

# ON-SETS WORKSHEET

3A

NAME \_\_\_\_\_

## PRINCIPLES

1. After the Goal is set, the players take turns making moves.  
A **move** is the transfer of a cube from the Resources to one of the three sections of the playing mat: Required, Permitted, or Forbidden.
2. a. If a cube is moved to Required, the symbol on that cube must be used in any Solution.  
b. If a cube is moved to Permitted, the symbol on that cube may be used in a Solution but does not have to be used.  
c. If a cube is moved to Forbidden, the symbol on that cube must not be used in any Solution.
3. Once a cube is legally played to one of the sections of the playing mat, it is not moved for the rest of the shake.
4. On your turn, if you are not leading in the match, you may make a **bonus move**. To make a bonus move, the Mover must say "Bonus," then move one non-digit cube from Resources to Forbidden. The Mover may then move a second cube to any of the three sections of the mat. If the player in the lead makes a bonus move and an opponent points out the error before the next player moves or someone challenges, the Mover must return the second cube played on that turn to Resources. (In Junior and Senior Divisions, the Mover also loses one point.)
5. On your turn you are not permitted to pass. However, instead of moving you could challenge the most recent Mover.

## EXERCISES

Circle the number of each true statement.

1. Once a cube is legally played to Required, Permitted, or Forbidden, it is not moved for the rest of the shake.
2. On his turn, including the Goal-setter's turn to set the Goal, a player may challenge.
3. Every cube played to Required must be used in any Solution.
4. Every cube played to Permitted may be used in a Solution.
5. A Solution does not have to contain any cubes in Permitted.
6. No cube in Forbidden may be used in a correct Solution.
7. A player is not allowed to pass.
8. Any player may make a bonus move on his turn.
9. A bonus move must be made to Forbidden.

# ON-SETS WORKSHEET

**3B**

NAME \_\_\_\_\_

## PRINCIPLES

The time limits for an On-Sets match are as follows.

a. Rolling the cubes and deal the cards (in either order)	1 minute
b. Making a variation selection	15 seconds
This time does not begin until after the one minute for rolling the cubes.	
c. Setting the Goal	2 minutes
d. First turn of the player to the left of the Goal-setter	2 minutes
e. All other regular turns (including bonus moves)	1 minute
f. Stating a valid challenge after picking up the challenge block	15 seconds
g. Deciding whether to challenge Impossible when no more cubes remain in Resources	1 minute
h. Writing a Solution	2 minutes
i. Deciding whether an opponent's Solution is correct.	2 minutes

- A one-minute sand timer is used to enforce time limits.
- A player being timed has ten seconds *after the sand runs out* to complete what he must do. An opponent must down the ten seconds at a reasonable pace ("one thousand ten, one thousand nine, ..., zero").
- If the ten seconds runs out before the player finishes what she must do, she loses one point and has one more minute to complete the task.
- If not finished by the end of a ten-second countdown at the end of the additional minute, the players loses another point and loses his turn.

## EXERCISES

Give the time limit for each action.

1. rolling the cubes and dealing the cards \_\_\_\_\_
2. making a variation selection \_\_\_\_\_
3. setting the Goal \_\_\_\_\_
4. making the first move after the Goal is set \_\_\_\_\_
5. writing a Solution \_\_\_\_\_
6. stating a valid challenge after picking up the challenge block \_\_\_\_\_
7. deciding whether an opponent's Solution is correct \_\_\_\_\_

Circle the number of each **true** statement.

8. A one-minute sand timer is used to enforce time limits.
9. If you don't finish what you must do when the sand runs out, you are immediately penalized a point.
10. If you lose a point for a time-limit violation, you get another minute to finish what you must do.
11. The most a player may be penalized for violating a time-limit is two points.

# ON-SETS WORKSHEET

3C

NAME \_\_\_\_\_

## CHALLENGES

### PRINCIPLES

You may make either of two challenges against the person who just moved.

1. **Impossible:** This means the Challenger thinks that *no correct Solution* can be written even if any or all of the cubes in Resources are used.
2. **Now:** This means the Challenger thinks a Solution can be *written using the cubes on the mat* and, if needed, *one cube from Resources*.

You may *not* make a Now challenge in two situations.

1. With no cubes in Required and Permitted since a Solution must contain at least two cubes.
2. With fewer than two cubes left in Resources.

In both cases, the challenge is set aside, and the player who tried to challenge Now is penalized one point.

Only the latest Mover may be challenged. In a three-player match, either of the other two players may challenge. To challenge, you must pick up the "challenge block" and say either "Now" or "Impossible."

Challenge **Impossible** when you think that *no* correct Solution can be written using:

- a. all the cubes in Required,
- b. any or all of the cubes in Permitted;
- c. any or all of the cubes still in Resources.

Challenge **Now** when you think *you* can write a Solution using:

- a. all the cubes in Required;
- b. any or all of the cubes in Permitted;
- c. **one** cube from Resources, if needed.

### EXERCISES

Circle the number of each **true** statement.

1. You may challenge only on your turn.
2. Only the latest Mover may be challenged.
3. To challenge, a player must touch the challenge block.
4. Any Solution written after a Now or an Impossible challenge must use all the cubes in Required.
5. After an Impossible challenge, a Solution may use any cubes in Resources.
6. After a Now challenge, a Solution may use any cubes in Resources.
7. After a Now challenge, a correct Solution might be written without using any Resource cubes.
8. A Now challenge is illegal when no cubes are in Required and Permitted.
9. A Now challenge may be made with only one cube left in Resources.
10. A Now challenge may be made with no cubes left in Resources.
11. A player who makes an illegal challenge is penalized a point.

# ON-SETS WORKSHEET

# 3D

NAME \_\_\_\_\_

## WRITING SOLUTIONS

### PRINCIPLES

After a valid challenge, at least one player must write a Solution.

1. After a **Now** challenge,
  - the Challenger *must* present a Solution.
  - the Mover may *not* present a Solution.
  - the Third Party *may* present a Solution.
2. After an **Impossible** challenge,
  - the Challenger may *not* present a Solution.
  - the Mover *must* present a Solution.
  - the Third Party *may* present a Solution.

If you challenge **Impossible**, you are saying that *no* correct Solution can be written. You, the Challenger, are *daring* the Mover to write a Solution. So the Mover must do so to prove you wrong. Note: The Goal may be challenged **Impossible** as soon as it is set.

If you challenge **Now**, you are saying that *you* can write a correct Solution using the cubes on the mat plus one cube from Resources (if needed). So you, the Challenger, must write a Solution after challenging Now.

In a three-player match, the Third Party must decide whether he will present a Solution. If writing a Solution, the Third Party must satisfy the same requirements as the other player (Challenger or Mover) who must write a Solution.

- a. After an Impossible challenge, the Third Party may use any cubes in Resources.
- b. After a Now challenge, the Third Party may use at most *one* Resource cube.

A Solution-writer must circle the Solution to be checked. If this is not done, the writer must do so immediately when asked by an opponent.

### EXERCISES

Circle the number of each **true** statement in Exercises 1-9.

1. At least one player must write a Solution after every valid challenge.
2. After making a Now challenge, the Challenger must present a Solution.
3. It is possible after an Impossible challenge that both the Challenger and the Third Party present Solutions.
4. An opponent may challenge Impossible right after the Goal-setter has set the Goal.
5. When you Challenge Impossible, you dare the Mover to write a correct Solution.
6. If writing a Solution, the Third Party must satisfy the same requirements as the other player (Challenger or Mover) who must write a Solution.
7. If presenting a Solution after a Now challenge, the Third Party may use as many cubes from Resources as she wishes.
8. A Solution that is not circled when presented to opponents is automatically incorrect.
9. A player who does not circle the Solution being presented has one minute to do so.

# ON-SETS WORKSHEET

3E

NAME \_\_\_\_\_

## LAST CUBE PROCEDURE

### PRINCIPLES

When one cube is left in Resources, no player may challenge Now. Instead, this is what you do.

1. The player whose turn it is moves the last cube in Resources to Required or Permitted.
2. All players have two minutes to write a correct Solution.
3. During the first of these two minutes, an opponent may challenge Impossible against the player who moved the last cube. If this is done, the last Mover (and the Third Party if siding with the Mover) has the rest of the two minutes to finish a Solution.
4. If the Impossible challenge is not made, the situation is called a "forceout." Any player who writes a correct Solution scores 4; anyone who does not present a correct Solution scores 2.

If no challenge is made during a shake, eventually only two cubes will be left in Resources. If a Solution can be written using only *one* of those cubes (or neither of them), a player should challenge Now against the last Mover. (Or an opponent could challenge Impossible.)

If no challenge is made, the next Mover should move one of the two cubes left in Resources to either Required or Permitted. This makes a Solution possible with one more cube. However, the Mover was *forced* to move the second-to-last cube to the mat. For this reason, **any Now challenge at this point is set aside**. However, you may make an Impossible challenge with one cube left in Resources if you think no one can write a correct Solution.

If no one challenges Impossible, follow the procedure listed in the Principles above. The shake should end in a tie with each player writing a correct Solution within two minutes.

Note: Moving the last cube in Resources to Forbidden is illegal procedure. Any challenge is set aside, and the cube is put back in Resources.

### EXERCISES

Circle the number of each **true** statement.

1. An Impossible challenge may be made after any move regardless of how many cubes remain in Resources.
2. A Now challenge may be made after any move.
3. The last Resource cube is never played to the mat.
4. If two cubes remain in Resources but only one is needed in a Solution, an opponent should challenge Now against the last Mover.
5. If no cube remains in Resources and no Impossible challenge is made, any player who writes a correct Solution scores 6.
6. If no cube remains in Resources and no Impossible challenge is made, any player who does not present a correct Solution scores 2.
7. Moving the last Resource cube to Forbidden is illegal procedure.

# ON-SETS WORKSHEET

3F

NAME \_\_\_\_\_

## WRITING SOLUTIONS

### PRINCIPLES

In Basic On-Sets (without Restrictions), any Solution must obey these rules.

1. A Solution is the name of a set. The number of cards in the set must equal the Goal.
2. Any Solution must contain at least two cubes.  
Because of this rule, any Now Challenge before a cube has been played to Required or Permitted is set aside and the "Challenger" is penalized one point.
3. The Solution must not use any of the cubes in Forbidden.
4. The Solution must use all the cubes in Required.
5. The Solution may use some, none, or all of the cubes in Permitted.
6. The number of Resource cubes in the Solution depends on the type of challenge.
  - a. After a **Now** challenge, the Solution may contain *at most one* cube from Resources.
  - b. After an **Impossible** challenge, a Solution may contain some, none, or all of the cubes in Resources.
7. The Solution-writer may put symbols of grouping (parentheses and brackets) anywhere in the Solution to indicate the desired order of operations.

### EXERCISES

Circle the number of each **true** statement.

1. The number of cards in the Solution set must equal the Goal.
2. A Solution must always use at least one cube from Resources.
3. A player may legally challenge Now with no cubes in Required or Permitted.
4. A Solution must contain at least two cubes.
5. A correct Solution does not use any cubes in Forbidden.
6. A correct Solution may contain none of the cubes in Permitted.
7. A correct Solution may use all the cubes in Permitted.
8. After a Now challenge, a Solution may use no cube from Resources.
9. After a Now challenge, a Solution may contain one cube from Resources.
10. You may put parentheses in your Solution where you want.
11. After an Impossible challenge, a Solution must not use more than one cube from Resources.
12. After an Impossible challenge, a Solution might use *no* cube from Resources and still be correct.

# ON-SETS WORKSHEET

3G

NAME \_\_\_\_\_

## CHECKING SOLUTIONS

### PRINCIPLES

1. After a challenge in a three-player match, the Third Party must indicate by the end of the two minutes for writing Solutions whether he will present a Solution.
2. All Solutions must be presented before any is checked.
  - a. Once a player presents a Solution to the opponent(s), he may make no corrections or additions even if the time for writing Solutions has not expired.
  - b. If the Solution to be checked is not circled, the writer must circle the Solution when asked to do so by an opponent.
3. Opponents have two minutes to check each Solution. In a three-player match, *both* opponents must check a player's Solution during the *same* two minutes. No other Solution should be checked during this time.
4. Within the time for checking a Solution, opponents must either accept the Solution or prove it is incorrect.
5. Players must not use the cubes in Required, Permitted, or Resources to form the Solution being checked to avoid arguments about where each cube was played on the mat.

### EXERCISES

■ Circle the number of each **true** statement.

1. After a challenge in a three-player match, the Third Party has one minute to decide whether to present a Solution.
  2. One Solution may be checked while another player is still working on his Solution.
  3. Only one Solution should be checked during a given two-minute time limit.
  4. A Solution is correct if no opponent proves it is incorrect.
  5. After an Impossible challenge, the Mover's Solution is checked before the Third Party's.
  6. Players should not use the cubes in Required, Permitted, and Resources to form the Solution they are checking.
  7. If a Solution is not circled, it is automatically wrong.
- Player **X** challenges Impossible against **Y**. The Third Party, **Z**, decides to present a Solution. Circle the number of each correct way **X**, **Y**, and **Z** can check Solutions.
8. **X** and **Y** check **Z**'s Solution, then **X** and **Z** check **Y**'s Solution.
  9. **X** checks **Y**'s Solution while **Y** checks **Z**'s Solution.
  10. **X** and **Z** check **Y**'s Solution, then **X** and **Y** check **Z**'s Solution.
- A three-player shake ends in a forceout. Players **A**, **B**, and **C** all present Solutions. Circle the number of each correct way **A**, **B**, and **C** can begin checking Solutions.
11. **A** check **B**'s Solution while **B** checks **C** and **C** checks **A**.
  12. **A** and **C** check **B**'s Solution while **B** times them.
  13. **A** and **B** check **C**'s Solution while **C** checks **A**'s Solution.
  14. **B** and **C** check **A**'s Solution while **A** times them.

# ON-SETS WORKSHEET

**3H**

NAME \_\_\_\_\_

## SCORING AFTER A CHALLENGE

### PRINCIPLES

1. After a challenge, you are *correct* if:
  - a. you had to write a correct Solution and did so, or
  - b. you did not have to write a correct Solution (someone else did) and no one wrote a correct Solution.
2. After a challenge, points are scored as follows.
  - a. If you are not correct, you score **2**.
  - b. A correct Challenger or Mover scores **6**.
  - c. A correct Third Party scores **6** if siding with the Mover or with an incorrect Now Challenger or scores **4** if siding with a correct Challenger.

### EXERCISES

Give the scoring (**6**, **4**, or **2**) for players **X**, **Y**, and **Z** in each situation.

	<b>X</b>	<b>Y</b>	<b>Z</b>
1. X challenges Impossible against Y. Z decides not to present an Equation. Y does not present a correct Equation.	_____	_____	_____
2. X challenges Impossible against Y. Z decides not to present an Equation. Y writes a correct Equation.	_____	_____	_____
3. X challenges Impossible against Y. Y presents a correct Equation, but Z's Equation is incorrect.	_____	_____	_____
4. X challenges Impossible against Y. Both Y and Z write correct Equations.	_____	_____	_____
5. X challenges Impossible against Y. Z writes a correct Equation, but Y does not.	_____	_____	_____
6. X challenges Impossible against Y. Both Y and Z present incorrect Equations.	_____	_____	_____
7. X challenges Now against Y. Both X and Z write correct Equations.	_____	_____	_____
8. X challenges Now against Y. X writes a correct Equation, but Z's Equation is incorrect.	_____	_____	_____
9. X challenges Now against Y. Z writes a correct Equation, but X does not.	_____	_____	_____
10. X challenges Now against Y. Both X and Z present incorrect Equations.	_____	_____	_____
11. X challenges Now against Y. Z does not present an Equation. X writes a correct Equation.	_____	_____	_____
12. X challenges Now against Y. Z does not present an Equation. X does not write a correct Equation.	_____	_____	_____