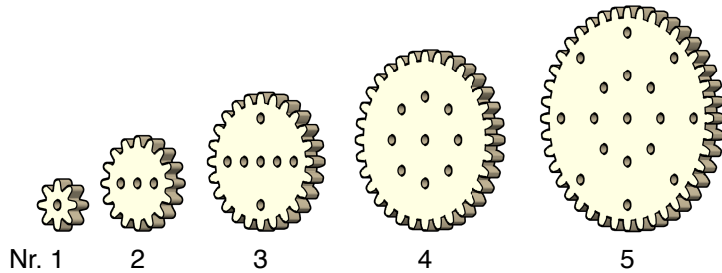


Z100 – Matador-Zahnräder / Matador Cogweels

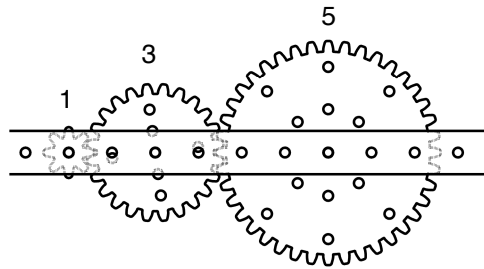
Matador-Zahnräder

(For english version see page 2)

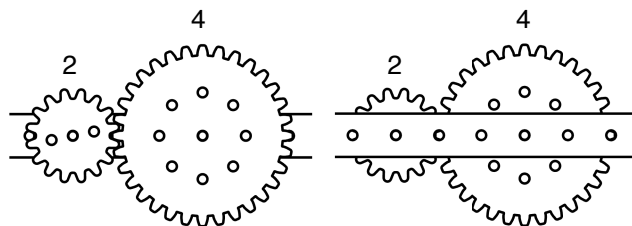


Größe 1 hat 8 Zähne, Durchmesser des Teilkreises 20 mm
 Größe 2 hat 16 Zähne, Durchmesser des Teilkreises 40 mm
 Größe 3 hat 24 Zähne, Durchmesser des Teilkreises 60 mm
 Größe 4 hat 32 Zähne, Durchmesser des Teilkreises 80 mm
 Größe 5 hat 40 Zähne, Durchmesser des Teilkreises 100 mm

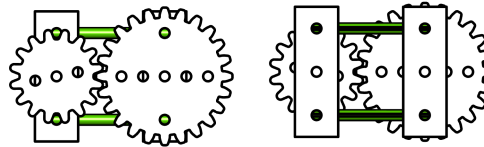
Die Zahnräder 1, 3 und 5 haben, wenn sie im Eingriff stehen, von Mittel zu Mittel stets ein Vielfaches der normalen Matador-Lochabstände von 20 mm.



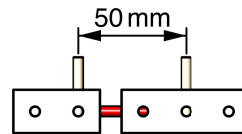
Das gleiche gilt für die Zahnräder 2 und 4.



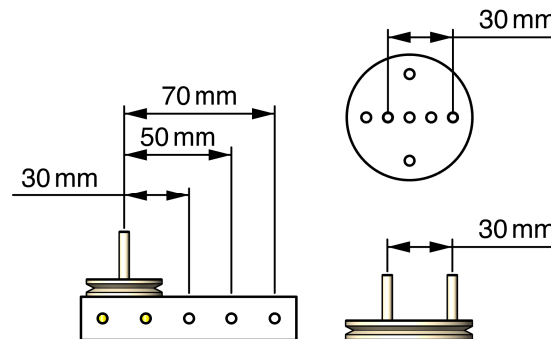
Will man zum Beispiel ein Zahnrad Nr. 2 oder 4 mit einem der Zahnräder 1, 3 oder 5 in Eingriff bringen, so genügen die normalen Lochabstände nicht. Die Abstände der Mittellocher der Zahnräder sind dann 3 cm, 5 cm usw. Man hilft sich, indem 2 Klötze mit dem entsprechenden Abstand entweder nebeneinander:



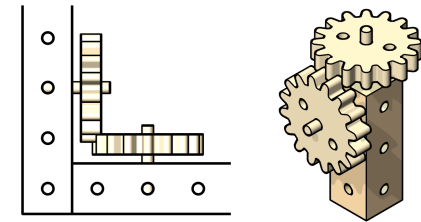
oder hintereinander verbunden werden:



Eine weitere Hilfskonstruktion ergibt sich mittels den Zwischenlöchern der Zweier- und Dreierräder. Wie folgende Abbildung zeigt, wird das Zweierrad mit beiden Seitenlöchern am Klotz befestigt, das Mittelloch des Rades dient der Lagerung für die Achse des Zahnades.



Obwohl die Matador-Zahnräder sogenannte Stirnräder sind, kann man sie aufgrund ihrer großen Zähne auch für Winkelübertragungen, wozu eigentlich Kegelräder nötig wären, verwenden.



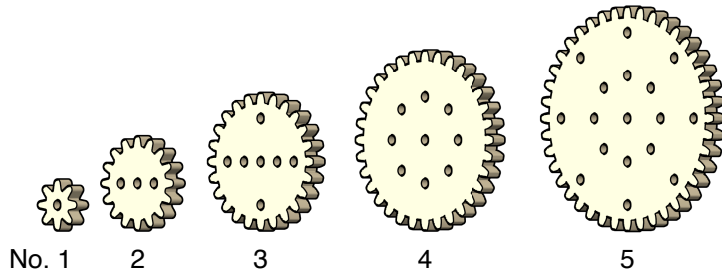
Die mit Matador-Zahnrädern herzustellenden Übersetzungsverhältnisse sind sehr mannigfaltig. Die Möglichkeiten der mit dem Zahnrad Nr. 1 beginnenden Übersetzungsverhältnisse von 1 : 2 bis 1 : 25 sind in nachfolgender Tabelle gezeigt:

Über- setzungs- verhältnis	Räder- anordnung	Über- setzungs- verhältnis	Räder- anordnung
1 : 2	1-2 od. 2-4	1 : 15	1-3 1-5
1 : 3	1-3		
1 : 4	1-4		
1 : 5	1-5	1 : 16	1-4 1-4
1 : 6	1-3 1-2	1 : 18	1-3 1-3 1-2
1 : 8	1-4 1-2	1 : 20	1-5 1-4
1 : 9	1-3 1-3		
1 : 10	1-5 1-2	1 : 24	1-3 1-4 1-2
1 : 12	1-4 1-3	1 : 25	1-5 1-5

Dann gibt es noch Kombinationen, bei welchen das Zweier-, Dreier- oder Viererzahnrad an erster Stelle steht. Diese ergeben jedoch Übersetzungsverhältnisse, die entweder auf einfachere Art mit einem Einserzahnrad erreicht oder solche, die nur in Bruchzahlen zum Ausdruck gebracht werden können.

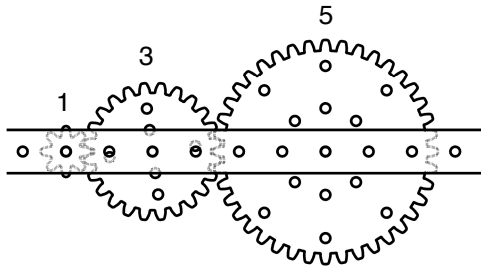
Vortsetzung auf Seite 3.

Matador Cogwheels

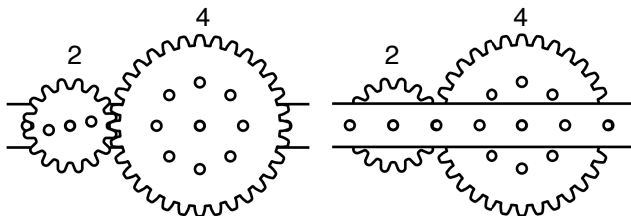


Size 1 has 8 teeth, diameter of the pitch circle 20 mm
 Size 2 has 16 teeth, diameter of the pitch circle 40 mm
 Size 3 has 24 teeth, diameter of the pitch circle 60 mm
 Size 4 has 32 teeth, diameter of the pitch circle 80 mm
 Size 5 has 40 teeth, diameter of the pitch circle 100 mm

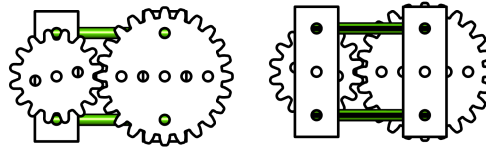
The gears 1, 3, and 5, when engaged, always have a multiple of the standard Matador hole spacing of 20 mm from center to center.



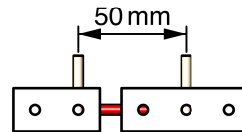
The same applies to gears 2 and 4.



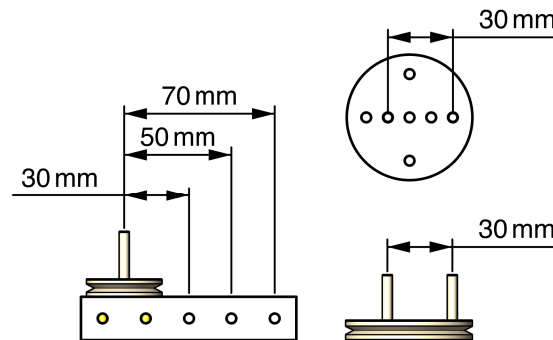
For example, if you want to engage gear No. 2 or 4 with one of the gears 1, 3, or 5, the standard hole spacing is not sufficient. The distances between the center holes of the gears then become 3 cm, 5 cm, etc. You can manage this by placing two blocks with the corresponding spacing either next to each other:



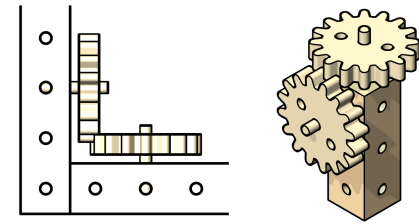
or connected one behind the other:



Another auxiliary construction can be achieved using the intermediate holes of the wheels No. 2 and 3. As shown in the following illustration, the wheel No. 2 is attached to the block using both side holes, while the center hole of the wheel serves as the bearing for the gear's axle.



Although the Matador gears are technically spur gears, their large teeth allow them to be used for angular transmissions, which would normally require bevel gears.



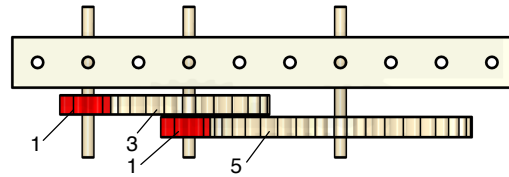
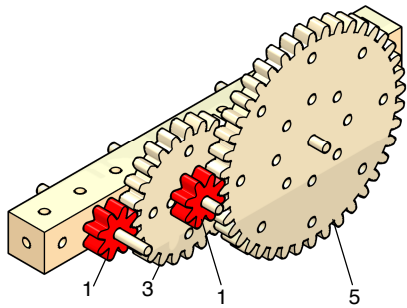
The gear ratios that can be achieved with Matador gears are highly diverse. The possible gear ratios starting with the gear No. 1, ranging from 1 : 2 to 1 : 25, are listed in the following table:

Gear ratio	Gear arrangement	Gear ratio	Gear arrangement
1 : 2	1-2 or 2-4	1 : 15	1-3 1-5
1 : 3	1-3	1 : 16	1-4 1-4
1 : 4	1-4	1 : 18	1-3 1-3 1-2
1 : 5	1-5	1 : 20	1-5 1-4
1 : 6	1-3 1-2	1 : 24	1-3 1-4 1-2
1 : 8	1-4 1-2	1 : 25	1-5 1-5
1 : 9	1-3 1-3		
1 : 10	1-5 1-2		
1 : 12	1-4 1-3		

There are also combinations where the gears No. 2, 3, or 4 come first. However, these result in gear ratios that can either be achieved more easily with a gear Nr. 1 or give ratios that can only be expressed as fractions.

Continued on page 3.

Z100 – Matador-Zahnräder / Matador Cogwheels



Darstellung des Übersetzungsverhältnisses 1 : 15.
In der Tabelle ist dies folgenderart angegeben:

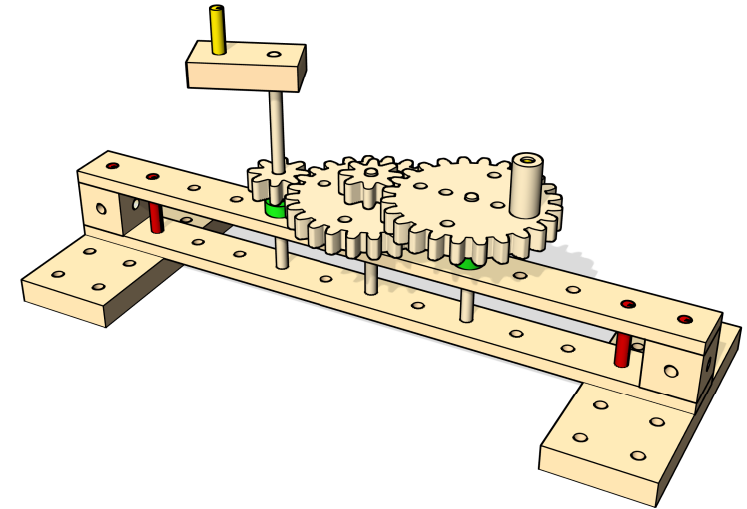
1-3
1-5

Es sind dazu verwendet die Zahnräder Nr. 1, 3, 1 und 5. Die Zahnräder 3 und 1 sind nebeneinander auf einer Achse festsitzend angeordnet.

Representation of the 1 : 15 gear ratio. In the table, this is indicated as follows:

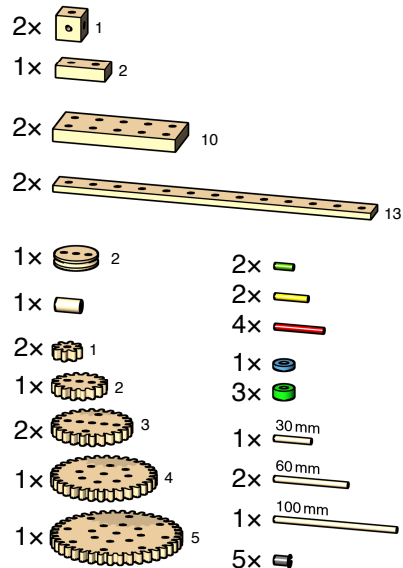
1-3
1-5

The gears No. 1, 3, 1, and 5 are used for this. Gears 3 and 1 are fixedly mounted side by side on one axle.

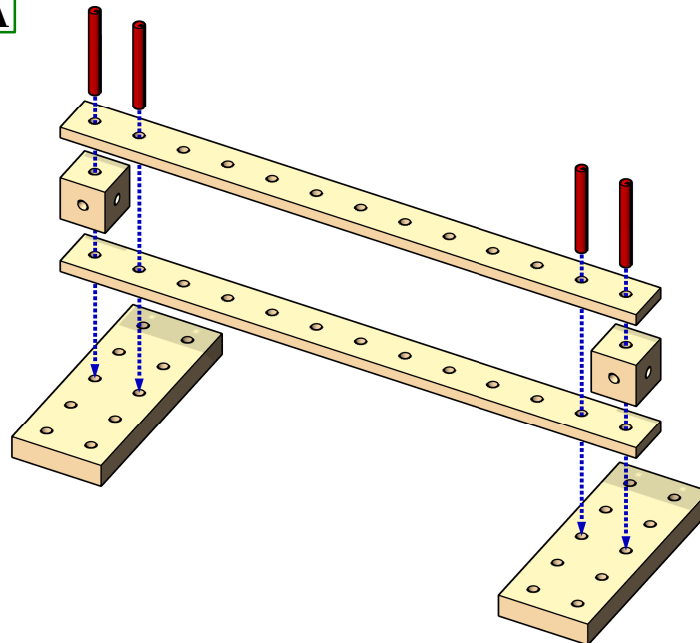


Beispiele für Übersetzungsverhältnisse / Examples of Gear Transmission Ratios

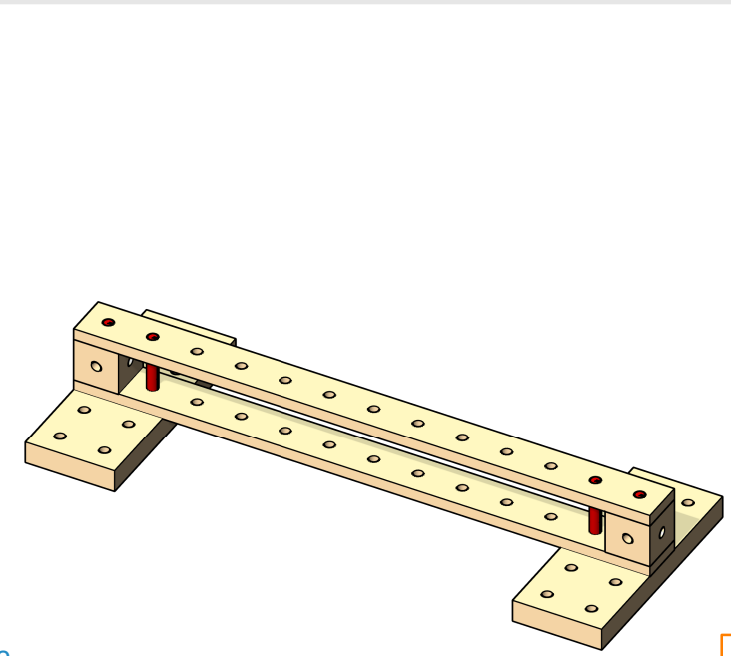
LEVEL



A



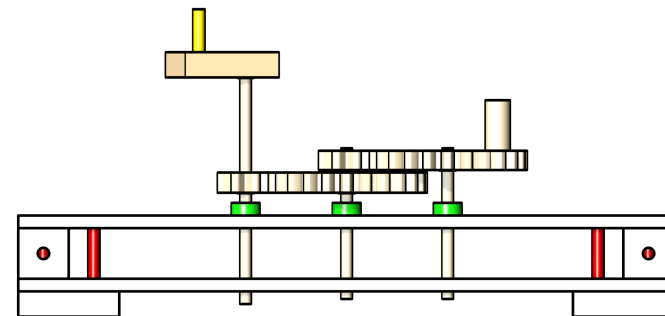
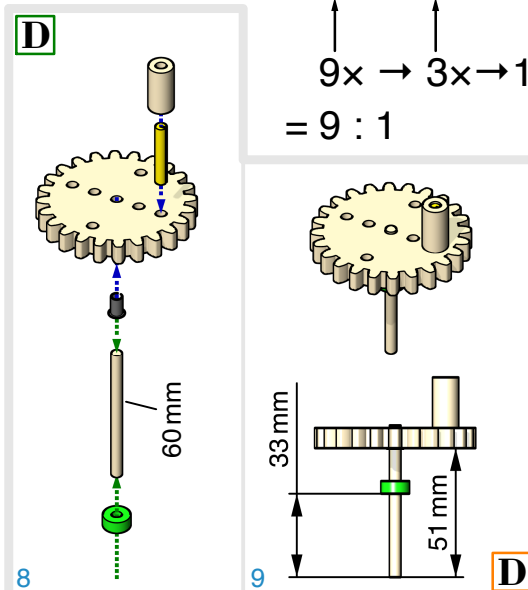
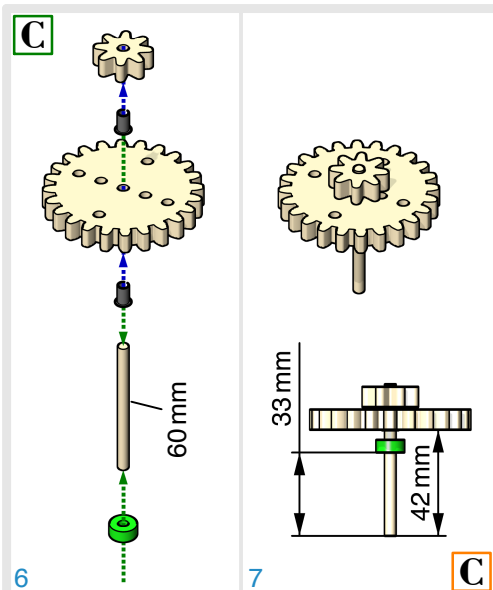
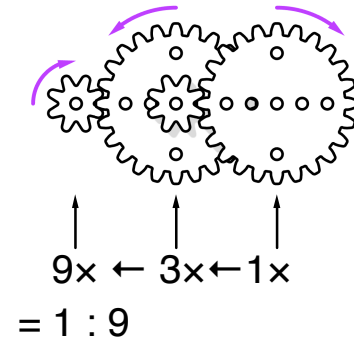
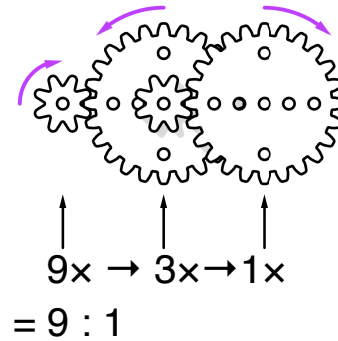
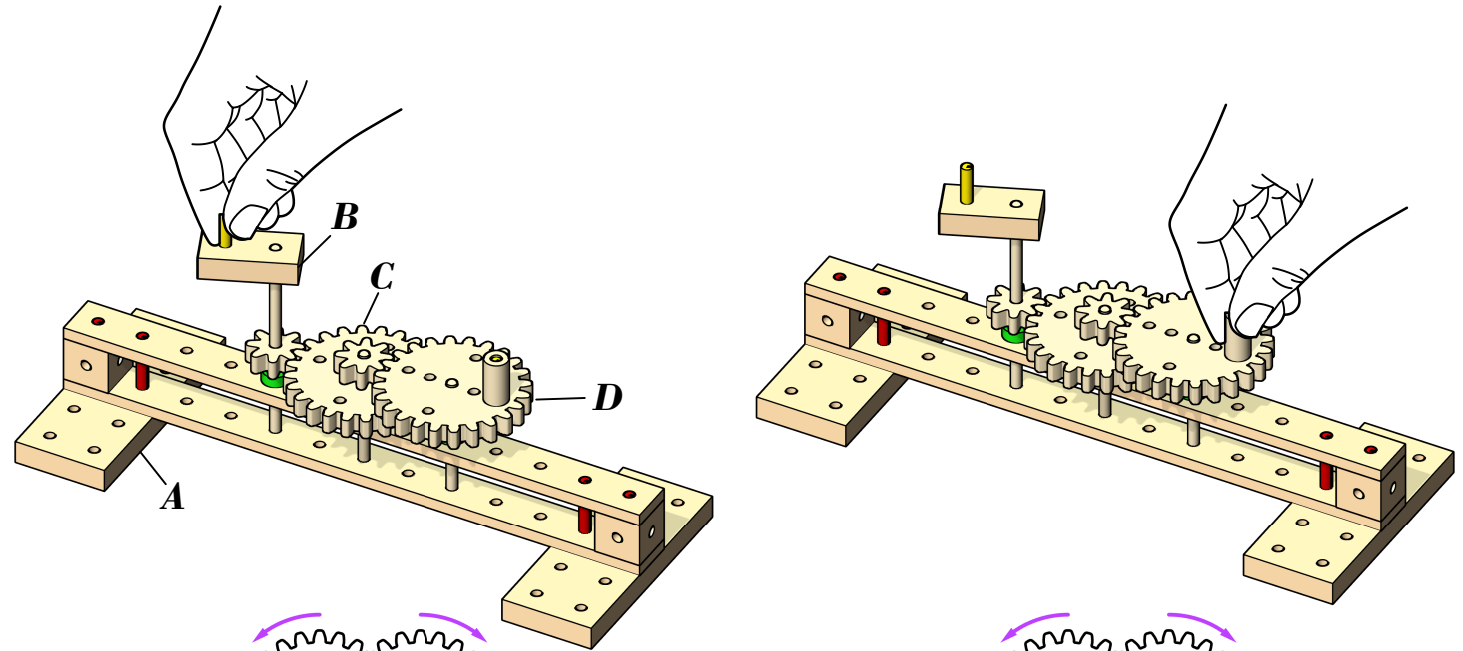
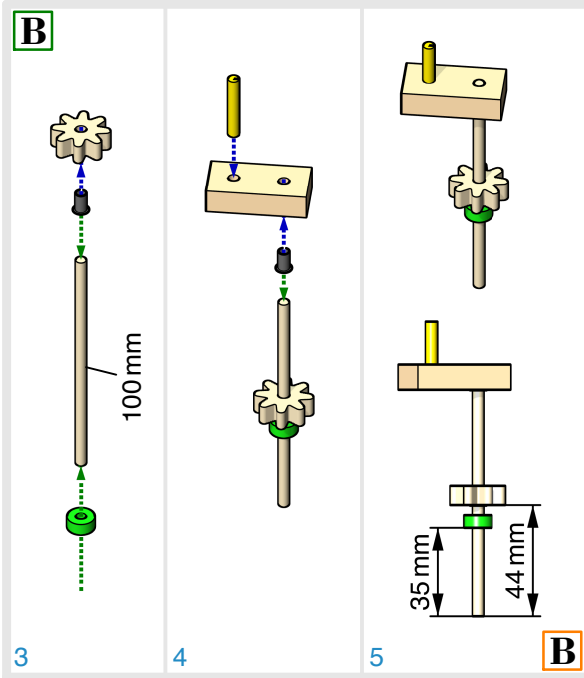
1



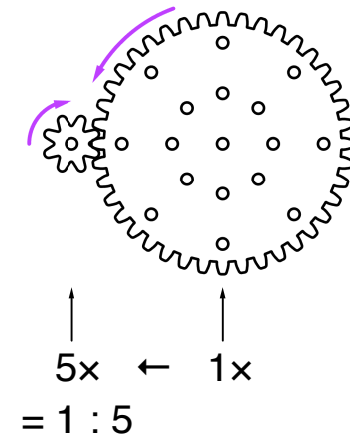
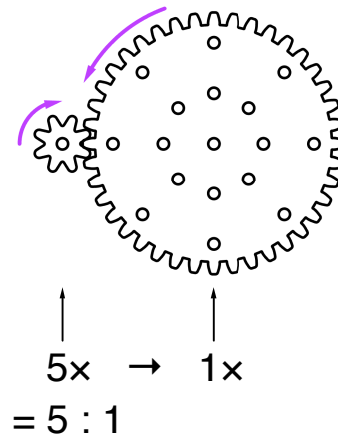
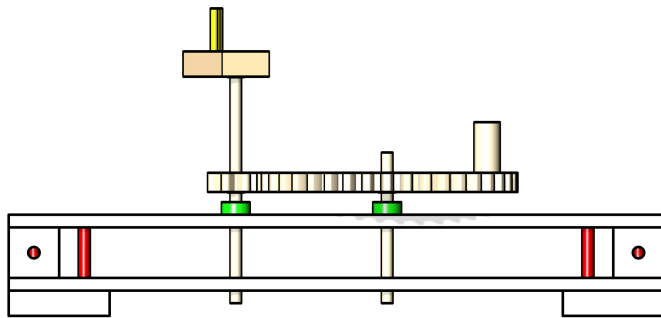
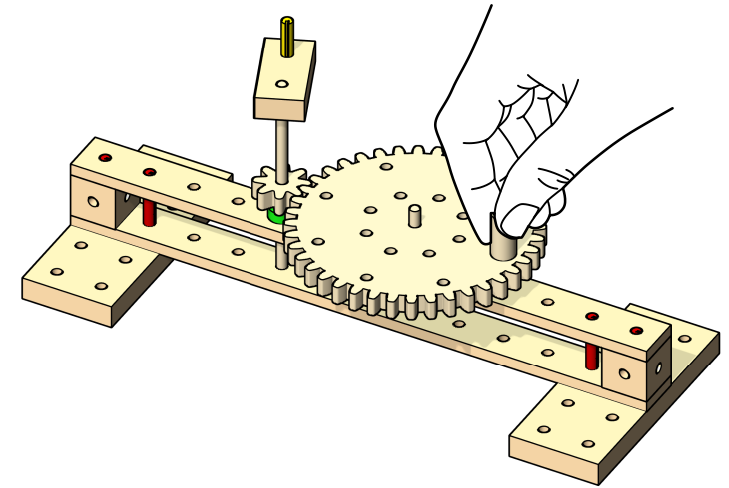
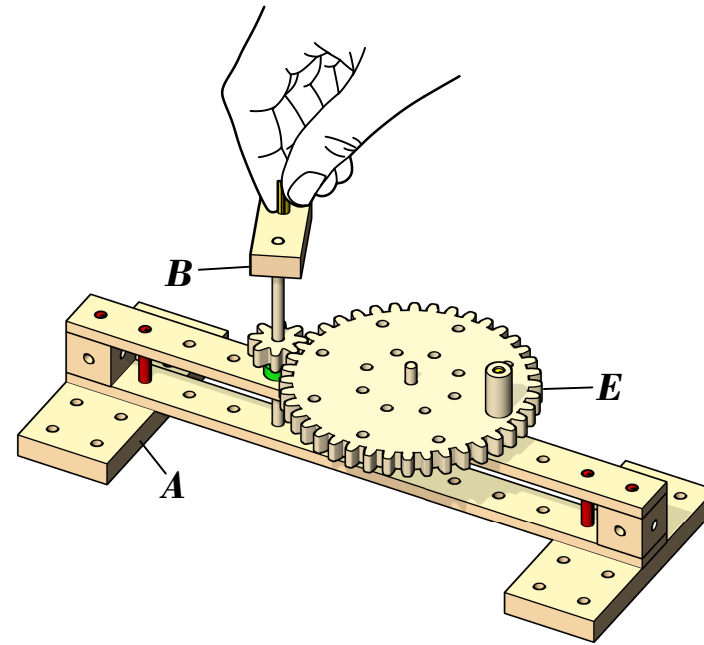
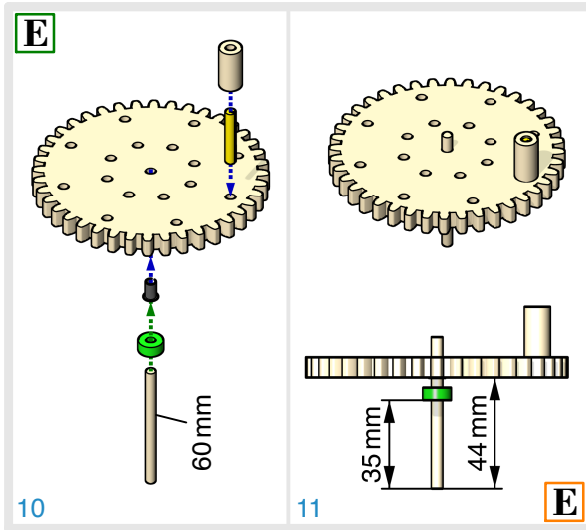
2

A

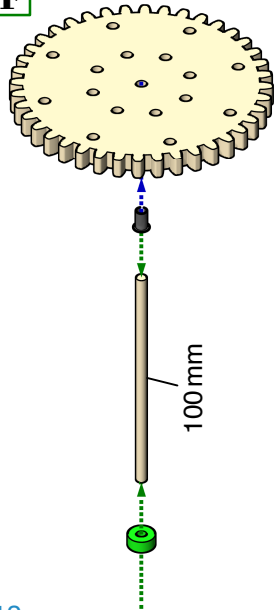
Z100/1 – Übersetzungsverhältnisse 9 : 1 und 1 : 9 / Gear Transmission Ratios 9 : 1 and 1 : 9



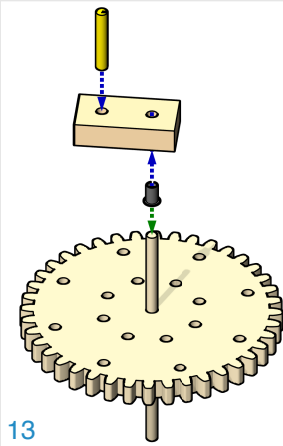
Z100/2 – Übersetzungsverhältnisse 5 : 1 und 1 : 5 / Gear Transmission Ratios 5 : 1 and 1 : 5



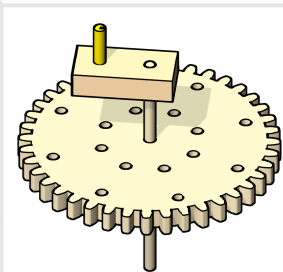
Z100/3 – Übersetzungsverhältnisse 1 : 20 und 20 : 1 / Gear Transmission Ratios 1 : 20 and 20 : 1

F

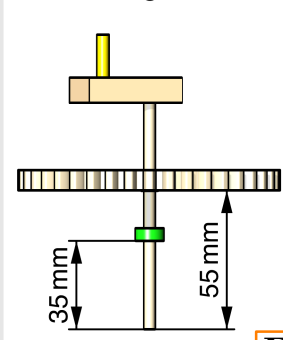
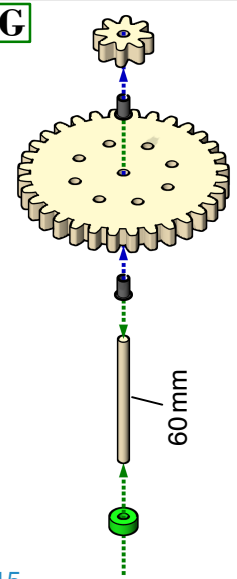
12



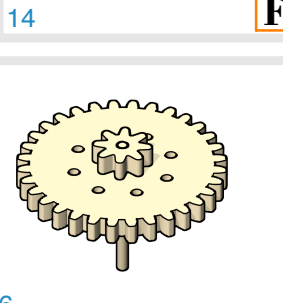
13



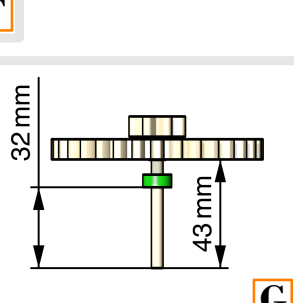
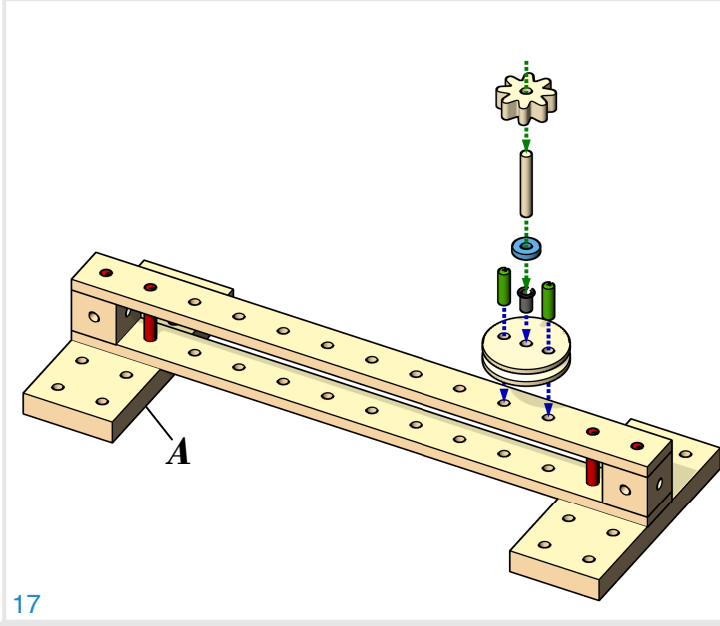
14

**G**

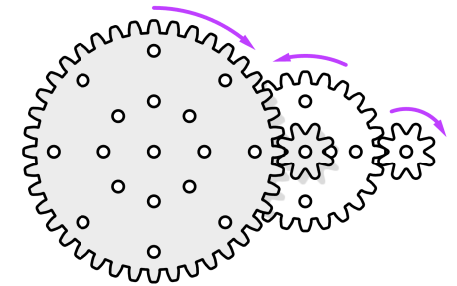
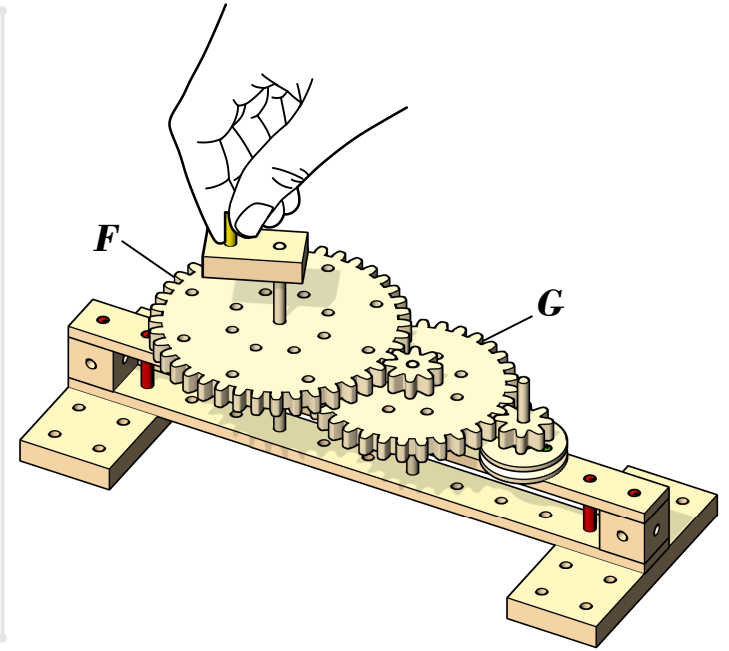
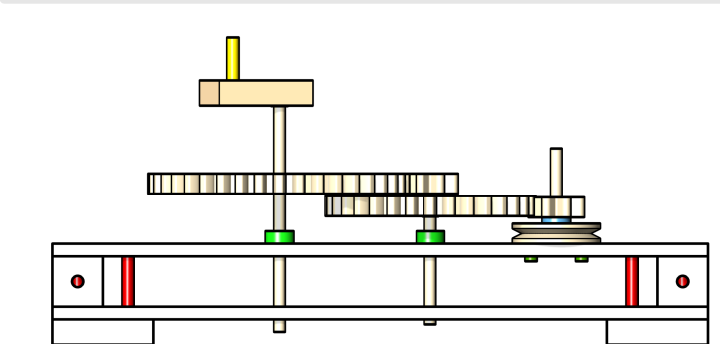
15



16

**G**

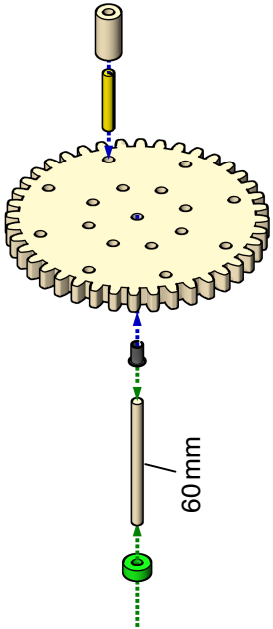
17



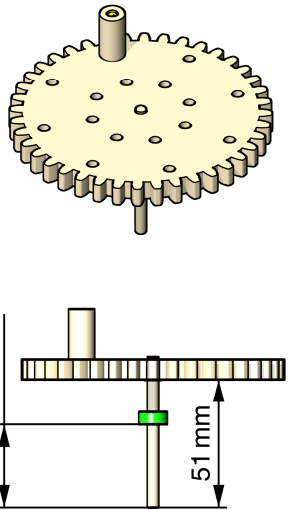
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$$1x \leftarrow 5x \leftarrow 20x \\ = 20 : 1$$

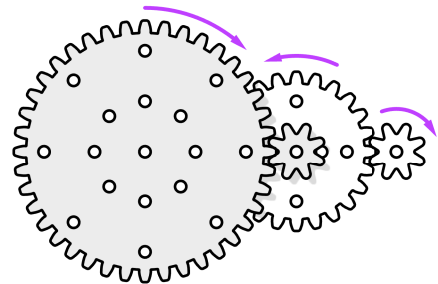
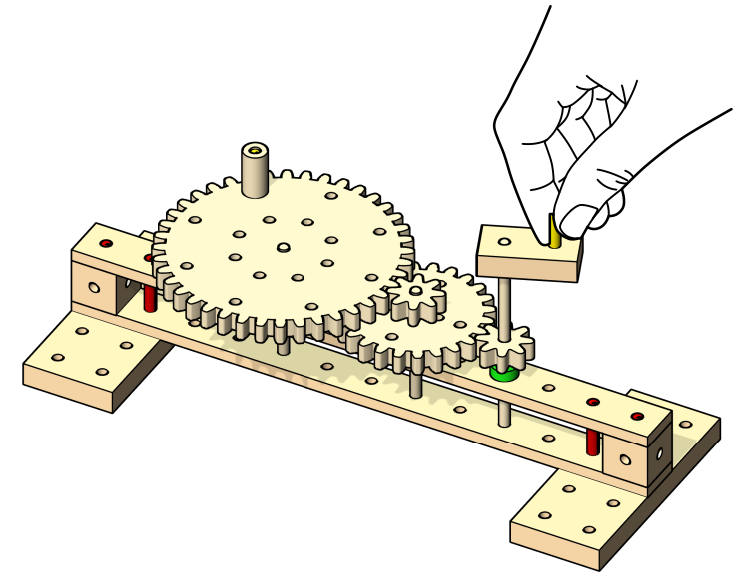
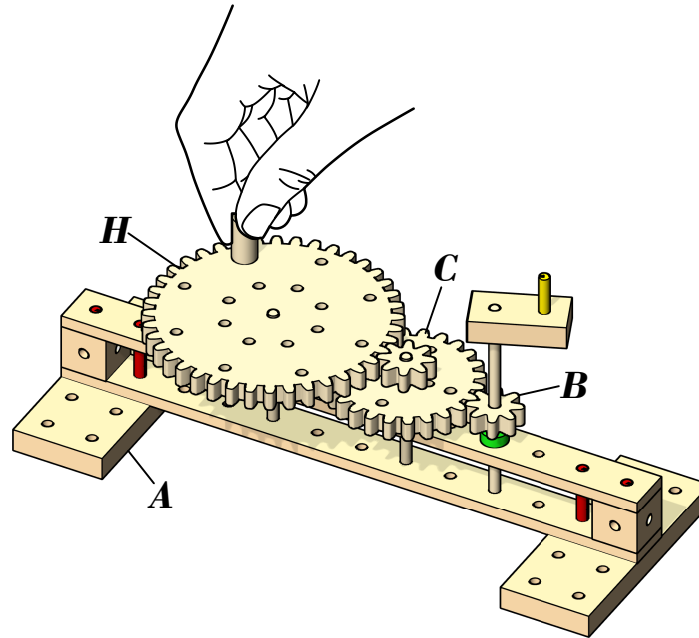
Z100/4 – Übersetzungsverhältnisse 1 : 15 und 15 : 1 / Gear Transmission Ratios 1 : 15 and 15 : 1

H

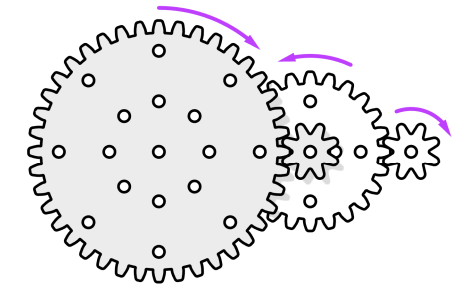
18



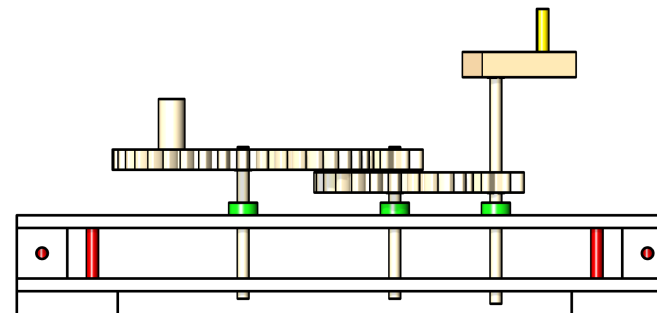
19

H

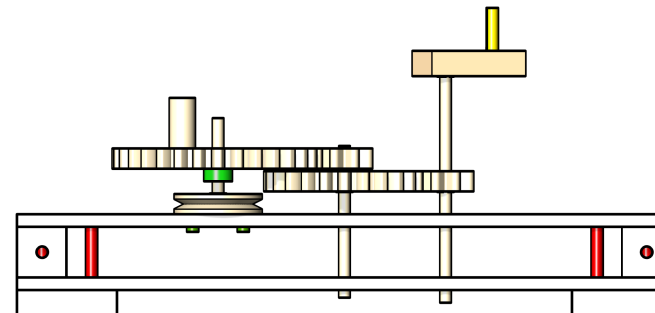
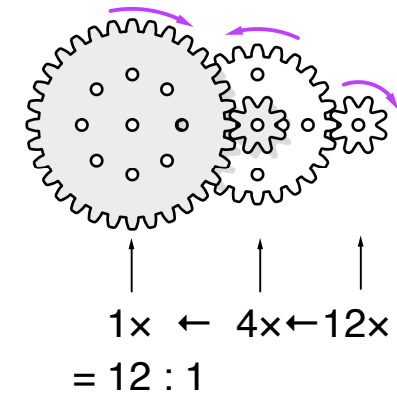
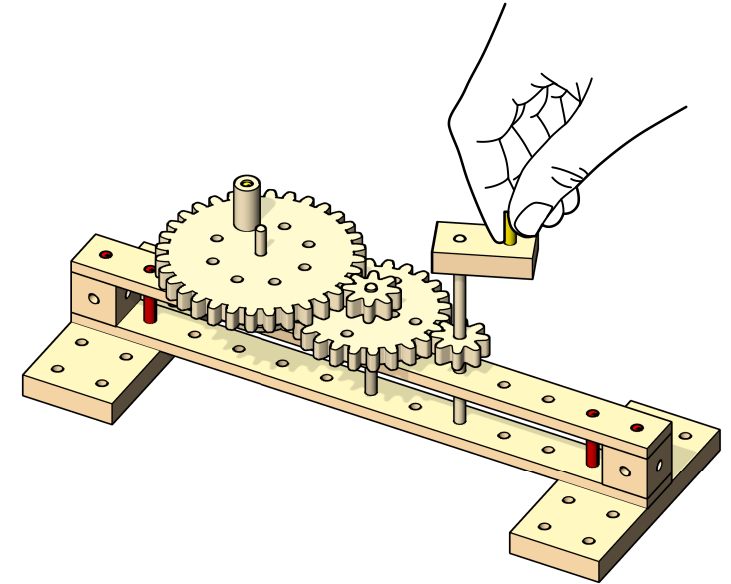
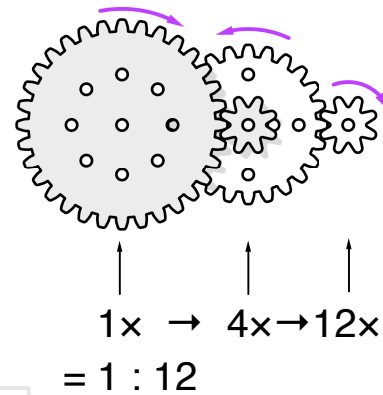
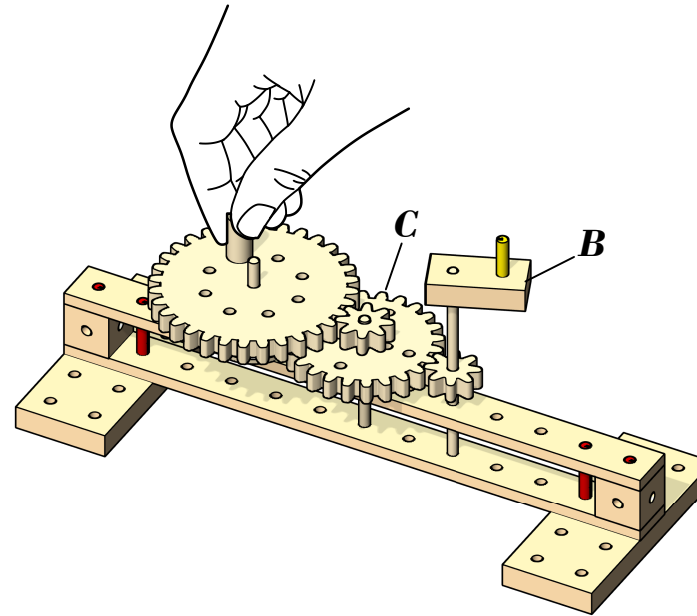
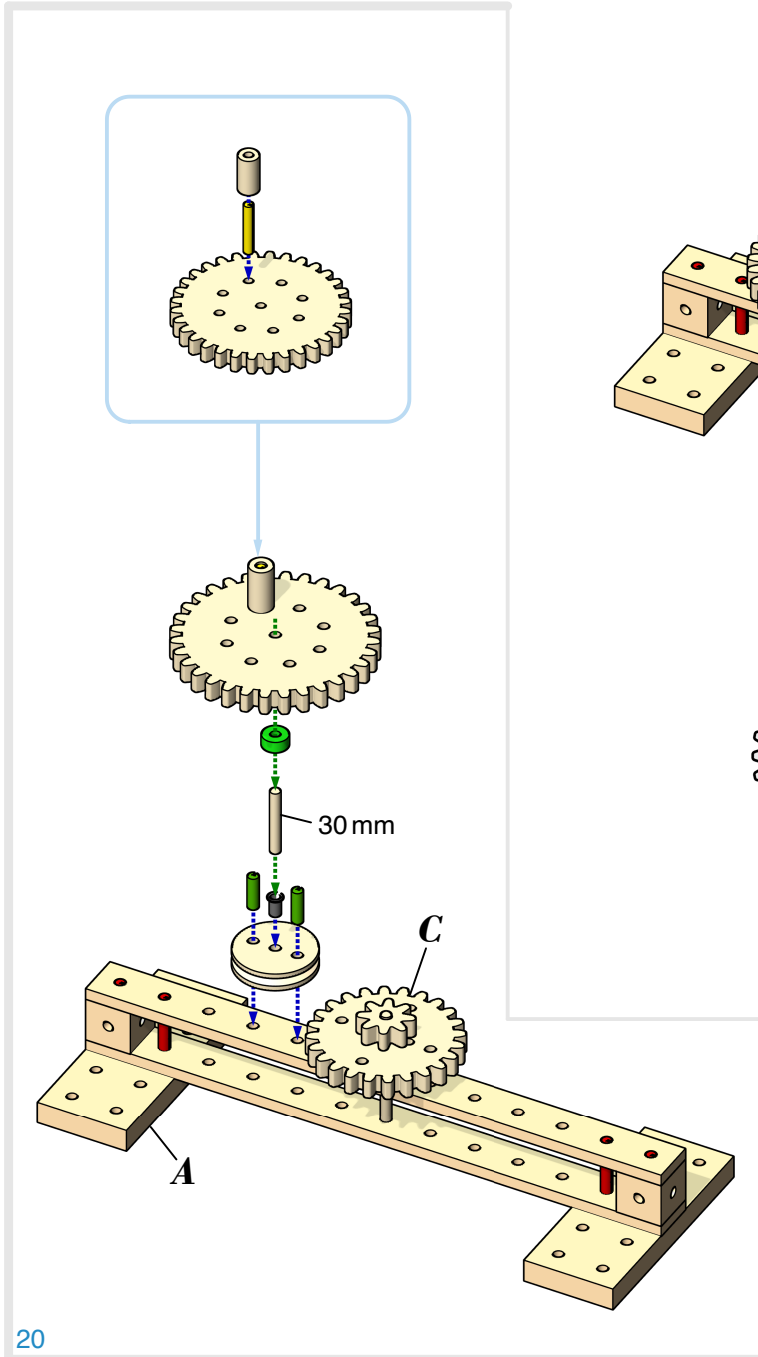
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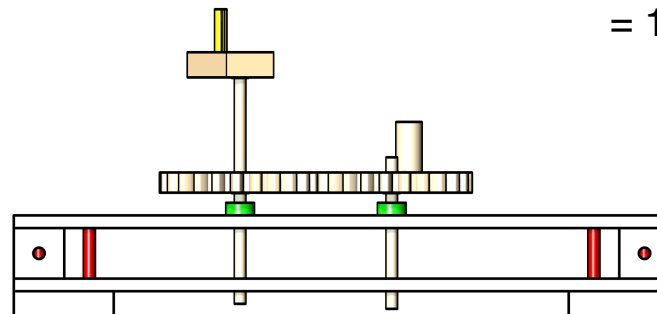
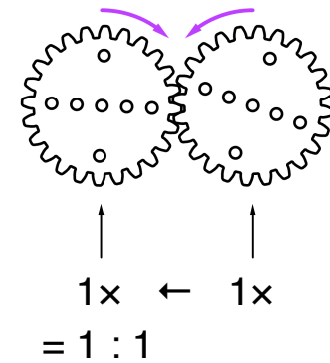
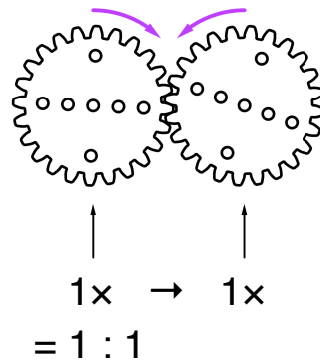
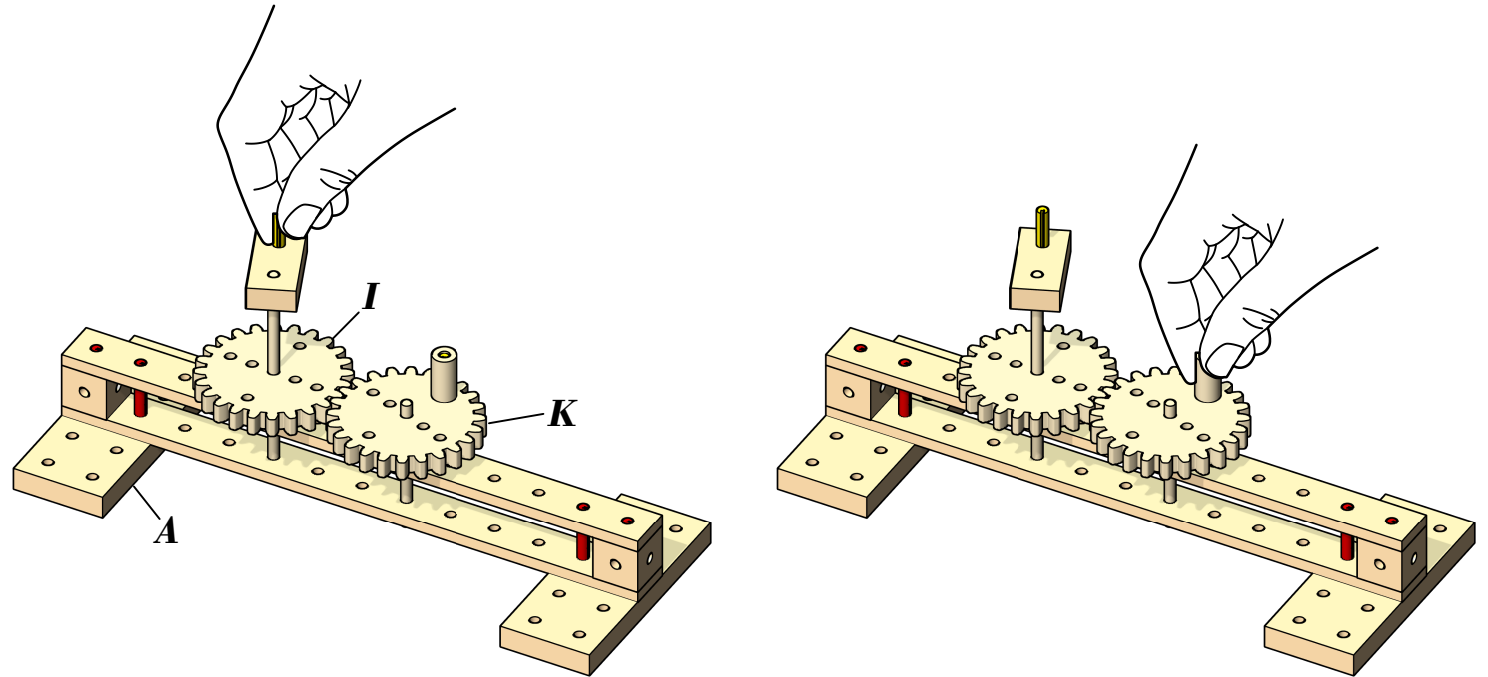
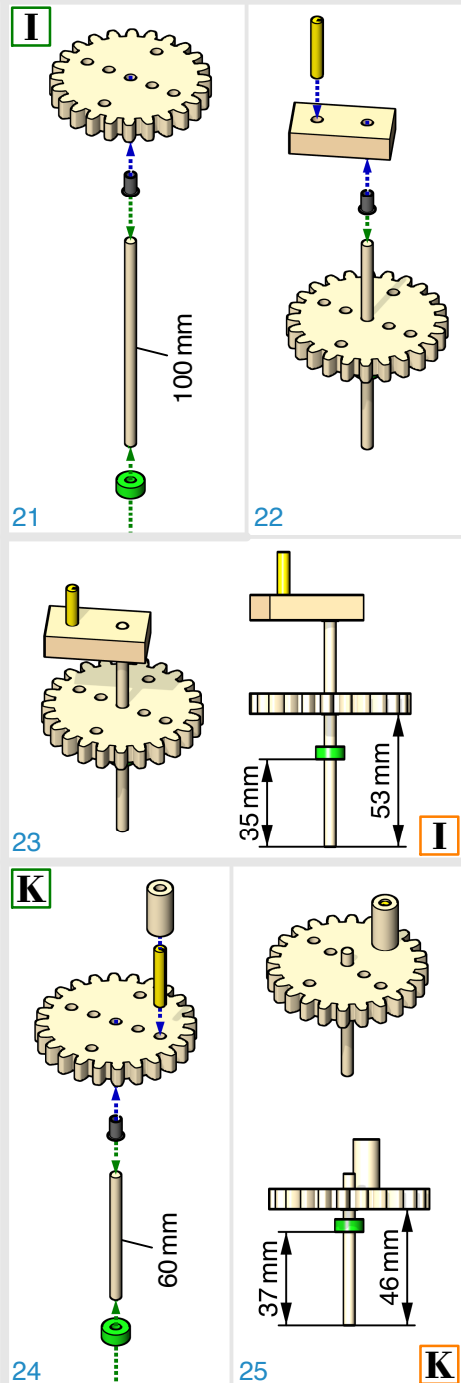
$$1x \leftarrow 5x \leftarrow 15x \\ = 15 : 1$$



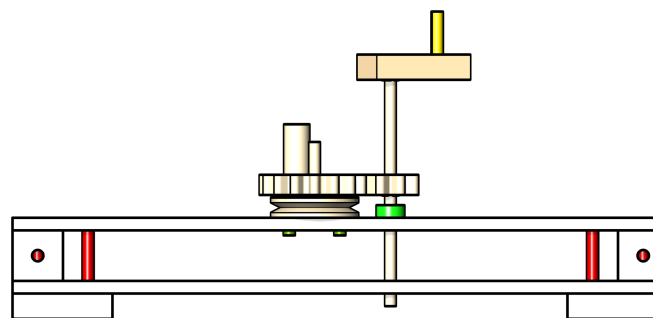
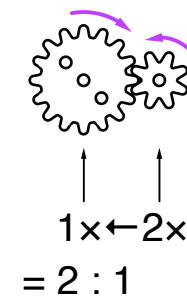
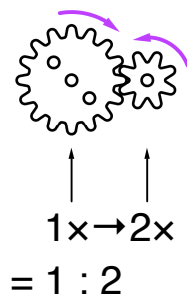
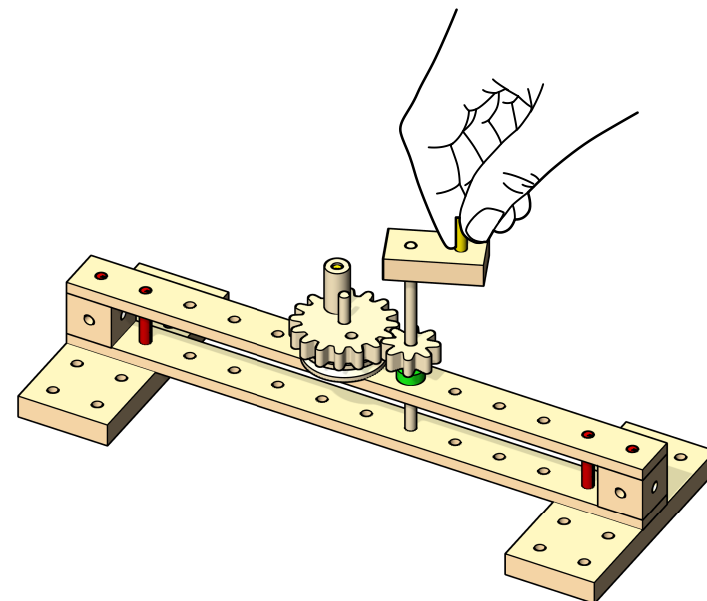
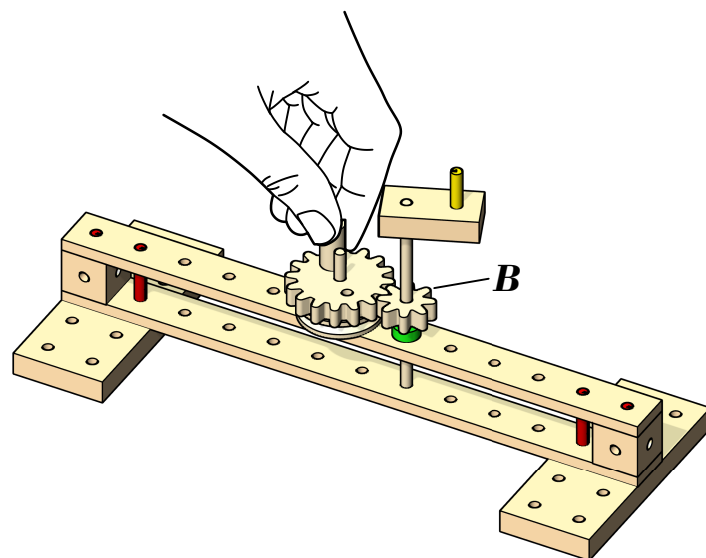
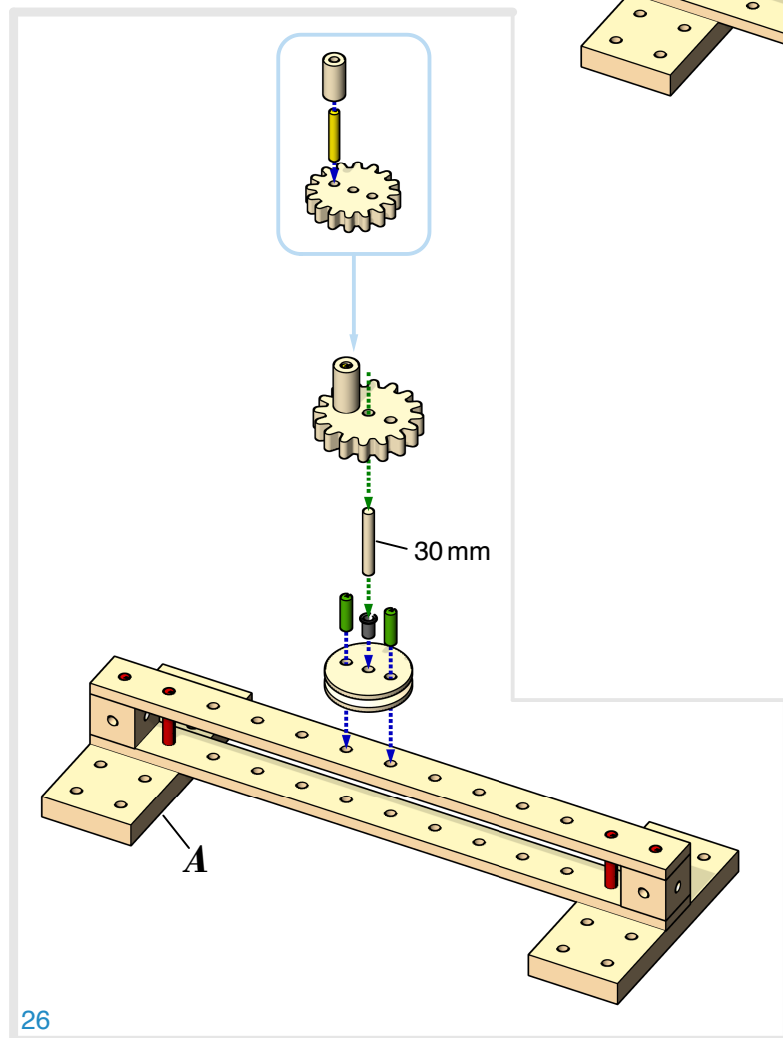
Z100/5 – Übersetzungsverhältnisse 1 : 12 und 12 : 1 / Gear Transmission Ratios 1 : 12 and 12 : 1



Z100/6 – Übersetzungsverhältnis 1 : 1 / Gear Transmission Ratio 1 : 1

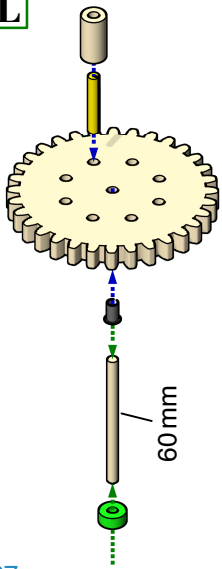


Z100/7 – Übersetzungsverhältnisse 1 : 2 und 2 : 1 / Gear Transmission Ratios 1 : 2 and 2 : 1

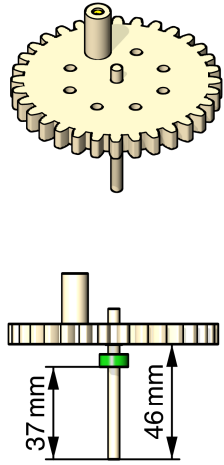


Z100/8 – Übersetzungsverhältnisse 1 : 2 und 2 : 1 / Gear Transmission Ratios 1 : 2 and 2 : 1

L

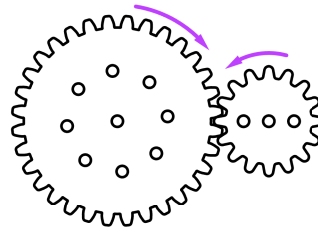
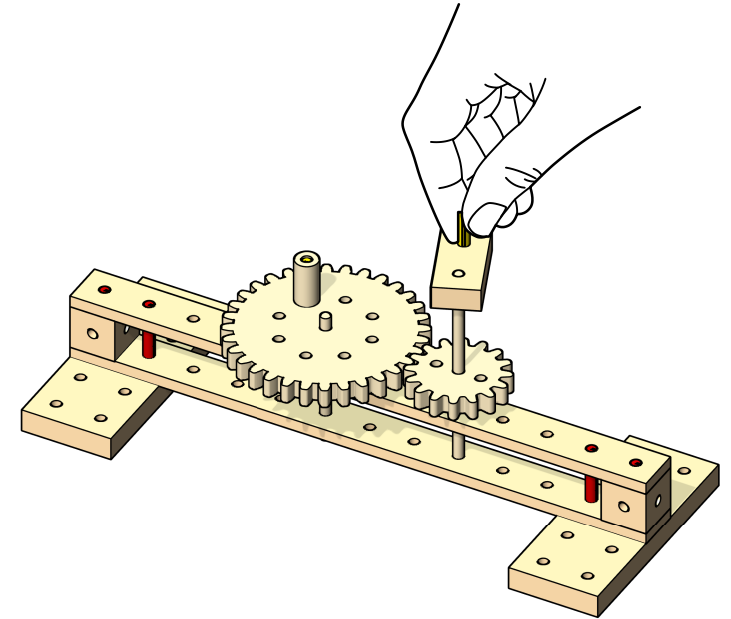
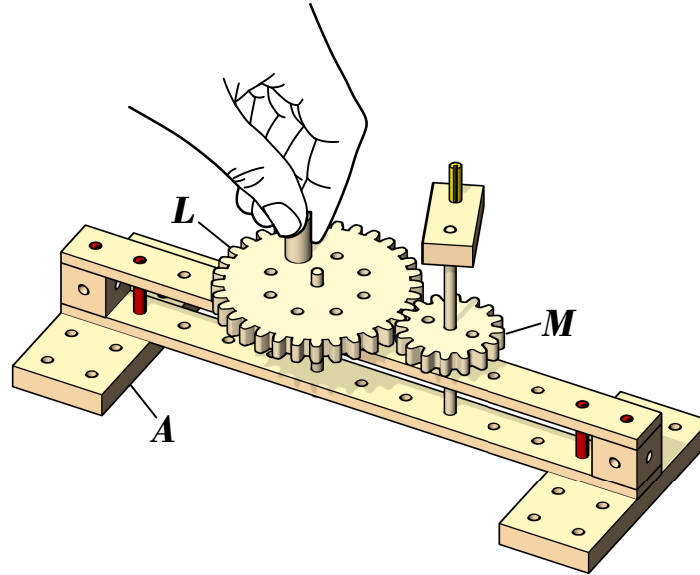


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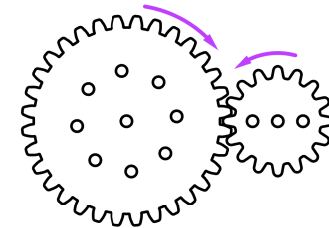


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L

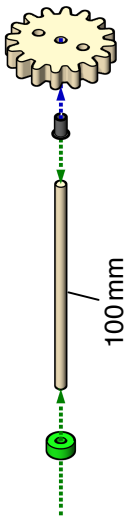


1x → 2x
= 1 : 2

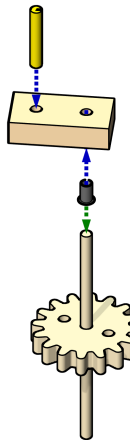


1x ← 2x
= 2 : 1

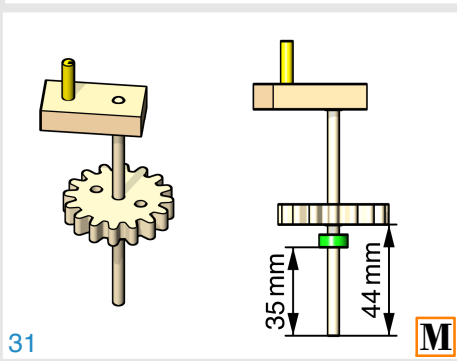
M



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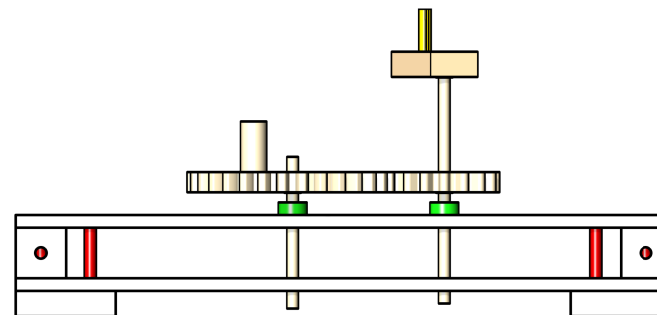


30

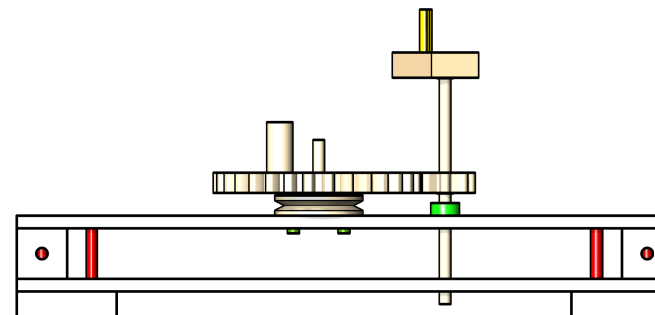
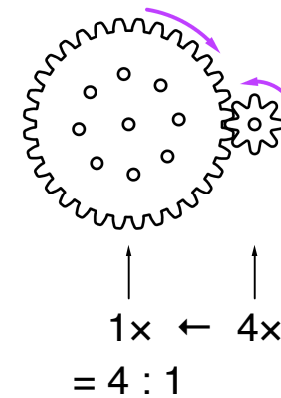
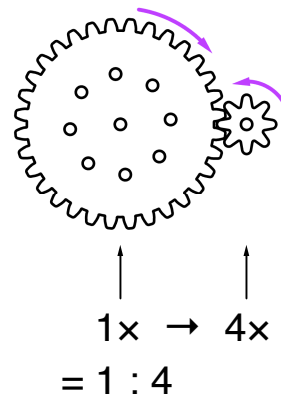
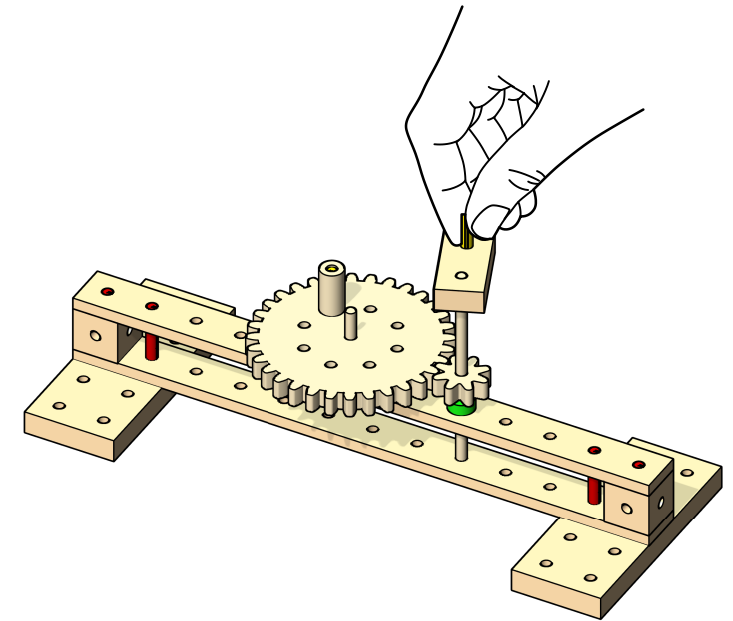
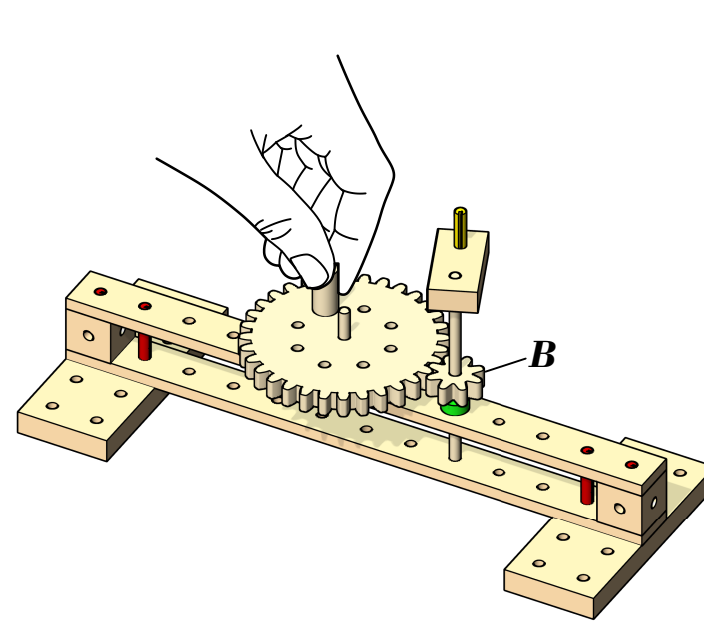
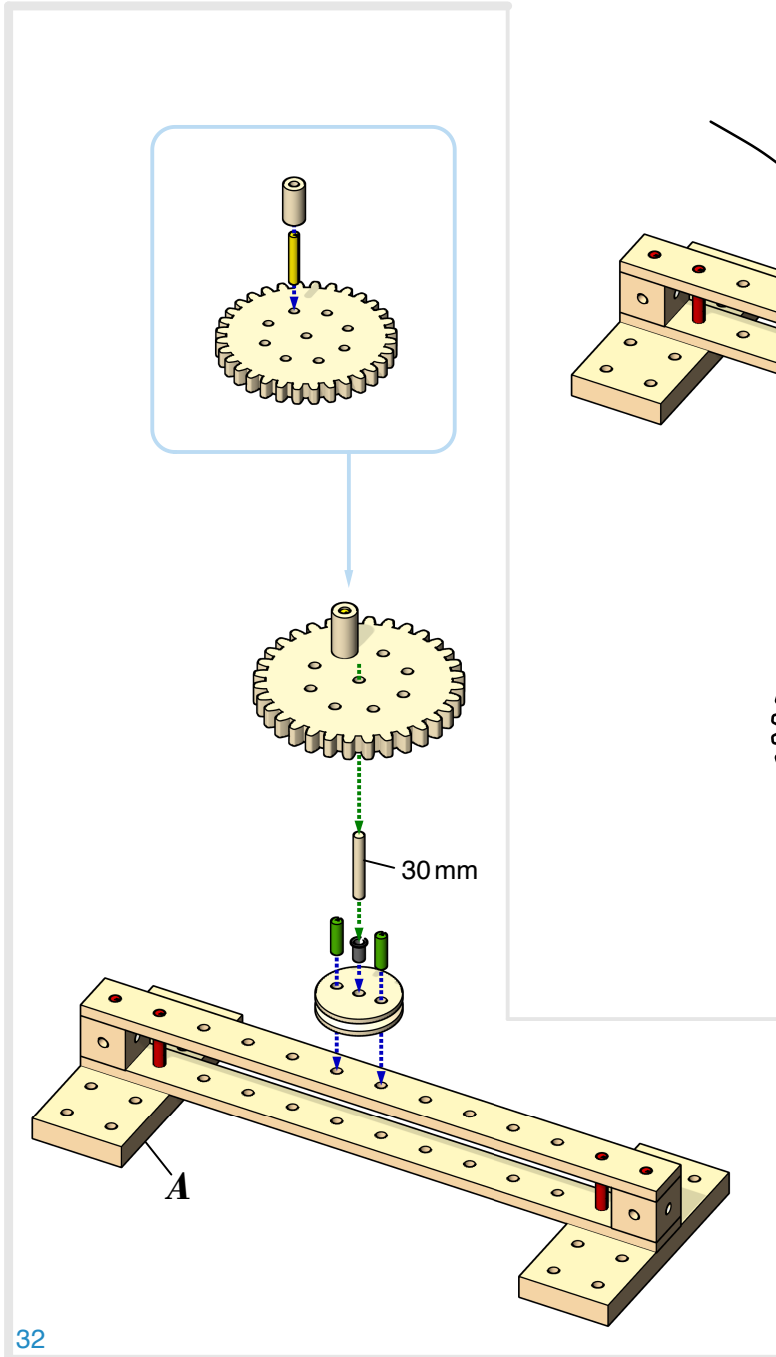


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M



Z100/9 – Übersetzungsverhältnisse 1 : 4 und 4 : 1 / Gear Transmission Ratios 1 : 4 and 4 : 1



Z100/10 – Übersetzungsverhältnis 1 : 1 / Gear Transmission Ratio 1 : 1

