

# Test Stand Ball bearing



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Etienne Bernot - Jean Luc Mathey



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Tél. : 01 64 86 41 00 - Fax. : 01 64 46 31 19  
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## SUMMARY

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## RESOURCES

All resources of this project are available on our website [www.a4.fr](http://www.a4.fr) and on the CD (ref "CD-BE1").

### It contains :

- The FreeHand version file (editable with this software - Evaluation version included).
- The PDF version file (readable and printable from AcrobatReader software).
- The **full 3D product modeling** with **3D SolidWorks**, Parasolid and eDrawings files format.

## Related products

Real metal bearing (réf. ROBI-45-85-19)



## This file and CDRom may be duplicated for students, for school internal use\*

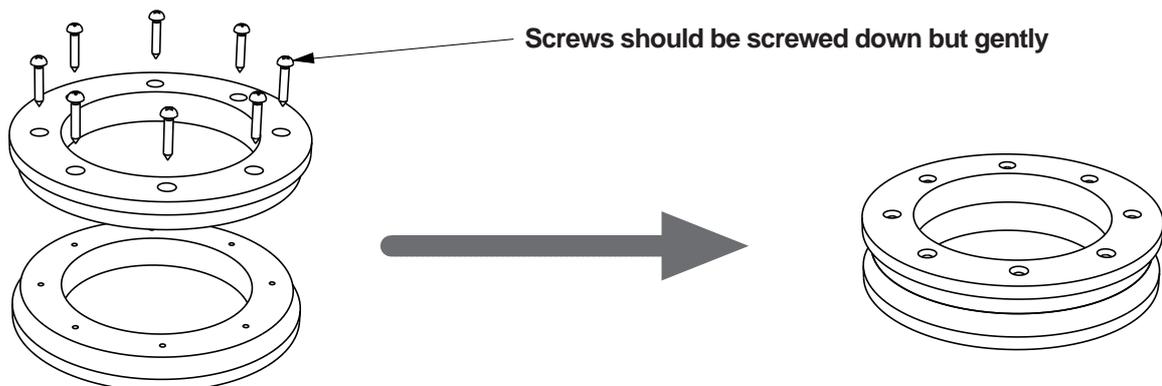
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# Presentation - Preparation of the model in kit delivered

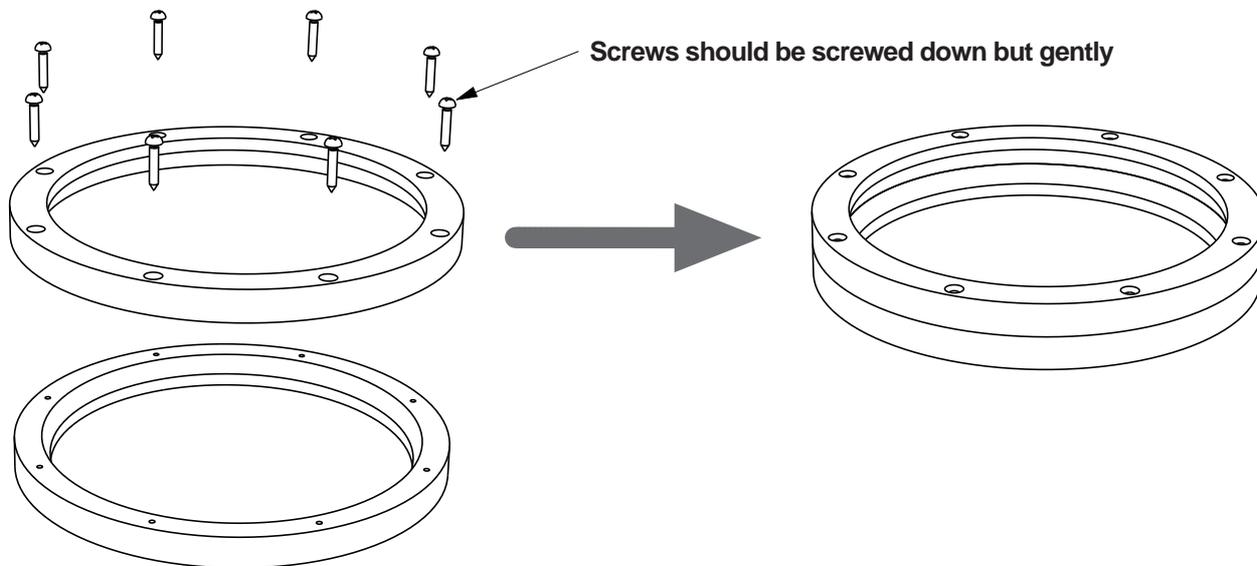
## 1 - Mounting the internal bearing cage

Assemble the two half-cages with the 8 3x13 screws



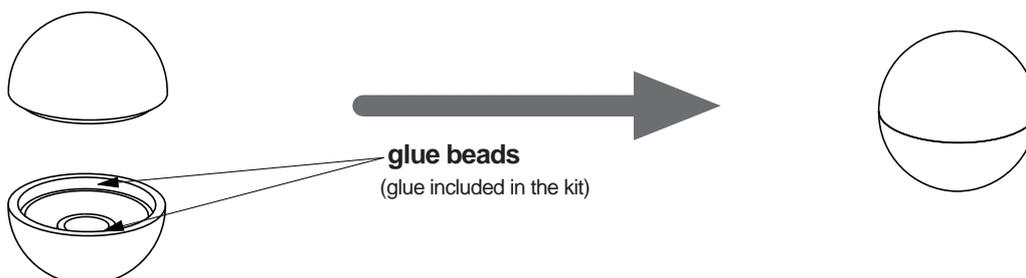
## 2 - Mounting the external bearing cage

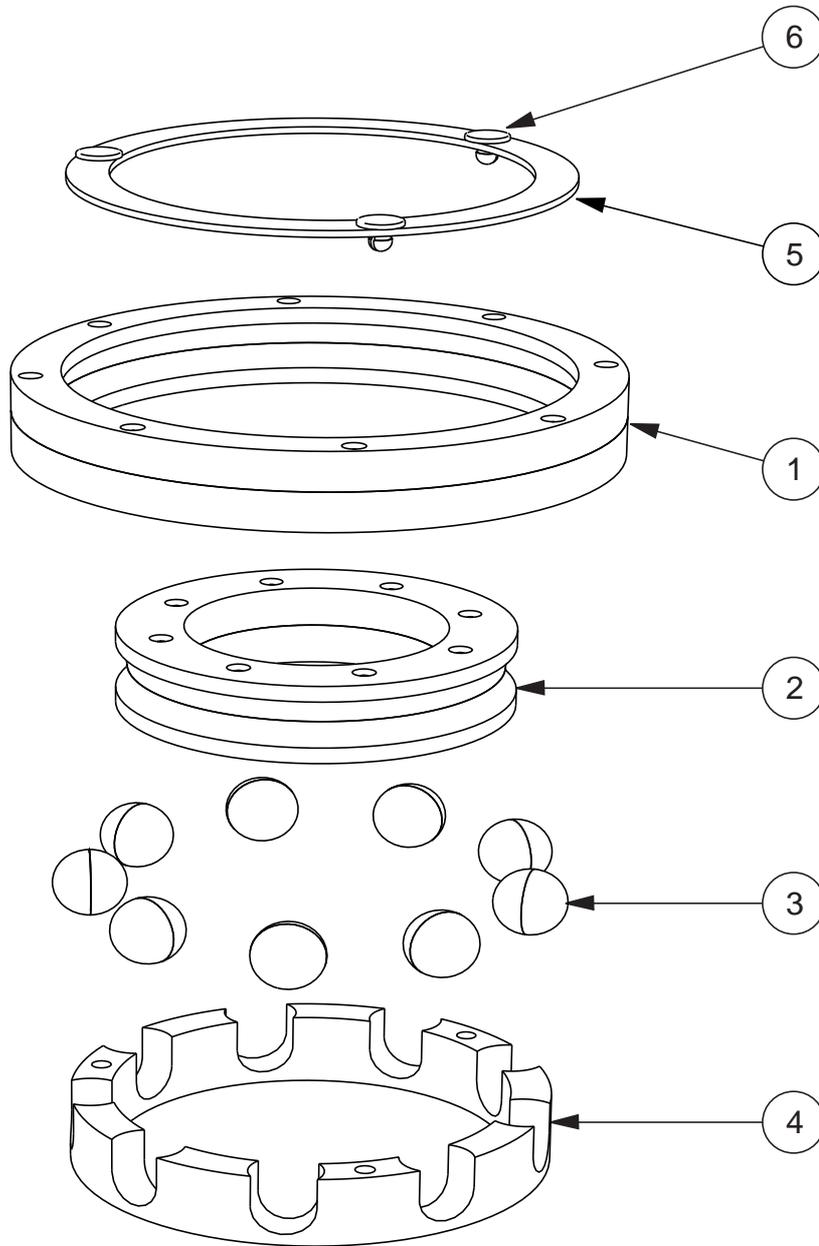
Assemble the two half-cages with the 8 3x13 screws



## 3 - Mounting balls

Stick together half-balls with different colours

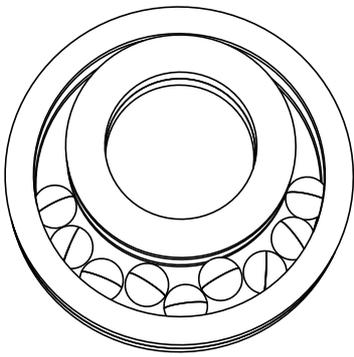




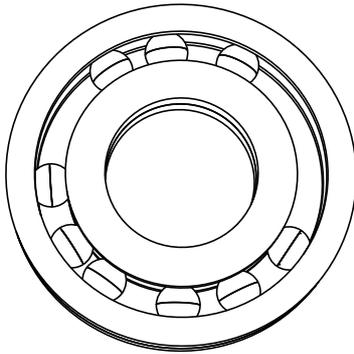
6	03	Large head elastic rivets	Injected polyethylene model
5	01	Flank	Cristal PVC model
4	01	Cage	Expanded PVC model
3	09	Balls	Injected ABS model
2	01	Internal bush	Machined polyethylene 500 model
1	01	External bush	Machined polyethylene 500 model

MARKS	NUMBER	DESIGNATION	CHARACTERISTICS
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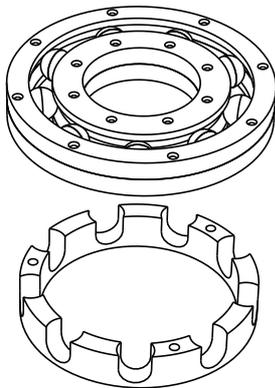
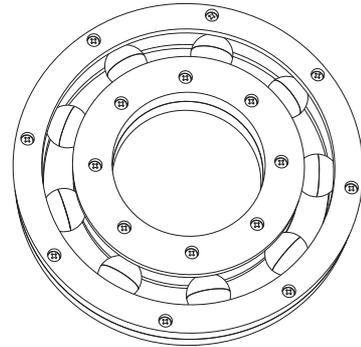
		<b>A4</b> School _____ Class _____	PROJECT	<b>Ball bearing</b>	PART	<b>ASSEMBLY</b>
	Name _____ Date _____		DOCUMENT TITLE		<b>Exploded vue</b>	



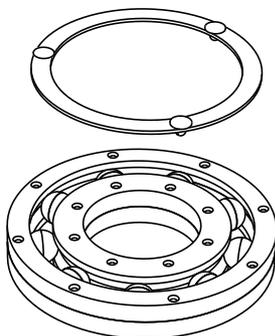
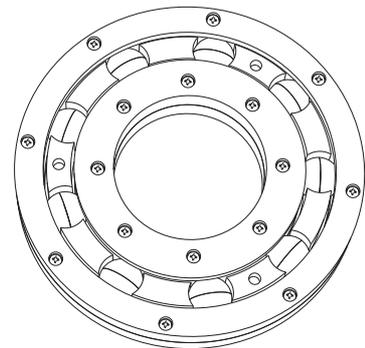
1- Place balls between external and internal bearing bushes.



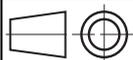
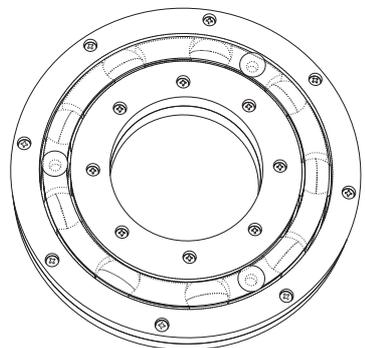
2 - Divide balls at equal distances.



3 - Insert cage between balls.



4 - Clip the transparent flank on the cage.



**A4**

PROJECT **Ball bearing**

PART **ASSEMBLY**

School \_\_\_\_\_ Class \_\_\_\_\_

Name \_\_\_\_\_ Date \_\_\_\_\_

TITRE DU DOCUMENT **Assembling**

# Educational operation

This model is designed to allow ball bearing study.

It must provide investigation support when students will discover a ball bearing on studied objects (skateboard, bike, scooter...).

## Some educational suggestions

1 - Bearing model manipulation : assembly and disassembly.  
Make realize an organigram of assembling steps from drawing provides by the teacher.  
Note : from the mounted bearing, let students find themselves the trick to assemble and disassemble it.

Drawing and organigram example page 05

2 - Identification of various parts of a ball bearing. technical vocabulary.  
Make complete the exploded vue and the general nomenclature.  
Student sheet page 08 ; use 02 as correcting.

3 - Observations on the model and the real stainless bearing.  
Students manipulate the ball bearing model and a real stainless bearing.  
Questions are said to guide their observations :

- Role of the balls.
- Role of the ball cage.
- Role of the bearing path.
- Schematize the bearing : represent the two bearing pathes and balls.
- Comparison between the model and the real stainless bearing.

Establish a comparative table of the model and the real ball bearing :  
materials, crimped metallic cage, lubricant, gap between external and internal bearing bushes...

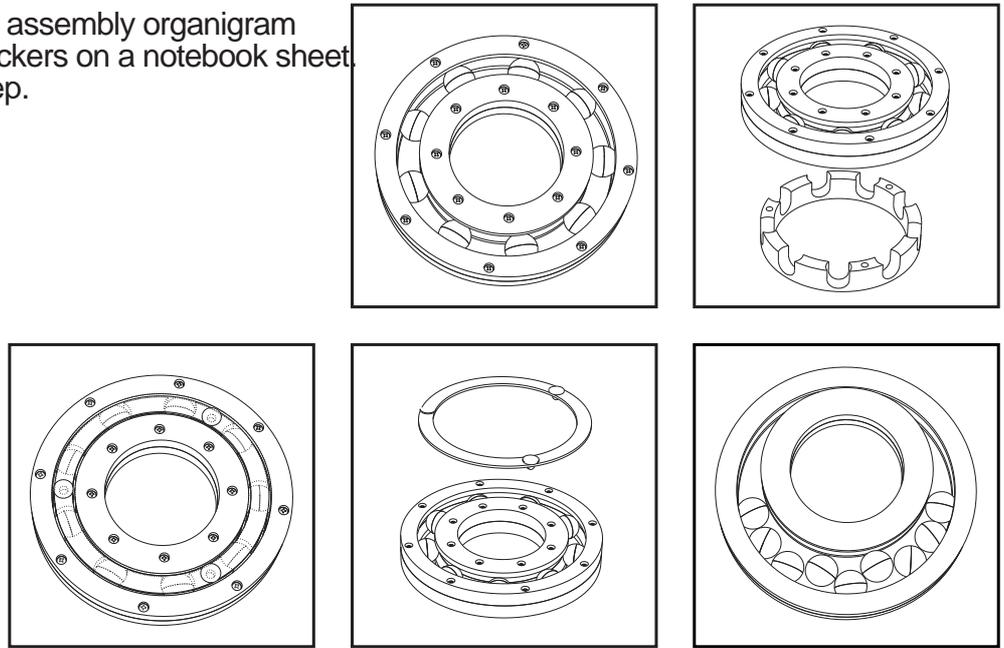
- Ball bearing utilizations : give technical objects using bearings. One could use class objects (borers and machinery, trucks, fans, drawers or shelves or computer table slides, various objects of study, bicycles, roller skates, skateboards, models, ...).

Student sheet page 06, correcting page 07.

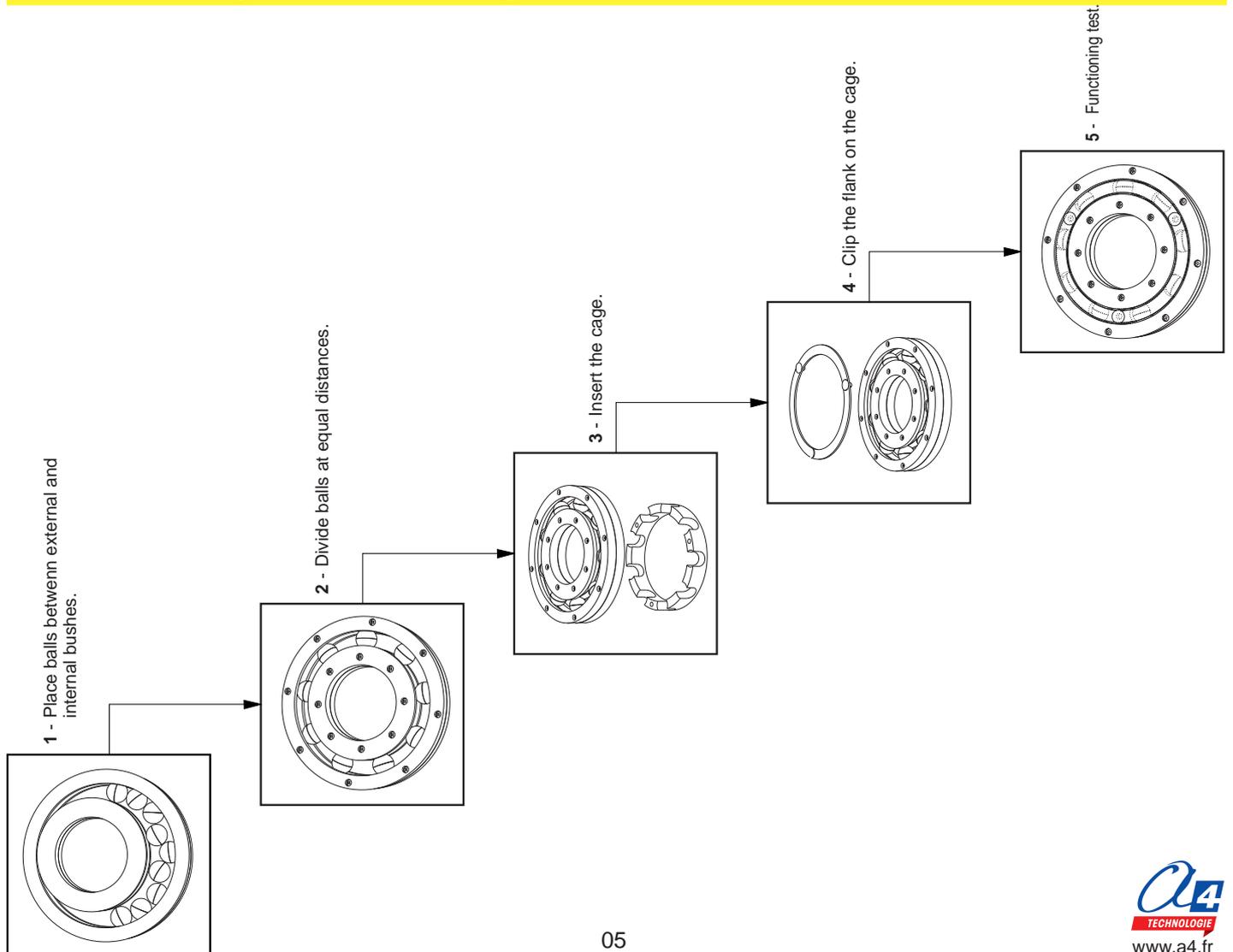


# assembling order

Reconstructing a bearing assembly organigram by cutting and sticking stickers on a notebook sheet.  
Name each assembly step.



# Correcting assembling order



# Observation of the ball bearing Work on model

**1 - Role of balls**

Block the internal bush with one hand and rotate the external bush with the other hand.  
Describe balls movement.

.....  
.....

**2 - Role of cage**

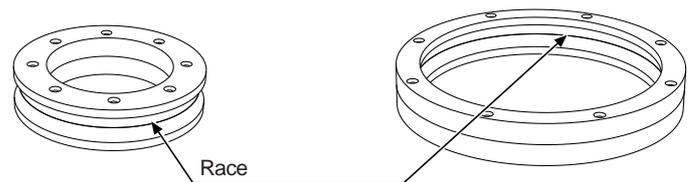
Disassemble the cage, block the internal bush with one hand and make the external bush several turns with the other hand.  
What do balls do?  
What cage is used for?

.....  
.....

**3 - Role of the race**

Observe races profiles and draw them as a diagram.  
Why have they this form?

.....  
.....



**4 - Compare the bearing model with the real metal bearing.**

Complete the comparative table (material, cage .....)

	Model	Real metallic bearing
Material		
Cage		
Lubrication		
Ext / int bushes gap		

**5 - Utilization of ball bearing.**

Give objects of your environment ball bearing equipped.  
Why do we use ball bearing?

.....  
.....  
.....

# Observation of the ball bearing Work on model CORRECTING

### 1 - Role of balls

Block the internal bush with one hand and rotate the external bush with the other hand.  
Describe balls movement.

Balls are rolling between the two bushes, they move slower than the external bush.

### 2 - Role of the cage

Disassemble the cage, block the internal bush with one hand and make the external bush several turns with the other hand.

What do balls do?

What cage is used for?

After few turns of the external bush, balls majority are grouping.

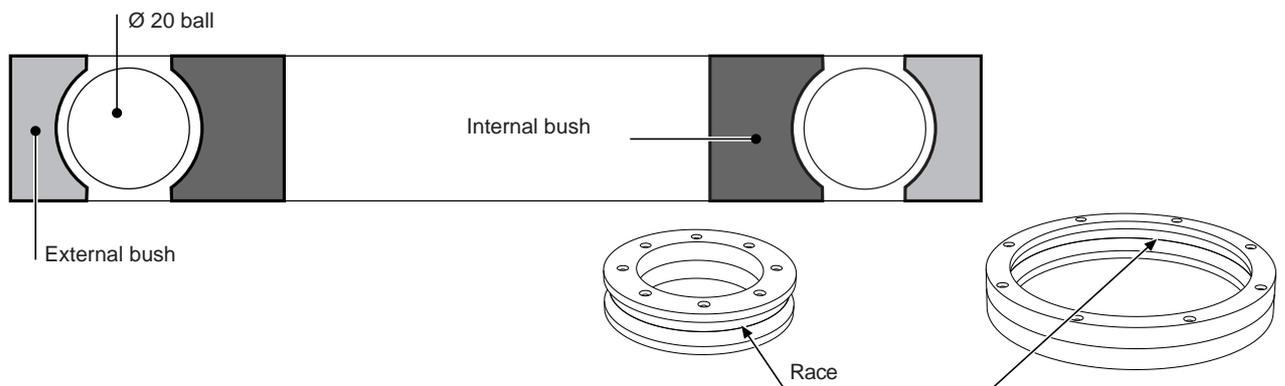
The cage maintains a gap between balls.

### 3 - Role of the race

Observe races profiles and draw them as a diagram.

Why have they this form?

The race profil follows balls profil, allows they guiding, facilitates rolling and secure the two bushes.



### 4 - Compare the bearing model with the real metal bearing.

Complete the comparative table (material, cage .....

	Model	Real metallic bearing
Material	PVC Polyethylene ABS	stainless
Cage	asymmetrical,removable	symmetrical,crimped,unremovable
Lubrication	none	grease
Ext / int bushes gap	important gap	no gap

### 5 - Utilization of ball bearing.

Give objects of your environment ball bearing equipped.

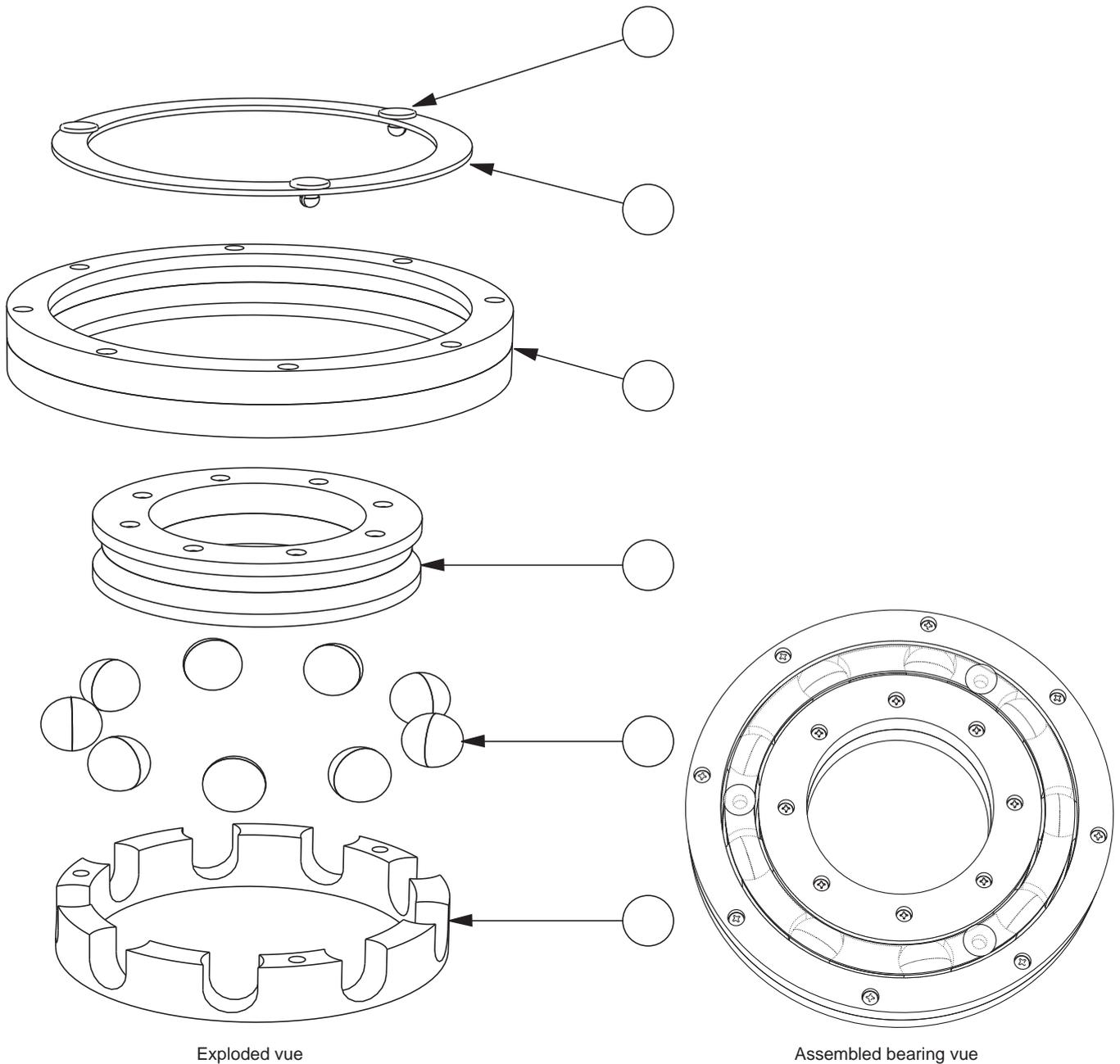
Why do we use ball bearing?

Thera ball bearing in bicycle direction, skateboards wheels axles, scooters, roller skates and bicycles, the spindle of drill...

Bearing can reduce friction between rotating parts.

**Exercise**

- 1 - Complete marking on exploded vue drawingt.
- 2 - Put various colours on ball bearing parts of the two drawings.



Exploded vue

Assembled bearing vue

6	03	Large head elastic rivets	Injected polyethylene model
5	01	Cage flank	Cristal PVC model
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		<b>A4</b>	PROJECT	PART
	School		<b>Ball bearing</b>	
	Class		<b>ASSEMBLY</b>	
Name		Date		DOCUMENT TITLE
				Perspective assembly drawing and exploded vue



