DESIGN PLAN AND TECHNICAL DIAGRAM OF A MANUAL EGGBEATER

STUDENT BOOK	Chapter 11, page 356
TOOLBOX	Pages 75–79

GOAL

Study the utility, function and operation of a manual eggbeater to complete a design plan and a technical diagram.

MATERIALS

- manual eggbeater

WHAT IS THE TECHNICAL OBJECT USED FOR?

1. Turn the crank on the eggbeater and observe its operation.
   What is the purpose of this object?

_____

_____

_____

2. Name at least three constraints that might have been entered in the specifications for designing this object.

_____

_____

_____

_____

_____

_____

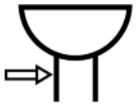
HOW DOES THE TECHNICAL OBJECT WORK?

3. Grasp the eggbeater by the handle. Note the places where your hand exerts force on this part. Circle the illustration below that best demonstrates the points at which force is applied.

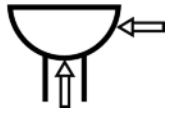
a)

b)

c)



d)



Name: _____ Group: _____ Date: _____

4. The handle allows you to hold the eggbeater. On what other part must you apply force in order to operate the beater?

_____

5. For each part listed in the table below, indicate:
- the type of motion involved (translational, rotational or helical)
- whether this motion is unidirectional or bidirectional
- the symbol representing the type of motion involved

Part	Type of motion	Unidirectional or bidirectional motion?	Symbol
Crank			
Beaters and beater rods			

6. Observe the system that transfers motion from the crank to the beaters.

a) Is this a motion transmission system or a motion transformation system? Explain your answer.

_____

_____

_____

_____

b) What is this system called?

_____

c) How many components does this system have?

_____

d) What type of motion is described by the components of this system while the object is in operation? Also indicate whether this motion is unidirectional or bidirectional.

_____

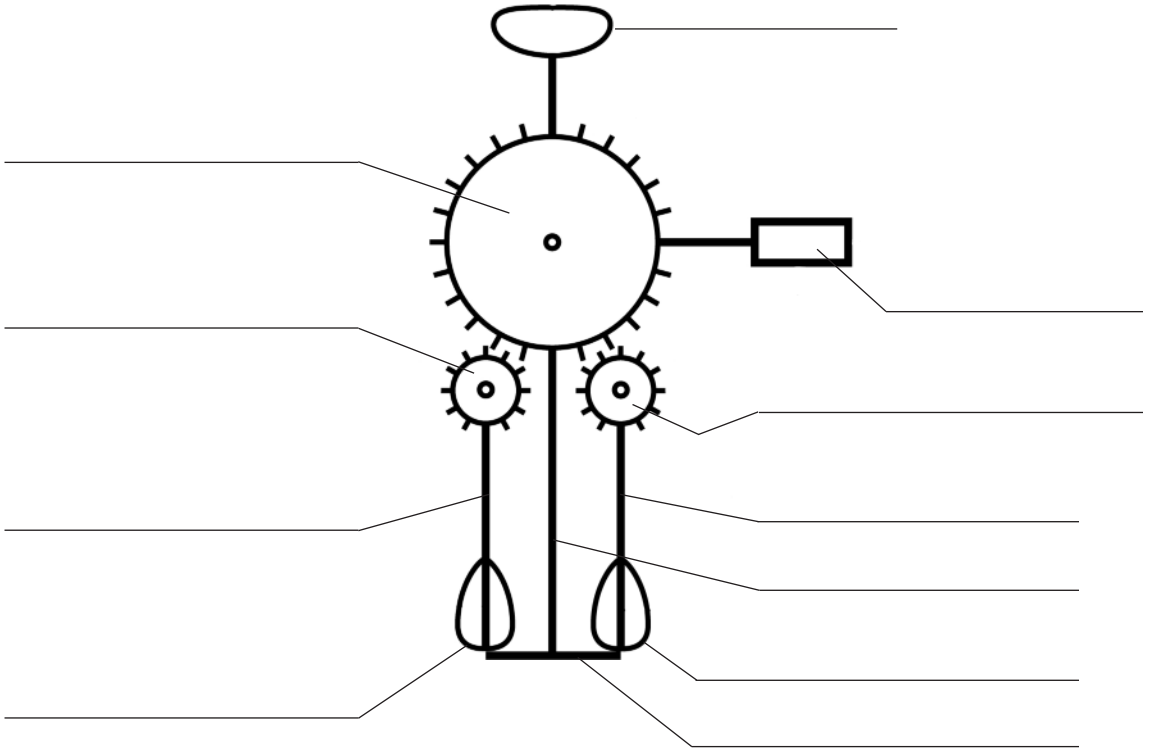
_____

_____

Name: _____ Group: _____ Date: _____

7. With the help of the answers you gave in Questions 3–6, complete the design plan for a manual eggbeater, providing:
- the points where force is applied
- the motion of the beaters, crank and gears respectively
- the names of the various parts shown, taken from the terms in the following box

Crank	Central rod	Large gear	Small gear (2)
Handle	Beater (2)	Beater rod (2)	Beater mount



HOW IS THE TECHNICAL OBJECT PUT TOGETHER?

8. Which parts of the eggbeater contain plastic?

_____

9. Beside plastic, what other material was used to manufacture the eggbeater?

_____

10. What type of guide:

a) allows the crank to revolve? _____

b) allows the large gear to turn? _____

c) allows the small gears to turn? _____

d) allows the beaters and their rods to turn? _____

Name: _____ Group: _____ Date: _____

11. What is the symbol for each type of guide mentioned in Question 3?

12. Observe the links below. For each one, state whether it shows a complete link (no motion possible between parts) or a partial link (motion is possible between parts).

a) the link between the beater mount and the central rod _____

b) the link between the central rod and the handle _____

c) the link between the crank and the large gear _____

d) the link between plastic parts and metal parts in the handle _____

e) the link between the beaters and their rods _____

13. What is the symbol for a complete link in a diagram?

14. With the help of the answers you provided to Questions 8–13, complete the technical diagram for the eggbeater, providing:
- the materials used in manufacturing it (in the legend)
- the names of the various parts shown
- the type of guide provided by certain parts (in the box pointing to the parts)
- the symbol for a complete link (where appropriate)