



The Knights of STEMalot Power Play **Classroom Game**

THE STORY

Sour Ron is back and sourer than ever! In the land of STEMalot, where science, technology, engineering and math are a huge part of everyday life, students graduate from Knight School to become wizards of STEM and play important roles in the community. But Sour Ron has discovered that he must pass gym class before he can be a true Knight of STEMalot! In a fit of rage, he has stolen the six simple machines from the Realm of the Six, causing everything in STEMalot to come to a halt. How can Carmen move around the Realm without wheels? How can Cleaver and his industrious beavers construct buildings without levers? As a knight-in-training in STEMalot Knight School, it's up to you to retrieve the six simple machines and restore order to the Realm of the Six.

ITEMS YOU'LL NEED TO SET UP THE GAME

Listed below are the materials you need for your students to play the game. There are additional kit items provided to be used with future games but you'll only need the specific kit items listed below for *The Knights of STEMalot Power Play* game. There are also suggested locations for some of the game materials. You know your students best, so feel free to get creative, making the gameplay tougher or easier by hiding clues and materials or placing them out in the open.

KIT ITEMS

- 1 small lock box to be placed in the playing area
- 1 large lock box to be placed in the playing area
- 1 padlock with key
 - » Key is taped to the back of the Realm of the Six map, which is to be hung up on the wall close to a light switch
- 1 mini USB drive to be placed in small lock box
- 1 five-letter combination lock
- 1 five-arrow combination lock
- 1 four-digit lock
- 1 three-digit lock
- 1 blue lock hasp
- 1 UV flashlight
- 1 UV marker
- 2 hint cards

PRINTED GAME RESOURCES

- Teacher instructions (for classroom setup)
- Game Logic Map (for classroom setup)
- FAQs (for classroom setup)
- Professor Merlin's diary
- Realm of the Six map
- 6 simple machine cards, one for each of the six simple machines: the LEVER card is to be placed in the small lock box; the rest of the cards (PULLEY, WHEEL & AXLE, WEDGE, INCLINED PLANE, SCREW) are to be hidden in the playing area by the teacher, and/or given to students when they successfully solve a puzzle or unlock a lock
- Knight of STEMalot diploma (one diploma placed in the large lock box, with individual diplomas distributed to all students after the game)

SETUP

The following is a basic logical order for setting up *The Knights of STEMalot Power Play* game. If you are already familiar with Breakout-type games, this may be a breeze. If not, take it step by step. Setup should take roughly 30 minutes.

1. Go to **www.NTCPowerPlay.com** and select *The Knights of STEMalot Power Play* program.
2. Click PLAY to access all the materials needed for the classroom game.
3. Read the game story and watch the teacher tutorial video.
4. Review and print all the game resources. Decide if you'd like to make additional sets of any resources to have multiple groups of students playing during a single game session.
5. Prepare the three-digit lock, the four-digit lock, the five-letter combination lock and the five-arrow combination lock with the correct combinations from the lock puzzle solutions.
6. Instructions for setting the combinations can be found here:
www.breakoutedu.com/locks
 - a. Set the locks to these solutions:
 - Three-digit lock = 1-5-2
 - Four-digit lock = 2-2-6-8
 - Five-letter combination lock = S – T – E – A – M
 - Five-arrow combination lock = UP – RIGHT – UP – LEFT – DOWN
 - Padlock = Key can be found taped to the back of the Realm of the Six map
7. Prep the lock boxes:
 - a. First, circle the words "light switch" on the LEVER card using the UV marker, and circle the first letter of each of the five entries in Professor Merlin's diary (which spell out S-T-E-A-M) using the UV marker. Then place the LEVER card, the mini USB drive and the UV flashlight in the small lock box. Lock with the five-arrow combination lock.
 - b. In the large lock box, place one Knight of STEMalot diploma along with candy or other prizes (if you choose) and the Reflection Questions. After preparing the combination locks, you will lock this box by first attaching the blue lock hasp and then locking with the four-digit lock, the three-digit lock, the five-letter combination lock and the padlock. Place the pages of Professor Merlin's diary on a table in the playing area or hang on the wall.
8. Place the pages of Professor Merlin's diary on a table in the playing area or hang on the wall.

9. Hide the five remaining Simple Machine cards throughout the playing area for students to find. Conversely, you can give the five remaining cards to students whenever they solve a puzzle, unlock a lock, work together, think critically or ask valuable questions.
10. Tape the padlock key to the back of the Realm of the Six map, and hang the map on the wall close to a light switch.
11. Ensure that the mini USB drive has the Knight School Course Catalogue and Sour Ron's transcript saved onto it, and can be accessed on your classroom computer. (Or, if your classroom does not have access to a computer, you can print these two materials and place them in the playing area.)
12. As you get ready to start, explain to your students that they'll need to work together and search the room thoroughly (and respectfully) in order to play the game. Explain that in order to use a Hint Card, your students must all agree that they are ready for a hint. Depending on their progress and how much time is left, you can then give the group an appropriate hint to get them moving in the right direction.
13. Show your students *The Knights of STEMalot Power Play* story video, set your timer for 45 minutes and begin!
14. After they've completed the game, ask your students the Reflection Questions.
15. Feel free to dig in deeper with your students on the ideas and concepts discovered by playing this classroom game. This game includes concepts from the following educational points:
 - Science is about asking questions and finding answers
 - Technology involves creation and innovation
 - Engineering involves design and testing
 - Math is used by you every day
 - Problem-solving and collaboration are important in the scientific process
16. You will be receiving an email containing a link to fill out a teacher evaluation and feedback form.
17. After your complete evaluation is submitted, you'll receive a code and instructions to register your kit.
18. Explore the additional games at www.breakoutedu.com and plan your next adventure. Your subscription is good for one year starting from your registration date.

THE CLUES

The following are the five puzzles and clues used to open the various combination locks.

Corresponding lock: Four-digit lock

Answer: 2-2-6-8

This solution can be found by retrieving all six of the Simple Machine cards. (One, the LEVER card, is placed in the small lock box; the other five are to be hidden or given to students at the teacher's discretion.) The backs of the six cards have a diagram of a catapult with the equation for determining force included ($\text{force} = \text{mass} \times \text{acceleration}$). The figures for mass and acceleration are given; students must determine the force of the equation, resulting in the four-digit code.

Corresponding lock: Three-digit lock

Answer: 1-5-2

This solution can be found by reading the course descriptions on the Knight School Course Catalogue sheet and finding the course number for gym class (which Sour Ron didn't pass). As an added clue, Sour Ron's transcript from Knight School is included, which makes it clear that he is short only one class.

Corresponding lock: Five-arrow combination lock

Answer: UP – RIGHT – UP – LEFT – DOWN

This solution can be found by following Sour Ron's last known whereabouts through the Realm of the Six map. His whereabouts are written out via cardinal directions, and a compass is included on the map.

Corresponding lock: Five-letter combination lock

Answer: S – T – E – A – M

This solution can be found by reading the diary entries in Merlin's diary. The diary entry numbers are out of order, but when placed in the correct order, the first letter of each entry reads S-T-E-A-M. The teacher should circle the first letter of each diary entry with the UV marker.

Corresponding lock: Padlock key

Answer: The key is found taped to the back of the Realm of the Six map, which is hung on the wall close to a light switch. (The LEVER card, which is to be found in the small lock box, has "light switch" circled in invisible ink by the UV marker; the UV flashlight is also included in the small lock box so the students can view the invisible ink.)

THE END

When students solve the puzzles and open the large lock box, they discover a diploma from STEMalot Knight School certifying them as true Knights of STEMalot, along with the Reflection Questions and any additional prizes or candy chosen by the teacher/facilitator. The Reflection Questions can be used as discussion prompts to solidify the learning from this classroom game experience.