

Guide to using K'NEX in Home Education

**...including 6 Instruction Cards
and 6 K'NEX challenges**



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1. Introduction

The K'NEX construction kit has been used successfully at school and in the home since 1995. Initially, K'NEX was seen just as a “fun” construction kit, but increasingly K'NEX has been put to many different educational uses, including:

- Schools (in the Design and Technology, Science, Maths, History and ICT curriculum, and in the Early Years)
- Nurseries and playgroups
- Children's clubs
- Childcare schemes
- Post-16 education
- Family learning
- Home education

This Guide has been written for everyone who has an interest in Home Education, including:

- Parents
- Grandparents
- Other family members
- Carers
- Schools and PTAs
- Home Education organisations

The guide mainly relates to children aged 3 to 11, but the content is also relevant to older children.

1.1 What is K'NEX

K'NEX is one of the most successful construction kits in the world, second in popularity only to Lego. It is based around a series of “rods”, which can be joined together by “connectors” such as the one shown in our logo. Once they have mastered using these simple components, children and adults alike can use their imagination to make potentially millions of different working models.

It is ease of use and versatility that make K'NEX such a good investment for educational purposes, whether in schools, home education, children's clubs, childcare schemes, family learning or post-16 education. You will find that there is no age limit for enjoying K'NEX - it is suitable for all ages from 5 to 95. There is also a version of K'NEX with bigger components for 3 to 7 year olds, called Kid K'NEX, as shown in the photo.



Building K'NEX models helps children and adults to understand subjects such as structures, forces and simple machines, in the way that Meccano educated an earlier generation. However, Meccano was aimed and advertised exclusively at boys, whereas both girls and boys find K'NEX easy and enjoyable to use. K'NEX can also be used effectively with adults, once they have mastered the basic techniques for joining rods and connectors together, and overcome any initial nervousness.

A further strength of K'NEX is that, when used to set Challenges, it can help both children and adults to develop skills such as innovation skills, problem-solving skills and team-working skills. These are skills that are much sought after by employers.

It is also worth remembering that even though educational organisations use K'NEX because of its high educational value, children and adults enjoy using K'NEX simply because it is fun. This makes K'NEX a good vehicle for engaging hard-to-reach children, such as disaffected children and children with behavioural and emotional difficulties.

1.2 K'NEX retail sets or K'NEX education sets?

If you do decide to use K'NEX or Kid K'NEX for Home Education, we would recommend purchasing K'NEX education sets, rather than the K'NEX retail sets you find in the shops. The education sets come with teacher guides, and many have compartmented trays, and a focus on a particular curriculum subject such as “Bridges” or “Space exploration”.

The full range of K'NEX education sets may be found in our on-line shop.

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2. K'NEX for Home Education

This section describes how using K'NEX at home can help children to develop skills and experience in the National Curriculum subjects of Design and Technology, Science, Maths, IT and History. The section covers children aged 5 to 7 (Key Stage 1) and children aged 7 to 11 (Key Stage 2). We use the usual abbreviations "KS1" and "KS2" for the Key Stages.

2.1 Why use K'NEX in the National Curriculum?

K'NEX is a versatile construction system, that can help meet the "Common Requirements" of the National Curriculum at KS1 and KS2, including:

- Communication skills
- Mathematical skills
- Problem-solving skills
- Creative skills

Not only is K'NEX "educational", but children also regard it as "fun and exciting", which helps to ensure that children usually stay involved and perform to the best of their ability when a K'NEX project is being completed.

There are very few barriers to children using K'NEX. All they need to learn are a few basic techniques for joining rods and connectors together. Time and again, teachers and home educators find that children excel at K'NEX, even if they are poor in other areas, such as literacy. This can be a great advantage in developing the self-esteem of children

2.2 K'NEX models from instructions

All K'NEX education sets arrive with step-by-step instructions showing how to build a number of K'NEX models, plus guidance for teachers/home educators. Building models from instructions is the best way to learn how to use K'NEX, for both adults and children.

The Appendix contains six K'NEX Instruction Cards, that are designed to allow children to build models from a photographic representation. The cards may be printed out, or displayed on a computer screen.

2.3 K'NEX challenges

Whilst building models from instructions is in itself educational, the real strength of K'NEX comes when children are set *K'NEX challenges*, in which they must build a model without instructions. Six K'NEX challenges are included in the Appendix, and 20 more challenges may be found on the K'NEX User Group website www.knexusergroup.org.uk.

Challenges are best completed by children working in pairs, because this will help to develop their communication skills and teamworking skills. If this is not possible, then we would recommend that the child completes the K'NEX challenges working as a team with a parent or other adult. For convenience, we refer below to "children" completing the challenge.

1. Decide on the K'NEX challenge you are going to provide (eg Crash Helmet challenge).
2. Provide sufficient K'NEX to complete the challenge, if possible in a compartmented tray.

3. Provide a copy of the Challenge Card, or, if you prefer, explain the challenge verbally.
4. If anyone hasn't used K'NEX before, explain the "Handy Hints" listed in the Appendix.
5. The children can then work at their own pace to complete the challenge, to the 1st, 2nd or 3rd level of difficulty.
6. As the challenge is being completed, give support and encouragement as required.
7. When the children have completed the challenge to level 1, ask them to demonstrate how it works, and praise them for all their hard work.
8. If there is time, ask the children to go on to complete level of difficulty 2, and then 3.
9. 10 minutes before the end of the session, ask the children to dismantle their models, and put the K'NEX back tidily in the tray.

Some of the advantages of the "K'NEX challenge" approach over the "Model-building" approach are that:

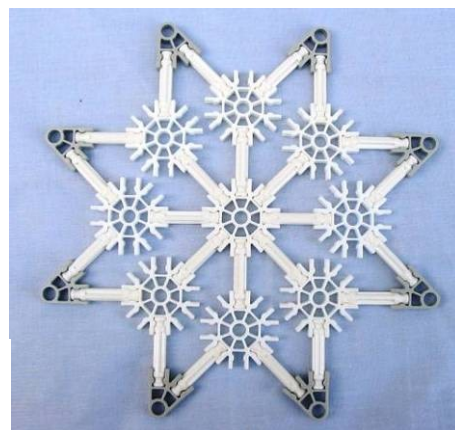
- Setting challenges helps to develop the problem-solving skills and creativity skills of children
- Setting challenges helps children to apply mathematical skills (eg shape, space and measure), rather than just copying them.
- Setting challenges helps ensure that the communication skills developed by children extend further into the vocabulary of technology and problem-solving.

2.4 Design and Technology curriculum

K'NEX projects can be designed to meet many of the requirements of the Design and Technology curriculum, including:

- Focused practical tasks
- Use of construction kits
- Designing skills
- Making skills
- Understanding structures
- Understanding simple mechanisms
- Designing and making products
- Computer control (see section 2.7)

K'NEX
snowflake



Many K'NEX projects only require K'NEX rods, connectors and wheels, but K'NEX can also be usefully extended with other equipment and materials, for instance:

1. Simple electrical circuits, such as a K'NEX lighthouse, or K'NEX house with burglar alarms
2. Paper or card, such a K'NEX castle with walls, or a K'NEX fan with card blades.
3. Cuddly toys, such as building a K'NEX house or a K'NEX car for a teddy bear.

There are a number of K'NEX education sets that explore particular aspects of the DT curriculum, as shown in Appendix B.

2.5 Science curriculum

K'NEX can be used effectively to help children in KS1 and KS2 learn about physical science in a practical way. Such an approach can ensure that children gain a better understanding of the principles involved, and retain that knowledge longer than if they had learned it only as theory.

Aspects of the Science curriculum that K'NEX can assist with include:

- Pushes and pulls
- Forces and motion
- Balanced and unbalanced forces
- Wheels, axles and inclined planes
- Pulleys
- Gears
- Motors
- Science investigations

K'NEX challenges based around a science investigation can be particularly effective, for instance:

1. Building a fan with K'NEX which is driven via a gear train, and investigating how different gears can be used in combination to change speed and the direction of motion.
2. Building a catapult out of K'NEX, and adjusting variables in the model to see how far a missile can be fired (eg length of throwing arm, angle of release, starting position).
3. Building a block and tackle out of K'NEX, and investigating the effect of using pulleys in combination.

There a number of K'NEX education sets that are based on Science, as shown in Appendix B.

2.6 Maths curriculum

In building K'NEX models and completing K'NEX challenges, children will be applying many different mathematical principles, including:

- Counting components required
- Selecting components by shape and size
- Creating patterns
- Interpreting 2-D diagrams of 2-D or 3-D models

- Using 2-D shapes such as squares, rectangles and triangles
- Using 3-D shapes such as cubes, cuboids, pyramids and prisms
- Applying symmetry
- Using 45 degree and 90 degree angles

Furthermore, K'NEX projects can be designed specifically as a vehicle for developing maths skills in KS1 and KS2 children, for instance:

1. Asking children to build K'NEX shapes in different sizes, and then fit the shapes one into another, or calculate the areas and volumes of the shapes.
2. Asking children to make a measuring wheel out of K'NEX, and then using it help to create a map.
3. Setting children the challenge of building (say) a K'NEX bridge, and then asking them to cost that bridge by assigning a monetary value to each K'NEX piece (eg £10 for a grey rod, £7 for a red rod, etc).

Appendix B gives details of the K'NEX education sets that are based on Maths, and the "UK Guide to using K'NEX for Hands-on Maths".

2.7 IT curriculum

Children now spend a significant amount of their time in school working on computers. K'NEX can be used to broaden the value of computer-based work, by:

1. Setting "K'NEX Computer challenges" that include both a K'NEX building element and an IT element.
2. Carrying out computer control projects in which a computer is used to program and control a K'NEX model.

An example of a K'NEX Computer challenge would be to:

- a. ask children to building a K'NEX car that will travel down a ramp,
- b. investigate how far the car will travel with the ramp set at different angles.
- c. record the data collected into a spreadsheet.
- d. produce graphs and charts from the spreadsheet.

A further example would be to take photos of a K'NEX model as it is being constructed, and then use Windows Movie Maker to turn the photos into a video

K'NEX swing



showing a K'NEX model apparently building itself.

An example of a K'NEX computer control project would be:

- a. To build a 50cm high K'NEX washing machine with a drum and opening door.
- b. To program the computer to provide a wash cycle and a spin cycle.
- c. To use a magnetic sensor that turns off the washing machine when the door is opened.

The Members Area of our website also includes lots of ideas for using K'NEX for computer control.

2.8 History curriculum

K'NEX challenges can be used as an enjoyable way of providing hands-on history projects to children, by asking them to design and build structures and mechanisms from different periods of history, including:

- Castles
- Windmills
- Waterwheels
- Bridges
- Railways
- Cranes
- Piers
- Lighthouses
- Mangonels and catapults
- Helmets and armour
- Swords and shields

The User Group website www.knexusergroup.org.uk includes challenges for a number of the above.



Kid K'NEX character



Kid K'NEX Vehicles set

3. Kid K'NEX for Home Education

“Traditional” K'NEX can be used by children aged 3 to 5, with supervision, but some children of this age may find that their fingers are not strong enough to join K'NEX rods to connectors.

The manufacturers of K'NEX recognised this problem, and in 2003 brought out the new Kid K'NEX range, as seen in the photos below. Kid K'NEX is suitable for ages 3 to 7, so there is some age overlap.

Kid K'NEX is a version of K'NEX with larger, chunkier rods and connectors that small hands can more easily join together. The bright, almost fluorescent colours appeal to young children, but undoubtedly the most attractive feature of Kid K'NEX are the eyes, ears and feet, as the photo shows.

The eyes can be made to look in any direction by swivelling them, and as the ears are also moveable, children can make Kid K'NEX characters with a whole range of expressions. The ears can also be used as wings, when making flying creatures.

The latest Kid K'NEX sets have also got some new components, including two different sizes of wheel, to make vehicles with.

Home educators are already confirming that the new Kid K'NEX fully upholds the K'NEX tradition, of being a product that children love to play with, but from which schools can also gain significant educational benefits. The skills that Kid K'NEX can help enhance include:

- Number skills
- Colour and Shape matching skills
- Problem-solving skills
- Spatial relations
- Strength and coordination
- Self-direction and self-esteem

As with traditional K'NEX, Kid K'NEX is especially valuable when children play with it in small groups. This helps them to develop additional skills such as:

- Language skills
- Cooperative skills

Kid K'NEX characters can also be used to link into other activities that the age group enjoy, such as story telling.

All Kid K'NEX education sets come with full-colour instruction cards. Once the children have used these to become familiar with Kid K'NEX, teachers and home educators can allow “free play”, or guide the children towards specific objectives such as:

1. Build a house for the Kid K'NEX creatures you have built (see Appendix A).
2. Make a table and chair for the Kid K'NEX creatures to use.
3. Make a Kid K'NEX garden.
4. Make a Kid K'NEX bus (if you have the Vehicles set).

The Kid K'NEX education sets currently available may be found in Appendix B.

4. Helping children with special educational needs

Many schools and parents have found that K'NEX can assist children with special educational needs to develop essential skills. This is not always the case. Every child with special educational needs is different, but we have been told about many different K'NEX projects in which children with special educational needs have done well, and on occasion exceeded the expectations of their teachers and parents.

The following notes may assist:

1. We suggest you start by assessing whether each child is physically able to make use of K'NEX or Kid K'NEX. For instance, some children with visual impairments, or cerebral palsy that affects their arms, or severe learning difficulties may find K'NEX too difficult to use.
2. If you decide you would like to try using K'NEX with a child, we suggest that you use Kid K'NEX for children aged 3 or 4, because less strength is needed to put the pieces together. For children aged 5+, it is usually better to use K'NEX rather than Kid K'NEX, but this is not always the case, and some children with special educational needs may prefer to stay with Kid K'NEX until age 7 or more.
3. You should then think carefully about how you introduce the K'NEX or Kid K'NEX set to the child. Start with easy tasks that are within the child's capability, and give as much assistance as is needed. Early failure may cause the child to reject the whole idea, even though by starting with simple tasks and then gradual development onto more difficult tasks, the child could have achieved excellent results.
4. If you find that the child does enjoy using K'NEX, you might then think about purchasing one or more of the smaller K'NEX education sets specifically for him or her. Prices start at £18 (see Appendix B), and the sets come with instruction books that are designed for educators. The "Discovery Building set" is a good general-purpose starter set.
5. Some children will not wish to develop beyond the stage of building the models in the instruction book you receive with the set, but if they do, you might like to start building the models from the Instruction Cards in this Guide, and then progress onto the K'NEX Challenges.
6. We suggest you also consider encouraging your child to build K'NEX models and carry out K'NEX challenges in a team of two or three children. Such an approach can help develop the communication skills and team-working skills of all the children participating.

Note that not only can K'NEX help children with special educational needs develop the curriculum skills shown in section 2, but achieving success with K'NEX can also help to develop self-esteem and confidence.

5. Helping gifted and talented children

Schools and home educators also report that K'NEX challenges are an excellent way of developing the skills and experience of gifted and talented children.

Some of the reasons why K'NEX challenges can work well with gifted and talented children are:

- Completing K'NEX challenges will help gifted and talented children to develop skills in Design and Technology, Maths and Science that go beyond the requirements of the National Curriculum. This broadening of the curriculum will help to keep gifted and talented children interested, and may help them to discover new interests and talents.
- Setting K'NEX challenges to gifted and talented children will help stretch them to the limits of their ability. For instance, the third level of difficulty of some of our challenges are difficult even for adults.
- Completing K'NEX challenges helps gifted and talented children to develop "life skills" such as problem-solving skills, creativity skills and team-working skills. These will be essential in the children's later life, whatever career they eventually follow.

Note that it is not necessary to segregate gifted and talented children from other children before setting them K'NEX challenges. The main reason that all the K'NEX challenges in this Guide and on our website have three levels of difficulty is so that they can be used in groups of mixed ability. For instance, in allowing a KS2 class an hour to complete the Crash Helmet challenge:

1. Children with special needs might only complete level of difficulty 1.
2. The majority of children in the class might complete level of difficulty 2.
3. Gifted and talented children might complete level of difficulty 3.



6. K'NEX birthday parties and Christmas parties

Children greatly enjoy working with K'NEX and Kid K'NEX in the home. Often, they will invite friends around to help them work on their models and challenges, and educationally this is an excellent thing, because K'NEX and Kid K'NEX can help children to develop communication skills and teamworking skills when used in groups.

One way that parents can encourage group work with K'NEX is to provide a K'NEX birthday party or K'NEX Christmas party for their child, as follows:

1. Decide on the number of children attending.
2. Choose a challenge or a model that can be provided with the children working in teams of two or three.
3. Send out invitations (eg to a Bear Home party, with the children bringing their own bears). **
4. Whichever model or challenge you have chosen, complete the model or challenge in advance with your child, so you can answer any questions that arise from other children at the party. It is also worth seeing how long it takes you, so you can decide on the length of the party.
5. On the day of the party, lay out the room so that the children can work at tables, or on the floor. On a sunny day, you may prefer to work outside.
6. Put out sufficient K'NEX to enable each group to complete the model or challenge. Ideally the K'NEX should be in the type of compartmented tray that come with many of the K'NEX education sets.
7. When the children arrive, explain to them verbally what you would like them to do.
8. As the children are working on their model or challenge, wander around the room, answering any questions the children may have, giving help where needed, and ensuring that every child is being given an equal chance to join in their group's model-building.
9. If any group of children finish the model or challenge in advance of the others, suggest improvements that they might make to the model, to keep them busy until the end
10. When all the children have completed the challenge, ask them to put their models on display somewhere in the room, and take some photos.
11. You might want to award a prize to the "best" model, but this is not essential, and can cause the children who did not win to become disappointed. It may be better to praise every model and child equally
12. Give each child a simple certificate to take home. **

** The Members Area of our website includes a free downloadable invitation and certificate.

Appendix A – Photocopiable resources

Handy Hints

- Hint L1 - 3 ways to connect rods and connectors
- Hint L3 - Making corners with blue & purple connectors

Instruction cards

- Bridge
- Frisbee
- Go-kart
- K'NEX House
- Kid K'NEX House
- Weighing Scales

Challenge cards

- Bear Home
- Crash Helmet
- Dinosaur
- Shopping Trolley
- Sundial
- Suspension Bridge

Appendix B – K'NEX set reviews and Order Form

- Reviews of K'NEX Discovery Building set, K'NEX Classroom super set and Kid K'NEX Classroom collection
- K'NEX Order Form

Note that more full-colour Handy Hints, instruction cards and K'NEX challenges are available on www.knexusergroup.org.uk.



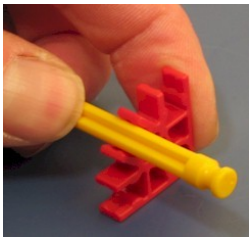
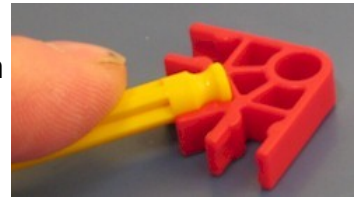
A K'NEX party

Handy Hints

Hint L1 - 3 ways to connect rods and connectors

There are only three ways to connect K'NEX rods to K'NEX connectors: End-on, Side-on, and Through the hole in the middle. All three are shown in the main picture.

To make an End-on connection, put the connector on the table, position the rod over the side of the slot in which you wish it to go, and push down gently. If it won't connect easily, reposition the rod, and try again. You don't need a lot of strength to make End-on connections.



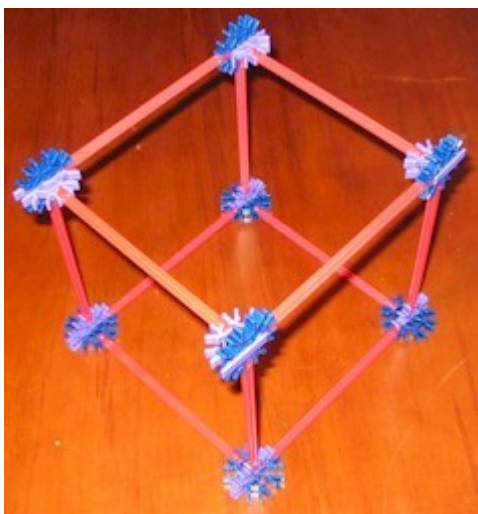
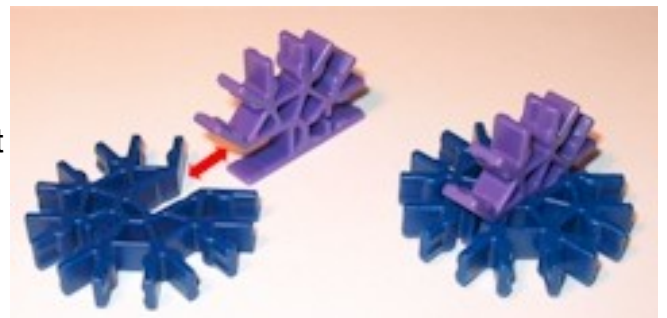
To make a Side-on connection, hold the connector in one hand, the rod in the other, and push the edge of the rod into one of the slots. You will need to push quite hard - young children may find this type of connection difficult. Note that you can only make this type of connection where there are ridges along a rod - so Side-on connections can't be used with the short green rods, or right at the end of any rod.

To make a connection through the hole in the middle, simply put the rod through the hole. Note that a few special-purpose connectors don't have a hole in the middle.



Hint L3 - Making corners with blue & purple connectors

Blue and purple connectors have slots in. This means you can connect two purple connectors to each other; two blue connectors to each other; or a blue connector to a purple connector. To do this, put one slot inside the other slot, and push until you hear a click.

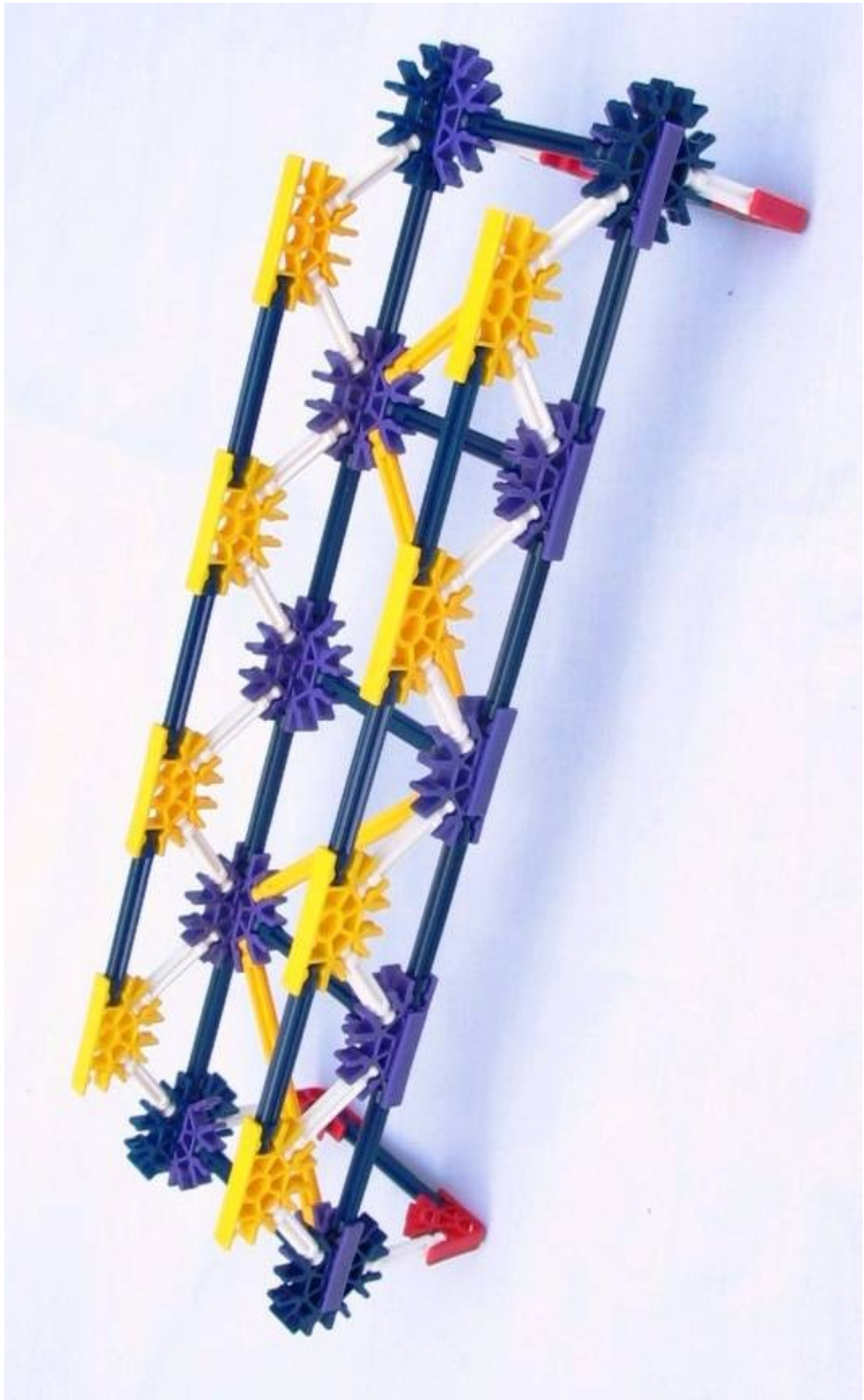


Using blue and purple connectors together like this is very useful if you are making a 3-D K'NEX model which needs corners, which can be a good starting point for some K'NEX challenges.

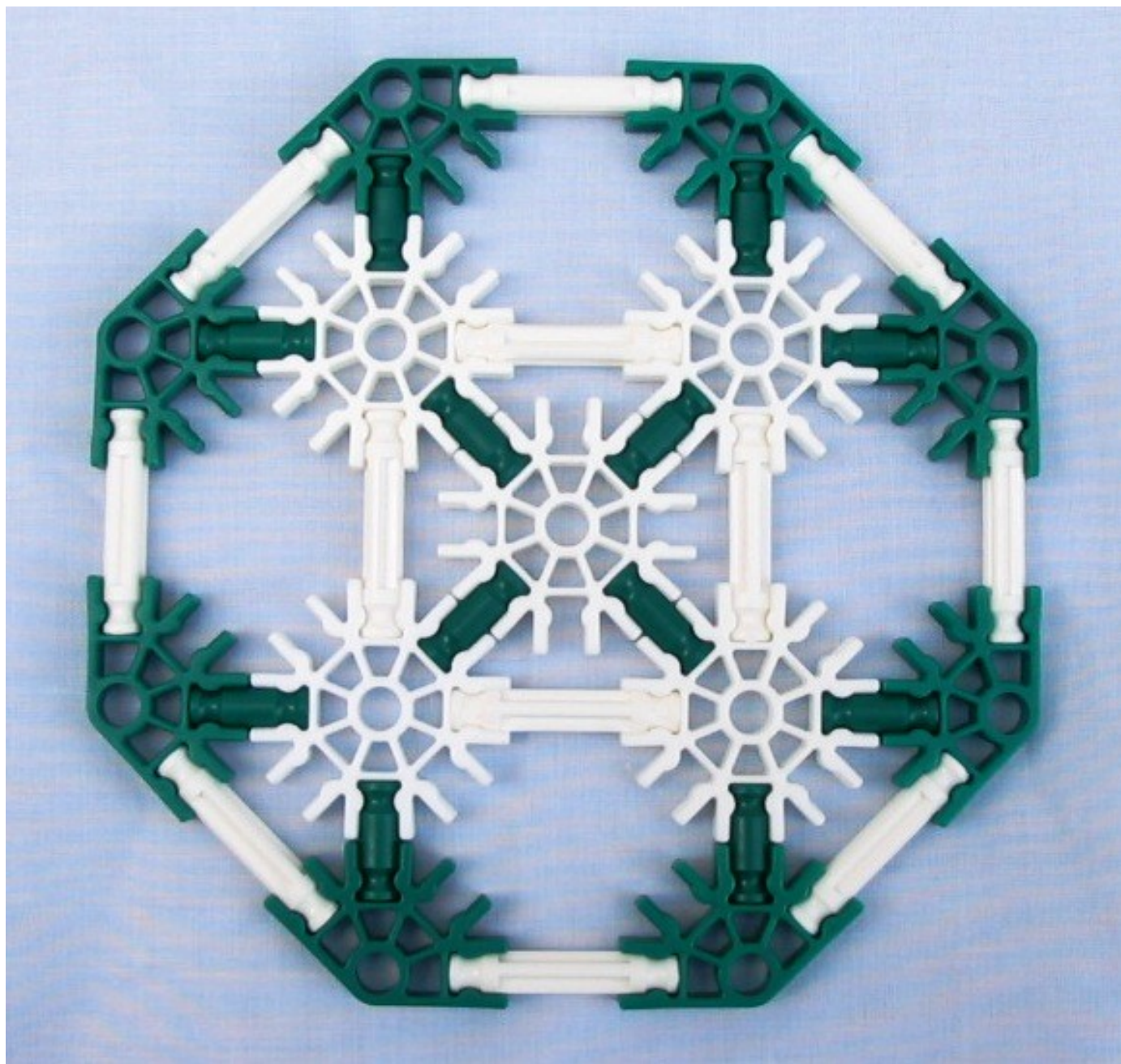
Younger children may find connecting blue and purple connectors together quite difficult. You may prefer to join them together yourself for them, before they start their K'NEX challenge.

Note that in K'NEX sets that have mainly grey components, rather than components in primary colours, the corresponding connectors are mid grey and dark blue.

Bridge Instruction Card



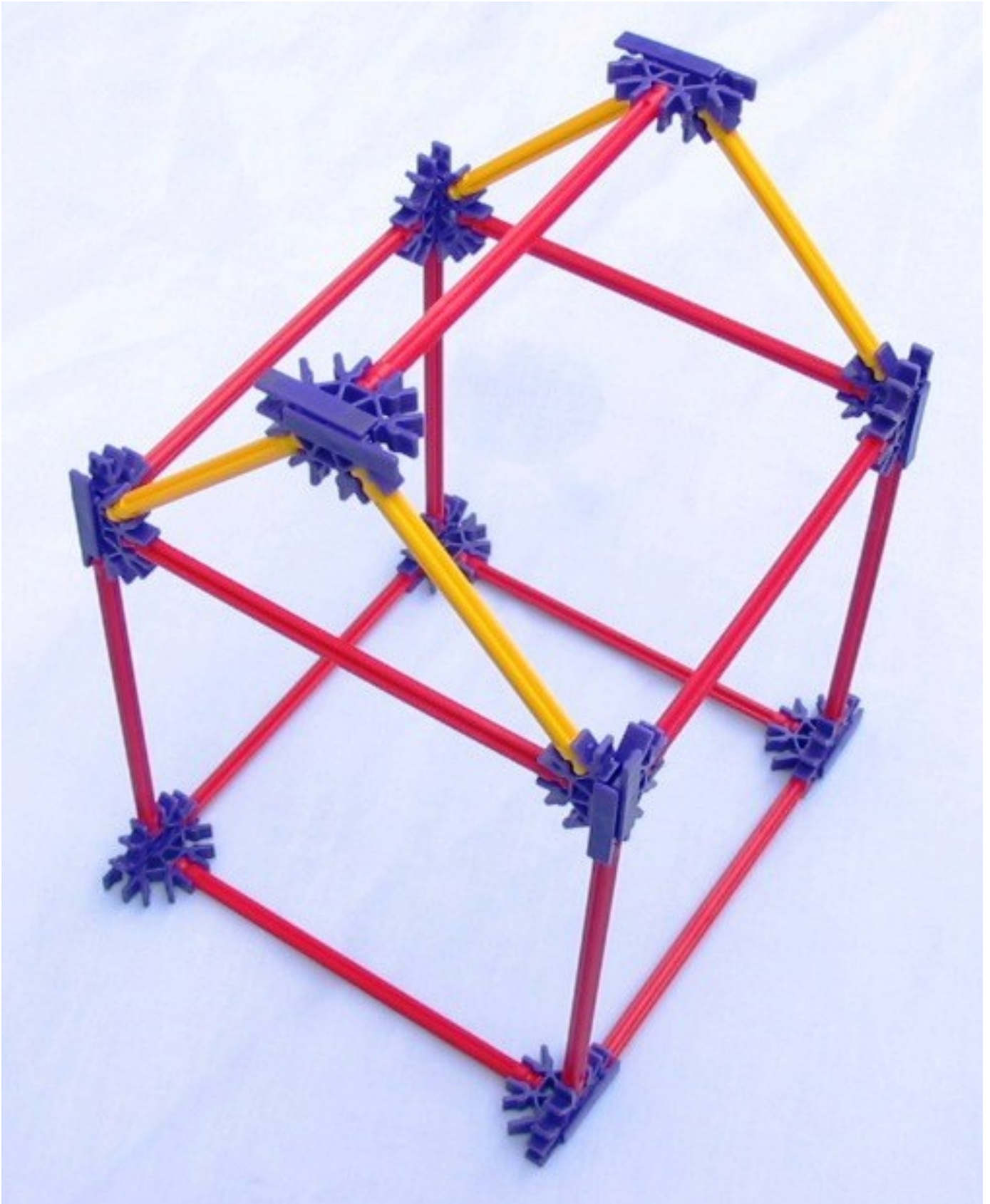
Frisbee Instruction Card



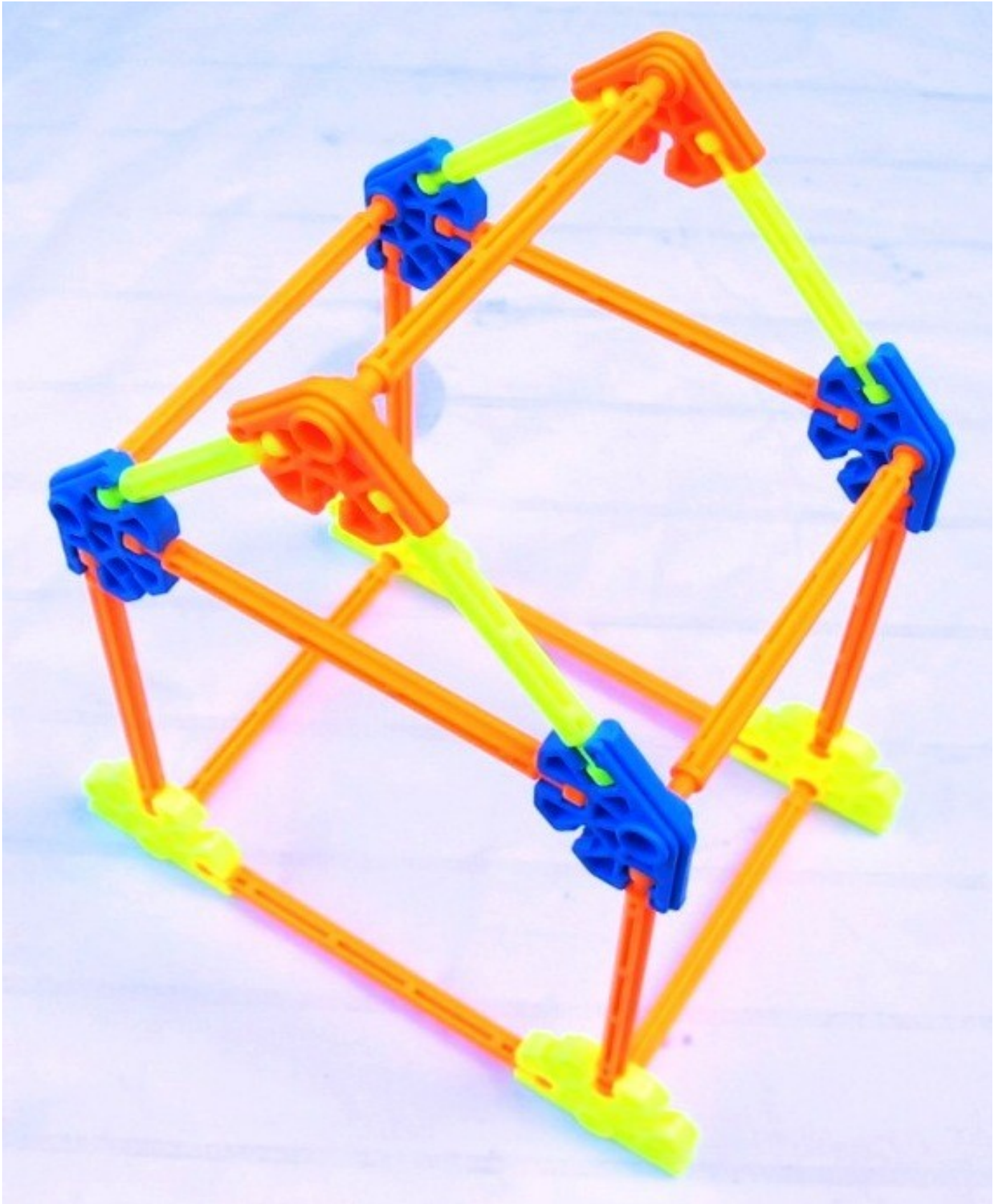
Go-kart Instruction Card



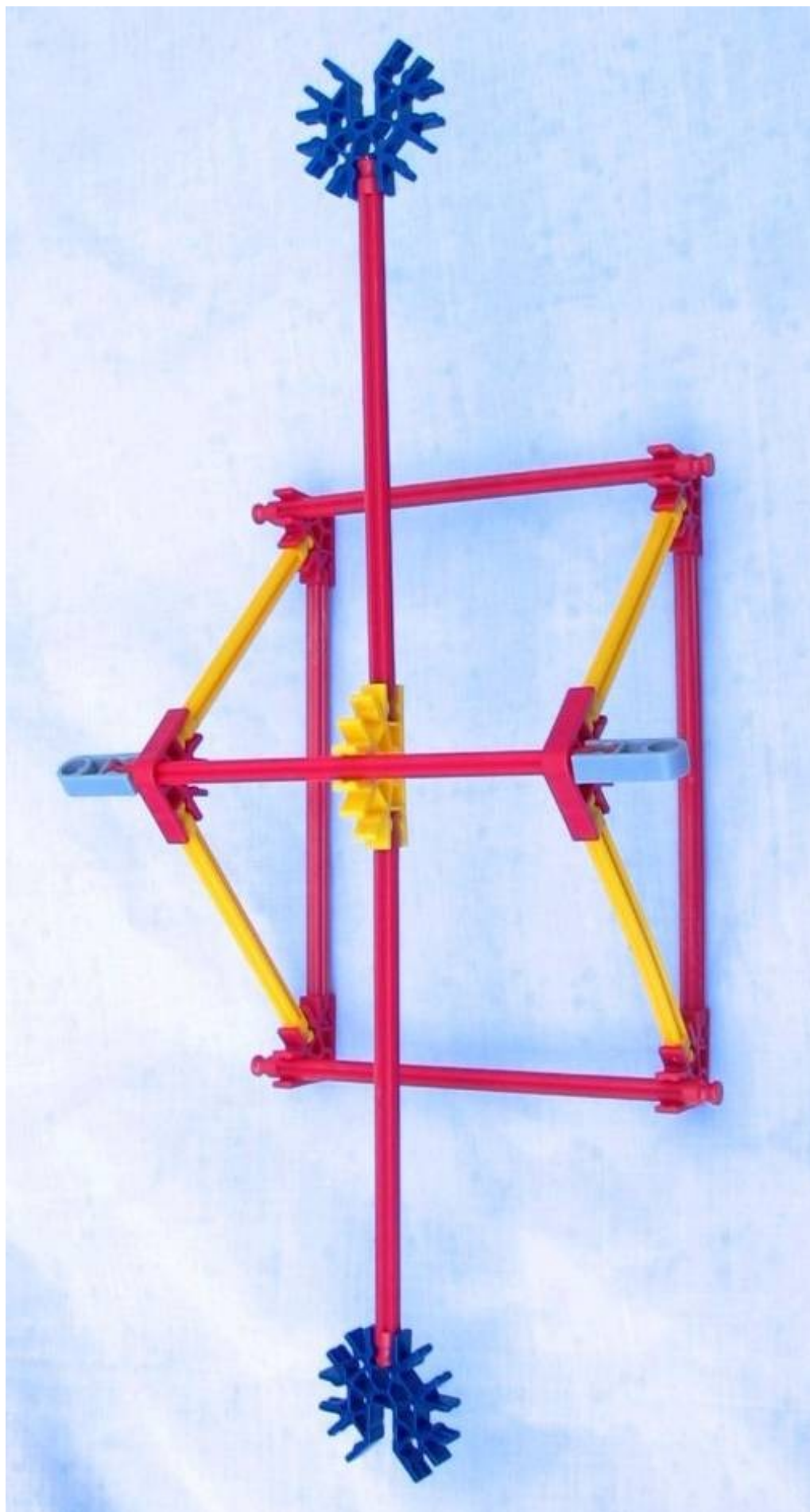
K'NEX House Instruction Card



Kid K'NEX House Instruction Card

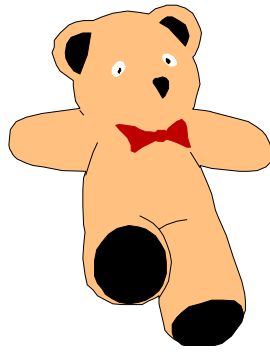


Weighing Scales Instruction Card



Bear Home

We have a baby bear coming to live with us, but it hasn't got anywhere to sleep. Could you make a bear home for the baby bear to sleep in?



Levels of difficulty

- Level 1 ✓5 Make a simple home for a teddy bear
- Level 2 ✓5 As level 1, with a door
- Level 3 ✓5 As level 2, with some toys for the bear to play with
- ✓5 = suitable for 5 year olds

What shape will your bear home be? Will it be big enough for the bear to sit down in? Can you make it really strong?

For level 2, where will you put the door? How can you fasten the door to the house so that it opens and closes?

For level 3, what toys would you like to play with if you were a bear? Can you make those toys out of K'NEX?

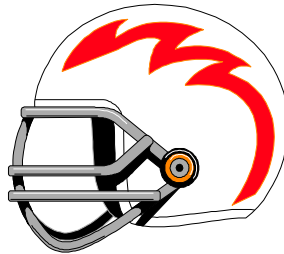
Equipment needed: K'NEX set, teddy bear about 15cm (6") high

😊 Handy hints

- L1 3 ways to connect rods and connectors
- L3 Making corners with blue and purple connectors
- L9 Hinges

Crash helmet

Whether you're playing American Football, riding a bike or working on a building site, your head is in danger! Can you make a crash helmet that will protect it?



Levels of difficulty

- Level 1 ✓5 Make a simple hat or helmet
- Level 2 As level 1, but the helmet does not break if you pat the top of your own head quite hard
- Level 3 As level 2, and the helmet does not break if you stand on it (on the floor!)
- ✓5 = suitable for 5 year olds

How could you make a hat or helmet that is the right shape for your head? What K'NEX rods and connectors could you use to make it fit snugly? How can you make it as strong as possible?

For level 2, test your helmet by putting it on your head and patting it. Did it bend or break? How could you improve the design, so it won't break? Don't be afraid to start again if you want to try a new design.

For level 3, put your hat on the floor, and put your foot on it gently. Does it bend or break? Keep improving your design, so eventually you can stand on it.

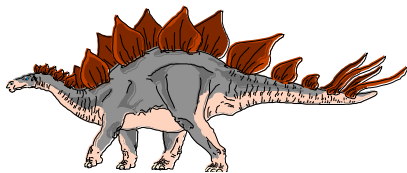
Equipment needed: K'NEX set

😊 Handy hints

- L1 3 ways to connect rods and connectors
- L3 Making corners with blue and purple connectors
- L4 Strong 3-D structures

Dinosaur

Exploring with a friend, you discover that a recent earth slip has uncovered a cave, which you follow down for a



long way until it opens up into a huge space deep underground. Many animals live in this 'Lost World' which have died out on the surface, including Dinosaurs, which have evolved into clever and friendly animals well adapted to living in the 21st Century. When you return home, though, no-one believes what you have found! You decide to build a working model of the dinosaur, to convince everyone that they exist.

Levels of difficulty

- Level 1 ✓5 Make a simple model of a dinosaur
- Level 2 As level 1, plus a mouth which opens and closes
- Level 3 As level 2, plus moveable legs, that allow the dinosaur to walk
- ✓5 = suitable for 5 year olds

Think about the different sorts of dinosaurs you have seen pictures of. Could you try and make a model of one of these out of K'NEX? How big will it be? Does it walk on two legs or four? Will a 21st Century dinosaur be different to one that lived millions of years ago?

For level 2, think how you could make a mouth out of K'NEX, that can open and close.

For level 3, how could you fasten the dinosaurs to its body in such a way that the dinosaur can "walk"? Will your dinosaur be able to bend its knees?

Equipment needed: K'NEX set

😊 Handy hints

- L1 3 ways to connect rods and connectors
- L4 Strong 3-D structures

Shopping trolley

Whoever designs a shopping trolley that will always steer the way you want it to go will make a fortune. Could you become an inventor, and design the perfect shopping trolley?



Levels of difficulty

- Level 1 ✓5 Make a simple trolley with four wheels
- Level 2 ✓5 As level 1, with a handle to push it by
- Level 3 As level 2, with swivel wheels so that the trolley goes in whatever direction you wish
- ✓5 = suitable for 5 year olds

Have you ever pushed a shopping trolley, or sat in one? What shape was it? Where did the wheels fasten on? Could you make one out of K'NEX - the bigger the better?

For level 2, think how you could make a strong horizontal handle to push it by, just like on real shopping trolley.

For level 3, how could you make your front or rear wheels swivel? Will they swivel independently (as on a real shopping trolley), or will they swivel together? Can you push your trolley by the handle, and steer it in any direction?

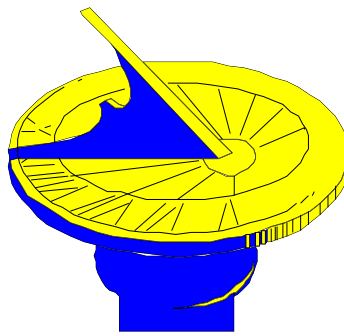
Equipment needed: K'NEX set
K'NEX wheels

😊 Handy hints

- L1 3 ways to connect rods and connectors
- L3 Making corners with blue and purple connectors
- L5 Wheels and tyres

Sundial

How did people know what time it was before clocks were invented? They sometimes used sundials, in which the sun cast a shadow on a dial marked out with the daylight hours. Could you make one?



Levels of difficulty

- | | |
|---------|---|
| Level 1 | Make an octagonal flat surface, with a K'NEX rod sticking out from the middle at a 45 degree angle |
| Level 2 | As level 1, plus a stand to raise it about 1m from the ground |
| Level 3 | As level 2, with a sheet of card on the flat surface marked out to show where the shadow is at each daylight hour |

First find a sunny day! Then think how you could make an octagon (an eight-sided 2-D shape) out of K'NEX. How can you make a rod stick up at or near the middle at an angle of 45 degrees?

For level 2, how can you make a stand that will hold the sundial about 1m up in air? Will it have feet to give it stability?

For level 3, cut your card to match the octagon shape, and attach it with Bluetac. See how the shadow falls. How can you mark out where the shadow will be for each daylight hour?

Equipment needed: K'NEX set

For level 3: Sheet of thin white card
Bluetic
Pencil

☺ Handy hints

- L1 3 ways to connect rods and connectors
- L3 Making corners with blue and purple connectors
- L4 Strong 3-D structures

Suspension bridge

Suspension bridges are often used to cross rivers and sea channels which are too wide for any other sort of bridge. Could you make one out of K'NEX?



Levels of difficulty

- | | |
|---------|--|
| Level 1 | Make a 1m roadway out of a flat layer of K'NEX rods and connectors |
| Level 2 | As level 1, plus two towers to support the bridge, and place them on either side of a 50cm gap |
| Level 3 | As level 2, and support the roadway from the towers using string |

How can you make a 2-dimensional flat roadway for your bridge? What rods and connectors will you use? Will you need to reinforce the roadway with sideways diagonals to make it stronger?

For level 2, how will you make two strong towers? How tall do you think they should be? Can you make them stable, so they don't fall over easily?

For level 3, how many lengths of string will you need? Where will you fasten them onto the roadway and onto the tower? Will you need to 'anchor' the ends of the roadway?

Equipment needed: K'NEX set

For level 3: 5m of string
Blunt-nosed scissors

☺ Handy hints

- L1 3 ways to connect rods and connectors
- L3 Making corners with blue and purple connectors
- L4 Strong 3-D structures
- N1 String

Safety: Children should be supervised when using scissors

K'NEX Set reviews

The K'NEX User Group sells a full range of K'NEX education sets, guides and parts in its online shop at www.knexusergroup.org.uk. Three of the most popular K'NEX sets are described below, together with an Order Form overleaf.

K'NEX Discovery Building set

A general purpose K'NEX set that is equally effective in the home, schools, clubs, childcare schemes and family learning.

20 different models can be built from instructions, and the set is also a good base for setting simpler K'NEX challenges.

Suggested age range: **5 to 95**

Number that one set can support:

2-4 children, working in pairs



K'NEX Primary Education set

Large general-purpose K'NEX set, with a good mix of classic K'NEX parts. Ideal for use in the home, schools, clubs, childcare schemes and family learning, and excellent value for money.

All the models shown in the photo could be built **at the same time** with this set.

32-page Teacher's guide based on UK Primary curriculum, plus 12 double-sided activity cards, covering the topics: Flat shapes, Patterns, Symmetry, Cubes and cuboids, Designing and building, Working with pulleys and Balancing.

Suggested age range: **5 to 95**

Number that one set can support:

12 children, working in pairs



Kid K'NEX Creatures set

A large Kid K'NEX set that enables children to build a range of "creatures". Good for home, nursery, school and family learning.

Build any 8 of 13 different models simultaneously, from full colour building cards. Includes 14 eyes, 11 dorsal fins and 4 bird feet.

Suggested age range: **3 to 7**

Number that one set can support:

12 children working in pairs





K'NEX Order Form

To use this order form, please print it out, and fill in every field marked with an asterisk. Then fax to **(0208) 196 2248**, or mail to *K'NEX User Group, 87A Newton Road, Mumbles, Swansea SA3 4BN*.
If you have any queries on completing this form, please email us via info@knexusergroup.org.uk

*Date ordered		*Your purch. order ref.	
*Organisation			
*Address			
		*Postcode	
*Telephone		*Email	
*Name		*Position	
*Signature		(Order not valid unless signed)	

Part no.	Description	Price	*Quantity	*Value
78650	K'NEX Discovery set			
79520	K'NEX Primary Education set			
78690	Kid K'NEX Creatureset			
* Nett value of goods =				£

All orders are subject to our Terms and conditions, which may be found at:

<http://www.knexusergroup.org.uk/acatalog/tandc.html>