



SCI-OPS: GLOBAL DEFENSE TEACHER REFERENCE GUIDE

Sci-Ops: Global Defense Overview

Sci-Ops: Global Defense is an entertainment quality, 3D, turn based strategy game that connects chemistry and physical science standards to real-life science. Learning standards are infused into the game play mechanics, requiring students to understand chemistry to select the best upgrades for their gear. Students use real world science to battle invading aliens, known as **THE HIVE**, freeing captured STEM experts along the way. As they rescue experts and upgrade their gear, students are also exposed to career paths and employment opportunities specific to their state.

SCI-OPS CHARACTERS



AKI

Creator of the Sci-Ops battle armor, Aki enjoys experimenting with metals to determine which is best suited for battle. Aki is equipped with dash boots.



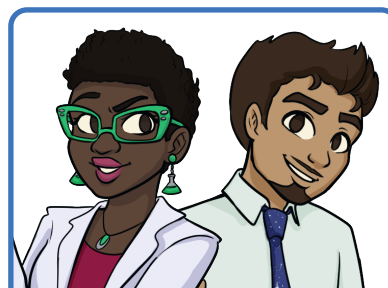
NIKOLE

Nikole created the Sci-Ops laser and uses noble gases to increase its energy output. Nikole is equipped with jump boots.



ZIA

Zia is a sci-operative, a member of a secret government organization. She recruits Aki and Nikole in the battle against **THE HIVE**. Zia is unlocked after completion of level 10.



STEM EXPERTS

Students will meet six STEM experts with educational and career paths specific to your state. Each STEM expert uses their expertise to provide a boost to a specific piece of gear.

The Sci-Ops: Global Defense Laboratory

The Sci-Ops laboratory is where students may:

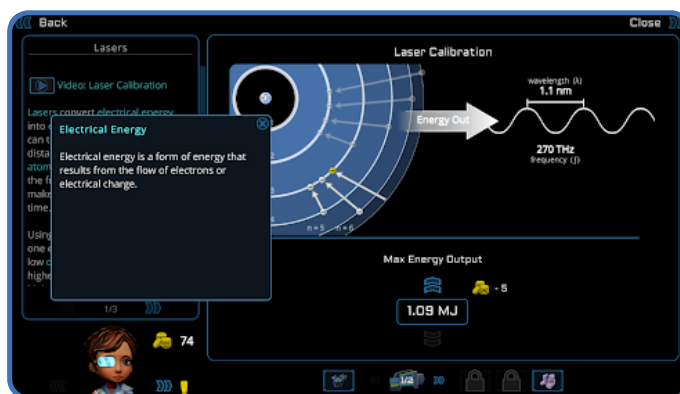
- Upgrade their gear using coins earned through their game play to defeat **THE HIVE**.
- Partner with rescued STEM experts.
- Watch instructional videos narrated by our experts that explain major science concepts.
- Interact with a dynamic text and an extensive vocabulary index.
- Explore an interactive periodic table.



Partnered Experts



Available Funds



Lab Strategy Tips:

- Students will need to consider **HIVE** capabilities (visible by hovering over the aliens before each level) and create a gear strategy for each new mission.
- Students must consider the properties of elements chosen for their gear, the cost-benefit of upgrading one piece of gear versus another, and their available funds.
- Students apply the appropriate science concepts to make the best choices for their gear.

Topics Supported by *Sci-Ops: Global Defense*

LASER: AVAILABLE IN LEVEL 1

- Bohr Model of the Atom
- Valence Electrons
- Emission of Light
- Periodic Table Families
- Element Reactivity
- Metallic vs. Nonmetallic Properties
- Electromagnetic Waves
- Factors Explaining Periodic Trends

ARMOR: AVAILABLE IN LEVEL 1

- Matter
- Atomic Structure
- Units for Measurement
- Periodic Table and Trends
- Thermodynamic Curves
- States of Matter
- Phase Changes
- Physical vs. Chemical Properties
- Bonding

DASH BOOTS & JUMP BOOTS AVAILABLE IN LEVELS 5 & 7

- Gas Laws
- Forms of Energy and Transfer
- Law of Conservation of Energy
- Calorimetry
- Phase Diagrams
- Work
- Simple Machines
- Open and Closed Systems

ORBITAL LASER: AVAILABLE IN LEVEL 8


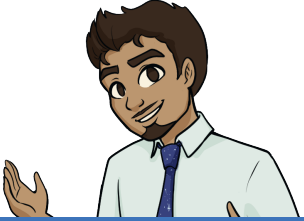


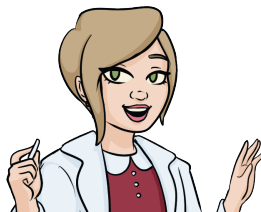

- Wave Movement through Different Media
- Refraction and Interference
- Insulators
- Types of Conductors
- Electromagnetic Radiation
- Atmospheric Composition
- Wave-Particle Duality of Light

EMAG BURST: AVAILABLE IN LEVEL 12

- Law of Conservation of Matter
- Mole Concept
- Unit Conversions
- Molecular Mass
- Properties of Solutions
- Molecule Polarity
- Factors Impacting Solubility
- Conduction, Expansion and Contraction
- Law of Multiple Proportions and Dalton's Atomic Theory



Meet the Sci-Ops Stem Experts

STEM EXPERT	EDUCATION PATHWAY	CAREER	GEAR
 <p>Dr. Joshi</p>	BS → MS → PhD	Electrical Engineer	<i>Laser OverCharge:</i> gives 100% boost to laser energy
 <p>Mr. Boyle</p>	AAS → BS → MS	Aerospace Engineer	<i>Dash Boots</i> <i>TurboFan:</i> instantly recharge boots
 <p>Mr. Pauling</p>	AAS → BS → MS	Mechanical Engineer	<i>Armor CoolFan:</i> quickly cool armor
 <p>Mrs. Watt</p>	AAS → AAS → BS	Material Scientist	<i>Jump Boot</i> <i>QuickCharge:</i> expanded jump boot range
 <p>Ms. Sputnik</p>	AAS → AS → BS	Computer Scientist	<i>Orbital Laser</i> <i>OverClock:</i> additional laser charges
 <p>Dr. Nobel</p>	BS → MS → PhD	Chemist	<i>E-Mag</i> <i>SmartStorage:</i> extended E-mag burst radius

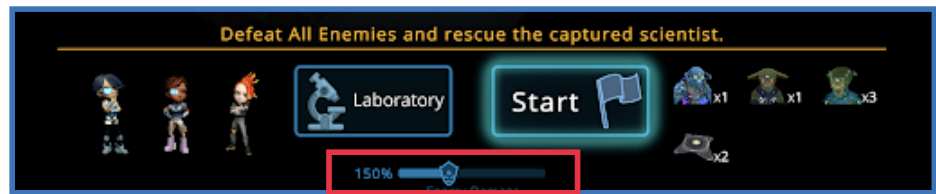
Implement *Sci-Ops: Global Defense* in Your Class

RESOURCE	SUGGESTED USE
<p>Play to Learn Activities</p>	<p>Use these resources to support student learning while they explore new levels in <i>Sci-Ops: Global Defense</i>. Consider having a whole class discussion, using the Play to Learn resources, after students have had a chance to play the assigned levels and complete the resource. These resources can also be used as a formative assessment.</p> <p>The following Play to Learn resources are available:</p> <ul style="list-style-type: none"> Levels 1 - 3 Levels 4 - 6 Levels 7 & 8 Levels 9 - 11 Levels 12 & 13 Levels 14 & 15
<p>Vocabulary Showdown Choice Board</p>	<p>Use the vocabulary showdown to reinforce the terms introduced in the <i>Sci-Ops: Global Defense</i> laboratory. Students will complete one activity from each level of the showdown to demonstrate mastery of the in-game vocabulary.</p>
<p>Sci-Ops: Global Defense Exit Tickets</p>	<p>Post a quick formative assessment after students have played <i>Sci-Ops: Global Defense</i> on the board or use the editable slide to project the question for your class. You can use the provided themed exfiltration exit ticket cards or whatever other recording method works best for your classroom.</p>
<p>Sci-Ops Gear CER Report</p>	<p>Use the provided Sci-Ops Gear CER template to support student processing of <i>Sci-Ops: Global Defense</i> and the upgrades available in the game. Students will make a claim about the gear upgrades available within a level and support their claim using evidence from their gameplay and the Sci-Ops laboratory. Student reasoning should include the use of vocabulary and concepts covered in the game.</p>
<p>In-Unit Gear Manuals</p>	<p>Use the gear manuals provided throughout the curricular content units to connect Sci-Ops game play with your content instruction. Gear manuals are designed to relate the concepts explored in the Sci-Ops laboratory to your required content standards. Gear manuals may cover several pieces of gear related to your content, or specific gear such as the armor or laser.</p>

General Game Play Tips

- Encourage students to launch **Sci-Ops: Global Defense** in full screen mode so that all assets display clearly.

- Students are able to control game play difficulty using the slider located on the START page. Students that achieve 4 star efficiency ratings should be encouraged to raise their



play difficulty level and vice versa. Level 7 is especially challenging on the highest difficulty level, so encourage students to lower their difficulty before starting this level.

- When necessary, students can reset their character funds, partner with new experts, and select new upgrades based on the needs of their current mission.

- Students should use teamwork between the heroes to defeat **THE HIVE**. A team gear strategy is needed.

- Use the STEM experts to support the team gear strategy.
Note: Only Nikole can partner with Ms. Watt and only Aki can partner with Mr. Boyle due to the specific gear they use.

- To support student game play, consider projecting the game for whole class collaborative play and discussion. Ask students what moves to make and what upgrades to select.



- If students are unable to defeat a level, direct them to visit the laboratory and read the gear related science text to re-evaluate their upgrades.
- If a student does not receive a 4 star efficiency rating, encourage them to replay the level after reading the lab text, change their gear upgrades and team strategy, choose a new STEM expert partner, and/or adjust their difficulty level.
- If students complete all levels of **Sci-Ops: Global Defense**, challenge them to play through the game again on a higher difficulty level.
- For middle school, suggested minimum game play is through Level 6. High students should be challenged to play all levels.