

Synthetic Biology

Democs game

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Synthetic Biology

a Democs game
to discuss a new field of science
and what it could mean for our lives



What's This All About?

This Democs game is a chance for you to learn about an emerging field of science called synthetic biology, to consider some of its wider implications, and to give your opinions about it.

What's Synthetic Biology?

Synthetic biology is an emerging scientific field with great potential but also some important challenges. It's still early days, but it aims to use knowledge of genetics and molecular biology to design and construct biological parts and devices to our own specification. The devices are based on specific parts of natural organisms which biologists have identified and extracted. These 'parts' would be incorporated into existing living organisms to redesign them to carry out new functions useful to us. Some call the parts BioBricks. These redesigned organisms are 'synthetic' in the sense that we have put new parts in them, but they are still based on normal biology. In the same way that new engineering parts are made to give a car some new function, scientists want to make biological 'components' to give micro-organisms new and useful properties.

Is this a bit like 'GM'?

It has some technical similarities with genetic modification (GM) and with nanotechnology but also a lot of differences. At the moment, it's about modifications in bacteria and other micro-organisms rather than plants and animals. Its applications are in fields like energy, materials, environmental monitoring, agriculture and medicine.

Where do I come into this?

Scientists and policy makers recognise that all this raises ethical and social issues which we need to discuss together as a society. That's what this Democs game is about.

Democs instructions

What is Democs?

This Democs game been created so that members of the public like you can learn about synthetic biology, explore its wider implications and issues, and give your opinions at the end of the game.

Democs is a conversation card game. Players get hands of cards and take turns to play them. But instead of playing to win, they are playing to learn about an important new scientific issue, namely synthetic biology, and form their opinions about it. At the end of the game, the players will get to vote on policy options and what they think about some of the potential applications of synthetic biology.

The kit is made up of several different types of cards. Some have information, ideas or stories about the topic.

One person acts as the dealer. It's the dealer's job to explain the rules, ask the questions and deal the cards, but he/she is not expected to be an expert on the subject! Usually, the dealer will be the person who has organised the game.

If you are thinking about organising a game, go for it!

Democs is designed to be played anywhere, by anyone.

All you need is a kit, about six to eight people (though you can play with more or less), a table and an hour and a half to two hours. You don't need to know anything about the topic to run a game and the rules are simple and easy to understand.

Kit contents

One set of instructions (which you're reading!)

Main cards

You can use these cards every time you play:

- 7 large pink story cards (Set S)
- 32 green information cards (Set A)
- 40 blue issue cards (Set B)
- 3 'yellow cards'.

Single-use items

These cards get written on during the game. We've given you enough for one or two games, but after that you'll need to go on the New Economics Foundation website: www.neweconomics.org/gen/democs.aspx and print some more.

- 8 purple cluster cards
- 8 grey blank cards
- 1 purple and white policy voting grid (Vote 1: Five Synthetic Biology Policy Options)
- 8 orange and white application voting forms (Vote 2: Synthetic Biology Applications)
- 8 feedback forms
- 1 stamped addressed envelope (SAE).

How it works

A Democs game has five rounds. In rounds 1, 2 and 3, players get dealt different hands of cards which are read out and discussed. In the first round everyone is given a single story card to read out. In rounds 2 and 3, players are given information cards and issue cards, respectively. Each player is asked to look at his/her hand of cards and select the ones that they think are most important or interesting. They read them out to the group, and say why these ones interest them, and the group can comment on and discuss them.

As the discussion develops, certain topics will come out. In round 4, players are asked to put cards into clusters which form a theme about synthetic biology. There can be several of these, and each is described on one of the cluster cards.

In the final round (round 5), players are invited to vote, in two ways. The first is on a set of policy options which are on a single grid. Each player votes individually on each of the five options. The second vote is on your views on different applications to which synthetic biology could be put. Each player has their own grid to vote on and also say in their own words why they voted that way.

After the game, there is a stamped addressed envelope for the dealer to send the cluster cards, the two voting grids and the feedback form to:

Perry Walker, nef, 3 Jonathan Street, London, SE11 5NH.

These will be included in the overall results which will be written up in a report to present to policy and science organisations. This will be done anonymously and no participants will be identified.

Dealer's instructions

Before the game – setting up

As the dealer, you should spend a little bit of time getting ready before the game starts. You need to:

- Carefully read the instructions and make sure you understand what happens in each round. There's a simple timetable on pages 7 and 8 to refer to, but it helps to know where you're going beforehand
- Check the kit to make sure you have everything
- Find a table, and a few pens
- Lay out the elements of the kit on the table in the order they will be used.

Basic Elements of the Game

This Instructions Booklet which you will need to keep at hand.

Story Cards (Set S)

These are stories about some people and situations to do with synthetic biology. Most of the people are fictitious but the stories are based on real issues and situations which have arisen or which we can envisage arising.

Information Cards (Set A)

These are facts about synthetic biology. These come from experts and reliable sources of information.

Issue Cards (Set B)

These are different people's viewpoints and opinions on synthetic biology. They are here to make you think, but they might be things that not everyone thinks are true.

Cluster Cards.

These are used to label groups of cards which the players make and say what they mean. You can write directly on these.

Blank Cards

If anyone thinks of something important that's not included, they can write it down on a blank card.

Yellow Cards

If anyone is getting confused or feels someone's hogging the discussion or going off on a tangent, play a yellow card. The dealer will then stop the game and sort things out.

Two Voting Grids

Five Synthetic Biology Policy Options, and Synthetic Biology Applications

Feedback Form

So that we know who and where your results have come from, and a bit about what you thought about the game, and ask for contact details if people want to receive the final report.

How to play the game

Introduction

Before you start, it's important that everyone knows the basic rules of the game. First of all, the dealer should explain the basics of the game. If you like, just read out the text below. 'What is This Game About?'. Explain that these discussions often work better if people agree on some guidelines beforehand. Then read out the conversation guidelines below and check that everyone is happy with them. Next, the dealer should explain each of the sets of cards and what they are for. You can use the list on page 7.

What is This Game About?

Synthetic biology raises ethical and social issues which we need to discuss together as a society. This Democs game has been created so that members of the public like you can learn about synthetic biology – using sets of cards – explore these wider questions, by working with the cards, and give your opinions at the end by voting on various options. It's quite a new field, so don't worry if you don't understand everything at once! This is an opportunity to learn and discuss, as far as you can.

Conversation Guidelines

- We are all equal – one person, one voice, one vote.
- Your view matters – especially if you are the only one that holds it.
- You have a right to be heard – but so does everyone else.
- Listening is as important as speaking – so work at understanding as well as being understood.
- Find common ground – look for where you agree.
- Don't worry if you are surprised or confused – it might mean that you are learning something new.

Timetable

The timings below add up to 90 minutes. If you have longer, please increase the timings appropriately.

Introduction	5 mins	The dealer explains what Democs is about, reads the conversation guidelines, and tells the group what each type of card is for. Then the dealer reads out the introductory page 2 about synthetic biology.
Round 1 Stories	10 mins	Players use the story cards to introduce some of the issues about synthetic biology through real or imaginary people and situations.
Round 2 Information	15 mins	Players are dealt a hand of information cards about synthetic biology. They choose two that interest them, to share with the group. This starts to assemble a shared knowledge 'bank'.
Round 3 Issues	15 mins	Players select from issue cards in the same way, opening up ethical and social questions that they think are important.
Round 4 Creating clusters	30 mins	The group discusses the topics that are beginning to emerge, making links amongst the cards they have chosen in the previous two rounds. The linked cards form clusters. Each cluster has a theme which is written on the cluster cards.
Round 5 Voting and Feedback	15 mins	Players give their views by voting individually on: Vote 1: Five Synthetic Biology Policy Options Vote 2: Applications of Synthetic Biology. Players also fill in the feedback form.

Round 1

Introduce the subject

Now you've explained how the game works, we turn to the subject itself, synthetic biology. Because it will be unfamiliar to most people, read out to the group the whole of page 2 of this instruction booklet, entitled 'What's this all about?'. This introduces the basic idea of what synthetic biology is. Then explain that the players will find out more as the game proceeds, starting with a set of stories about people and situations to do with synthetic biology.

Deal out the story cards to each player.

Story Cards

This is where each player is given a story to help them think about the important issues around synthetic biology. Tell them that cards 1, 3 and 5 are about real people, but the other named people are fictitious. But in all of them the situations portrayed are real or ones which could be envisaged in future.

Shuffle the big pink story cards and give one to each player. (There are seven of these, so if there are more than seven players, some will have to share.) Each card ends in a dilemma.

In turn, ask each player to read out or summarise their card. When they have read it out, if they want they can say what they think about it and then other players can respond. But stick to time.

If anyone is very unhappy with their card, they can swap it for one of the spares (if there are any), or with one of the other players if both people agree.

Ask each player to put their story card in front of them, face up.

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Rounds 2 and 3

Information Cards and Issue Cards

These two rounds are the main information gathering stage. Players will look through the information and issue cards and choose the most important ones.

Shuffle the green information cards and deal them all out to the players. It doesn't matter if not all players have exactly the same number of cards.

Each player should pick the two most important cards from their hand. Players can choose what 'important' means for themselves. It could be:

- Relevant to the dilemma on their story card
- Interesting
- Surprising
- Something they strongly agree with
- Something they strongly disagree with.

Once they've chosen two they should put the rest of the cards in the middle of the table. Other players can look through these and if they wish use them to replace one or both of their initial choices. Once they've chosen their final two, the rest of the cards can be put away – you won't need them again.

Ask players to take it in turn to play one card by reading it out to the group and then explaining why they chose it. Once a player has finished reading the card out, other players can say something in response if they want to. Once the discussion has finished, the player puts the card down face up next to their story card. Each player should have two cards, so you need to go around twice.

After all the players have played their two green cards, deal them a hand of blue cards and do the same thing again.

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Round 4

Creating Clusters

Round 4 is the discussion stage. The players will look at all the cards together to try and identify common themes and think about what they mean. They then sort the cards they've chosen into groups according to these themes.

We've set out a formal way of doing this below, but it may be that your group has started discussing the issues and has already spotted links between cards. In that case, you can be more relaxed, and your job as dealer is a) to ensure everyone has a chance to contribute their cards and thoughts, and b) to check if there are other issues around which people want to cluster cards. The aim is up to four or five clusters.

All the players put the green and blue cards they chose together in the middle of the table. They are the issues and information which the group thinks are the most important.

The player on the dealer's left takes two cards that they think are linked. They put them together in a separate part of the table and explain to the group what the link is, and what point they think comes out of it. This is your first 'cluster'.

Clusters are groups of cards which the group thinks have a common theme. It's up to the players to decide what the clusters are about but it can be anything. They might be things like 'making new vaccines' or 'risks of synthetic biology'. They can be blue cards, or green cards or a mixture of both.

The next player can either look for a card to add to the first cluster, or start a different topic using other cards from the 'pool'. Again they should say what they think the link is.

Go round the table once, getting everybody either to contribute to an existing cluster or begin a new one. This is to get everyone comfortable with the idea of sorting the cards into clusters. At this stage things can still change, so people don't need to worry too much about detail.

During this process, players can also add their story card to a cluster if they think it fits. And if the players think of things that are important which aren't on the cards they can write them on a blank card and add them to the clusters.

After you've been round once, there should now be a number of clusters, but no more than four or five at most. Ask the players to work together to see if the rest of the cards can fit into any of the clusters. If there are cards that don't fit in any cluster, put them to one side.

This is where a lot of discussion takes place about what opinions the group wants to express and what different cards mean to different people. Look for consensus as far as possible, but if opposing opinions come out, these can both be given.

Encourage the players to take their time so that everyone is happy with the clusters – even if that means breaking up some of the original clusters or using cards twice. If the players can't agree and time is short, get the players to vote and let the majority decide.

Once the players are happy with each cluster, they decide what it should be called, take a cluster card and write in the name as a title. They should then decide what opinion about synthetic biology they are stating. The group comes up with a one or two sentence summary. When everyone has agreed, one player writes it on the card.

The players write the numbers of all the cards used in the cluster on the bottom of the card as a record.

In the same way, players make a cluster card for each cluster.

Round 5

Top tips for dealers

Voting

In this last round, players are asked to vote on two separate voting grids. Unlike the clustering, which is a group exercise, everyone votes as an individual.

For the first vote there is one purple and white communal card which everyone casts their votes on. For each of five policy options, each person is asked to put one cross in the box that corresponds to their view – I agree, or I disagree, or I could live with it, or I don't know.

While this first voting grid is going round, hand out the second set of orange and white voting grids. This time there is one for each person. Ask each player to put a cross to show their opinion about the acceptability of each of eight different potential applications of synthetic biology. Note that there are four applications on the front and four on the back. Invite them to put in their own words why they think so, in the big box underneath the voting area, if they feel they can do so.

At the end

Thank everyone for taking part and hand out a feedback form to each player. This gives people a chance to say what they thought about the game. It also asks them to provide their contact details if they would like to have the final report of this project, or if they'd like to explore the issues a bit further, or perhaps play the game again with other friends. When they have done this, collect the feedback forms and put them together with the four or five cluster cards, the voting cards, and any blank cards people have written on, into the stamped addressed envelope provided. Send this back to us. Gather up the cards into their different types and put them back in the box.

- 1 **The rules are not the point.** The aim of this game is to let people discuss the issues. As long as people are discussing, don't worry too much about the details.
- 2 **It's good to talk...** since the point is to talk about the issues, encourage people to say what they think and to respond to each other's views (politely!)
- 3 **...but silence is OK too.** At the beginning of the game, people will spend more time reading cards than talking. Don't worry, discussion will come later.
- 4 **No surprises.** Make sure all the players know how the process fits together so they can figure out what they need to do next.
- 5 **Stick to time.** If you think you'll struggle, set an alarm that rings when each session should end.
- 6 **Don't get involved in the conversation.** Your role is to help other people to have their say. If you keep talking, you'll disrupt other people's ability to have their own conversation.
- 7 **But do help the conversation along.** If you think people are being a bit quiet, especially in the early stages, you can get conversation going by asking questions. Things like 'do you agree with that card?' or 'does anyone else have an opinion?' can help people start to engage with each other and the issues.
- 8 **Everyone deserves to be heard.** Make sure everyone gets the chance to speak. One way to do this is to ask people at the start to agree to let others finish before they start to speak. If you do this, remind people of their agreement when they forget it!