CATAN®

SCENARIOS
GLOBAL WARMING

Printing and Copyright

Printing Instructions

This folder contains the following files:

- 'Rules' (the basic rules of play)
- 'Cards and Tokens' (the cards and tokens needed for the expansion, you might wish to print these on thin card)
- 'Almanac' (detailed alphabetical entries and examples for Catan: Global Warming)
- 'Design Notes' (additional materials detailing the scientific work behind the expansion and ideas for using the game in an educational setting)

Printing 'Rules' and 'Cards and Tokens' will give you all you need to play. All files should be printed at actual size and double-sided. You will need to cut out the cards and tokens.

Copyright Information

Funding

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SCENARIOS
GLOBAL WARMING

Rules

A scenario by Sam Illingworth & Paul Wake for Klaus Teuber's *Catan*®.

Dear Settlers,
Welcome to Catan, a land of plentiful resources and perfect spaces. You've found the ideal place to settle and expand! But settling a land comes with certain challenges, and accommodating the needs and desires of your expanding population won't be easy, on you or on the land itself. Developing villages and cities, roads to connect them, and armies to defend them, will all take a toll on the environment. Rapid development, and the destruction of the natural landscape will result in emission of greenhouse gases, which, should it go unchecked, will have potentially catastrophic effects. As settlers you have a choice, tackle global warming with sustainable development, or pursue individual victory, no matter what the cost…

Game Components

You will need all the components included in *Catan*® with the exception of the number tokens. *Catan: Global Warming* contains the following additional components:

- 18 double-sided number tokens
- 19 Crisis Cards
- 10 Green City tokens
- 1 Green Guardian card
- 1 Greenhouse Gas Tracker
- 1 Greenhouse Gas Marker

Set Up

- Set up the game board hexes and harbours using the variable set-up rules from the *Catan* rulebook.
- Place 1 randomly-selected number token (yellow side up) on each land hex. Skip the desert.
- Place the Greenhouse Gas Marker on the '1' on the Greenhouse Gas Tracker.
- The player who had the most sustainable journey today goes first.

Special Rules

Except where noted, use the *Catan* rules. Use the Almanac for reference when questions come up during play.

Pregame Discussion

Is it possible to win if Catan is destroyed?
Before play commences players must choose one of the following options for use in the event that the Greenhouse Gas Tracker reaches 13 before a player reaches 10 victory points:

'Everyone loses. Catan is uninhabitable' or **'The player with the highest score wins'.**

Note: *If more than 5 number tokens are removed from the board the Greenhouse Gas Tracker is immediately moved to 13.*

Greenhouse Gas Step

When players roll for resource production in the Production Phase they should compare the number rolled with the 'Target Number' on the Greenhouse Gas Tracker. If the number rolled exceeds the Target Number they must draw a Crisis Card and apply the results before continuing the phase.

Note: *If the Crisis Card results in a number token being 'flipped,' the token's new number is used for resource production.*

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Unstable Resource Production

Catan: Global Warming comes with 18 double-sided number discs (one per terrain hex) that are used in place of the number tokens that come with the base game. When setting up the game these discs are placed yellow side up. During the game Crisis Cards will require players to 'flip' these tokens (turning them over) to reveal their red side and a new resource production number (in all cases flipping the tokens reduces productivity). If a Crisis Card calls for a token to be flipped a second time it is removed from the game board.

Crisis Cards

Catan: Global Warming comes with a deck of 18 Crisis Cards (one per terrain hex) each representing the results of catastrophic global warming. When required, players draw a card from this deck and apply its effects, flipping one of the double-sided number tokens on the game board. The cards indicate which type of hex is affected (Pastures, Hills, Mountains, Fields…) and the order in which these should be flipped is represented by a sequence of numbers that relate to the numbers on the number tokens. Players should flip the first number token in the sequence listed, reading from left to right. If all terrain hexes of that type have had their tokens removed then the Crisis Card has no effect. Place Crisis Cards in a discard pile once used. Once the Crisis Deck is exhausted, shuffle the discard pile to create a new deck.

Note: *If more than one terrain hex of that type has the indicated number then the player whose turn it is chooses which token to flip.*

Managing Greenhouse Gases

The levels of Greenhouse Gases (GHG) can be managed by players during the game. Positive actions reduce GHG levels by 1, negative actions increase GHG levels by 1. All changes should be made by moving the Greenhouse Gas Marker along the Greenhouse Gas Tracker.

Positive Actions

- **Fallow Period:** players may elect to not receive resources. Where a hex is controlled by more than one player, all players must agree that they want a Fallow Period to take place.
- **Green Tax:** When the production roll is a 7, players are given the option of paying 1 resource each to reduce the GHG level by 1. This is done before the rules of the robber are applied. If the Green Tax is paid then the rules for the robber are not used and the robber token is returned to the desert hex.

Note: *If any players decline to pay the Green Tax, or are unable to pay, then the robber is used as normal. Players may pay the Green Tax on behalf of fellow players.*

Negative Actions

- **Intensified Production:** hexes produce double the amount of resources *(i.e. settlements produce 2 and cities 4)*. Where a hex is controlled by more than one player, all players must agree that they want Intensified Production to take place.
- **Longest Road:** each time the Longest Road special card is awarded or changes hands.
- **Largest Army:** each time the Largest Army special card is awarded or changes hands.
- **Building a City:** each time a city is built unless players elect to build a 'Green City' in order to prevent the GHG level rising. Instead of the usual buiding requirements, building a Green City costs 2 ore and 3 grain (place a Green City token under the any cities built in this way).
- **Desertification:** every time a hex stops producing resources *(i.e. when its number token is removed).*

Green Guardian

Catan: Global Warming introduces a new special card: 'Green Guardian'. This card awards 2 victory points and is given to the first player to build 2 green cities. Another player who builds more green cities takes this card.

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GLOBAL WARMING

Almanac

This 'Almanac' contains detailed, alphabetical entries and examples for *Catan: Global Warming*. These clarify the new rules provided with this scenario and should be used as a supplement to the Almanac included in the base game where needed.

Desertification

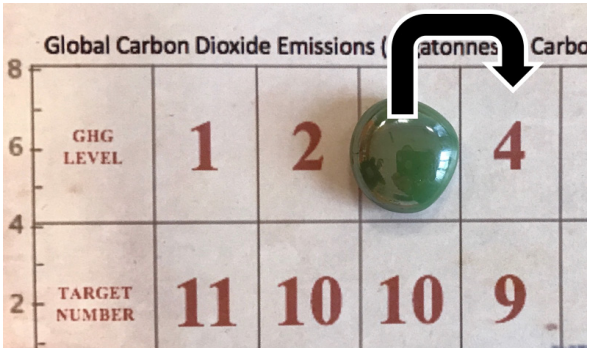
When a Crisis Card is drawn it will indicate which type of resource is affected and the order in which number tokens should be 'flipped'.

Example: See Illustration A. Alex, the orange player, draws 'Crops Fail' which requires him to flip a number token on a field hex matching the first number available reading the following sequence from left to right: 8, 6, 11, 3, 10, 4, 9, 5, 12, 2. There is one field hex with a number 11 production token but it is red side up, indicating that it has been turned over earlier in the game. Alex must remove the token from the board (it cannot be flipped back to its yellow side).

Illustration A.

See Illustration B. As the hex will no longer produce resources Alex must now move the Greenhouse Gas Marker one place along the Greenhouse Gas Tracker from 3 to 4. The Target Number is now 9.

Illustration B.



Fallow Period

Taking a 'Fallow Period' allows players to move the Greenhouse Gas Marker back one space on the Greenhouse Gas Tracker. All players who would normally receive resources following a production roll must agree to take this action.

Example: See Illustration C. The red player has rolled 4 for production. This means that both red and blue players will receive 1 ore, and the orange player will receive 2 lumber and 2 ore. The white player will receive nothing. In order to benefit from the Fallow Period the red, blue and orange players must all agree to the action (and receive no resources this production phase). White, who would receive no resources, has no vote.

Illustration C.

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Flipping

See Greenhouse Gas Step.

If more than one terrain hex of that type has the indicated number then the player whose turn it is chooses which number tokens to flip.

Green Cities

Players must pay 1 additional grain and 1 additional ore to build green cities. The cost of Green Cities is therefore 3 grain and 4 ore.

Note: *The benefit of this action is that the Greenhouse Gas Tracker remains in place when Green Cities are built.*

Greenhouse Gas Step

This phase is the first step of the Resource Production phase and can impact on which hexes produce resources. The active player rolls both dice as normal, and **before players collect resources** compares the sum of the two dice with the current state of the Greenhouse Gas Tracker.

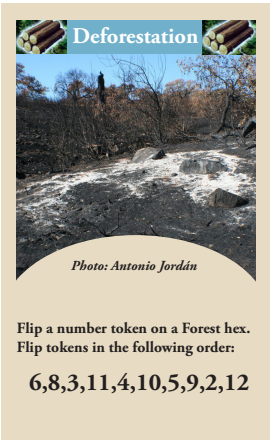
If the sum of the two numbers rolled is equal to or lower than the target number, nothing happens and play continues as per the standard *Catan* rules. If the sum of the two numbers rolled exceeds the target number draw a crisis card and apply its results **before** collecting resources.

Example: See Illustration D. Claudia, the blue player rolls a resource production roll of '10.' This number exceeds the current Target Number (which is 9) and so a Crisis Card must be drawn.

Illustration D.

Illustration E.

See Illustration E. Claudia draws 'Deforestation' with the flip sequence '6, 8, 3, 11, 4, 10, 5, 9, 2, 12.'



See Illustration F. Claudia must now locate the forest hex with a number token closest to the start of the flip sequence (reading left to right) and turn over that number token. In this case there no forest hexes have a 6 or an 8 so Claudia turns over the number token on a forest hex that would produce on a 3.

Illustration F.

See Illustration G. With the token turned over, revealing a 2 (making the forest hex less likely to produce lumber in future), players now collect resources. In this example, Claudia (blue) receives 3 ore and Pete (orange) collects 2 lumber.

Illustration G.

Intensified Production

'Intensified Production' allows players to collect double the amount of resources at the cost of moving the Greenhouse Gas Marker one space forwards on the Greenhouse Gas Tracker. All players who would normally receive resources following a production roll must agree to take this action.

Example: See Illustration H. On her turn Emily, the red player, has rolled 4 for production. This means that both red and blue players will receive 1 ore, and the white player will receive 1 grain. The orange player will receive nothing. By taking an Intensified Production action, blue and red will receive 2 ore each and the white player will receive 2 grain.

In order to benefit from Intensified Production the red, blue and white players must all agree to the action. Orange, who doesn't stand to benefit, has no vote.

Illustration H.

Production

The sequence (resolve crisis before production of resources) makes it possible that the flipping of a number token will (i) prevent a hex from producing resources, or, conversely, (ii) make a hex produce resources.

Example: See Illustration I. Coleman, the red player, makes a production roll of 9. This exceeds the current Target Number and he draws a crisis card. He is required to flip a Mountain hex with a number token of 8. This reveals a 9. Jhinuk, the blue player, has a city adjacent to this hex and now collects 2 ore.

Illustration I.

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SCENARIOS
GLOBAL WARMING

Design Notes

A scenario by Sam Illingworth & Paul Wake for Klaus Teuber's *Catan*®.

The Earth is warming up. For each of the last three decades temperatures at the Earth's surface have been rising, reaching levels higher than any recorded since 1850 (when multiple independently produced measurements first began) [1]. This recent warming has been caused by an increase in the atmospheric concentrations of carbon dioxide, methane, and other greenhouse gases, which have increased to levels unprecedented in the last 800,000 years. Carbon dioxide concentrations alone have increased by 40% since pre-industrial times, primarily from fossil fuel emissions and secondarily from net land use change emissions [1].

Amongst scientists there is almost unanimous agreement that this global warming is mostly anthropogenic (i.e. human-made), with 97% of publishing scientists agreeing that this is the case [2]. However, this is not always well communicated to non-scientists. Debates in the media can give the impression that there are two equal and opposing views in the scientific community (there aren't), while the language used by scientists – words such as 'uncertainty' and 'error' – risks suggesting doubt about the fact of anthropogenic global warming where in reality there is only uncertainty as to how much the Earth is warming, and what the main driving forces for this rise might be.

For people to take global warming seriously, and to support appropriate mitigation (intervention to reduce anthropogenic greenhouse gas emissions) and adaptation (adjustment in natural or human systems to a new or changing environment) strategies, they need to be both aware that it is taking place, and to be certain that it is anthropogenic [3]. To make this possible it is necessary that scientists, policy makers, and the public at large engage in a conversation that is both informed and open. When discussing issues surrounding global warming, research has shown that members of the public need a safe space in which to have meaningful discussions [4] and it is our hope that *Catan: Global Warming* will present one such space.

The aim of this set of design notes is to present the underlying research that has informed the design choices made in the scenario, as well as enabling players to find out more about the anthropogenic causes of global warming. Just like the islanders of Catan, we have a choice. Things are not too late for us to make a difference and to enact positive change to mitigate the effects of global warming. But the time for us to make that change is certainly not without limit…

Acknowledgements

We would like to recognise the support and input of the many playtesters (students, educators, games designers, and scientists) who have been kind enough to provide feedback on *Catan: Global Warming*. Special thanks to: Erik Assadourian, Stuart Capstick, Emil Chappin, Oliver Clark, Tim Cockitt, Ashley Darrow, Rebecca Docherty, Matthew Dunstan, Darren Edwards, Chloé Germaine Buckley, Helena Gregory, Gabi Hegerl, Michael James Heron, Matt Jarvis, John Lean, Doug Lowe, Laura Mitchell, Paul Palmer, Martin Robinson, and the many anonymous playtesters whose feedback has been invaluable. Finally, we would like to thank Catan GmbH for permitting us to use their game to develop this resource.

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Set Up

When playing *Catan: Global Warming*, the player who has had the most sustainable journey takes the first turn. The purpose of this rule is to initiate a conversation into what constitutes sustainable travel. Even in car-dominated cities like Los Angeles, the promotion of alternative modes of transportation (through conversation) can have a significant effect on future commuting plans [5].

Special Rules

Pregame Discussion

When playing *Catan: Global Warming* players must first decide on the endgame condition – in the face of environmental catastrophe does one player still win, or does everybody lose? In game theory, a zero-sum game is a mathematical representation of a situation in which each participant's gain or loss is exactly balanced by the losses or gains of the other participants. This is how *Catan* is usually played. However, is this a realistic representation of global warming? Carrying out a cost-benefit analysis of the effects of global warming is difficult given the large degree of uncertainty surrounding the potential scale of global warming [6]. But does anyone really stand to win in the long-term from the destruction of our natural habitat?

Greenhouse Gases

The greenhouse effect occurs when Earth's atmosphere traps outgoing heat from the Earth's surface which in turn causes temperatures to rise. This effect is needed in order for the Earth to retain heat, without it life could not survive. However, since the industrial revolution the strength of this effect has been exacerbated by a sharp increase of greenhouse gases into the atmosphere, as a direct result of human activity (e.g. through the burning of fossil fuels). Any gas which contributes to this effect is considered to be a greenhouse gas, but the three gases that contribute most significantly are carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O). The atmospheric concentrations of these gases now exceed their pre-industrial levels by about 40%, 150%, and 20%, respectively [1]. The GHG Tracker uses a graph of CO_2 emissions produced by NASA, and which shows annual global CO_2 emissions from 1850 to the present day.

Unstable Resource Production

The 'flip' mechanic that is introduced in *Catan: Global Warming* is representative of the fact that despite our best intentions with regards to mitigation and adaptation strategies, we only have one planet, and a finite set of resources.

Crisis Cards

Catan: Global Warming comes with a deck of 18 Crisis Cards (one per terrain hex) each representing the results of catastrophic global warming. The pictures on these cards feature images taken by scientists and uploaded to the European Geoscience Union's Imaggeo database (imaggeo.egu.eu). Imagery plays a central role in generating dialogue around global warming [7].

Managing Greenhouse Gases

Movement up and down the GHG Tracker is representative of the positive and negative feedback mechanisms that contribute towards the warming of our planet. Feedback mechanisms either change a system to a new state or return it to its original state:

Negative feedback mechanisms – push a system back toward its original equilibrium position.
e.g. warmer air temperatures lead to more water vapor content in the atmosphere, and thus an increased cloud content. Clouds can reflect sunlight, which reduces the incoming solar radiation, hence leading to a degree of cooling.

Positive feedback mechanisms – push a system to a new state of equilibrium.
e.g. as the Earth warms large patches of ice melt, exposing soil or water beneath it. This soil or water has a lower reflectivity than the ice and so less sunlight is reflected back into the atmosphere, warming the Earth, and melting more ice, which in turn leads to an increase in global temperatures.

These feedback mechanisms are complex processes, and many of them are interrelated; the cumulative impact of these complex relationships are impossible to predict perfectly, which is why scientists often talk about uncertainty.

Positive Actions

- **Fallow Period:** Soil carbon sequestration is a process in which CO_2 is removed from the atmosphere. This process is primarily mediated by plants through photosynthesis, with carbon stored in the form of Soil Organic Carbon (SOC) [8]. Since the industrial revolution, the conversion of natural ecosystems to agricultural use has resulted in the depletion of SOC levels, releasing large amount of carbon from the soil into the atmosphere [9]. Leaving land fallow for extended periods can restore this SOC, and thus increase the amount of CO_2 that can be removed from the atmosphere [10]. Unfortunately, increasing agricultural demands brought about by rising populations (represented in the game by the 'Intensified Production' rule) mean that farmers are not always able to leave their land fallow.
- **Green Tax:** In theory environmental tax reform yields a cleaner environment and also non-environmental benefits, such as welfare and employment [11]. In reality they are difficult to implement effectively, as demonstrated by Norway, for whom a 10-year period of carbon taxes only contributed to a 2% reduction in atmospheric CO_2 [12].

Negative Actions

- **Intensified Production:** See Fallow Period.
- **Longest Road:** Transport accounts for over a quarter of global CO_2 emissions and is one of the few industrial sectors where emissions are still growing [13]. Equating this to a mechanic where building the longest road directly accelerates the greenhouse effect is perhaps an over simplification. However, such a mechanic is representative of the fact that a stabilisation of greenhouse gas emissions from transport requires behavioural change brought about by policy and independent decision making.
- **Largest Army:** The equation of the Largest Army with accelerating the greenhouse effect is undoubtedly a simplification. In fact, in many countries the military are strong advocates for addressing issues of global warming, which has been identified as a cause of potential conflict and made a foreign policy priority [14]. However, we used the largest army as a negative point to recognize the failure to mitigate conflict through the control of global warming.
- **Building a city:** In *Catan: Global Warming*, building cities represents population growth and an attendant use of resources [15]. Our scenario allows players to construct 'Green Cities' [17] dedicated to reducing the environmental impacts of its occupants. As Erik Assadourian, the creator of *Catan: Oil Springs* [16], points out presenting Green Cities as a solution to global warming can give people the false impression that they may continue to live their fossil-fuel-based lifestyles without a detrimental effect on the environment [17]. Green Cities, which we regard as those in which citizens engage in meaningful dialogue and mitigation strategies around global warming, are therefore presented in *Catan: Global Warming* as neutral.

Desertification

Drylands are home to more than 38% of the total global population and are one of the most sensitive areas to global warming and human activities. The increasing aridity, warming, and human population will exacerbate the risk of land degradation and desertification in the near future, especially in the drylands of developing countries [18].

Green Guardian

One of the questions that scientists are asked most often when talking about global warming is: 'what can I do to make a difference?' While this is a commendable question, it establishes a burden of individual guilt that can become an obstacle in tackling attitudes towards global warming. One recent study found that the single greatest impact individuals can have is to have one fewer child (closely followed by selling your car, making fewer long-distance flights, and becoming vegetarian) [19]. However, to some people these demanding and, at times life-changing, measures further entrench the view that 'nothing can be done'.

Ultimately it is the responsibility of the governments that we elect to take the actions necessary to abate global warming. In order to ensure that they do this every citizen must remind them of this responsibility, and we hope that the conversations that arise whilst playing *Catan: Global Warming* can help us take a small step forward in that direction.

References

One of the difficulties that non-scientists face in developing dialogue around global warming is in finding reliable information. The evidence that is provided in these design notes, and which underpins the design of *Catan: Global Warming*, comes from the following independently peer-reviewed scientific journal articles. In particular the IPCC summary for policymakers [1] is an accessible and well-written document aimed at providing valuable information to a non-specialist audience.

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In the Classroom

The *Catan: Global Warming* scenario was originally designed to be used in a learning environment to develop a dialogue around global warming. Aside from being in the curricula of many high school students (aged 11-18) across the globe, we believe that it is vital for these citizens to be presented with opportunities to discuss these issues now; after all it is the current and future generations that will be faced with the greatest challenge of how to mitigate and adapt to the consequences of global warming.

The notes provided in this section represent our suggestions for using *Catan: Global Warming* in the classroom, based around our research into how best to use this scenario to develop effective and meaningful dialogue with a variety of audiences.

Running the Game

As university academics with experience of teaching in high schools, we appreciate that every classroom environment is different. However, we offer the following advice and guidance based on our own teaching sessions using *Catan: Global Warming*.

- **Space:** The ideal setup for the game is a series of tables, each of which needs to be a minimum of 1.5 m x 1 m, and which can accommodate between 3 and 8 players.
- **Setup:** If possible we recommend setting up *Catan: Global Warming* prior to the teaching session. If the students have not played *Catan* before we suggest asking them to a watch a video of how it is played, either in their own time or in a previous lesson. Both *Shut up and Sit Down* (www.shutupandsitdown.com) and Wil Wheaton's *TableTop* (geekandsundry.com/shows/tabletop) provide excellent examples.
- **Time:** The ideal time for this session is **2 1/2 hours**. 30 minutes of setup and initial discussion; 90 minutes of playing the game; 30 minutes of post-game discussion. It can be done in less time than this, especially if the students have previous experience of playing Catan or are experienced tabletop gamers, but do not skimp on the post-game discussion, as this is vital in order to help establish a meaningful dialogue (see below).
- **Facilitators:** We recommend one teacher / facilitator per three active games of *Catan: Global Warming*.
- **Double-up:** In order to accommodate larger classes, we recommend asking students to play in pairs (with each pair taking one colour of tokens). This is especially effective if few of the students have played *Catan* before, and it can also help to develop further dialogue in the down-time between player turns.
- **Audience:** Whilst *Catan: Global Warming* has been run successfully for students from age 11 upwards, the space and facilitator requirements mean that it is ideally suited for the slightly smaller classes that are associated with older high school students and seminar classes at universities and in higher education.

Developing a Dialogue

Here are some pre-game and post-game questions that we have used to seed dialogue amongst students:

Pre-game

1. What do you understand by the phrase global warming?
2. Is global warming something that concerns you?
3. Do you play any tabletop games?

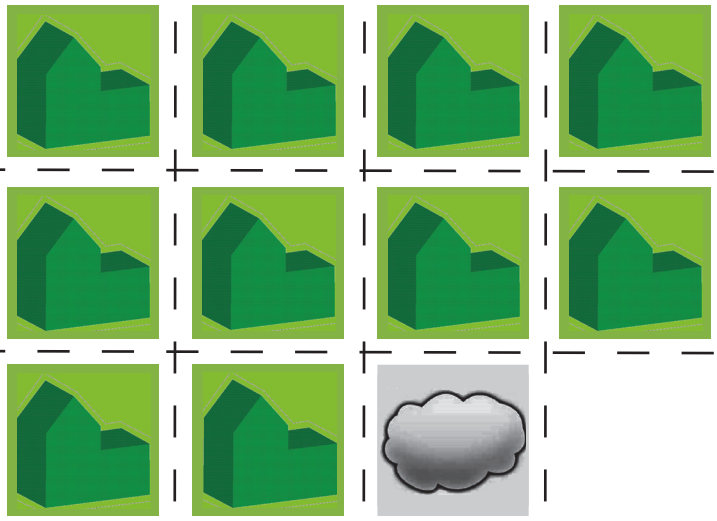
Post-game

1. Which end-game scenario did you pick, and why?
2. Was this game representative of the current global warming situation?
3. Does this game perpetuate any global warming myths?
4. How would you improve the game?

Get in Touch

If you have any questions about *Catan: Global Warming*, or any suggestions for how to improve it, please get in touch by emailing us at: **games.research.network@gmail.com**.

4	10	3	9	11	6
11	9	8	4	5	6
8	3	10	5	2	12

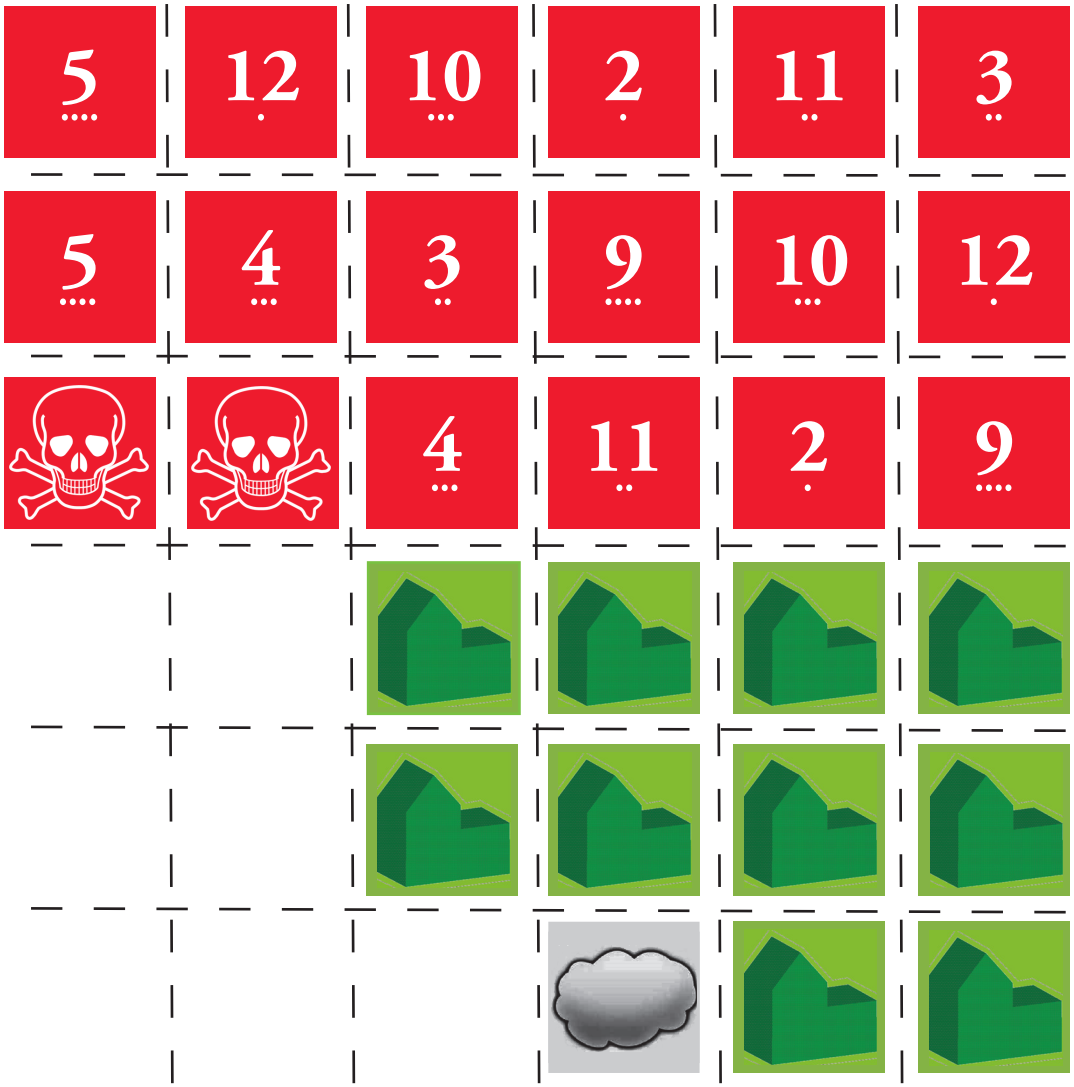


Green Guardian

Photo: Critina Nicolaita

2 Victory Points!

The first player to build two green cities gets this card. Another player who builds more green cities takes this card.



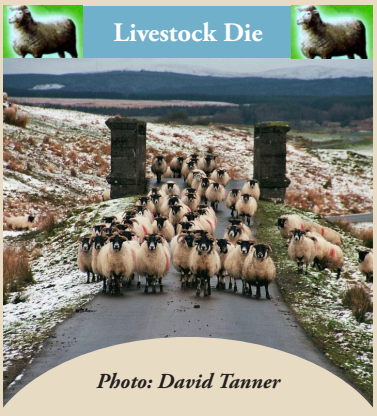


Photo: David Tanner

Flip a number token on a Pasture hex. Flip tokens in the following order:

6,8,3,11,4,10,5,9,2,12

Green Guardian

Photo: Critina Nicolaita

2 Victory Points!

The first player to build two green cities gets this card. Another player who builds more green cities takes this card.

Landslide

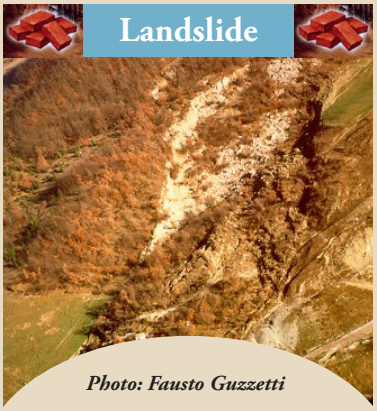


Photo: Fausto Guzzetti

Flip a number token on a Hill hex. Flip tokens in the following order:

6,8,3,11,4,10,5,9,2,12

Landslide

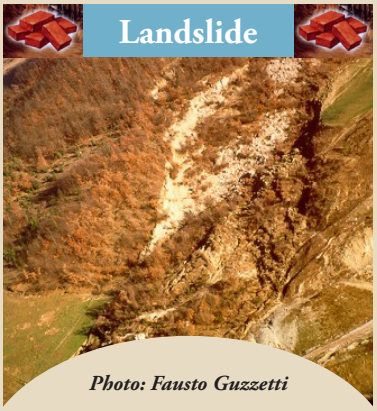


Photo: Fausto Guzzetti

Flip a number token on a Hill hex. Flip tokens in the following order:

8,6,11,3,10,4,9,5,12,2

Landslide

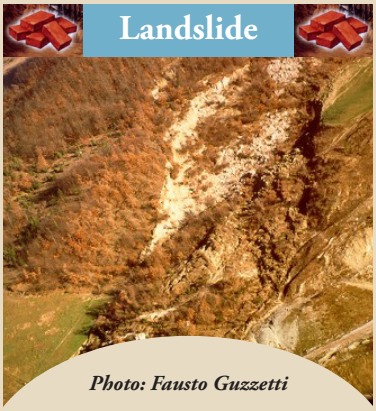


Photo: Fausto Guzzetti

Flip a number token on a Hill hex. Flip tokens in the following order:

6,8,3,11,4,10,5,9,2,12

Glaciers Melt

Photo: Martin Luethi

Flip a number token on a Mountain hex. Flip tokens in the following order:

6,8,3,11,4,10,5,9,2,12

Glaciers Melt

Photo: Martin Luethi

Flip a number token on a Mountain hex. Flip tokens in the following order:

8,6,11,3,10,4,9,5,12,2

Glaciers Melt

Photo: Martin Luethi

Flip a number token on a Mountain hex. Flip tokens in the following order:

8,6,11,3,10,4,9,5,12,2

Crops Fail

Photo: Saskia Keesstra

Flip a number token on a Field hex. Flip tokens in the following order:

6,8,3,11,4,10,5,9,2,12

Crops Fail

Photo: Saskia Keesstra

Flip a number token on a Field hex. Flip tokens in the following order:

8,6,11,3,10,4,9,5,12,2

Crops Fail

Photo: Saskia Keesstra

Flip a number token on a Field hex. Flip tokens in the following order:

6,8,3,11,4,10,5,9,2,12









Crops Fail

Photo: Saskia Keesstra

Flip a number token on a Field hex.
Flip tokens in the following order:

8,6,11,3,10,4,9,5,12,2

Deforestation

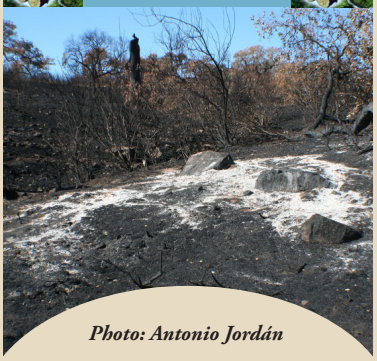


Photo: Antonio Jordán

Flip a number token on a Forest hex.
Flip tokens in the following order:

6,8,3,11,4,10,5,9,2,12

Deforestation

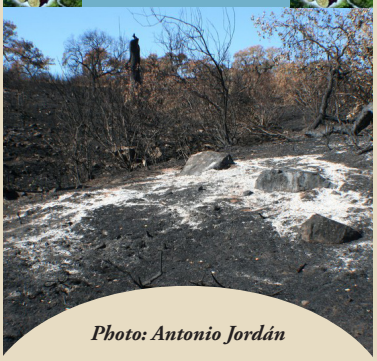


Photo: Antonio Jordán

Flip a number token on a Forest hex.
Flip tokens in the following order:

8,6,11,3,10,4,9,5,12,2

Deforestation

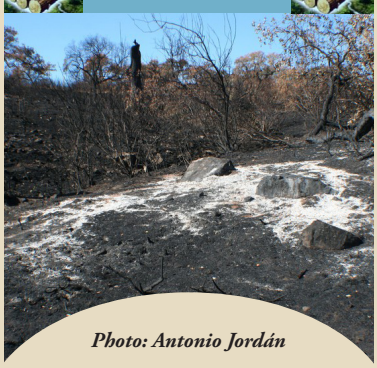


Photo: Antonio Jordán

Flip a number token on a Forest hex.
Flip tokens in the following order:

6,8,3,11,4,10,5,9,2,12

Deforestation

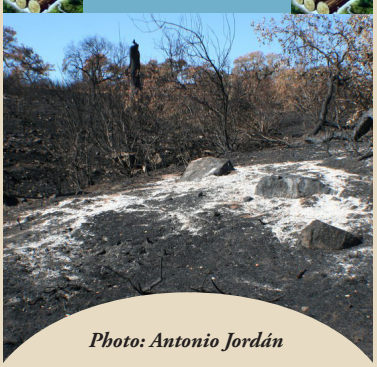


Photo: Antonio Jordán

Flip a number token on a Forest hex.
Flip tokens in the following order:

8,6,11,3,10,4,9,5,12,2

Livestock Die

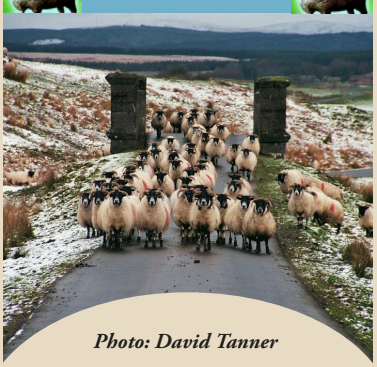


Photo: David Tanner

Flip a number token on a Pasture hex.
Flip tokens in the following order:

6,8,3,11,4,10,5,9,2,12

Livestock Die

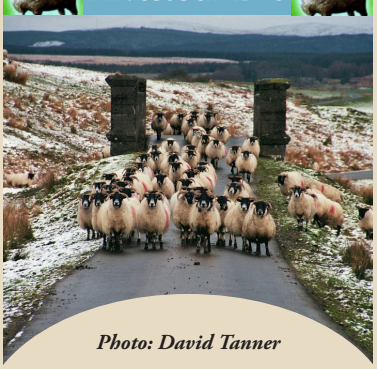


Photo: David Tanner

Flip a number token on a Pasture hex.
Flip tokens in the following order:

8,6,11,3,10,4,9,5,12,2

Livestock Die

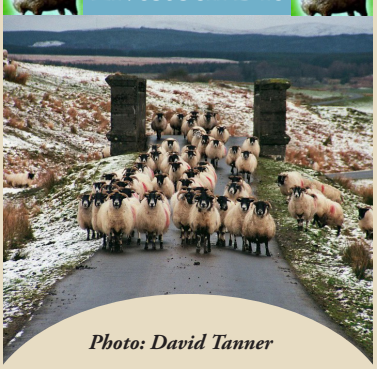


Photo: David Tanner

Flip a number token on a Pasture hex.
Flip tokens in the following order:

8,6,11,3,10,4,9,5,12,2

Major Desertification

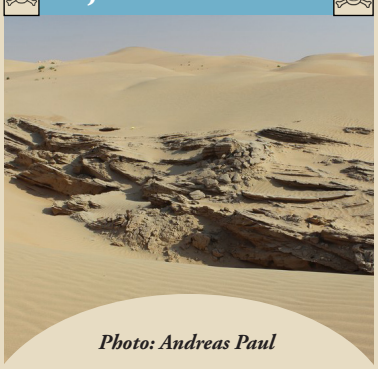


Photo: Andreas Paul

Remove a number token on a hex.
Remove tokens in the following order:

6,8,3,11,4,10,5,9,2,12



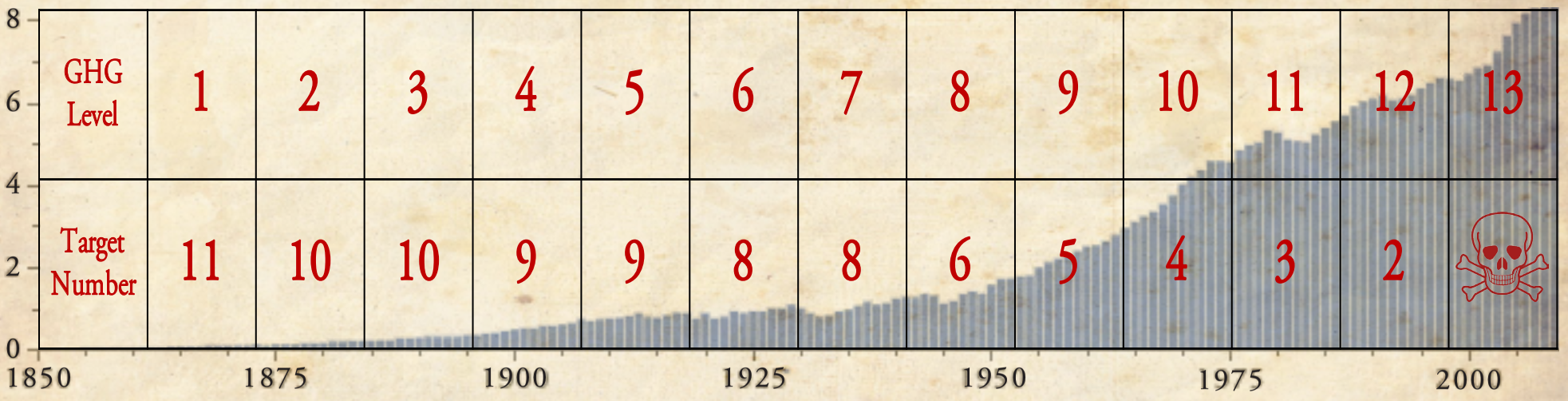






GREENHOUSE GAS TRACKER

Global Carbon Dioxide Emissions (Gigatons of Carbon per Year)



If your *Resource Production* roll is higher than the Target Number draw a *Crisis Card* and apply its effects immediately. Then continue your turn.