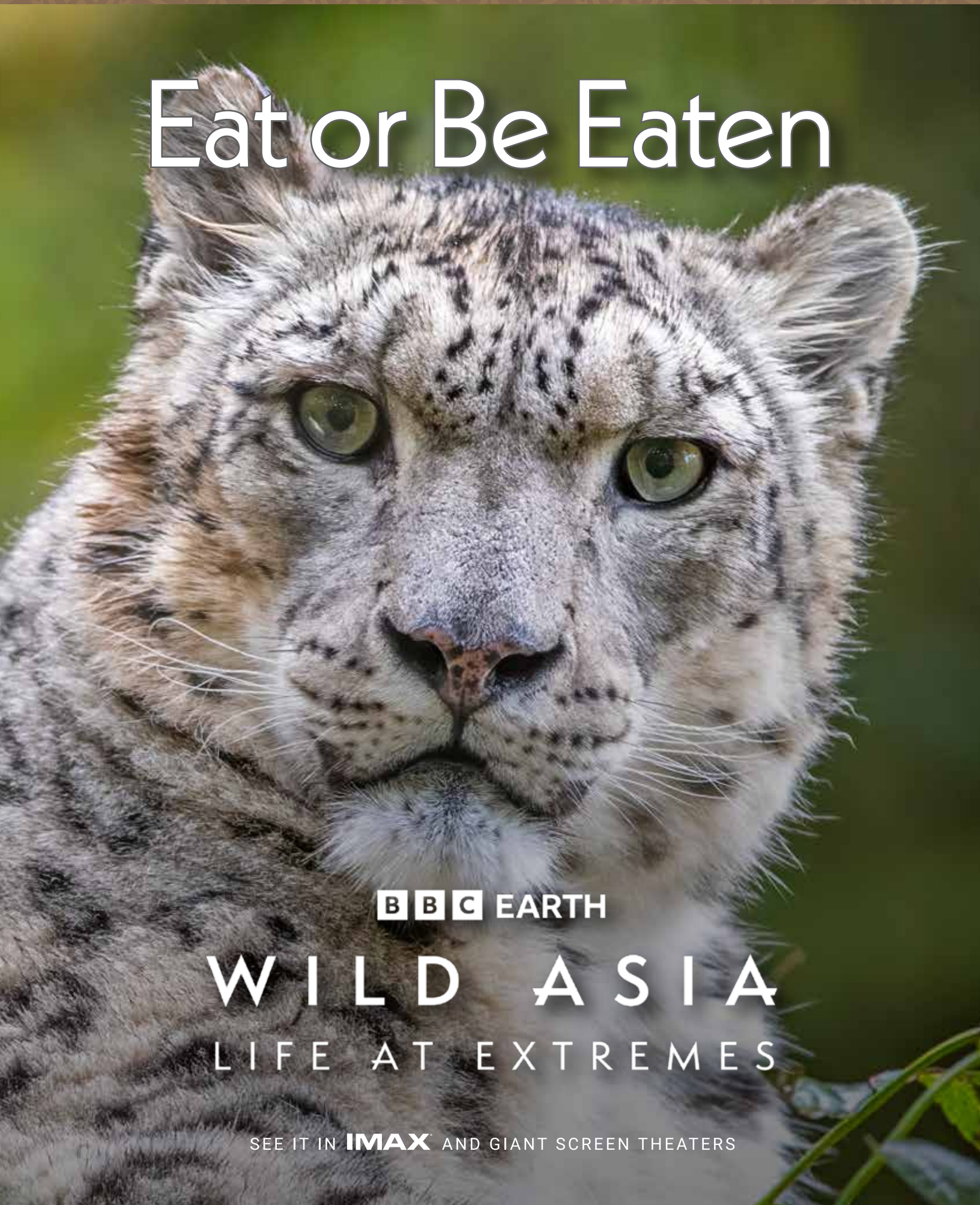
Eat or Be Eaten



BBC EARTH

WILD ASIA

LIFE AT EXTREMES

SEE IT IN IMAX AND GIANT SCREEN THEATERS

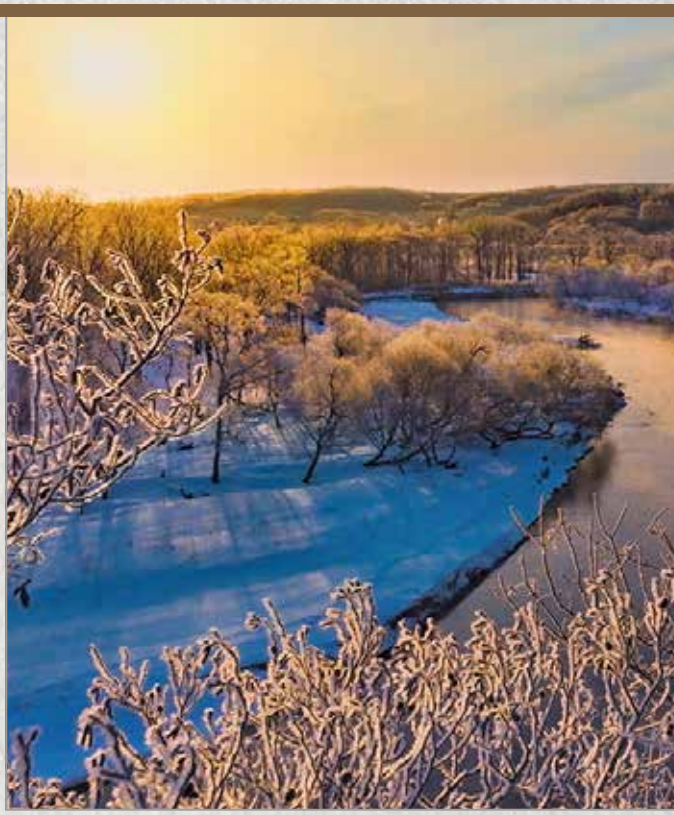
Introduction

In almost every ecosystem, energy begins with the Sun. When its rays reach Earth, producers (usually plants) harness that light energy and turn it into chemical energy through a process known as **photosynthesis.**

Producers continue to grow until they are eaten by another organism, known as a consumer. The consumer absorbs energy through digestion and uses that energy to move, hunt, or reproduce. If that consumer gets eaten by another consumer, its energy gets absorbed and the cycle continues.

In these relationships, the producer or consumer that gets eaten is the **prey,** and the organism that eats them is its **predator.**

Organisms have **adaptations** to help them evade predators and to successfully hunt prey. Populations in an ecosystem must maintain balance, as too many of one species can offset this delicate predator-prey relationship.



Early sun on the horizon

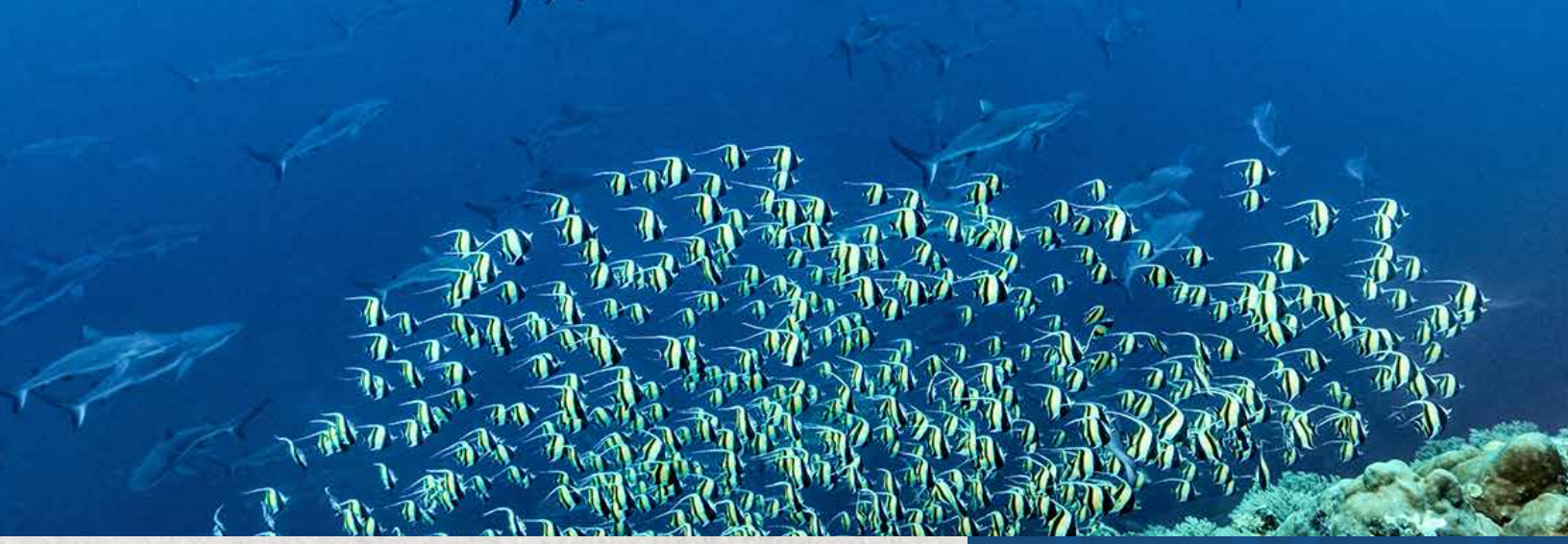
From the Film

BBC EARTH
WILD ASIA
LIFE AT EXTREMES

Wild Asia: Life at Extremes highlights the unique relationships between many different species on the continent, from herbivores to apex predators within numerous diverse ecosystems.

The film examines the various hunting strategies predators use and the adaptations prey animals have for protection and survival.

The long-eared jerboa's excellent hearing is an adaptation that helps it tune in to a predator's location



Activity Overview

In this activity, participants will duel against each other in a head-to-head-style card game, similar to the card game War.

Using cards featuring animals from the film, participants will pair up and face off using cards from their decks to see who eats and who gets eaten!

Participants will continue making pairs and collecting cards based on **predator-prey** relationships until they have gone through the entire deck.

At the end of the game, whoever's ecosystem has the most energy wins!

Materials:

- Ecosystem Decks (one per participant)
- Baby Bonus cards (one set per pair)
- Six-sided die (one per pair)
- Scissors (one per player)

Deck lists:

High Altitude Land**: (6 species, 15 cards total)**
Human (1), Snow leopard (2), Tibetan fox (2), Markhor goat (3), Pika (3), Lichens and mosses (4)

Low Altitude Land**: (7 species, 15 cards total)**
Human (1), Bengal tiger (1), Golden eagle (1), Musk deer (2), Jerboa (3), Grasshopper (3), Grasses (4)

Sea Level: (7 species, 15 cards total)
Human (1), Grey reef shark (1), Leopard moray eel (2) Moorish idol (2), Parrotfish (2), Coral (3), Algae (4)

Baby Bonus Cards**: (9 cards total)**

NGSS

5-PS3-1

Energy: Use models to describe that energy in animals' food (used for body repair, growth, motion, and to maintain body warmth) was once energy from the sun.

5-LS2-1

Ecosystems: Interactions, Energy, and Dynamics: Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.

MS-LS1-6

From Molecules to Organisms: Structures and Processes: Construct a scientific explanation based on evidence for the role of photosynthesis in the cycling of matter and flow of energy into and out of organisms.

HS-LS2-6

Ecosystems: Interactions, Energy, and Dynamics: Evaluate the claims, evidence, and reasoning that the complex interactions in ecosystems maintain relatively consistent numbers and types of organisms in stable conditions, but changing conditions may result in a new ecosystem.

Preparation

Print the playing card decks that you will need for the group

- Ecosystem decks: **Low altitude, High altitude, and Sea level**
- One **Baby Bonus** deck (one per participant)

Participants must pair with someone who has the same deck, i.e. someone with the sea level deck can only play against someone else with a sea level deck.

NOTE: *For added durability, cards can be laminated.*

Procedure

1. Introduce the activity by reviewing the biodiversity shown in the film, *Wild Asia: Life at Extremes.*

Ask everyone to stand next to their chairs. We're going to play a game called New Ideas Only.

Think of as many plant and animal species from the film as you can. We'll go around the room—when it's your turn, name one. If it's a new species, stay standing; if you repeat one or can't think of any, take a seat. Ready…**GO!**

Procedure cont.

Participants should say a single plant or animal species. If they say something new, they remain standing. If they can't name an animal that hasn't already been named, they sit down. The last person standing is the **winner.**

You can determine how strict to be with answers (i.e. if you'll accept "the wolfy things" or if you need to hear "Tibetan fox").

2. Now, let's play a game to learn more about each of these animals and how they interact with one another.

I'm going to pass out a few sheets of paper to each of you, and you should recognize some of the species as the plants and animals we just listed.

3. Give each player one copy of a deck and scissors. Instruct them to cut out the cards, shuffle them, and place their deck face down. Participants should also cut out their own set of **Baby Bonus** cards and keep them separate.

Sea bunny (nudibranch)

Stack the **Baby Bonus** cards in piles based on the numbers shown (all the +1 cards in one stack, +3 in another stack, etc.).

Procedure cont.

4. Once everyone's cards are cut and their decks have been shuffled, it's time to find an opponent and play the game.

First, you'll find someone to challenge who has the same deck as you do **(High altitude, Low altitude, or Sea level).** You'll start with your decks placed facedown.

After participants pair up, give each pair one die.

5. Explain the rules by doing a practice round.

Let's do the first round together. To flip the top card at the same time, you'll declare, "Eat or be eaten!" and flip on "eaten," like "Rock, paper, scissors, shoot!" Ready? "Eat or be eaten!" The two cards now facing up are the cards that will interact with one another.

Look at your card. At the top, you'll see the name and image of an organism within your ecosystem. On the left side, you'll see everything it eats, or where it gets its energy. On the right side, you'll see everything that eats it, or its natural predators. Now, we're going to use that information to see how your organism would interact with your opponent's and track how energy flows through your ecosystem.

6. Give participants time to **practice this step.**

When a predator encounters its prey, the prey participant rolls the die to see if it escapes. If the roll is lower than the **survival score** on the card, the predator eats the prey and keeps both cards in its discard pile.

A roll higher than the survival score means the prey participant **escapes** and keeps its card.

Procedure cont.

Example: If one player turns up a snow leopard and the other player turns up a markhor goat, the goat player must roll their die, hoping for a survival score of 5+. If the goat player rolls 5 or 6, they **escape** the snow leopard, and everyone keeps their own cards. If they roll a 1-4, the snow leopard **eats** them, and the snow leopard player now has both cards in their discard pile while the goat player has zero.

If the two animals are both herbivores, or if the organism is not listed on the other's card, then they do not interact, either because they are not in the same food chain or because one would not eat the other in any circumstance. Each player places their card in their own discard pile.

If the two animals are the same, they reproduce! Each player keeps their card and gets an additional **Baby Bonus** card to represent babies.

The number of babies varies based on the reproductive habits of each organism. Consult the bonus cards to see which point value corresponds to each organism.

They should put their card in their discard pile and keep the **Baby Bonus** card beside it (but keep it separated).

Pallas's cat cubs wait while their mother ambushes prey for dinner

Procedure cont.

7. Regardless of the outcome of the matchup, both cards flipped during the first turn should go face-up in discard piles (like the card game War).

Go through your full deck this way. Once you run out of cards in your draw pile, the round is over. To determine the winner, count the total cards you have in your discard piles. Each card represents one **energy** point. Whoever's ecosystem has the most energy wins the hand!

8. Allow participants to ask any further questions about the rules.

Now it's time to **Eat or be Eaten.** Both participants will flip a new card from the draw pile for a new matchup.

9. Circulate around the room and help participants navigate the interactions.

Make sure participants are reading their cards and not guessing or assuming what the interaction would be. While a Bengal tiger would probably eat a jerboa, they aren't part of the same food chain. Tigers aren't just trump cards that automatically take everything, since they only eat meat and won't eat the plant cards. Encourage participants to think through these things as they play.

10. As matches are concluding, participants tally their points to determine the winner.

Each individual animal counts as one point, while the **Baby Bonus** should be added as it is written on the card (ex: one baby card with +5 on it counts as 5 energy points).

Procedure cont.

11. After the first round, participants can either reset or continue in a bracket.

To reset, return **Baby Bonus** cards and separate decks back to their starting hands—this is also a good time to swap decks for a new ecosystem.

12. To host a bracket, the winner keeps their full deck (including won cards) and finds another winner to battle.

Shuffle your discard pile to form a new draw pile.

The player keeps their **Baby Bonus** cards as well, but sets them off to the side. Those values will just be added into their final ecosystem energy total, not used as cards in the gameplay.

Each matchup ends when one player runs out of cards. Any remaining cards in the other player's draw pile become energy points.

Continue this cycle until you have an ultimate winner with the most energy-dense ecosystem!

Grey reef sharks hunt Moorish idols in the Coral Triangle

Debrief

What pairings surprised you? Were there any unexpected connections between species that you didn't anticipate?

A: Will vary. Encourage discussion.

How did adaptations impact your survivability when you were prey?

A: Example responses include: markhor goats' sense of smell, pikas' ability to burrow, parrotfish's mucus cocoon.

What adaptations made you more successful as a predator?

A: Example responses include: Tibetan foxes' heads and snouts evolved to fit into pika holes, jerboas' sensitivity to sound and ability to jump, Bengal tigers' camouflage, leopard moray eel's double set of jaws for catching and swallowing fish.

What type of organisms are missing from every deck?

A: Decomposers.

What real world impact would this have on the ecosystem?

A: Without decomposers, nutrients would have a much harder time getting back into the soil to nourish the producers, leading to a domino effect through the food chain. There would also be more disease spreading through populations.

Debrief cont.

What did you decide to do with your human card and why did you make those choices? Did your decision change based on which organism you were paired with? How do you think human impact connects to the real Wild Asia ecosystems?

A: Human interference with populations through intentional hunting or land development can alter the balance between predator and prey relationships, leading to extinction and/or overpopulation.

Humans are the only predator of the Tibetan fox, regularly hunting them for their fur.

Pollution and climate change can impact the environment the animals live in, changing their migration and hunting patterns, food supplies, and overall health.

For additional discussion: Select a matchup where neither organism wins or loses.

If those two organisms met in the wild and had to interact, what do you think would happen and why?

Which adaptations give one the advantage?

The Tibetan fox

Appendix

Use these talking points to guide participants in their discussions about each animal's survival score.

High Altitude Deck

- Markhor goats are expert climbers, but the snow leopard can climb, too! Goats might get a head start if it can smell the leopard coming.
- Snow leopards are fast, but pikas can hide below ground.
- Tibetan foxes' snouts fit perfectly into the holes where pikas hide.
- Humans are the only natural predator of a Tibetan fox, trapping them for their fur.

Low Altitude Deck

- Jerboas' large ears can hear the eagle coming, and their fast, unpredictable movement makes them difficult to catch.
- Because musk deer can't see red or orange, tigers appear greenish to them. Tiger stripes serve as camouflage in their green heavily forested habitat.
- Golden eagles are generally only able to capture a small, young deer.

Sea Level Deck

- Leopard moray eels don't often hunt Moorish idols, but if an opportunity presents itself, they won't say no to a free meal.
- Moorish idols and parrotfish swarm together to confuse grey reef sharks.
- Parrotfish have a mucous cocoon that masks their scent from eel's excellent sense of smell.
- Sharks can't reach eels in their dens but can reach them when they are swimming in open water.

Instructions for Play

STARTING THE GAME

Participants declare, **Eat or be eaten!** On the word eaten, each participant should flip the top card of their deck and place them face up in the center of the playing space. Next, use the information on the cards to determine how the interaction unfolds.

If neither animal is listed on the other card, then they are not in a predator-prey relationship. It is considered a draw, and each participant keeps their own card and places it face-up in their discard pile.

If each animal is listed on the cards, that means one card is the predator and one card is the prey. The participant who drew the prey card will have to roll the die to see if they evade the predator or if they become lunch.

The number listed on the prey card beside the predator is the **survival score** that must be achieved in order to survive the encounter. If the prey participant rolls their exact survival score or higher, the prey escapes and each participant keeps their card, placing it in their discard pile.

If however the prey participant rolls below their survival score the prey organism is eaten! The participant who flipped the predator card takes **BOTH** cards and places them in their discard pile. Play repeats until participants have no more cards in their deck.

BABY BONUS

If the organisms are the same, then they reproduce. Each participant should place their card in their own discard pile as well as one **Baby Bonus** card specific to that species of animal.

TO DETERMINE THE WINNER

Participants count the number of cards in their discard piles. Each organism card counts as one point, while the Baby Bonus cards are added in based on the value on the card.

Whoever has the most energy (points) in their ecosystem wins!

TRIM CAREFULLY ALONG GREY OUTLINE OF CARDS

LEOPARD MORAY EEL

SEA

EATS	EATEN BY
Moorish idols Parrotfish	Grey reef shark: **3+**

LEOPARD MORAY EEL

SEA

EATS	EATEN BY
Moorish idols Parrotfish	Grey reef shark: **3+**

CORAL

SEA

EATS	EATEN BY
A microscopic organism called **zooplankton**	Moorish idols **6** Parrotfish **6**

CORAL

SEA

EATS	EATEN BY
A microscopic organism called **zooplankton**	Moorish idols **6** Parrotfish **6**

CORAL

SEA

EATS	EATEN BY
A microscopic organism called **zooplankton**	Moorish idols **6** Parrotfish **6**

MOORISH IDOL

SEA

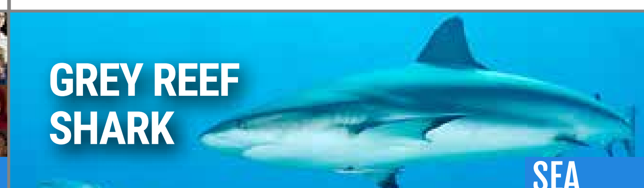
EATS	EATEN BY
Algae Coral	Leopard moray eels: **2+** Grey reef sharks: **6**

HUMANS

SEA

Humans are omnivores and can eat most things. Even for things they can't eat, they may choose to hunt them for their skins, to use other resources like their chemicals or fibers, or simply hunt them for sport.

As a human, choose what to do with the other organism.



GREY REEF SHARK

SEA

EATS	EATEN BY
Leopard eels Moorish idols Parrotfish	This is an **APEX PREDATOR** Eaten by no other species

MOORISH IDOL

SEA

EATS	EATEN BY
Algae Coral	Leopard moray eels: **2+** Grey reef sharks: **6**

TRIM CAREFULLY ALONG GREY OUTLINE OF CARDS

TRIM CAREFULLY ALONG GREY OUTLINE OF CARDS

PARROTFISH

SEA

EATS	EATEN BY	
Algae Coral	Leopard moray eels:	3+
	Grey reef shark:	6

PARROTFISH

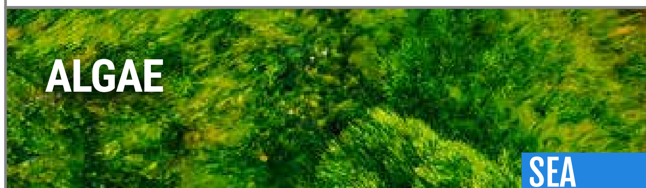
SEA

EATS	EATEN BY	
Algae Coral	Leopard moray eels:	3+
	Grey reef shark:	6

ALGAE

SEA

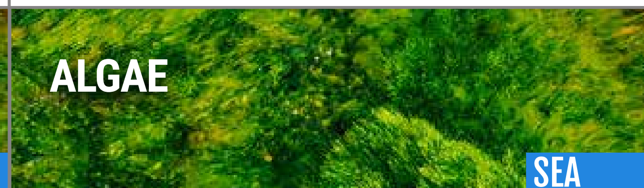
EATS	EATEN BY	
Energy from the Sun	Moorish idols	6
	Parrotfish	6
	Coral	6



ALGAE

SEA

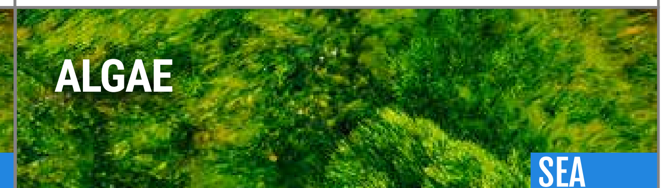
EATS	EATEN BY	
Energy from the Sun	Moorish idols	6
	Parrotfish	6
	Coral	6



ALGAE

SEA

EATS	EATEN BY	
Energy from the Sun	Moorish idols	6
	Parrotfish	6
	Coral	6



ALGAE

SEA

EATS	EATEN BY	
Energy from the Sun	Moorish idols	6
	Parrotfish	6
	Coral	6

HUMANS

LOW

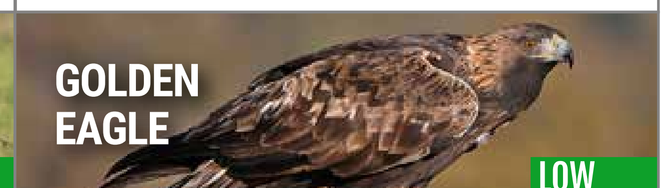
Humans are omnivores and can eat most things. Even for things they can't eat, they may choose to hunt them for their skins, to use other resources like their chemicals or fibers, or simply hunt them for sport.

As a human, choose what to do with the other organism.

BENGAL TIGER

LOW

EATS	EATEN BY
Musk Deer	This is an **APEX PREDATOR** Eaten by no other species



GOLDEN EAGLE

LOW

EATS	EATEN BY
Jerboa Musk Deer	This is an **APEX PREDATOR** Eaten by no other species

TRIM CAREFULLY ALONG GREY OUTLINE OF CARDS

TRIM CAREFULLY ALONG GREY OUTLINE OF CARDS

EATS	EATEN BY	
Grasses Grasshoppers	Golden eagle	4+

EATS	EATEN BY	
Grasses Grasshoppers	Golden eagle	4+

EATS	EATEN BY	
Grasses Grasshoppers	Golden eagle	4+

EATS	EATEN BY	
Grasses	Bengal tiger Golden eagle	6 2+

EATS	EATEN BY	
Grasses	Bengal tiger Golden eagle	6 2+

EATS	EATEN BY	
Grasses	Jerboa	5+

EATS	EATEN BY	
Grasses	Jerboa	5+

EATS	EATEN BY	
Grasses	Jerboa	5+

EATS	EATEN BY	
Energy from the Sun Nutrients from the soil	Grasshopper Jerboa Musk Deer	6 6 6

TRIM CAREFULLY ALONG GREY OUTLINE OF CARDS

TRIM CAREFULLY ALONG GREY OUTLINE OF CARDS

GRASSES

LOW

EATS

Energy from the Sun
Nutrients from the soil

EATEN BY

Grasshopper 6
Jerboa 6
Musk Deer 6

GRASSES

LOW

EATS

Energy from the Sun
Nutrients from the soil

EATEN BY

Grasshopper 6
Jerboa 6
Musk Deer 6

GRASSES

LOW

EATS

Energy from the Sun
Nutrients from the soil

EATEN BY

Grasshopper 6
Jerboa 6
Musk Deer 6

SNOW LEOPARD

HIGH

EATS

Markhor goat
Pika

EATEN BY

This is an
APEX PREDATOR
Eaten by no other species

SNOW LEOPARD

HIGH

EATS

Markhor goat
Pika

EATEN BY

This is an
APEX PREDATOR
Eaten by no other species

MARKHOR GOAT

HIGH

EATS

Lichens and mosses

EATEN BY

Snow Leopard 5+

HUMANS

HIGH

Humans are omnivores and can eat most things. Even for things they can't eat, they may choose to hunt them for their skins, to use other resources like their chemicals or fibers, or simply hunt them for sport.

As a human, choose what to do with the other organism.

MARKHOR GOAT

HIGH

EATS

Lichens and mosses

EATEN BY

Snow Leopard 5+

MARKHOR GOAT

HIGH

EATS

Lichens and mosses

EATEN BY

Snow Leopard 5+

TRIM CAREFULLY ALONG GREY OUTLINE OF CARDS

TRIM CAREFULLY ALONG GREY OUTLINE OF CARDS

TIBETAN FOX

HIGH

EATS	HUNTED BY	
Pikas	Humans	6

TIBETAN FOX

HIGH

EATS	HUNTED BY	
Pikas	Humans	6

PIKA

HIGH

EATS	EATEN BY	
Lichens and mosses	Snow Leopard	3+
	Tibetan fox	6

PIKA

HIGH

EATS	EATEN BY	
Lichens and mosses	Snow Leopard	3+
	Tibetan fox	6

PIKA

HIGH

EATS	EATEN BY	
Lichens and mosses	Snow Leopard	3+
	Tibetan fox	6

LICHENS AND MOSSES

HIGH

EATS	EATEN BY	
Energy from the Sun Nutrients from the soil	Markhor goat	6
	Pika	6

LICHENS AND MOSSES

HIGH

EATS	EATEN BY	
Energy from the Sun Nutrients from the soil	Markhor goat	6
	Pika	6

LICHENS AND MOSSES

HIGH

EATS	EATEN BY	
Energy from the Sun Nutrients from the soil	Markhor goat	6
	Pika	6

LICHENS AND MOSSES

HIGH

EATS	EATEN BY	
Energy from the Sun Nutrients from the soil	Markhor goat	6
	Pika	6

TRIM CAREFULLY ALONG GREY OUTLINE OF CARDS

TRIM CAREFULLY ALONG GREY OUTLINE OF CARDS

SEA	LOW	HIGH
Human	Markhor goat Snow leopard Human	Musk deer Golden eagle Human

SEA	LOW	HIGH
Human	Markhor goat Snow leopard Human	Musk deer Golden eagle Human

SEA	LOW	HIGH
	Bengal tiger	Pika

SEA	LOW	HIGH
	Bengal tiger	Pika

SEA	LOW	HIGH
Grey reef shark Moray eel	Jerboa	Tibetan fox

SEA	LOW	HIGH
Grey reef shark Moray eel	Jerboa	Tibetan fox

SEA	LOW	HIGH
Algae Coral Moorish Idol Parrotfish	Grasshopper Grasses Lichens and Mosses	

SEA	LOW	HIGH
Algae Coral Moorish Idol Parrotfish	Grasshopper Grasses Lichens and Mosses	

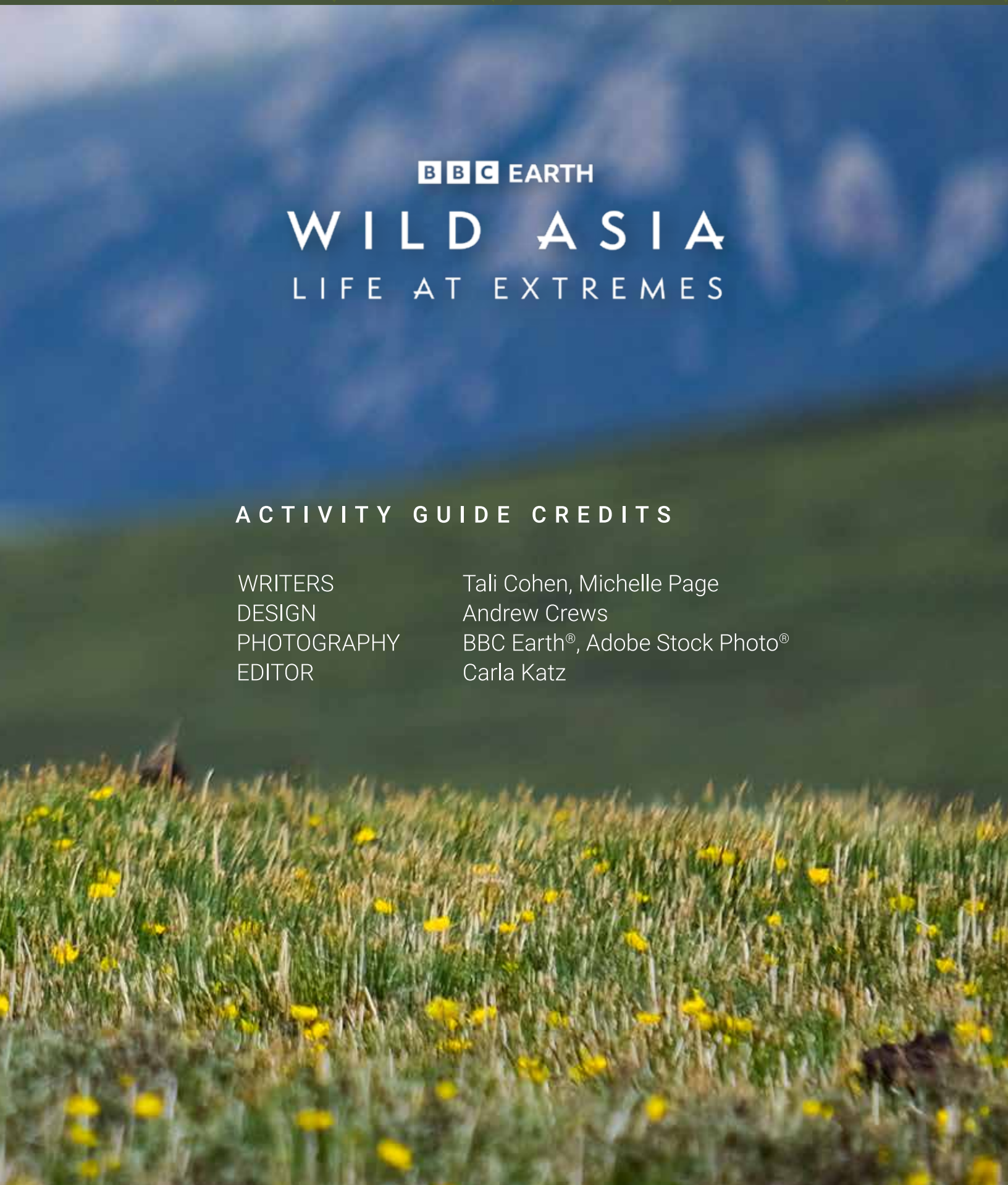
BEATEN BY NO ONE

This is an

APEX PREDATOR

Beaten by no other species

TRIM CAREFULLY ALONG GREY OUTLINE OF CARDS



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