

```
CREATE TABLE sales
(
    id UInt32,
    product_id UInt32,
    quantity UInt32,
    price Float32,
    sale_date DateTime
)
ENGINE = MergeTree
ORDER BY id
```

Query id: 09a3adf2-599c-4921-b289-ad566bf1f87c

ok.

```
INSERT INTO sales (id, product_id, quantity, price, sale_date) SELECT
    number AS id,
    (rand() % 100) + 1 AS product_id,
    (rand() % 10) + 1 AS quantity,
    round((rand() % 10000) / 100., 2) AS price,
    toDateTime('2024-01-01 00:00:00') + (rand() % ((365 * 24) * 3600)) AS sale_date
FROM numbers(10000)
```

Query id: 46d19279-e8e4-497b-96a2-1894625ab9b9

ok.

```
ALTER TABLE sales
  (ADD PROJECTION sales_projection
  (
    SELECT
      product_id AS UInt32,
      sum(quantity) AS total_quantity,
      sum(quantity * price) AS total_sum
    GROUP BY product_id
  ))
```

Query id: bfd57961-9a17-4e4e-8aa9-1836a7676e6d
ok.

```
ALTER TABLE sales
  (MATERIALIZE PROJECTION sales_projection)
```

```
Query id: 9289e60d-0765-42e4-9d92-a785c3a388d2
```

```
ok.
```

```
EXPLAIN indexes = 1
SELECT
    product_id,
    sum(quantity) AS total_quantity,
    sum(quantity * price) AS total_sum
FROM sales
GROUP BY product_id
```

Query id: 05a5fc77-d1b7-4314-bf3a-9037a37c2fd1

```
1. explain
2. Expression ((Project names + Projection))
3.   Aggregating
4.     Expression
5.       ReadFromMergeTree (sales_projection)
6.       Indexes:
7.         PrimaryKey
8.           Condition: true
9.           Parts: 1/1
10.          Granules: 1/1
11.          Ranges: 1
```

10 rows in set. Elapsed: 0.002 sec.

```
CREATE TABLE sales_sum
(
    `product_id` UInt32,
    `total_quantity` UInt64,
    `total_sum` Float64
)
ENGINE = SummingMergeTree
ORDER BY product_id
```

Query id: b5f06e08-b8c2-432a-96a0-28663ce38ebf

Ok.

```
CREATE MATERIALIZED VIEW sales_mv TO sales_sum
AS SELECT
    product_id,
    sum(quantity) AS total_quantity,
    sum(quantity * price) AS total_sum
FROM sales
GROUP BY product_id
```

Query id: ee2a81bb-5010-4838-b7d9-e7086c6082ed

Ok.

```
SELECT *
FROM sales_sum
LIMIT 10;
```

Query id: 12a5a2c5-1512-4f0b-9788-bfd101ad1541

	product_id	total_quantity	total_sum
1.	1	115	5756
2.	2	190	10499.900091666728
3.	3	300	15998.999649580568
4.	4	352	16938.559722170234
5.	5	460	22173.400340639055
6.	6	546	25605.300401687622
7.	7	623	30767.37965510413
8.	8	888	42046.159752845764
9.	9	936	46478.88104613125
10.	10	1020	48951.79869621992

10 rows in set. Elapsed: 0.002 sec.

```
SELECT
    product_id,
    sum(quantity) AS total_quantity,
    sum(quantity * price) AS total_sum
FROM sales
GROUP BY product_id
LIMIT 10
```

Query id: 0e1a8e87-8a9b-415b-a766-ec49450b3a64

	product_id	total_quantity	total_sum
1.	66	1242	61293.30124211311
2.	94	784	39433.12020897865
3.	69	1773	89468.64048582315
4.	89	1908	90320.03891909122
5.	41	198	9906.200177818537
6.	53	570	30107.399339675903
7.	46	1182	55437.8993332386
8.	50	1970	102285.29950857162
9.	4	728	35281.83945414424
10.	24	804	41608.92076301575

10 rows in set. Elapsed: 0.026 sec.