlat texnika Instituti)

## 3-Mavzu: Fizik kattaliklarning birliklar tizimi.

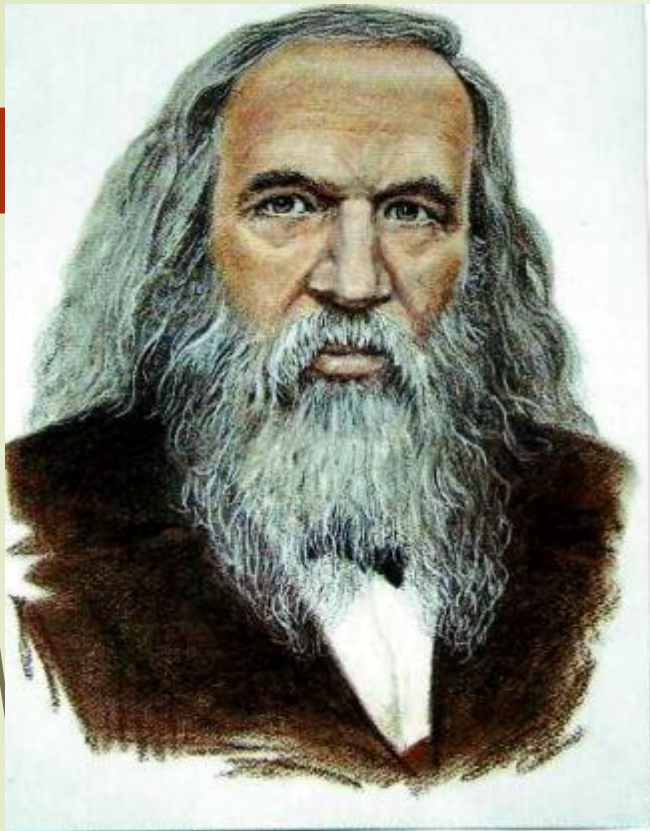
### Reja:

3.1 Fizik kattaliklar

3.2 Kattalikning o'lchamligi

3.3 Fizik kattaliklarni tasniflanishi

3.4 O'lchash va nazorat haqida tushuncha



Yandex Images. (n.d.). *Portrait of D. I. Mendeleev* [Image]. Retrieved September 22, 2025, from <https://avatars.mds.yandex.net/i?id=f40b729a63e9d70c6e6c425d00e9eb9c2c2e42df-12406511-images-thumbs&n=13>

**“O'lchash  
boshlanganda ilm-fan  
boshlanadi.  
Aniq fanni o'lchashsiz  
tasavvur qilib  
bo'lmaydi”**

**D.I. Mendeleev**



Google Images. (n.d.). *Measurement units illustration (kg, m, s)* [Image]. Retrieved September 22, 2025, from <https://encrypted-tbn3.gstatic.com/images?q=tbn:ANd9GcSNZ0EkSa6F3KVWi37LVT8A3MsVtI0sKrWdhT8Ztks0Jy5tFFRE>

Jismlarning yoki fizik hodisalarning ba'zi *parametrlarini* tajriba yordamida o'lchash mumkin.  
Bu parametrlar *fizik kattaliklar* deb ataladi.

Masalan, jismning *uzunligi, hajmi, temperaturasi, massasi* va h.k.

Aynan bitta kattalik turli fizik hodisa va jismlarning aynan bitta xossasini xarakterlash uchun ishlatiladi.


Masalan: **qadamning uzunligi, stolning uzunligi, arqonning uzunligi.**

Lekin bu kattalik yuqorida aytilgan holatlar uchun turli qiymatga ega bo‘ladi. Fizik kattalikni miqdor jihatidan aniqlash uchun uning son qiymatini va birligini bilish kerak.

Masalan, maktabda dars 45 minut davom etadi deyilganda «*vaqt*» deb ataluvchi fizik kattalik ikkita qismdan iborat holda ifodalanadi.

Birinchi – 45 raqami uning son qiymatini, ikkinchi – «*minut*» so‘zi birligini bildiradi.

Vaqtни minutdan tashqari soatlarda, sekundlarda ham ifodalash mumkin.



Shunga ko‘ra birliklarni o‘lchash uchun 1960-yilda Xalqaro Birliklar Tizimi (XBT) qabul qilingan.

Masalan, Xalqaro birliklar sistemasi (XBS) da uzunlikning birligi sifatida kelishuvga muvofiq **metr** (1 m), vaqtni o‘lchash uchun **sekund** (1 s), massani o‘lchash uchun **kilogramm** (1 kg) qabul qilingan.

**Kattalik** – sifat jihatdan ajratilishi va miqdor jihatdan o'lchanishi mumkin bo'lgan mahsulot, jarayon, modda, tizimning xossasi.



**O'lchash** – maxsus texnik vositalar yordamida tajriba yo'li bilan fizik kattalik qiymatini topish.

Google Images. (n.d.). *Scientific illustration* [Image]. Retrieved September 22, 2025, from <https://encrypted-tbn3.gstatic.com/images?q=tbn:ANd9GcT6q9Y5ASSuwFWU8VD8tlklhhcvZ-4iBVZ2mkhU15-1E9kpAkrk>



Google Images. (n.d.). *Measurement diagram* [Image]. Retrieved September 22, 2025, from <https://encrypted-tbn3.gstatic.com/images?q=tbn:ANd9GcQVkJ0HeC8ZG0-0Rpqk7fgpODFK48meKd50fdlga2eQwGHYGzNhS>

## kattalikning o'lchamligi

har bir xossa ko'p yoki kam darajada ifodalanishi, ya'ni miqdor tavsifiga ega bo'lishi mumkin ekan, demak bu xossani ham o'lchash mumkin.

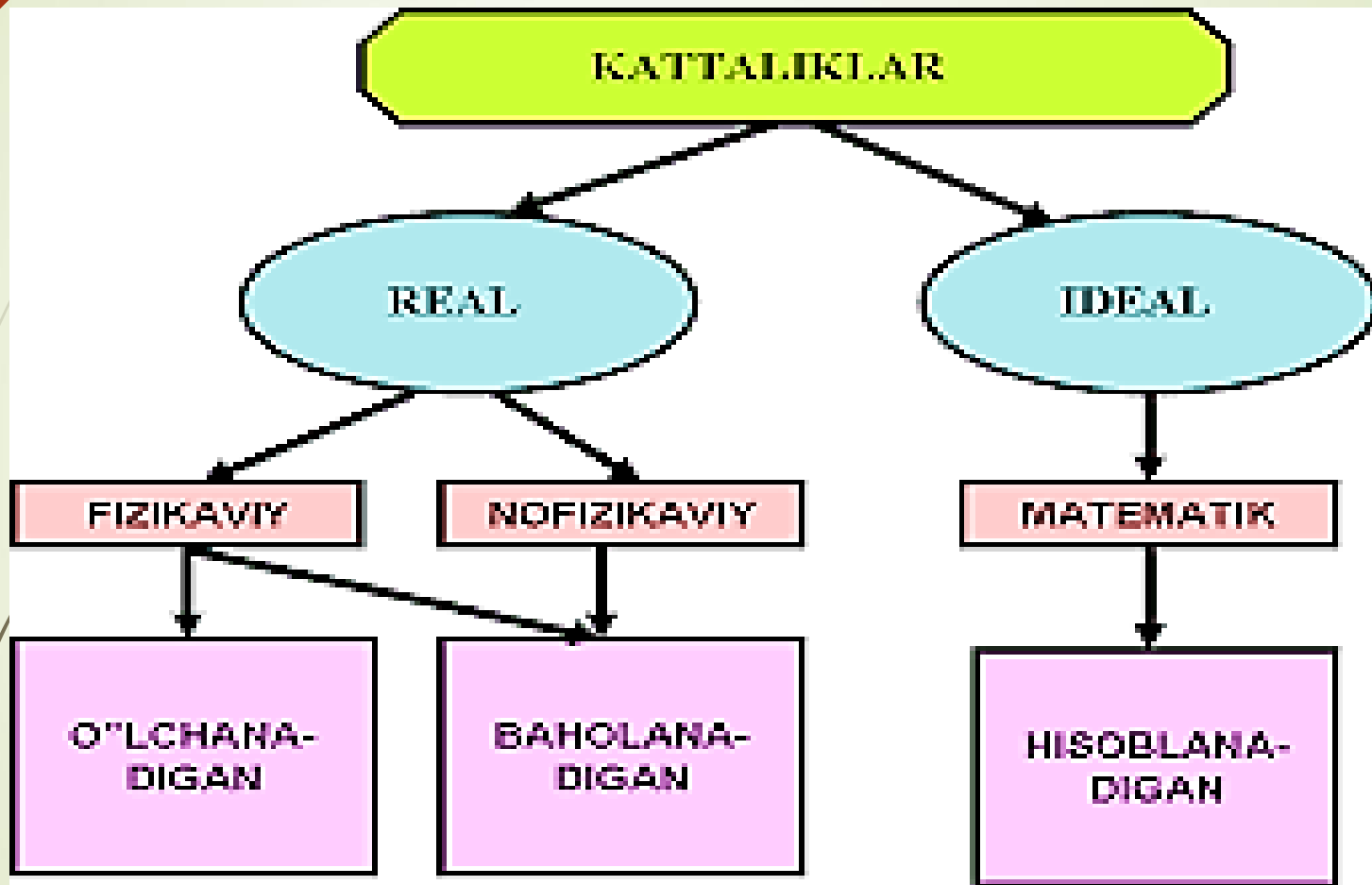
shu kattalikning tizimdagi asosiy kattaliklar bilan bog'ikligini ko'rsatadigan va proportsionallik koeffitsienti 1 ga teng bo'lgan ifodaga aytiladi.

**kattalikning o'lchamligi** -o'lcham, o'lchamlik ma'nosini bildiradigan **dimension** (inglizcha) so'zga asoslangan holda **dim** simvoli bilan belgilanadi.

Odatda, asosiy kattaliklarning o'lchamligi mos holdagi bosh xarflar bilan belgilanadi

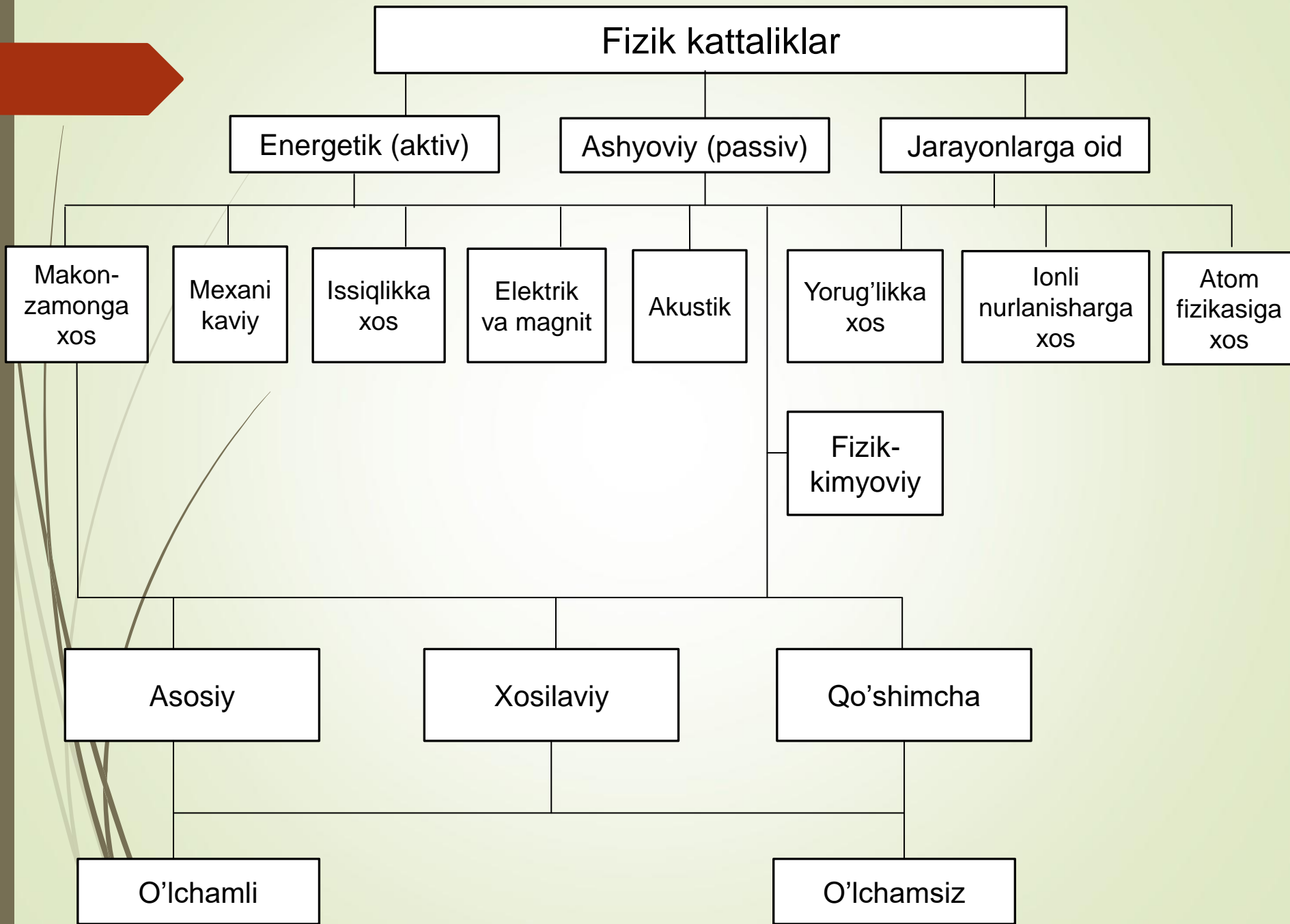
masalan, **uzunlik** - **dim 1** = L; **massa** - **dim m** - m; **vakt** **dim t** = T.

# Kattaliklarning tasniflanishi



Savol-javob.com. (2023, January). *O'lchov vositalari bo'yicha ko'rgazmali rasm* [Image]. Retrieved September 25, 2025, from <https://www.savol-javob.com/wp-content/uploads/2023/01/%D0%91%D0%B5%D0%B7-%D0%BD%D0%B0%D0%B7%D0%B2%D0%B0%D0%BD%D0%B8%D1%8F.png>

# Fizikaviy kattaliklarni tasniflashi



**Erkin fizik kattaliklar  
Asosiy kattaliklar  
deyiladi**

**Erkin kattaliklarning funksiyalari  
Hosilaviy kattaliklar deyiladi**

# Kattalik

Asosiy kattaliklar- ko'rilayotgan tizimga kiradigan va shart bo'yicha tizimning boshqa kattaliklariga nisbatan mustaqil qabul qilib olinadigan kattalikka aytiladi.

Vaqt, uzunlik, massa, harorat, tok kuchi, modda miqdori, yorug'lik kuchi,

Hosilaviy kattaliklar- deb tizimga kiradigan va tizimning kattaliklari orqali ifodalanadigan kattalikka aytiladi.

Tezlik, tezlanish, kuch,...

**Kattalikning  
birligi**

Ta'rifi

*Kattalikning birligi deb – ta'rif bo'yicha soniy qiymati 1ga teng qilib olingan kattalik tushuniladi.*

**Asosiy birlik**

*Kattalikning asosiy birligi deb, birliklar tizimidagi ixtiyoriy ravishda tanlangan asosiy kattalikning birligiga aytiladi.*

**Hosilaviy birlik**

*Hosilaviy birlik deb, berilgan birliklar tizimining birliklaridan tuzilgan, ta'riflovchi tenglama asosida keltirib chiqariluvchi hosilaviy kattalikning birligiga aytiladi.*

## KATTALIKLARNING BIRLIKLARI

### ASOSIY BIRLIKLAR

1. Metr (uzunlik);
2. Kilogramm (massa);
3. Sekunda (vaqt);
4. Kelvin (Termodinamik harorat);
5. Mol (modda miqdori);
6. Amper (elektr toki kuchi);
7. Kandela (yorug'lik kuchi)

### HOSILAVIY BIRLIKLAR

1. Nyuton (kuch);
  2. M/s (tezlik);
  3.  $m/s^2$  (tezlanish);
  4. Paskal (bosim);
  5. Vatt (quvvat);
  6. Volt (kuchlanish)
- va boshqalar

## **Birliklar tizimi**

**bu ma'lum printsiplar asosida shakllangan, ba'zi kattaliklari erkin, boshqalari ularning funktsiyalari sifatida qabul qilingan fizik kattaliklar yig'indisidir.**



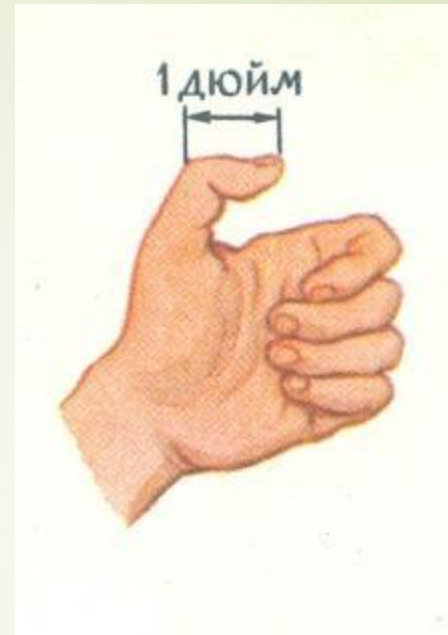
Google Images. (n.d.). *Units illustration* [Image]. Retrieved September 22, 2025, from <https://encrypted-tbn3.gstatic.com/images?q=tbn:ANd9GcSNZ0EkSa6F3KVWi37LVT8A3MsVtI0sKrWdhT8Ztks0Jy5tFFRE>

# Qadimiy o`lchov birliklari

Qadimda qo`llangan o`lchovlar – uzunlik, maydon, hajm, vazni ularning tarixiy rivojlanishida o`rganuvchi yordamchi tarixiy fan hisoblanadi. Ko'pincha o'lchov birliklari metrik tizimni tashkil etmaydi, ular an'anaviy o'lchov tizimlari deb ataladi.



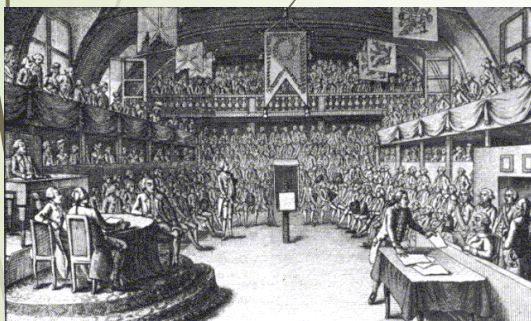
ru-static.z-dn.net. (n.d.). *Measurement illustration* [Image]. Retrieved September 22, 2025, from <https://ru-static.z-dn.net/files/d73/22b7e3a49343c3e20e095d4e064106c6.jpg>



kopilkaurokov.ru. (n.d.). *Educational illustration* [Image]. Retrieved September 22, 2025, from [https://fsd.kopilkaurokov.ru/uploads/user\\_file\\_54560412062a6/user\\_file\\_54560412062a6\\_1\\_7.jpeg](https://fsd.kopilkaurokov.ru/uploads/user_file_54560412062a6/user_file_54560412062a6_1_7.jpeg)



Google Images. (n.d.). *Scientific chart* [Image]. Retrieved September 22, 2025, from [https://encrypted-tbn2.gstatic.com/images?q=tbn:ANd9GcQAQQDfIX46C6\\_XDK\\_V-YK88ci38C3T8Ffj3Acbsq128BdRRqY1](https://encrypted-tbn2.gstatic.com/images?q=tbn:ANd9GcQAQQDfIX46C6_XDK_V-YK88ci38C3T8Ffj3Acbsq128BdRRqY1)



Wixstatic. (n.d.). *Historical image* [Image]. Retrieved September 22, 2025, from [https://static.wixstatic.com/media/7aa76e\\_9758e53c92e14f128c8947fa58cdb868.jpg/v1/fill/w\\_280,h\\_159,al\\_c,q\\_80,usm\\_0.66\\_1.00\\_0.01,enc\\_avif,q\\_uality\\_auto/7aa76e\\_9758e53c92e14f128c8947fa58cdb868.jpg](https://static.wixstatic.com/media/7aa76e_9758e53c92e14f128c8947fa58cdb868.jpg/v1/fill/w_280,h_159,al_c,q_80,usm_0.66_1.00_0.01,enc_avif,q_uality_auto/7aa76e_9758e53c92e14f128c8947fa58cdb868.jpg)

- ❑ **O'lchovlar metrik tizimi**— uzunlik birligi uchun **metr** asos qilib olingan fizik kattaliklar majmui. Dastlab, O'lchovlar metrik tizimiga, metrdan tashqari, yuza (kvadrat metr), **hajm** (kub metr), massa [**kilogramm** (4° dagi 1 dm<sup>3</sup> suvning massasi) o'lchovlari hamda **litr**, ar (yer yuzalarini o'lchash uchun)] va tonna (1000 kg) ham kirar edi.
- ❑ O'lchovlar metrik tizimi. fransuz olimlari (J.Borda, M.J.Kondorse, **P.Laplas**, G.Monj va boshqalar)dan tuzilgan komissiya taklifiga ko'ra, uzunlik birligi — metr uchun Parij geografik meridiani 1/4 uzunligining o'n milliondan bir qismi qabul qilingan.
- ❑ Fransiyada O'lchovlar metrik tizimini joriy qilish haqidagi kelishuv (dekret) 1795-yil 7-aprelda qabul qilinib, 1799-yilda platinadan metrning namunasi yasalgan. 1875-yil 17 ta mamlakat xalqaro birxillikni ta'minlash va o'lchovlar tizimini takomillashtirish maqsadida o'lchovlar haqidagi shartnomaga qo'l qo'ydi.



**1 metr**

KTOPOverit.ru. (n.d.). *Revolution photo* [Image]. Retrieved September 22, 2025, from [https://www.ktopoverit.ru/images/news/rozhdennaya\\_revolyutsiei31.jpg](https://www.ktopoverit.ru/images/news/rozhdennaya_revolyutsiei31.jpg)



**1 kilogramm**

Google Images. (n.d.). *Physics diagram* [Image]. Retrieved September 22, 2025, from [https://encrypted-tbn1.gstatic.com/images?q=tbn:ANd9GcSrgssI0xARlqw6Swi6lz7rFriJ4XO0QjtP6I\\_ufg5z06bZQWYr](https://encrypted-tbn1.gstatic.com/images?q=tbn:ANd9GcSrgssI0xARlqw6Swi6lz7rFriJ4XO0QjtP6I_ufg5z06bZQWYr)

**1976 yildan beri Parijda  
Vojirar ko'chasida yagona  
saqlanib qolgan metrning  
ommaviy etaloni**



Telegra.ph. (n.d.). *Measurement device photo* [Image]. Retrieved September 22, 2025, from <https://telegra.ph/file/10781da9d027a6705b834.jpg>

# Gaussning mutloq birliklar tizimi 1832 y.

millimetr,  
milligramm,  
sekund.



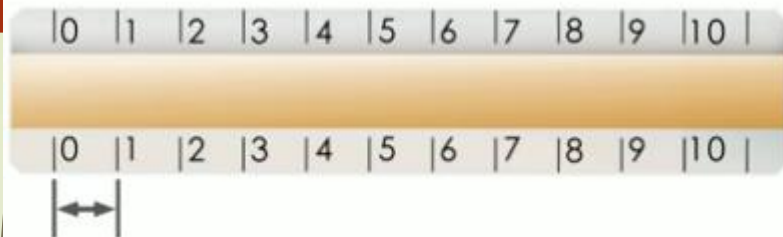
**Karl Fridrix Gauss**  
**1777-1855**

Google Images. (n.d.). *Educational illustration* [Image]. Retrieved September 22, 2025, from [https://encrypted-tbn1.gstatic.com/images?q=tbn:ANd9GcSFXyKuwZthqpK4toAgV9XqI\\_MRnviEke3gOTTqPa8r43NsRR1N](https://encrypted-tbn1.gstatic.com/images?q=tbn:ANd9GcSFXyKuwZthqpK4toAgV9XqI_MRnviEke3gOTTqPa8r43NsRR1N)

# SGS tizimi

Elektriklar xalqaro kongressi

Parij 1881 y.



Slovogriz.ru. (n.d.). *Centimeter image* [Image]. Retrieved September 22, 2025, from <https://www.slovogriz.ru/images/santimetr11155.jpg>

**1 santimetr**



**1 gramm**

Google Images. (n.d.). *Physics concept illustration* [Image]. Retrieved September 22, 2025, from [https://encrypted-tbn0.gstatic.com/images?q=tbn:ANd9GcT3Evl77qVheyjG76byipasUcwRget2BooMC0eF\\_6Jmqkg2dW5I](https://encrypted-tbn0.gstatic.com/images?q=tbn:ANd9GcT3Evl77qVheyjG76byipasUcwRget2BooMC0eF_6Jmqkg2dW5I)



Pinterest. (n.d.). *Measurement illustration* [Image]. Retrieved September 22, 2025, from <https://i.pinimg.com/236x/5f/92/08/5f9208bce257281216d12e9d338b4ce9.jpg>



**1 sekund**

Medium. (n.d.). *Scientific infographic* [Image]. Retrieved September 22, 2025, from [https://miro.medium.com/v2/resize:fit:3840/1\\*E6uep-Fy1PhWMqvIWzhj1g.jpeg](https://miro.medium.com/v2/resize:fit:3840/1*E6uep-Fy1PhWMqvIWzhj1g.jpeg)

**N.R.Kempbell fizikaviy ob'ektning barcha xilma-xil X xossalari ekvivalentlik, tartib va additivlik kabi 3 ta eng muhim umumiy ko'rinishdagi munosabatlarga ega ekanligini qayd etadi. Bu munosabatlarni matematik logikaning sodda postulatlarini orqali ifodalash mumkin.**



**Ekvivalentlik**  
**munosabati**



**Tartib**  
**munosabati**

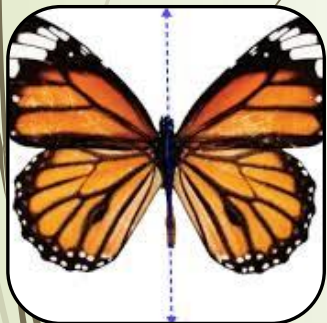


**Additivlik**  
**munosabati**

**Ekvivalentlik munosabati** - turli A va V ob'ektlarda muayyan X xossa bir xil yoki bir xil emas. Ekvivalentlik munosabati postulatları:



dixotomiya (o'xshashlik va farqlilik):  
 $X(A) \approx X(V)$  yoki  $X(A) \neq X(V)$ ;

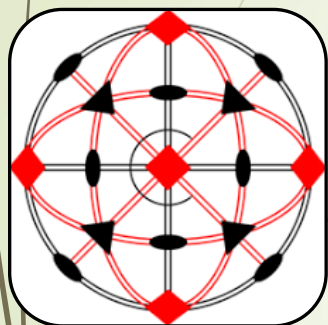


simmetriklik (ekvivalentlik munosabatining simmetrikligi): agar  $X(A) \approx X(V)$  bo'lsa,  
 $X(V) \approx X(A)$ ;



sifat bo'yicha tranzitivlik: agar  $X(A) \approx X(V)$  va  
 $X(V) \approx X(S)$  bo'lsa,  $X(A) \approx X(S)$ .

**Tartib munosabati** - turli A va V ob'ektlarda muayyan X xossa katta yoki kichik tartib munosabati postulatlarini:



antisimmetrik: agar  $X(A) > X(V)$  bo'lsa,  
 $X(V) < X(A)$ ;



xossaning intensivligi bo'yicha tranzitivlik (tartib munosabatining o'tishi):  $X(A) > X(V)$  va  $X(V) > X(S)$  bo'lsa,  $X(A) > X(S)$

**Additivlik munosabati** - turli oboektlarda bir jinsli xossalarni qo'shish mumkinligi. Additivlik munosabati postulatlar:



monotonlik (additivlikning bir tomonlama yo'nalganligi): agar  $X(A)=X(S)$  va  $X(V)>0$  bo'lsa,  
 $X(A)+X(V)>X(S)$ ;



kommutativlik (qo'shiluvchilarning o'rin almashuvchanligi):  $X(A)+X(V)=X(V)+X(A)$ ;



distributivlik:  $X(A)+X(V)=X(A+V)$ ;



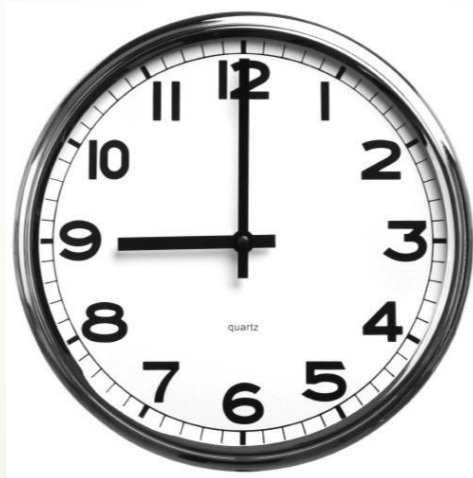
assotsiativlik:  $[X(A)+X(V)]+X(S)=X(A)+[X(V)+X(s)]$

## Tizimdan tashqari birliklar

hech bir tizimga mos kelmaydigan, ma'lum bir sohalarda yoki tarixiy an'analarda ulardan foydalanish qulayligi tufayli tark etilmaydigan hamda keng tarqalgan turli ko`rinishdagi birliklar.



Google Images. (n.d.). *Historical portrait* [Image]. Retrieved September 22, 2025, from [https://encrypted-tbn1.gstatic.com/images?q=tbn:ANd9GcSrgsSl0xARlqw6Swi6lz7rFriJ4XO0QjtP6l\\_ufg5z06bZQWyR](https://encrypted-tbn1.gstatic.com/images?q=tbn:ANd9GcSrgsSl0xARlqw6Swi6lz7rFriJ4XO0QjtP6l_ufg5z06bZQWyR)



MyIDs.ir. (n.d.). *Medical chart* [Image]. Retrieved September 22, 2025, from <https://hfile.myids.ir/files/formpanel/0B3FD19FDC89963BB3813642F1F5BD7F.jpg>



Pinterest. (n.d.). *Physics instrument* [Image]. Retrieved September 22, 2025, from <https://i.pinimg.com/736x/68/05/dc/6805dc92877497aa5407a22c3092af68.jpg>

# I - guruh

Keng qo`llaniladigan tizimdan tashqari muxim birliklar

**Uzunlik** - Angstrom, yorug'lik yili, parsek;

**Maydon** - ar, gektar;

**Hajm** - litr;

**Massa** - karat;

**Bosim** - atmosfera, bar, mm.cbv.ust, mm.suv.ust;

**Iссиqlik miqdori** - kaloriya;

**Elektr energiyasi** – elektron-volt, kWt-soat;

**Ionlashtiruvchi nurlanish** - rentgen, rad, kyuri,

## II - guruh

tizimning asosiy birliklaridan olingan,  
ammo o'nlik printsiptga zid bo'lgan  
tizimdan tashqari birliklar

**Vaqt – daqiqa (minut), soat;**



MyIDs.ir. (n.d.). *Health document* [Image]. Retrieved September 22, 2025, from <https://hfile.myids.ir/files/formpanel/0B3FD19FDC89963BB3813642F1F5BD7F.jpg>

## III - guruh

**eskirgan milliy birliklar**

**Uzunlik - arshin, sajen, dyuym, fut;**

**Og'irlik - funt**

**Quvvat - ot kuchi;**



Pinterest. (n.d.). *Medical illustration* [Image]. Retrieved September 22, 2025, from <https://i.pinimg.com/736x/a6/34/49/a63449fd68409acfd2ebcd39a426b5eb.jpg>



Google Images. (n.d.). *Scientific measurement photo* [Image]. Retrieved September 22, 2025, from [https://encrypted-tbn2.gstatic.com/images?q=tbn:ANd9GcQdCZy8MVt5\\_P5j7X9Y1YlaVcJzlb2rL7I3jCpNFwz2GpKAPFMV](https://encrypted-tbn2.gstatic.com/images?q=tbn:ANd9GcQdCZy8MVt5_P5j7X9Y1YlaVcJzlb2rL7I3jCpNFwz2GpKAPFMV)

Google Images. (n.d.). *Experimental photo* [Image]. Retrieved September 22, 2025, from <https://encrypted-tbn0.gstatic.com/images?q=tbn:ANd9GcShcf2UzKXLQeEF4KXxP3xzO9fO5krc04Uyn83E6eVVP13WmWlId>


# Metrologiyaning amaliy ahamiyati




O'lchash uchun sarflanadigan sarf-xarajat jamoatchilik mehnatining (10-15)% qismini tashkil etadi



Murakkab texnika ishlab chiqaruvchi sanoat tarmoqlarida bu ko'rsatkich (50-70) % gacha bo'yoqdan yetadi



Podshipniklarning texnik resursini 40% ga oshirish – dumaloqlikdan og'ish etalonining joriy qilinishi natijasidir



Nosilliqlik etaloni bo'yash ishlarida ishlatiladigan har bir tonna bo'yoqdan 1 kg qismini tejaydi.

# Metrologiya halol savdoni qo'llab-quvvatlaydi



standartlar, etalonlar moslashuvini, xalqaro e'tirof etilgan sertifikatlarni uyg'unlashtirish yo'li bilan quyidagilarga erishiladi:

- ✓ Bir mamlakatda ishlab chiqarilgan detallar boshqa davlatda yasalgan mashinalarga mos keladi
- ✓ Bir mamlakatda sinovdan o'tkazilib qo'llashga ruxsat berilgan qurilmani, hech qanday qayta texnik tekshiruvlarsiz boshqa davlatda sotish va ishlatish mumkin
- ✓ Bir davlatda qadoqlangan «1 kg» yorliqli tovar boshqa davlatda ham huddi shu miqdorda bo'ladi



## Metrologiya innovatsiyani jadallashtiradi:

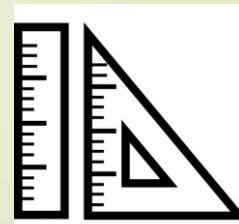


**O'lchash fani texnologiyaning imkon yetgan ishlarni amalga oshiradi va ilg'or ishlab chiqarish hamda asbobsozlikda sanoat innovatsiyasini jadallashtiradi**

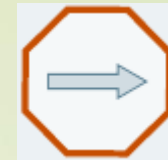
✓ Ishlab chiqarishning yuqori aniqlikdagi texnologiyalari jarayonlarni va mahsulotlarni yig'ilishini nazorat qilish imkoniga ega bo'lish uchun yuqori aniqlikdagi o'lchash usullari orqali qo'ldan qo'lga o'tib borishi lozim. masalan elektrik va mexanik mikro va nanotuzilmalar.



✓ “faqat mumkin bo'lganinigina o'lchash mumkin”



# Metrologiya reglamentlashni qo'llab quvvatlaydi



siyosiy hujjatlar, direktivalar ishlab chiqish, muvofiqlikni baholash va qiyoslash ishlarida o'lchashga asoslangan dalillar taqdim etish yo'li bilan.

*masalan*

- ✓ iste'molchilarni himoya qilishning muhim elementi sifatida, metrologik usullar gaz, energiya va suv hisoblagichlarida, alkotesterlar, supermarketlardagi tarozilar va sh.k.larda ruxsat etilgan xatolik chegarasidagi aniq o'lchashlar natijalarini aniqlaydi va aniq o'lchashlar o'tkazishga yordam beradi
- ✓ har bir litr benzina pul to'langan vaqtda aynan o'sha bir litr quyilganiga ishonamiz
- ✓ har yili iste'mol qilinadigan dunyo gazini o'lchashdagi 1 % xatolik milliard yevro yoki yevroni tashkil qiladigan iqtisodiy samaraga ega bo'ladi !



**Odamlar, hayvonlar va parrandalarni emlashda, viruslar miqdorini o'lchashdagi xato, salbiy holatlarda ommaviy o'lim hodisalari ro'y berishiga olib kelishi mumkin**



Lahisam.uz. (2014, July). *Doctor photo* [Image]. Retrieved September 22, 2025, from [https://lahisam.uz/wp-content/uploads/2014/07/1379479436\\_vrach\\_0.jpg](https://lahisam.uz/wp-content/uploads/2014/07/1379479436_vrach_0.jpg)

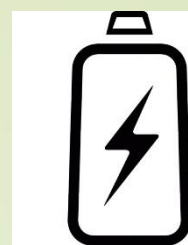
Google Images. (n.d.). *Technical photo* [Image]. Retrieved September 22, 2025, from [https://encrypted-tbn0.gstatic.com/images?q=tbn:ANd9GcQkTyEo8MrIBv8KZmtcfZyQqr5UYKTSm5Oz8fNj\\_aJAFu5767s](https://encrypted-tbn0.gstatic.com/images?q=tbn:ANd9GcQkTyEo8MrIBv8KZmtcfZyQqr5UYKTSm5Oz8fNj_aJAFu5767s)



Google Images. (n.d.). *Physics research illustration* [Image]. Retrieved September 22, 2025, from [https://encrypted-tbn3.gstatic.com/images?q=tbn:ANd9GcRyYJzDkJFjsUbS-U3\\_mD-aVXtihQK6-1xpY5BooZmJVfVGWWs8](https://encrypted-tbn3.gstatic.com/images?q=tbn:ANd9GcRyYJzDkJFjsUbS-U3_mD-aVXtihQK6-1xpY5BooZmJVfVGWWs8)

**metrologiya iste'molchilar huquqlarini himoya qilish bo'yicha choralar qo'llash, fuqarolar sog'lig'ini va xavfsizligini, atrof muhitni va davlat manfaatlarini noto'g'ri o'lchash natijalarining salbiy oqibatlaridan himoya qilish uchun zarurdir**

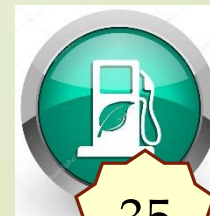
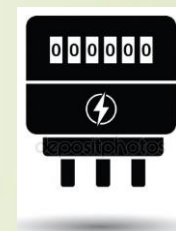
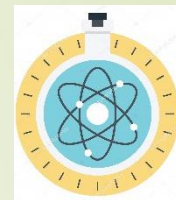
## Metrologiya jamiyatning umummaqsadlariga yetishishga yordam beradi



### qaysiki energiya iste'moli samaradorligini oshirish va resurslar iste'molini kamaytirish yo'li bilan

*misollar:*

- ✓ Atom soatini tadqiq qilish sun'iy yo'ldoshning navigatsiya tizimini takomillashtirishga yordam beradi
- ✓ real vaqtdagi ko'rsatishni ko'rsatuvchi elektr hisoblagich ("intellektual hisoblagichlar" deb nomlanadigan) samaradorlikning oshishiga sabab bo'ladi. chunki intellektual tarmoqlardan foydalanish va iste'mol to'g'risidagi qulay va ochiq ma'lumotlar bilan energiyadan oqilona foydalanish bunga zamin yaratadi
- ✓ datchiklarning ishonchliligi va/yoki sezgirligini oshirish sanoat jarayonlarining qat'iy nazoratini eng aniq va to'g'ri ma'lumotlar bilan ta'minlab beradi. bu esa samaradorlikning oshishi va yo'qotilishlarning kamayishiga olib keladi.
- ✓ bioyoqilg'i, siqilgan tabiiy gaz va shu kabi yangi energiya manbaalarini o'lchash uchun tadqiqotga sharoit yaratilishini qo'llab quvvatlaydi.



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uchun rahmat !!!**