

Engineering And Robotics Learned Young

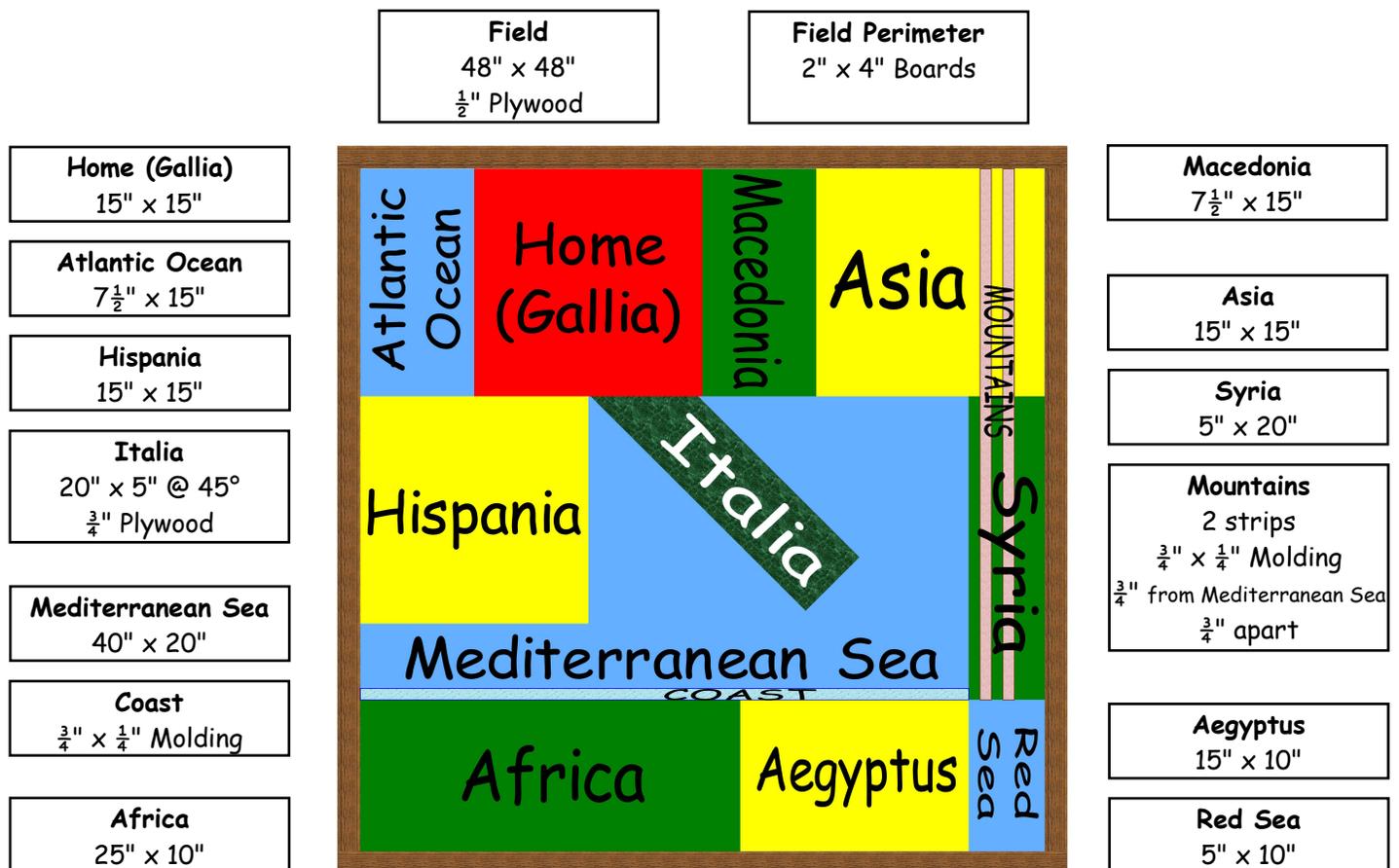
◆ EARLY ◆

Fall 2014 Robotics Competition

Roboticists, the World Archaeological Society (WAS) needs your help exploring the Ancient Roman Empire! Using DigBots, WAS is continually making discoveries of ancient worlds helping us understand our past and plan for our future. WAS needs you to build a robot to deploy DigBots at archaeological sites in the former Roman Empire. Please help WAS uncover the Ancient Roman Empire!

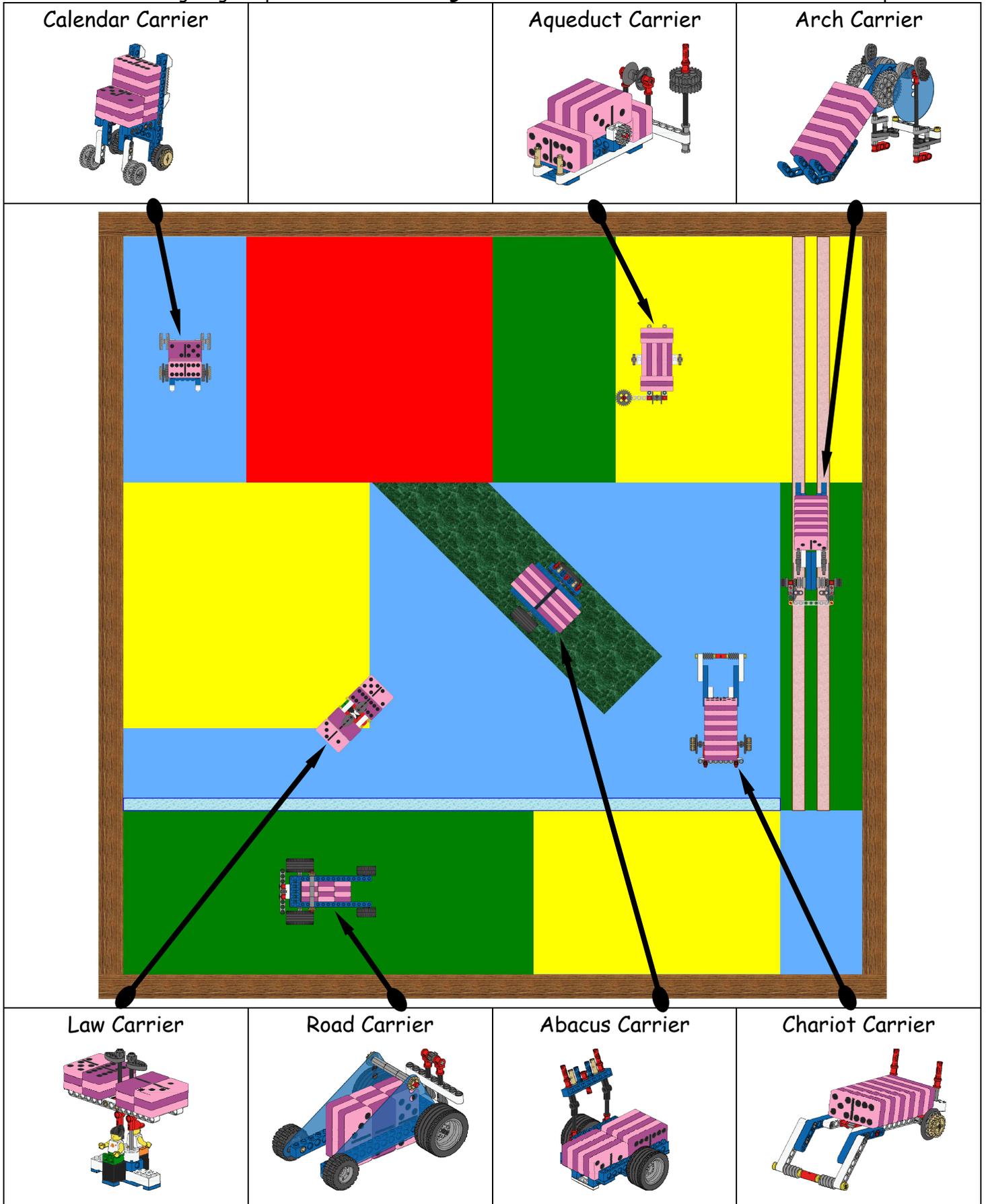
Below is everything that we know about the mission.

- The team must be ready to execute the mission for your EARLY Tournament.
- The equipment available for a team to build a robot is 3 LEGO® Simple & Motorized Mechanisms Kits.
- The following diagram presents the environment that will be encountered. Construction details are found in the *Mission Field Details* document.



Ancient Roman Empire

- The following diagram presents where the *DigBots* and *Carriers* will be in the Ancient Roman Empire.



Mission Rules

1. The team has 2 minutes to complete the mission.
2. There are 84 *DigBots* on the mission field at the beginning of each mission, represented by dominoes. Domino details are found in the *Mission Object Details* document.
3. There are 7 *DigBot Carriers* on the mission field at the beginning of the mission constructed from one LEGO® Simple & Motorized Mechanisms kit. Carrier details are in each *Carrier Instruction* document.
4. The team's score is determined at the end of the 2-minute mission.
5. If a *DigBot* is moving when time expires, the *DigBot's* scoring position is determined when the *DigBot* has come to rest.
6. There are three scoring zones: **ASIA**, **HISPANIA**, and **AEGYPTUS**. The **MOUNTAINS** contained within the borders of **ASIA** are part of **ASIA**.
7. The goal of the mission is to *deploy DigBots* in the scoring zones.
8. A *DigBot* is *deployed* when the *DigBot* is directly supported by the mission field or other *DigBots* that are *deployed*. A *DigBot* is *NOT* *deployed* if it is on a *Carrier* or in a robot.
9. The team scores 2 points for each *DigBot* that is *deployed* in a scoring zone.
10. There are three penalty zones: the **ATLANTIC OCEAN**, the **MEDITERRANEAN SEA**, and the **RED SEA**. The **COAST** is part of the **MEDITERRANEAN SEA**.
11. The team is penalized 1 point for each *DigBot* *deployed* in a penalty zone.
12. A perfect score is achieved by having each of the 84 *DigBots* *deployed* in one of the three available scoring zones. Thereby, all 84 *DigBots* are worth 2 points each, resulting in a score of $84 \times 2 = 168$.
13. A *DigBot* *deployed* and breaking the plane of a scoring zone is considered *deployed* in the scoring zone.
14. A *DigBot* *deployed* in multiple zones simultaneously (scoring zone & non-scoring zone, scoring zone & penalty zone, penalty zone & non-scoring zone, etc.) is considered *deployed* in the zone that results in the greatest points.
15. Please remember that a *DigBot* must be "*deployed*" in a scoring zone for a *DigBot* to count for points. A *DigBot* is *deployed* when the *DigBot* is directly supported by the field or other *DigBots* that are *deployed*.
16. Only the parts that are contained in three LEGO® Simple & Motorized Mechanisms kits along with nine 20" controller extension wires may be used to construct the robot and attachments (i.e. no other materials such as glue may be used on the robot). The kit parts may not be altered.

17. **HOME** is the 15" x 15" boundary extended vertically.
18. The robot and all attachments must begin completely inside **HOME** at the beginning of the 2-minute mission (i.e. no LEGO parts may be off the playing field when the mission begins). The parts do not have to be assembled together and the parts may be removed from and returned to the field during the 2-minute mission.
19. The team may retrieve their robot without penalty when the robot is partially inside **HOME** by lifting the robot vertically. After retrieving, the robot must be returned to **HOME**. If a *DigBot* or *Carrier* remains with the robot when the robot is retrieved without penalty, the *DigBot* or *Carrier* that is now in **HOME** remains in play.
20. If a team touches their robot, including parts that have become separated from the robot, that is completely outside **HOME**, the team is penalized 10 points. The robot must be returned **HOME** to continue the mission and if a *DigBot* or *Carrier* remains with the robot when the robot is returned **HOME**, the *DigBot* or *Carrier* is removed from the field.
21. The robot must start completely inside **HOME** every time the robot is returned **HOME** (i.e. after retrieving the robot, no part of the robot may be breaking the **HOME** plane when continuing the mission).
22. The controllers and wires are NOT considered part of the robot.
23. The controller wires may only be used to provide electrical power to robot motors (i.e. the controller wires may not be used to drag or corral a robot, *DigBot*, or *Carrier*). If a controller wire is used illegally, the robot is immediately returned **HOME** to continue the mission and the *DigBots* and *Carriers* involved are removed from the field.
24. The robot shall not have any elastic stored energy when the mission begins or when the robot is returned **HOME**, but elastic stored energy may be created with a motor during the mission (i.e. the robot may not be "wound up" manually).
25. The team may touch a *DigBot* or *Carrier* without penalty if the *DigBot* or *Carrier* is COMPLETELY inside the **HOME**.
26. If a *Carrier* is illegally touched, the *Carrier* along with any *DigBots* the *Carrier* is carrying is removed from the field. If a *DigBot* is illegally touched, the *DigBot* is removed from the field.
27. A *Carrier* is never considered part of the robot.
28. *DigBots* may only leave **HOME** by using the robot or by "letting go" of a *DigBot* or something carrying a *DigBot*. For example, a team member may not roll, push, or throw a *DigBot* but a team member may put a *DigBot* on a 'LEGO slide' and "let go" of the *DigBot*.
29. Because *DigBots* are very valuable, the team is penalized 10 points for each *DigBot* ejected from the field. No penalty shall be assessed for a *DigBot* that is removed by rule (e.g. for illegal touching, dragging, etc.).
30. A score of zero shall be awarded if penalties result in a negative score.

Please contact Mission.Control@EARLYrobotics.org with any questions or comments.

Thank you for maintaining the spirit of the game!