



Cardinal Points

Teachers' Resource

Age Range

EYFS

Key Stage 1

Key Stage 2

Curriculum Links

Science

History

RE

Geography

Number of Lessons

One

Location

Church





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Instructions, compass picture, cardinal point arrows and labels

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About this publication

Lesson Aims

- To teach students how to make and use magnetic compasses.
- To help students understand the science behind how magnetic compasses work.
- To develop students understanding of why churches are orientated in a particular way.

Description

Students will learn about what are cardinal points and why churches are built and orientated using them. They will apply their knowledge to make their own compasses and use these to explore the building and its features.

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Overview

Suitable For

Churches with WWI memorials.

Find your local CCT church at [visitchurches.org.uk](https://www.visitchurches.org.uk)

If you wish to deliver this activity in a church cared for by Churches Conservation Trust, please contact learning@thecct.org.uk to confirm availability and book the building.

If you wish to use a church not cared for by Churches Conservation Trust, please contact the relevant parish or diocese in advance.



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Lesson Plan

Location

Church

You Will Need

- Corks – with a hole pre-punched lengthways
- Nails
- Basins/bowls
- Permanent magnets
- Water
- Compass (or picture of a compass)
- Cardinal Points diagram
- 'X' signs
- North, south, east and west signs

Introduction

Upon arrival at your local historic church assemble the students together. Explain that historic churches are very predictable buildings, they are always orientated the same way/always point in the same direction.

Show a compass, or a picture of a compass and discuss with the students what it is and how it is used. Then show the 'Cardinal Points Diagram' to review the names of the four cardinal points. Explain that the four directions have a fixed relationship to each other as shown in the diagram and recite the rhyme 'never eat shredded wheat' aloud, explaining that this is a good way of remembering that relationship.

Tell the students that in medieval times, when there was a boom in church building across Britain, modern compasses had not yet been invented so medieval builders had make their own compasses to help them determine directions.

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Main Activity

Explain that they will make their own medieval style compasses to help determine the orientation of the church. Split the class into small groups (3 of 4 students in each) and give each group the following materials:

- A nail (ensure nails are made out of magnetic material – e.g. steel or iron)
- A cork (with nail sized hole pre punched lengthwise through the middle)
- A permanent magnet
- A bowl with water in it (enough water so that the cork floats freely)

Once the groups have their materials give them the instructions (in the Teachers' Notes)

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Explaining the Science

Explain to the students how and why the magnetised nail and cork combination behaved as a compass. Reinforce the fact that compass needles (in this case the nail) are attracted to the north and south poles of the earth therefore the ends/sides of the church indicated by the cork & nail compasses in their experiment - and subsequently marked by the 'X' signs - must be north and south. Ask them, which is which?

Remind the students that historic churches are predictable and are almost always orientated the same way. Explain that the reason for this was the religious significance of placing certain objects inside the churches in certain positions – particularly the altar and the font. Reinforce the idea that the church therefore had to be orientated so that the end with the altar in it faced east and the end with the font faced west. The students can now use this knowledge to complete the identification and labelling of the four cardinal points. Ask them to find the altar and label the end of the church where it is located with the 'east' sign. Now encourage

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Explaining the Science continued...

students to use their knowledge of the relationship of the cardinal points to add west (the font should be found towards the west end of the church), then north and south (using the phrase '*never eat shredded wheat*').)

Medieval builders would have been faced with the same challenge of distinguishing which of the directions indicated by their cork & nail compasses was north and which was south, without having the altar and font already in situ they would have used the sun, then placed north and south, ensuring the whole church could be built on the correct axis to ensure that the altar, font and all other features were put in the right places inside the completed building.

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Plenary

Recap on the activities of the day and discuss with students how the science of identifying the four cardinal points and the religious significance of the orientation of a church and its features are so closely linked.

Extension

Students to repeat the cork & nail compass experiment at school to determine the orientation of the school building, or a set room.

Make a visit to a second church within the community and use either cork & nail or modern compasses to identify cardinal points to confirm that all churches are orientated the same way.

Use a modern compass to negotiate orienteering course(s) set up around schoolyard and/or local community.



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Magnets are made up of billions of tiny atoms - each one like a microscopic magnet in itself with a north pole and a south pole. The atoms all line up so that the north poles all point in one direction and all the south poles point in the opposite direction

The north and south poles of magnets are naturally attracted to the opposite poles of other magnets (north poles attract south poles and south poles attract north poles)

The earth is a gigantic magnet, its molten metal core generating magnetic fields around the planet with a north pole and a south pole at either end.

If you let a magnet move freely, its poles will naturally spin and turn until they line up with Earth's north and south poles

In a modern compass the needle/arrow is a magnet which is allowed to move freely so that no matter what direction you turn the compass, the needle always spins so that it is pointing north and south.



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The nails used in this experiment are also made out of billions of tiny atoms, each one with a north and a south pole but under normal circumstances the atoms in the nails are all pointing in different directions. When students dragged their nails against the permanent magnets though the magnetic force made all of the atoms within the nail line up (north poles in one direction, south poles in the other) – turning the nail into a temporary magnet. While the atoms in the nail were all lined up they behaved the same way as the magnetic needle in the modern day compass – aligning itself with Earth's north and south poles.

Labelling the Four Cardinal Points - The Religious Significance of East and West

In many religions east and west have special meaning or symbolism. The sun rises every morning in the east - as though it is being re-born each day – so the east represents positive things such as hope, resurrection and salvation. The sun sets in the west - and the sunset brings with it darkness – so the west represents negative things like spiritual darkness, ignorance and sin.

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In Christian churches the main door and the font (the basin which holds the holy water used for baptisms) are usually located at the western end of the church representing the fact that when people enter the church they enter bearing sin. Even babies are said to be born with 'original sin' which they carry with them until they are baptised and have the sin washed away in the font. As people they then move from the western end of the church towards the eastern end of the church this represents their journey closer to God and the hope and salvation that he represents. For this reason, the altar, the most sacred object in a church and the place in the church where Christians believe you are closest to God, is always located at the eastern end of the building.



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Labelling the Four Cardinal Points - Using the Sun

The sun always rises in the east and sets in the west. It crosses the midway point in the sky around mid-day. So by tracking the sun's movement across the sky a person can identify which direction is east and which is west (e.g. if the sun is on your right-hand side in the morning then right is east; if the sun is on your right-hand side in the afternoon then right is west). Once east and west were identified then the medieval builder could say which of the other two directions was north and which was south.

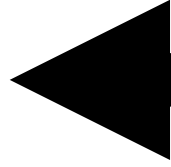
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Making and Using Cork and Nail Compasses

1. Drag the nail from head to tip along the magnet about 100 times, always in the same direction (if using bar magnets, only drag the nail along one pole/end)
2. Push the nail through the centre of the cork so that both ends of the nail are visible (adults to help) – DO NOT LET FINGERS OR HANDS GET IN THE WAY WHEN PUSHING THROUGH THE NAIL!
3. Float the cork with the nail pushed through it in the bowl of water
4. Wait for the cork to stop spinning (check it doesn't rest against the side of the bowl)
5. Stand and point your arms in the directions shown by the ends of the nail (if the experiment has worked all students should be pointing in the same directions)
6. Mark the two ends/sides of the church indicated by the cork & nail compasses with printed copies of the 'X' signs



north



west

east

south

n o r t h

South

east

west



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Learning at CCT

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This resource was created by CCT's Heritage Learning Team. To book a workshop, or if you have any feedback, questions or notice any problems with the resource, please get in touch:

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Churches Conservation Trust (CCT) is the national charity caring for historic churches and their heritage. With over 350 beautiful church buildings in its care, CCT's collection includes irreplaceable examples of art, architecture and archaeology from over 1,000 years of history.

Our churches are unique spaces that inspire creativity and learning at every age and stage of life. For centuries, these special buildings have witnessed personal moments and the collective histories of the local community they sit in. Today, we work with diverse communities across England to encourage the use, enjoyment and appreciation of these important places; a fundamental part of our shared heritage.

CCT's Learning and Participation Team offers a range of inclusive activities for schools, families and adults taking place in local churches, within communities and online. We welcome people of all faiths and none to engage with the stories and investigate the questions contained in these historic places. Our churches are free to access and open to all.

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